EUROPEAN **MISSIONS**

Commission Expert Group to support the monitoring of EU Missions

Final report of the EG

Independent
Expert
Report

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Final report of the EG

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GLOSSARY

AC	Associated Countries
CSAs	Coordinated and Support Actions
CAP	Common Agriculture Policy
CEF	Connecting Europe Facility
DG	Directorate-General
DG REGIO	Directorate-General for Regional and Urban Policy
DG RTD	Directorate-General for Research and Innovation
EC	European Commission
EIB	European Investment Bank
EIC	European Innovation Council
EIF	European Investment Fund
EG	Commission EG to support the monitoring of EU Missions
ERDF	European Regional Development Fund
ERRIN	European Regions Research and Innovation Network
ESIF	European Structural and Investment Fund
EU	European Union
FP	Framework Programme
HE	Horizon Europe
HE KIP	HE Key Impact Pathways
IAs	Innovation Actions
MIP	Mission Implementation Plan
MLE	Mutual Learning Exercise
EU MS/AC	EU Member States and Associated Countries
RRF	Recovery and Resilience Facility
RRP	Recovery and Resilience Plan
RIS3	Regional Innovation Smart Specialisation Strategy
UN SDGs	United Nations Sustainable Development Goals
R&I	Research and Innovation
RIAs	Research and Innovation Actions and
SPC	Strategic Configuration of the HE Programme Committee
STI	Science, Technology and Innovation
S3	Smart Specialisation Strategy
TRAMI	Transnational Cooperation on the Missions Approach – EU funded project

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EXECUTIVE SUMMARY

This report presents the results of the work of the Commission Expert Group to support the monitoring of EU Missions. The Expert Group (EG) developed a conceptual understanding of EU Missions as a policy approach in the context of EU's research and innovation policy and proposes, in this report, a monitoring framework and indicators focusing on the 'beyond Horizon Europe' scope of Missions' development and implementation.

The conceptual understanding of EU Missions as a policy approach, presented in this report, is an original piece of work, adapted to the systemic nature of Missions. The EG defined the intervention logic for EU Missions as a policy approach in a 'beyond Horizon Europe' context and identified the key pillars of the approach. The 'beyond Horizon Europe' context means that our focus is on monitoring activities that are not directly funded by Horizon Europe, thus complementing the monitoring conducted by the EC and the EU Missions. The work was supplemented by an initial mapping of the current progress in implementing the five EU Missions as described in Mission Implementation Plans, Mission Assessment Reports, and other studies as well as a series of meetings with Mission Secretariats and other Missions' stakeholders.

Based on this, the EG proposed a framework and indicators, as depicted in the Table 1a below, that complement the Horizon Europe's Key Impact Pathways framework and Mission-specific monitoring and evaluation systems currently in development. The proposed monitoring framework enables a systematic monitoring of EU Missions as a policy approach as well as, contributes to the monitoring of individual Missions.

As part of the mandate, the EG deployed the short- to mid-term indicators of the monitoring framework through a survey that targeted EU Member States and Associated Countries. This enabled a review of the state-of-play of the following three key tasks:

> I. *Monitoring EU Missions beyond Horizon Europe, looking at the contribution of other funding programmes at EU and national, regional and local levels towards the achievement of Missions' objectives.*

A first general observation is that **EU Missions as a novelty of the EU's Research and Innovation Framework Programme has been a significant trigger for Mission-oriented policy discussions and developments across, and at, different levels of the EU**. The share of EU Member States and Associated Countries participating in different knowledge sharing exercises (e.g., TRAMI project, Mutual Learning Exercises and Enhanced Dialogues focusing on Missions) indicates that there is interest and willingness across the majority of the European countries to engage in Mission-oriented thinking and policy innovation. At the same time, we note that our survey findings, as well as, other prior studies indicate that **in terms of concrete actions, most countries are at early stages in their contributions to EU Missions**.

Our main finding from the first monitoring survey is that the **majority of the European countries and regions are setting up a variety of mechanisms to integrate the EU Missions in their policies and policy initiatives**. However, considering the short timeframe since the launch of Missions, **targeted contributions and pooling of significant financial and non-financial resources from the public sector, community actions and private initiatives towards the achievements of the objectives of EU Missions have not yet synergised**.

PILLAR	SUB-ASPECT	INDICATOR

Pillar 1 Knowledge creation and usage

1.1 Knowledge valorisation at local and regional level for transformative Mission-oriented solutions

1.1.1 — New knowledge created in different Mission units (LLs, LHs, cities, hubs, platforms) **[to launch in 2024+]**

1.1.2 — Novel solutions further developed & piloted in Mission units **[2024+]**

Pillar 2 Governance

2.1 Mission-oriented governance mechanisms

2.1.1 — Mission-oriented governance mechanisms at EU level to implement EU Missions **[Piloted (P) - 2023]**

2.1.2 — Mission-oriented governance mechanisms at MS and AC level to implement EU Missions **[P-2023]**

2.2 Acceptance of Mission-oriented innovation policy

2.2.1 — Acceptance of Mission-oriented policy approach for complex societal challenges beyond five EU Missions **[2025+]**

Pillar 3 Participatory engagement of citizens and stakeholders

3.1 Co-creation of Mission solutions with citizens in programs beyond Horizon Europe

3.1.1 — No. of actions developed by Mission units where citizens contribute to the co-creation of solutions **[2024+]**

3.1.2 — No. of actions reported in 3.1.1 that have considered inclusiveness criteria **[2024+]**

3.2 Citizens engaged in processes and activities in line with the Missions

3.2.1 — No. of formal engagement mechanisms developed by Mission units **[2024+]**

3.2.2 — Presence and relevance of Mission goals in (social) media **[2024+]**

3.3 Strong civil engagement with R&I solutions for societal challenges achieved

3.3.1 — Citizen awareness of the EU Missions **[2024+]**

3.3.2 — Citizens' engagement in the EU Missions domain **[2024+]**

Pillar 4 Pooling and scaling-up

4.1 Pooling and leveraging public and private funds

4.1.1 — Mission-oriented budgets/funding in EU programmes other than HE **[P-2023]**

4.1.2 — Mission-oriented funding in shared management programmes disbursed by EU MS/AC; Co-programmed and co-funded HE Partnerships allocations by EU MS/AC; National and regional R&I programmes **[P-2023]**

4.1.3 — Mission-oriented private sector investment & donations from charities and philanthropic organisations **[P-2023]**

4.2 Scaling of transformative solutions and supportive measures

4.2.1 — Innovative solutions further tested and deployed across countries and regions to support Mission goals **[2025+]**

4.2.2 — No. and types of institutional changes explicitly adopted to support scale-up of Mission solutions **[2025+]**

Level of monitoring of indicators:
- 🟢 Integrated into Mission Monitoring Systems
- 🟠 Common Assessment across Missions
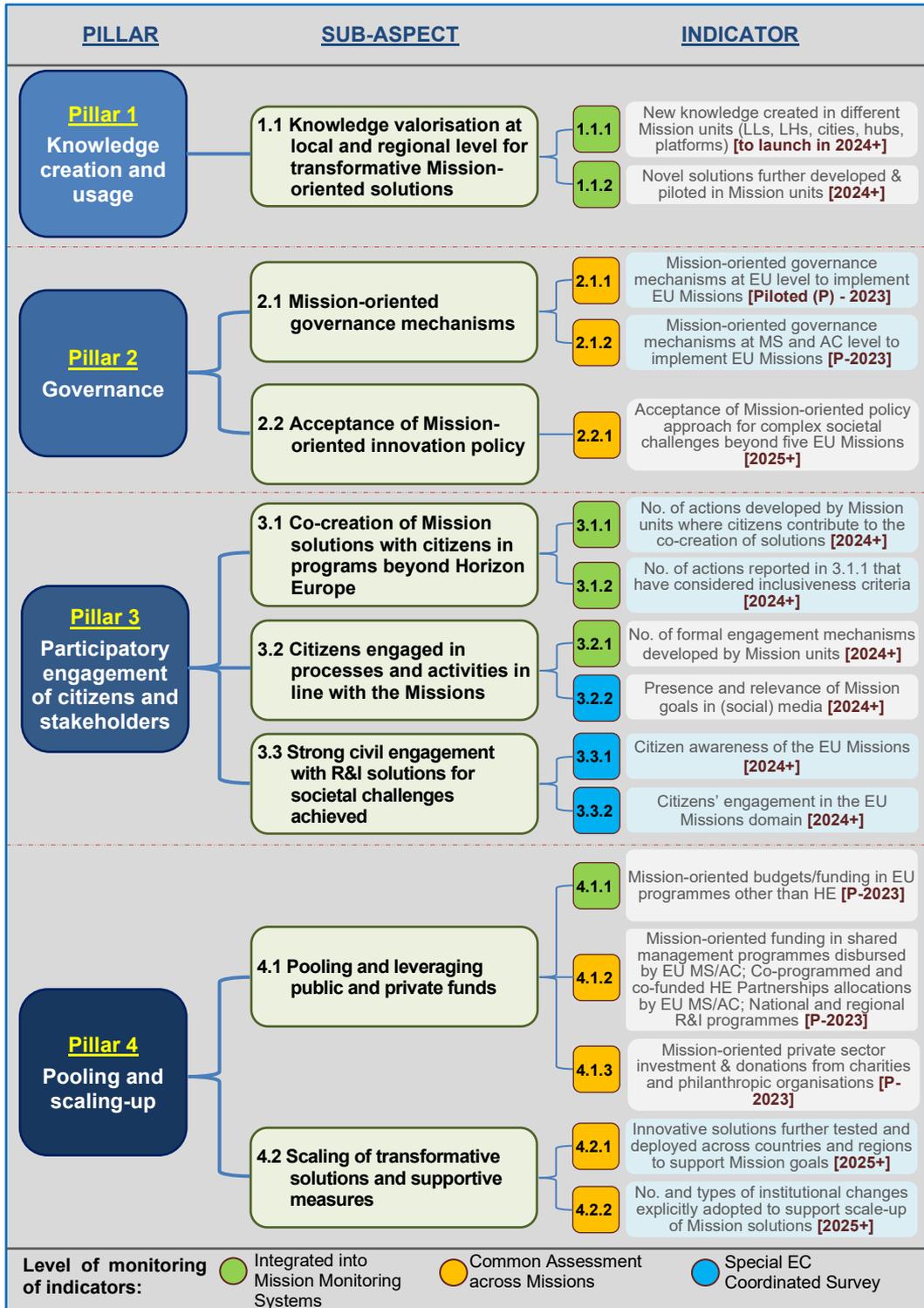- 🔵 Special EC Coordinated Survey

Table 1a. EG's proposed monitoring framework and indicators.

II. *Monitor whether the EU Missions are on track to deliver against their objectives and targeted impacts.*

Missions have largely progressed following the overall design of the approach and specific models of each Mission as proposed in respective Mission Implementation Platforms. Whilst EU level structures and processes are mostly set up and specific research and innovation activities such as piloting and scaling-up of solutions have been launched via calls in Horizon Europe, **EU Missions are not yet at a stage where monitoring of their contribution to the substantive transformative goals of each Mission can be done.**

At EU level, the role of Missions as a policy approach and how to structure its implementation was set in the formal Horizon Europe regulations and in the implementation activities of each Mission. **Beyond Horizon Europe, and at national, regional and local levels, most actors are still in the process of "sense making" and exploring and experimenting appropriate roles and logic models for the approach, mainly based on the existing structures**. The EG's survey showed that the "sense making" stage is under development in terms of visions of how to plan and coordinate EU Missions and integrate specific Missions into national context. Nevertheless, viewed broadly, **the on-going process transitions in terms of knowledge creation and valorisation, governance, participatory engagement of citizens and stakeholders and pooling and scaling-up in the EU Missions are indications that directionality towards achievement of the Missions' objectives and targetd impacts is taking place.**

III. *Monitor supportive measures implemented to enable EU Missions, including policy interventions, governance approaches, deployment actions and involvement of end-users.*

There are several new governance approaches to support the EU Missions at EU, national and regional levels. At EU level, **horizontal governance mechanisms involving the Commission's sectoral Directorate-Generals for the co-management of Missions seems to be an accepted and functioning novelty.** Herein, a greater inclusion of the Directorate-General for Regional and Urban Policy and its programmes in the broader portfolio of Mission-oriented activities to trigger further coordination and pooling of resources at the Member State level is necessary.

At national level, some countries are developing nationally coordinated governance approaches across the five Missions, whilst others are building more decentralized and Mission-specific models. The [Mission Data Platform](#) introduced by the TRAMI project provides a very detailed overview of these actions as well as a potential platform for future gathering and sharing of these practices.

Our findings further indicate that **in cases where the Mission's objectives are closely aligned to pre-existing European and national policy strategies, and when the introduction of EU Missions has overlapped with national policy planning cycles, faster and deeper integration of Missions with national systems and processes has occurred** (e.g. the Europe Beating Cancer Plan, the upcoming Soil Directive in the Common Agricultural Policies, the national sustainable cities programmes, the national climate change adaptation plans). Also, in these cases the chances of finding new policy interventions alongside research and innovation funding decisions are highest. Apart from this, there are not many concrete examples of additional supportive policies and strategic activities.

The inclusion of citizens and stakeholders and co-creation aspects are emphasised in the design of EU Missions as a policy approach. However, beyond traditional engagement

practices as part of policy making and implementation of Horizon Europe funded and similar projects, **citizen and stakeholder engagement in the implementation of EU Missions is rather limited and requires further elaboration and conceptualization**. Given that Missions' goals require significant transformation of investment, consumption and other behaviours, it seems paramount that stakeholders are engaged, brought on board and actively participate in the Missions prior to the scaling-up of potential solutions.

The EG recognizes that the EU Missions as a policy approach is at a relatively early stage of its evolution and that EU Missions have triggered discussions, policy debates and developments on the contributions of different EU and national level actors. Taking this into consideration, **the report proposes recommendations for improving EU level actions to support the functioning and roll-out of the approach in a 'beyond Horizon Europe' context.**

1. INTRODUCTION

1.1. Background

The European Commission (EC) introduced a novel policy approach – Missions – as part of the current Horizon Europe (HE) Framework Programme (FP)[1]. This novel policy approach combines research and innovation (R&I) and sectoral policies to tackle some of the more complex societal challenges through new working modes across different levels of governance, sectors of society and collaborations combining public and private investments. Monitoring and evaluation of Missions must consider its scope and ambitions, novel processes and approaches.

In this context, the Commission's Directorate-General for Research and Innovation (DG RTD) set up an Expert Group tasked to develop and deploy a "methodology to monitor EU Missions beyond HE, looking at the contribution of other funding programmes at EU and national, as well as at regional and local levels towards the achievement of Missions' objectives" (EG).

It is expected that the methodology shall enable monitoring of:

- EU Missions beyond HE, looking at the contribution of other funding programmes at EU and national, regional and local levels towards the achievement of Missions' objectives;

- Progress of EU Missions to deliver against their main objectives;

- Supportive measures implemented to enable EU Missions, including policy interventions, governance approaches, deployment actions and involvement of end-users.

The EG's work builds upon the HE Key Impact Pathways (HE KIP)[2] and complements the work done in the context of the overall HE monitoring and evaluation framework, Missions specific monitoring and evaluation exercises, and other related studies and exercises. It is important to note that none of these exercises looks at Missions as a policy approach and proposes relevant indicators. HE KIP looks at within HE developments and does not provide indicators to monitor beyond HE R&I developments; Mission-specific monitoring exercises may partially cover beyond-HE elements, but do not focus on the whole policy approach. Hence, our work proposes a complementary monitoring lens and indicators for monitoring of the systemic approach.

A key principle is that the framework shall permit the monitoring of EU Missions as a systemic policy approach while accounting for different maturity levels and development pathways of individual Missions. Therefore, the work of the EG included a focus on aspects such as **process transformations across several key pillars as opposed to a solely results-oriented focus dominating traditional project monitoring and evaluation.** These pillars were chosen with respect to necessary short-, medium-and

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[1] Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 (Text with EEA relevance).

[2] European Commission, Directorate-General for Research and Innovation, Nixon, J., *Study to support the monitoring and evaluation of the framework programme for research and innovation along key impact pathways* – Operationalisation plan for IT systems, Nixon, J.(editor), Publications Office of the European Union, 2022.

long-term actions for the desired transformative outcomes and impacts. Furthermore, the EG's development work took into consideration other monitoring, evaluation, and assessment exercises of EU Missions as a policy approach as well as of individual Missions. The proposed monitoring framework for EU Missions as a policy approach shall be an umbrella framework open to inclusion of supplementary monitoring data from these other sources.

The EG's work also includes guidance and suggestions to individual Missions in the development of their Mission-specific monitoring frameworks, aiming to build synergies and complementarities between them.

1.2. Purpose and scope of this report

This report proposes a robust and harmonised framework for monitoring EU Missions beyond HE that may be utilised for the current five Missions and any future Missions. The monitoring framework comprises:

- **Key pillars** that require process transformations at EU, national, regional and local levels, and

- **Common indicators** that may be applied to current and future Missions. For the indicators, while recognizing that some of the indicators need further specification and refinement at Mission level, we identified general data sources and methodologies allowing for monitoring over time of achievements, progress towards objectives and impacts, including delivery on EU policy objectives.

The second part of the report introduces key findings from a survey that the EG carried out amongst EU Member States and Associated Countries (EU MS/AC) to pilot a few of the short- to medium-term indicators, together with a synthesis of the findings from prior studies and evaluation exercises. The report also concludes on the main findings and makes recommendations for corrective actions.

1.3. The Expert Group's workflow

The workflow of the EG is depicted in Fig. 1. Conceptualisation of the monitoring framework was carried out by defining a problems and goals tree for individual Missions (section 3.1) followed by a harmonisation exercise across the five Missions to create an intervention logic model for EU Missions as a policy approach (section 3.3).

Hereafter, as mandated in the Terms of Reference of the EG, the beyond HE context of the monitoring framework was defined (section 3.4). From the intervention logic model, the EG was able to identify four key pillars for transformative action towards achieving the objectives of Missions (section 3.4). The intervention logic and the four key pillars were validated through a consultation of Mission Secretariats and Mission Implementation Platforms.

Following this, indicator development work was carried out (sections 4.3 and 4.4) and included the identification of level of monitoring and timing (Annex I).

A survey at EU MS/AC level was used to validate and test a few of the indicators in the proposed monitoring framework.
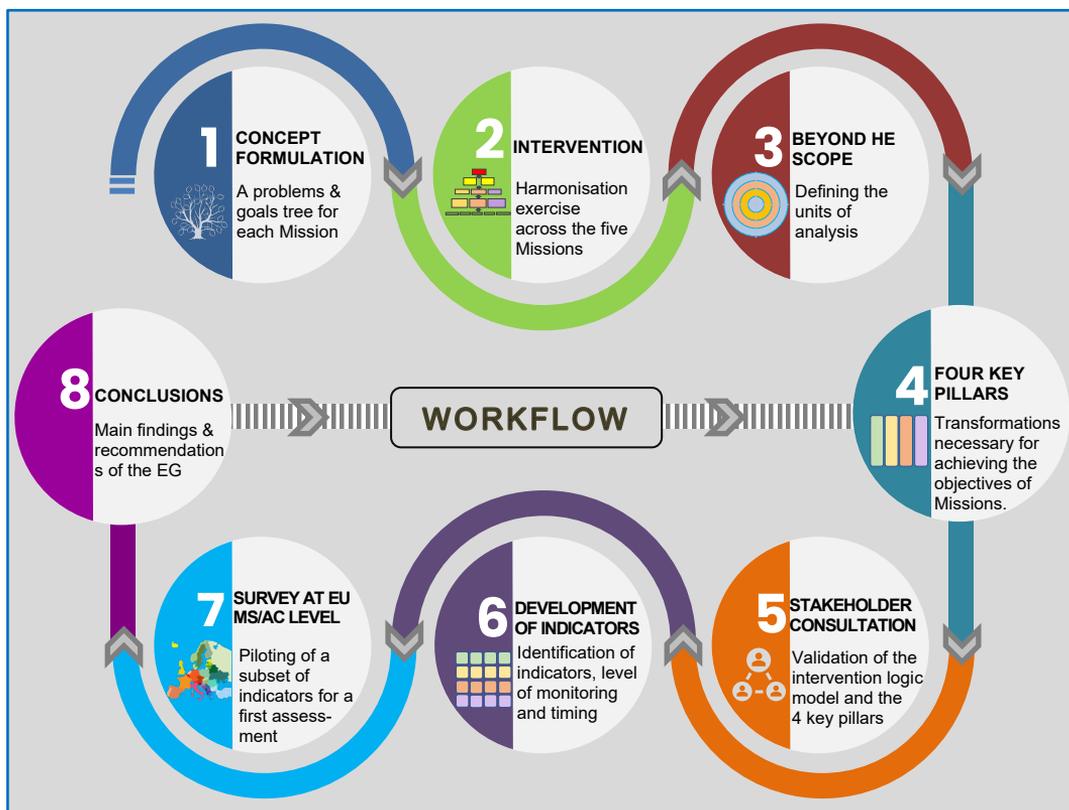
Figure 1. The Expert Group's Workflow

2. EU Missions – A NOVEL POLICY APPROACH

2.1. A brief history and contextualisation

The emergence of Mission-oriented policy approach at EU level started during the programmatic debates on HE around 2017. The High-Level Group report LAB – FAB – APP, mostly referred to as the Lamy Report, looked at how Europe could maximise the impact of EU R&I Programmes[3]. One of its recommendations was to adopt a Mission-oriented, impact focused approach to address global challenges.

This was very much in line with the earlier Lund Declaration that stated that Europe should focus more on the Grand Challenges of our time and move beyond, what they called the rigid thematic approaches. This declaration subsequently influenced the focus of Horizon 2020 towards addressing societal challenges.

In response to the findings of the Lamy report asking for a stronger impact focus for EU R&I policy, the concept of an EU Mission policy was further developed, first by the Expert Group

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[3] European Commission, Directorate-General for Research and Innovation, LAB – FAB – APP – Investing in the European future we want – Report of the independent High Level Group on maximising the impact of EU research & innovation programmes, Publications Office, 2017.

on the Economic and Societal Impact of Research and Innovation (ESIR)[4] and subsequently by M. Mazzucato in 2018[5]. The ESIR report stressed that challenge-led Missions can achieve transformational change and galvanise innovation, while transforming production, distribution, and consumption patterns across various sectors.

Mazzucato's report further emphasised that Mission policy is about designing and implementing Missions in a way that links them to delivery and results, hence bring a stronger stakeholder involvement into the research and innovation policy mix.

While these reports developed the rationale behind Mission-oriented policies and sketched what could be achieved, they also gave some initial guidance on how Mission policy could be implemented in practice. The ESIR report suggested that Mission-oriented policies need a modular or portfolio approach, a broad range of experimental and flexible policy instruments, supported by cross-sectoral investments. They explicitly argued for instruments to fund the scaling-up of tested innovative solutions for the Single Market, with regulation and standards allowing this to occur swiftly. Mazzucato elaborated the selection criteria for Missions:

- bold and inspirational with wide societal impacts,
- have a clear direction: targeted, measurable, and time-bound,
- ambitious (taking risks) but with realistic R&I actions,
- cross-disciplinary, cross-sectoral, and cross-actor innovation,
- allowing for multiple, bottom-up solutions.

With these reports as inspiration, the Commission designed the Mission-oriented policy approach to be implemented in HE. The impact assessment accompanying the proposal for HE[6] announced the introduction of a limited number of highly visible R&I Missions with clear time-bound goals and expected impact. It was emphasised that the Missions "will be closely co-designed with end-users and citizens, thus prioritising public engagement and involvement and building upon existing work and prior commitments to bring societal actors together to prioritise R&I activities".

The Commission then proposed five initial broad Mission areas in autumn 2018 which were discussed and adjusted in the Council. After the formal decision to launch HE, the Regulations elaborated the key characteristics and expectations of Missions without referring to the five Mission areas that would start after the launch of HE. This suggested a novel policy approach which could be applied to any number of Missions within the time span of HE.

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[4] European Commission, Directorate-General for Research and Innovation, *Towards a mission-oriented research and innovation policy in the European Union – An ESIR memorandum*, Publications Office, 2017.

[5] European Commission, Directorate-General for Research and Innovation, Mazzucato, M., *Mission-oriented research & innovation in the European Union – A problem-solving approach to fuel innovation-led growth*, Publications Office, 2018.

[6] Commission Staff Working Document Impact Assessment, accompanying the document Proposals for a Regulation of the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, SWD/2018/307 final.

Missions in the HE Regulations

1. Missions shall be programmed within the pillar *'Global Challenges and European Industrial Competitiveness'* but may also benefit from actions carried out within other parts of the Programme as well as complementary actions carried out under other Union programmes. Missions shall allow for competing solutions, resulting in pan-European added value and impact;

2. […] ensuring the active and early involvement of the Member States and extensive exchanges with the European Parliament. The Missions, their objectives, budget, targets, scope, indicators and milestones shall be identified in strategic R&I plans or the work programmes as appropriate;

3. During the first three years of the Programme, a maximum of 10 % of the annual budget of Pillar II shall be programmed through specific calls for proposals for implementing the Missions […];

4. Missions shall:

   (a) using SDGs as sources for their design and implementation, have a clear R&I content and Union added value, and contribute to reaching Union priorities and commitments and the Programme objectives referred to in Article 3;

   (b) cover areas of common European relevance, be inclusive, encourage broad engagement and active participation from various types of stakeholders from the public and private sector, including citizens and end-users, and deliver R&I results that could benefit all Member States;

   (c) be bold and inspirational, hence have wide, scientific, technological, societal, economic, environmental or policy relevance and impact;

   (d) indicate a clear direction and clear objectives, be targeted, measurable and time-bound and have a clear budgetary envelope;

   (e) be selected in a transparent manner and be centred on ambitious, excellence-based and impact-driven, but realistic goals and on research, development and innovation activities;

   (f) have the necessary scope, scale and mobilisation of the resources and leverage of additional public and private funds required to deliver their outcome;

   (g) stimulate activities across disciplines (including SSH) and encompass activities from a broad range of TRLs, including lower TRLs;

   (h) be open to multiple, bottom-up approaches and solutions which take into account human and societal needs and benefits and recognise the importance of diverse contributions to their achievement;

   (i) benefit from synergies with other Union programmes in a transparent manner as well as with national and, where relevant, regional innovation ecosystems.

5. The Commission shall monitor and evaluate each Mission […]

Article 8 - excerpt

In June 2022, the Council of the EU published its Council Conclusions on EU Missions[7] emphasizing the Missions should have a directionality element underpinned by clear R&I and supported by effective governance (horizontal, vertical, portfolio level), citizen engagement, and monitoring & evaluation practices that enable the:

> *"…collaborative, transnational, inclusive, multidisciplinary and cross-sectoral approach to address complex societal challenges through the development of a systemic and coordinated approach across the whole value chain at EU, national, regional and local level through relevant actors, public policies, private initiatives and funding instruments and programmes within a set timeframe and with measurable goals... "*

Importantly, the Conclusions highlighted that for many aspects of the Missions there needs to be recognition of the novelty and context-specificity of the Missions, i.e. each of the Missions may require a unique/tailored governance set-up and also each of the EU MS/AC is free to set up its own governance model to contribute to Missions. This implies that the first years of implementing Missions are clearly exploratory and at experimental stage where different actors are learning about the potential and practicalities of using this novel approach. This also means that monitoring and evaluation exercises should inform about the learning, experimental development, and implementation of the approach.

2.2. Mission-oriented approaches

While the EC's initial efforts served as inspiration for several EU MS/AC and regions, at the time of the launch of HE, several countries were already experimenting with challenge-driven and/or Mission-oriented approaches in R&I policy. Several international review studies have mapped and characterised these novel policy approaches and identified numerous initiatives resembling Mission-policy, also in the adjacent field to EU Missions. A Joint Institute for Innovation Policy (JIIP) study clearly demonstrated that there is no single model for Mission policy and that there are various degrees of Mission orientation[8]. Thereafter, Larrue made an even finer-grained characterisation of Mission-oriented innovation policies across the OECD countries to cover their wide variety in policy practice[9]. He also pointed out that, despite the experimentation in several countries, experience with their design and evaluation is still limited.

As the EG's mandate is to monitor Missions beyond HE, it is important to take stock of these reviews to see what is already happening in terms of Mission policies across Europe, even if they were launched prior to the EC's Missions. While the more active countries introduced their own Mission-oriented approaches several years ago, the specific policy responses of EU MS/AC regions specific to the five EU Missions are at an early stage as the five EU Missions started their work in the past two years and may also be influenced by prior development of Mission-oriented policies.

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[7] Council Conclusions on European Missions.

[8] European Commission, Directorate-General for Research and Innovation, Türk, A., Arrilucea, E., Skov Kristensen, F. et al., *Mission-oriented research and innovation – Inventory and characterisation of initiatives – Final report*, Publications Office, 2018.

[9] Philippe Larrue, 2021. "The design and implementation of mission-oriented innovation policies: A new systemic policy approach to address societal challenges,"OECD Science, Technology and Industry Policy Papers 100, OECD Publishing.

Not only do Mission-oriented policies have different characteristics, but Missions also have quite different features. The JIIP review of Mission policy distinguishes transformer Missions (with the aim of achieving transformative change addressing societal challenges), accelerator Missions (a concentration of direct resources that relies on accelerated scientific and technological advancements) and hybrid scenarios. Based on the information in Mission Implementation Plans (MIPs), the five EU Missions are mostly transformer Missions. The Missions are thematically distinct, they are at different stages of development and the nature of challenges are Mission specific. The Missions also vary in other respects:

- the degree to which they rely on the development of new scientific and technological solutions, or rather the deployment of solutions that already exist;

- an emphasis on centralised (EU, MS/AC-led) interventions or rather more decentralized regional, local and citizen interventions;

- the degree to which policy leadership (e.g. defining the ambitions and directions) is taken by sectoral policy, or by research and innovation policy actors;

- the degree to which the key perceived impacts of Missions are (for now) focusing on public policy issues or on market creation and shaping goals;

- the degree to which the key stakeholder communities of a Mission domain are already aware and well organised or still need to be mobilised by the Mission's activities.

The positioning of each Mission on these scales asks for a different portfolio of interventions and policy instruments to be utilised to achieve the key objectives. For monitoring and evaluation, this means that while one can draft a common intervention logic for Missions as a policy approach to inform about the change processes and the general progress of utilizing the approach, each of the actual Missions inevitably places its focal emphasis on different steps and elements in this intervention logic (e.g., knowledge creation vs usage).

Hence, the policy approach level monitoring and evaluation exercises can inform and provide learning opportunities about general progress in rolling out the policy approach as part of HE, as well as about the progress of setting-up and implementing specific Missions vis-à-vis the general model (e.g., whether Missions are considering and utilizing all possible resources of the approach). At the same time, these exercises should not be used for comparing and benchmarking the five EU Missions against each other in terms of their "success".

2.3. EU Missions as policy experiments

The goal of EU Missions as a novel policy approach is to have greater impact on societal challenges compared to traditional R&I policy. Therefore, Missions are both an R&I policy approach and an experimentalist governance approach, i.e., they bring together and address two inter-related aspects of policy making[10]:

- lack of sufficient directionality, boldness, inclusiveness, trans-disciplinarity of current EU R&I policies and instruments to tackle complex societal challenges;

- limited use of R&I outputs in established sectoral public policy processes to tackle complex societal challenges.

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[10] Matthijs J. Janssen & Jonas Torrens & Joeri H. Wesseling & Iris Wanzenböck, 2021. "The promises and premises of mission-oriented innovation policy—A reflection and ways forward,"Science and Public Policy, Oxford University Press, vol. 48(3), pages 438-444.

There is no EU document, beyond Article 8 of the HE Regulation, that sets out the exact structure and logic of EU Missions as a policy approach, as it is an experimental approach. This also implies that there are no baselines or established best practices for many elements of the policy. Consequently, in the first stages of monitoring, one needs to focus on mapping the emergent practices through exploratory means. Monitoring the progress of EU Missions as a policy approach, therefore, requires that we monitor first the evolving governance, implementation, and participatory processes alongside the traditional outputs from R&I activities.

Once Missions have evolved through different stages of implementation and matured sufficiently, we can move away or complement the process-based view with monitoring of transformative aspects towards achievement of the transformative goals of individual Missions and Missions as a policy approach i.e., changing the way R&I is done and used in policy. Working in this context, the EG proposes a monitoring framework that can be adjusted for different stages of the evolution of Missions via selection of specific subsets of indicators for monitoring.

EU Missions as a policy approach as currently operationalized in the MIPs of the five EU Missions makes explicit the experimentalism of the approach vis-a-vis traditional R&I instruments on several dimensions:

- The substantive goals of EU Missions extend clearly beyond the traditional 7-year timeframes of EU FPs. Most Missions set their core targets around 2030 with the Cities Mission foreseeing follow-on broader impacts to be achieved in a timeframe extending to 2050s;

- The emphasis on citizen and stakeholder involvement in all stages of Mission policy from design to implementation and monitoring and evaluation. This opens a traditionally technocratic and expert-driven policy arena of R&I to more democratic processes of priority-setting and co-creation;

- The ambitions of the EU Missions to achieve transformative changes within relatively short timeframes requires pooling of additional resources on a scale that extends a traditional R&I policy context. This entails financial and institutional resources in the form of novel policy mixes and projects and initiatives portfolios to be coordinated. These include, and extend beyond the HE scope to other policy domains, EU MS/AC and regional levels, private sector and citizen actions.

The proposed monitoring and evaluation framework offers a tool to capture changes related to these three aspects, that are partially beyond the scope of the data collection systems developed under HE. Therefore, the framework must accommodate the experimentalism to inform on the progress in implementing these experimental dimensions at two levels:

1) on the level of the **policy approach i.e.**, does the approach as currently designed and practiced enable full usage of the experimental dimensions?

2) on the level of **specific Missions** i.e., to provide information on whether EU Missions as a policy approach can support the experimental dimensions of specific Mission challenges in the different EU Missions domains?

3. RATIONALE FOR THE PROPOSED MONITORING FRAMEWORK

3.1. Defining the problems and goals tree

Based on official Commission documents related to the HE Missions[11], core objectives, main problems and planned interventions were identified (Annex I, Figs. 13-17). Thereafter, through analysis of individual Mission intervention logic models, we defined the intervention logic of EU Missions as a policy approach as follows:

- **Elaboration of a problem tree for each Mission.** Problems that are expected to be solved by each Mission were identified and represented in a cascade format in a problem tree (Fig. 2).

- **Transforming problems into goals.** Once the problems were identified, they were transformed into goals represented in a goals or outcomes tree included in the logic model (Fig. 3). The cascade design allowed distinction of interactions between the outcomes and definition of temporal short-, medium- and long-term outcomes. The uniqueness of Missions is reflected in a temporal sequence of necessary activities. Herein, the long-term transformative outcomes and impacts are solving specific Mission challenges to transforming how STI is used. This requires a more explicit focus on enabling and transformer outcomes from providing necessary knowledge and solutions to setting-up structures of governance and engagement.
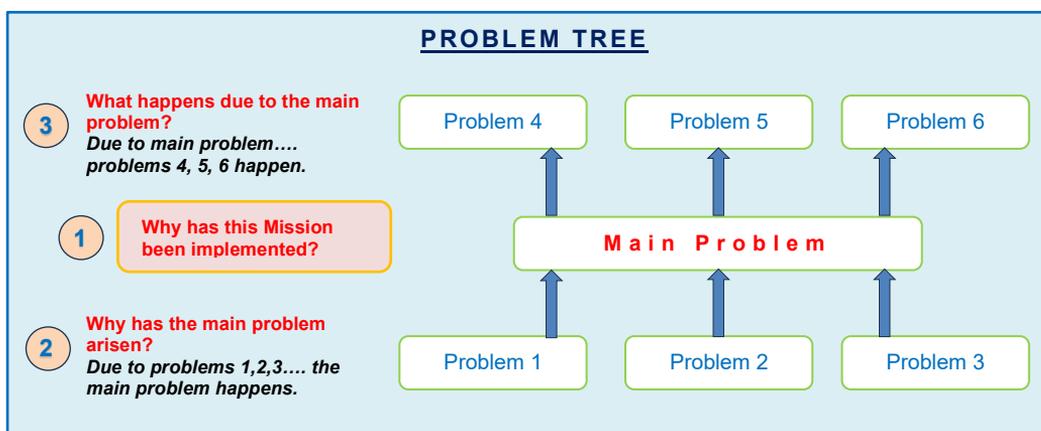
Figure 2. Defining the problems to be solved.

3.2. Intervention logic for EU Missions as a policy approach

Based on the conceptualisation and review, the EG constructed a general **intervention logic model for EU Missions as a systemic policy approach** (Fig. 3).

In our model, the starting point for the changes expected in EU Missions is R&I as defined in the HE Work Programmes and specific calls. This R&I-focused logic model for EU Missions was developed and operationalized in the HE KIP. However, EU Missions as a systemic policy approach requires commitment, engagement, and active participation from a broader

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[11] Includes HE Regulations, Commission Staff Working Documents (SWD) for HE, DG RTD presentations on Mission policy and MIPs.

IMPACT → Greater impact on societal challenges compared to traditional R&I policies

TRANSFORMATIVE OUTCOMES → Strong civil engagement with R&I solutions for societal challenges | Transformative solutions solving specific Mission challenges

TRANSFORMER OUTCOMES → Citizens engaged in processes and activities in line with the Missions | Acceptance of Mission-oriented policy approach for complex societal challenges | Engagement and commitment of national and regional actors and private sector | Novel Mission-specific solutions supporting Mission goals being scaled

ENABLER OUTCOMES → New Mission-oriented governance mechanisms at MS/AC level to implement Missions | New Mission-oriented governance mechanisms at EU level to implement Missions | Leveraging public and private sector financing for Missions | Missions-relevant research and innovation outputs generated and deployed

OUTPUTS → MIP Soil Mission | MIP Oceans & Water Mission | MIP Climate Mission | MIP Cancer Mission | MIP Cities Mission

INPUTS → Public – private investments under HE, norms, and rules

Figure 3. Intervention logic model of EU Missions as a policy approach.

perspective to achieve the expected transformative goals. As such, our model must cover the 'beyond HE' scope to capture the commitment and involvement of stakeholders who operate beyond the specific rules of HE.

This is the reason behind inclusion of the implementation plans of the five EU Missions as outputs in the intervention logic model for EU Missions as a systemic policy approach. The activities planned and coordinated in the MIPs are the immediate result of the HE resources (inputs) allocated to HE programmes and calls. Without these initial resources and activities, focused on five specific goals, it would not be feasible to go a step forward, beyond HE, and reach the "enabler outcomes" (processes level changes) and "transformer outcomes" (actual behavioural changes among actors) that lead to the "transformative outcomes" (new system dynamics) and final goal which is impact on societal challenges.

The 'beyond HE context' implicit in this intervention logic model is the basis for building a monitoring system with two characteristics:

1. **Complexity-aware monitoring**[12]: Missions are complex policy interventions that attempt to generate a social change, involving different stakeholders in the policy cycle. This ambitious goal requires **systemic interventions**, with coordinated and balanced actions carried out at different governmental levels and aligned with community interests. Considering the embedded complexity of the Mission-oriented policy, the proposed monitoring system should fulfil the following requirements:

   - Integrating structural elements, processes, results and interactions among them;

   - Providing information about the different perspectives within the system;

   - Defining the limits of the system, with a clear view on what belongs to the system and what is outside.

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[12] Discussion Note - Complexity-Aware Monitoring (usaidlearninglab.org)

2. **Harmonization vs. Diversity:** The MIPs of the five EU Missions include intervention logics based on their goals, objectives, and processes. As shown in Figs. 13-17 in Annex I, these intervention logics are heterogenous and create challenges for building a common monitoring system. The challenge is to create a harmonized intervention logic valid for all of them and coherent with the overall goal of the Mission-oriented policy. Hence, it is important to note that in the intervention logic model depicted in Fig. 3, the key transformative outcomes and impacts of EU Missions as a systemic policy approach are defined in a R&I policy specific manner. In this model, Missions strive towards R&I having greater impact on societal challenges compared to traditional R&I policies through stronger civil engagement and ability to deliver Missions-specific solutions. It is implicit in the model that for each Mission, there are **Mission-specific transformative outcomes and impacts** from specific transformative solutions to the specific intended impacts that are defined, operationalized and then monitored and evaluated through Mission-specific frameworks. Our work on EU Missions as a policy approach complements these with a common logic and monitoring of policy processes and outcomes.

3.3 Defining the beyond Horizon Europe context of EU Missions as a policy approach

EU Missions as a policy approach is unique by design. In addition to R&I policy actions and funding, the approach asks for **cross-sectoral policy coordination and complementary activities** to achieve the set goals within the ambitious timelines.

The EG's mandate is to monitor EU Missions in this **'beyond HE' scope**, looking at the contribution of other funding programmes at EU and national, as well as at regional and local levels towards the achievement of the Missions' objectives. To demarcate what the monitoring framework should include beyond HE, units of analysis needed to be clarified.

The units of analysis considered as beyond HE are depicted in concentric circles around the Mission funding from within HE (Fig. 4). As the design of the beyond HE monitoring framework is oriented to future evaluation and impact assessment, the model must consider one of the key challenges of evaluation: the attribution of an effect to a particular intervention. The further one goes from the directly HE funded activities, the more difficult it is to directly attribute their effects to the Missions. Further, as the experimental essence of Missions is to trigger complementary activities to support the ambitions of Missions, the activities that shall be included in the framework cover more than traditional R&I interventions from funding through to institutional processes.

At the **centre circle (C-I)** are all R&I activities **directly funded by the HE programme** for the current five EU Missions. These are monitored through the EC's internal monitoring systems, especially the HE KIP framework and indicators of the HE as well as Mission-specific monitoring and evaluation systems, and not directly integrated into the proposed monitoring framework. There are clear interlinkages between the HE KIP and the proposed monitoring frameworks. This entails the inclusion of all the previous and current EU FP funded projects and results as a potential pool of knowledge and solutions to be utilized by the EU Missions.

The **second circle (C-II)** consists of initiatives, processes, structures, or solutions that are **launched by the EU Missions and that are also co-funded or co-regulated by other EU programmes, or by national, regional or local funding programmes, or by other stakeholders** (e.g., private sector, foundations). In this context, one of the novelties of the Mission approach is the focus on specific **"Mission units" that are created or selected by the Missions to act as core centres of Mission-oriented activities** in EU MS/AC and their

regions. The specific focus of these units is on co-creating knowledge and/or piloting, demonstrating, and deploying of Mission-relevant activities and solutions. To this end, Cities mission has selected 112 cities to act as first pilots to trigger broader changes across the EU cities; the Cancer Mission is establishing National Cancer Mission Hubs; Soil Mission has the ambition to set-up 100 living labs and lighthouses; Oceans Mission is focusing its actions on 4 lighthouses (for different types of basins); the Climate mission has set up the Mission Charter that has pooled by now 308 authorities (mostly regions) to work on the climate adaptation and mitigation actions. We find that these **Mission units are important focal points for traceability of the results-solutions-deployment chain and important foci for monitoring**. As the Missions focus on different types of problems and activities (e.g., different types of pilot activities, engagement practices etc), the activities within these Mission units can be mostly monitored at the level of individual Missions through customized monitoring indicators. But we also find that for the monitoring of EU Missions as a policy approach, the Mission-specific monitoring results should be aggregated into general policy level monitoring as well through coordination of a common approach to monitoring and aggregation of monitoring data.

In a **third circle (C-III)** we include all **EU Missions concordant initiatives, processes or solutions that are independently launched by EU, national, regional, or local funding programmes, or by other stakeholders** (e.g., private sector, foundations). These can be included in the proposed monitoring framework if this support is clearly stated by the initiators as being linked to the EU Missions. Again, this can be monitored at the level of individual Missions as well as at supra-Mission policy level.

In a **fourth circle (C-IV)** we can categorise all other activities, processes and solutions that are in the same thematic areas or following the same objectives as the current five EU Missions (e.g. national climate change focused Mission-oriented initiatives introduced before the five EU Missions were launched), or have a clear Mission policy approach but cover another thematic area than the EU Missions. **This fourth circle of activities and solutions will not be included in the monitoring framework as they are too far detached from the inner circle, C-I for attribution of their effects to EU Mission policy.**

C-I All R&I activities directly funded by the HE Programme for five EU Missions

C-II All initiatives, processes, structures, and solutions launched by the HE Missions and that are also co-funded or co-regulated by other actors.

C-III All initiatives, processes, structures and solutions launched by other actors in concordance with five EU Missions

C-IV All other activities in the policy domains of five EU Missions or Mission-specific activities in other policy domains
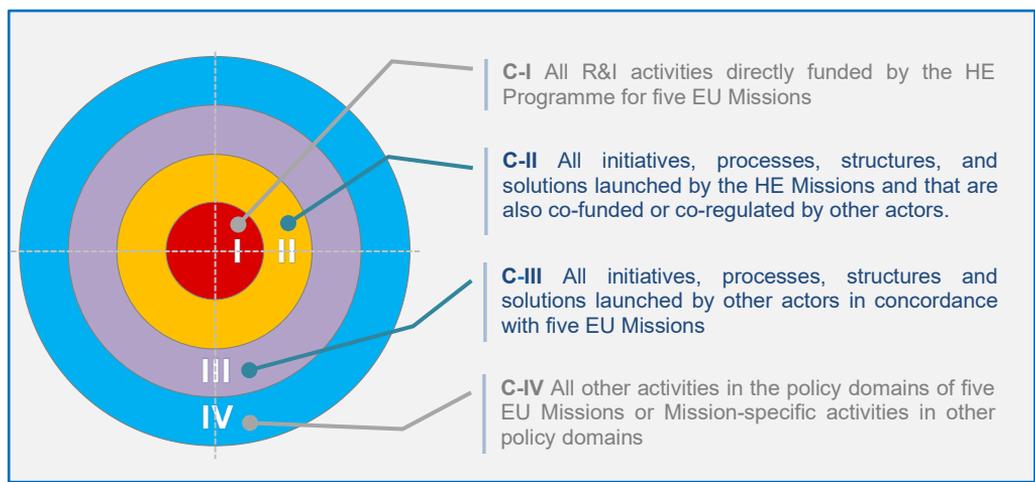
Figure 4. Units of analysis for defining the beyond HE scope of the monitoring framework.

3.4. Key pillars of EU Missions as a policy approach

In the process of conceptualizing EU Missions as a policy approach, we conducted a state-of-the-art synthesis of the five EU Missions to understand their current stages of development (Figs. 13-17, Annex I).

This work allowed us to highlight the commonalities and key differences in the roll-out of Missions. Based on this analysis, we defined **four pillars that focus on the transformative changes in EU Missions,** both in specific policy domains of each Mission and in the way R&I is used in the context of complex policy challenges.

Pillar 1: Knowledge creation and valorisation

EU Missions as a policy approach puts a strong emphasis on **demand-driven knowledge valorisation** i.e., development of new bodies of knowledge as well as usage of existing knowledge to co-create innovative solutions to achieve the goals of different Missions.

As the Missions are targeting societal transformations, knowledge valorisation shall combine and transform research results into sustainable solutions, products and services that benefit society and are the basis for economic prosperity, environmental benefits, social progress, and policy making. The success of each EU Mission is, therefore, reliant on the mobilisation of a large variety of knowledge from different sciences for the generation of transformative solutions, acceptance of these at large and behavioural changes, involving and including many actors from public and private organisations to citizens and communities for their effective implementation at scale, in particular at regional and local levels.

All five EU Missions engage, to different degrees, in regular projects of HE through Research and Innovation Actions (RIAs) and Innovation Actions (IAs), but also through more specialized and custom-built instruments such as the innovation pilots directly funded through the MIPs as in the case of Cities Mission or ad-hoc Coordinated and Support Actions (CSAs). More broadly, EU Missions should stimulate multidisciplinary approaches and use the entire research and innovation value chain, from fundamental research to applied research and a mix of cutting-edge innovations (technological, social, financial, political, educational, etc.).

Effective Missions, therefore, have to operate as portfolios of actions – such as research projects, policy measures or even legislative initiatives and educational training – to achieve a measurable goal that could not be achieved through individual actions. To this effect, a culture of experimentation and risk taking is a crucial element in the philosophy of Missions. This means promoting "thinking out of the box" and stimulating cross-disciplinary academic and innovation work, bridges across sectors and cross-actor collaborations to develop new solutions and address specific problems[7].

The first enabling action contributing to the achievement of the Mission goals is to secure resources and coordination for the portfolios of actions. This should include access to existing R&I outputs as well as support of new R&I initiatives to fill the gaps in the R&I space that feed into other actions of piloting to scaling-up stages of Missions' implementation. In this context, the EC has developed a **Mission portfolio approach** for projects supported by FPs for R&I (FP7, H2020, HE) and other EU programmes (EMFF, Interreg, LIFE, etc.). This approach **allows identification of a portfolio of EU funded projects that have the potential to contribute to Mission solutions**, and monitors the past and on-going project results that could be used by Mission stakeholders.

Further to the monitoring of a portfolio of Mission-relevant projects is the **usage and capitalisation of the potential of this knowledge** in the development of Mission-oriented solutions that can be further developed, tested, piloted, and scaled-up across countries, regions and communities by various Mission stakeholders. This approach, as well as the HE KIP framework, focus mostly on EU-level initiatives as it maps existing and new projects and outputs and overlooks R&I activities beyond HE. It does not include potential R&I activities and outputs at the level of EU MS/AC R&I actors that could directly contribute to the EU Missions, or could have been called into action to support EU Missions. Given the bottom-up and stakeholder-participation driven nature of the EU Missions, this could be an important source of knowledge creation and dynamism in the Mission context.

A similar portfolio analysis across all R&I actors at EU MS/AC level would clearly be too complex a task and would entail the risk (as in the case of the EU level mapping) that mapping of projects also covers projects that are in-line with the EU Missions but not necessarily directly linked to them or without clear added value for valorisation. Furthermore, each of the EU Missions focuses its core "on the ground" activities in what we call here **Mission units.** Mission units are initiatives promoted and supported by each Mission to initiate the change that will generate the expected goals. Currently, these Mission units take different forms, from regional or local pilots or demonstrators (Climate) to pilot cities and platforms (Cities), living labs and lighthouses (Soil), pilots and hubs (Ocean & Waters), and hubs and networks (Cancer). They also are initially selected and funded by HE EU Mission-specific calls. As Missions' implementation progresses, we should expect the bottom-up emergence of further Mission units (e.g. new cities joining the Cities Mission ambitions, independently or with the support of EU MS/AC policy).

These Mission units represent a context for monitoring the creation of new localized knowledge and the use of existing knowledge (either created through EU's FP projects or by other past or on-going initiatives within EU MS/AC) for the development of novel solutions, their testing and piloting. **R&I activities of Mission units are, therefore, a measurable proxy for knowledge valorisation.**

Hence, for understanding the R&I role in Missions as well as the role of EU's FP in contributing to Missions, it is important to monitor knowledge created from projects supported through HE and other EU Programmes, the exploitable outcomes therein and the subsequent valorization linked to the Mission units. This will provide an overview of the added value of EU funds on Missions in the national and regional research and innovation landscape. Mission units established by the five Missions will act within different contexts, governance structures and institutional capacity. The knowledge creation and valorisation in the long run will be inevitably influenced by contextual factors and actors involved. In some contexts, the R&I outputs of EU projects will be directly applicable while in other contexts we might see the development and/or utilization of more local R&I outputs.

The HE KIP captures only the R&I activities implemented through traditional HE calls, mainly at the EU level. Hence, **there is an evidence gap** at national, regional, and local levels. This is the reason underlying the introduction of the indicator on knowledge valorisation at regional and local levels in the proposed monitoring framework (see Table 1b and Annex II for further elaboration of the indicators). The indicator proposed in the monitoring framework can **link the EU portfolio approach to Mission units extending it to national and regional projects that are not supported by EU funding** i.e. other activities and initiatives funded directly through Mission Implementation Platforms, or by other EU level and MS/AC and private sources that are not captured by the EU Mission portfolio approach.

Pillar 2: Governance

EU Missions as a policy approach needs to be legitimate and accepted among different policy actors, as well as, wider society.

It is commonly argued that effective Missions addressing complex societal issues require a **different governance approach in comparison to traditional R&I policies** (see Mazzucato 2019[13], Larrue 2021[13]). To maximise the contribution of R&I to address the societal challenges, the **R&I efforts should support or influence sectoral policies** that affect the Mission goals and objectives. This asks for **new governance mechanisms that support achieving directionality, coordination, and synergies between these different policy domains.** While many Mission-oriented instruments and projects may develop novel arrangements for their tasks and bottom-up initiatives, for EU Missions as policy approach, it is important to have **system-level revisions of governance arrangements to enable more systemic effects**. To maximise the long-term impact of Missions, the new governance mechanisms need to engage policy and decision makers from EU MS/AC, regions, and cities, to identify, develop, fund, implement and disseminate Mission activities.

EU Missions, therefore, require an effective multi-level governance model. Furthermore, there is a need to tailor the governance model to each of the EU Missions ensuring

  i.   horizontal governance - coordination between relevant actors, public policies, private initiatives and funding instruments and programmes at the same administrative level
  ii. vertical governance - coordination between relevant actors, public policies, private initiatives and funding instruments and programmes across multiple levels: European, national, regional, and local.

The Missions, as expressed in the MIPs, expect the EU MS/AC to contribute through funding and supporting of local R&I actions and providing institutional solutions for implementing and scaling-up of different solutions and practices towards achievement of EU Missions. This requires EU MS/AC to rethink their governance approaches, to best support EU Missions given their contexts. Nevertheless, EU MS/AC contributions to the Missions is a voluntary process which accepts variable geometry, meaning that countries can be selective as to which Mission(s) to support in line with their national and regional policy agendas.

Emergent **Mission-oriented practices need to be embedded in different levels of policy making** (HE, EU beyond HE, MS, AC and regions) in a stable manner and ideally beyond the current HE strategic planning period. In this way, EU Missions as a policy approach may achieve its desired ambition of introducing a new solutions-oriented R&I policy paradigm, and forging closer linkages/synergies between R&I and other "policy" domains in the long term.

Pillar 3: Participatory engagement of citizens and stakeholders

The ambition of Missions, in terms of speed and scale of transformative changes, requires not only engagement of different actors in R&I projects and initiatives, but also **broader and extensive societal mobilization**. This is essential, on the one hand, to **legitimise Missions** as cross-silo collective efforts and, on the other hand, to **foster collective behavioural changes in society**. Engagement of different types of stakeholders, users and citizens in Mission activities must cover **planning, implementation, monitoring, and evaluation** activities. In this regard, we use the concept "citizens" in a broad sense, including all actors not belonging to the traditional R&I system. Nevertheless, this concept is not perfectly defined

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[13] Mazzucato, M. (2019). Governing Missions in the European Union - European Commission (europa.eu)

and delimited. According to the Missions approach, citizen engagement denotes the development and implementation of solutions by all the social actors concerned by a problem.

The engagement of citizens and stakeholders is understood as a key element in the five EU Missions from two perspectives: they are expected to be part of the change processes and also the final recipients of solutions. In this regard, citizens could be involved in different roles e.g., as political agents, users, producers, consumers or owners of e.g. land, buildings or transport means. At the same time, citizens could have different functions, as co-designers, co-implementers and co-beneficiaries of solutions developed as part of Missions.

According to the logic model of EU Missions as a systemic policy approach, the engagement of citizens would contribute to the achievements of Mission goals following a three-step path.

The first enabling action of governments will be focused on the co-creation of solutions, notably based on technological developments. In this regard, citizens will participate in all the steps of the policy cycle: agenda setting, policy formulation, decision making, implementation and evaluation. Co-creation will generate two benefits: on one hand, citizens will provide valuable inputs for policy formulation and R&I processes and on the other hand, scaling-up of solutions, oriented to solve the real needs of the society, will be smarter and faster.

The second step will be the rooting of citizen engagement, by means of stable and permanent structures or practices that act as transforming elements. The commitment of public and private organizations with civil engagement will generate two changes: on the site of the development of solutions, these mechanisms will reduce the cost and time of the R&I actions, due to the learning processes and capacity building in the society. On the other hand, the scaling up of solutions will be faster, as a result of this fluid channel with the society.

Finally, civil engagement in solving societal problems will be embedded in the European culture and will remain as a commonly accepted and usual behaviour. At this point, citizen engagement in public policies will be the general procedure.

According to the MIPs of the five EU Missions, initiatives to support engagement are managed through the following mechanisms:

- Mapping and opinion collection, actions and databases building, supported by HE calls;

- Dissemination activities (identification and rewards for best practices);

- Awareness actions, focus on capacity building, literacy, education with pupils, students, teachers or parents;

- Networking events, such as civil society fora; citizen events; participatory workshops; national policy roundtables to elaborate national policy roadmaps;

- Co-creation processes, aiming to identify priorities; develop citizen' science actions; carry out participative and co-creative methods or implement initiatives;

- Creation of devoted structures, such as national support structures; Mission hubs; citizen observatories; citizen assemblies; citizen panels; citizen communities.

Co-creation, rooting and cultural change towards citizens engagement should be promoted not only by HE calls, but also by regional and national policies. To the extent that public policies are implemented at the three levels, the benefits from citizen engagement will contribute to the achievement of the five EU Missions' goals. In fact, indicators on citizens' engagement according to these two dimensions are foreseen to be included in all Mission-specific monitoring systems.

Pillar 4: Pooling and Scaling-up

Pooling and scaling-up activities of Missions cover both **financing and investments** (pooling of R&I resources, but also resources specifically for scaling-up) **as well as policies and strategies** (e.g. regulatory changes, revisions of standards) in support of scaling-up activities and large-scale deployment of transformative solutions.

HE funds allocated to Missions are intended as **seed money to trigger the pooling of further and more significant financial resources** across public programmes at EU, national and regional levels (shared management, direct management) as well as private investments (including new PPP-models for industry transition). MIPs explicitly state that most of the funding needs to be pooled from **sources beyond HE** (mainly EU MS/ AC levels, regional and private investments).

Contribution to Missions' objectives will require **directional mobilisation beyond HE.** In this connection, it will be important to support the development of complementary activities by European, national, regional and local funding programmes as well as activities supported by industry and by charities. Monitoring of the quantification of the further funding planned and/or allocated at EU level beyond HE through shared management, through national, regional and local funds as well as private sector (industrial business) investments will be important, as this will allow re-orientation of support and/or introduction of corrective measures where necessary. Private sector investment will be determinant for supporting sustainable infrastructure, research, innovation and digitalisation, SMEs and social investment and skills that are essential for scaling-up of transformative solutions.

The five EU Missions, in their financing strategies, include other EU funding, national and regional funding and private sources for i) preparing and planning, ii) accelerating transformations, iii) demonstrating systemic transformations and iv) deployment of transformative solutions at large scale. It shall be noted that **leveraging of public and more importantly private investments will be vital for scaling-up of solutions.**

For Missions to be successful, **implementation must go far beyond R&I to develop new solutions, to change production-consumption patterns** and to build resilience of Europeans. EU level funding programmes kick-start research, development, and innovation via a portfolio approach. This portfolio must be linked and expanded at national, regional, and local levels, and via industrial clusters. Herein, engagement of interdisciplinary and inter-sectoral stakeholders will be ensured by alignment that favours **converging funding rules and conditionalities in different policy programmes**.

Permissive regulation must be in place to allow for new transformative solutions to be tested and deployed at large scale. Stable and robust framework conditions, regulatory sandboxes, future-oriented legislation, and other processes must be in place because Missions are focusing on complex societal challenges with a problem-solving and action-oriented approach, involving technological and economic aspects but also individual or group behaviour, multi-layer governance and policies and conflicts of interests.

The MIPs do address the **need for inclusion and for creating impact at scale via the transformation of key community systems, enabling conditions and international collaboration.** Conducive policy, and regulatory and legal environments that are informed through consideration of societal readiness, will be imperative for the deployment of innovations that are adapted to societal needs and are acceptable for society. **Intensive policy support and best practice sharing across EU MS/AC**needs to be in place in the coming years for pooling/leveraging of resources and for accelerating conducive regulatory and policy landscapes in support of deployment of Mission-oriented approaches and solutions.

4. THE PROPOSED MONITORING FRAMEWORK AND INDICATORS

The proposed monitoring framework is intended to be a **tool to inform on the progress of EU Missions as a systemic policy and the impact of Missions** at EU, national, as well as regional and local levels, where applicable. It is also intended to **identify potential needs for corrective measures**. To serve this purpose, the framework considers the main characteristics of a Mission-oriented approach:

- directionality element i.e. strategic coordination between R&I and other sectoral policy areas;

- utilisation of knowledge towards the achievement of Missions' objectives;

- collaborative, transnational, inclusive and cross-sectoral approach to address complex societal challenges through the development of a systemic and coordinated approach across the whole value chain at EU, national, regional and local levels;

- process of co-design, co-implementation and co-monitoring with public actors, private sector and civil society at national, regional and local levels;

- substantial investments beyond HE funds, both financial and other resources such as policies and regulations, that need to be pooled for testing, demonstrating, piloting, scaling-up and large-scale deployment of transformative solutions.

It is clear that the impetus provided at the EU level works as the basis for a further action by EU MS/AC. As EU MS/AC represent different contextual landscapes of administration and execution, this further action comes as tailored, flexible and bottom-up approaches.

The monitoring framework, therefore, focuses on capturing process transitions that are essential for transformation in support of achieving the Missions' objectives. In this context, the monitoring framework introduced in section 3.4. is structured into four key pillars: knowledge creation and valorisation, governance, participatory engagement of citizens and stakeholders and pooling and scaling-up.

To align the proposed monitoring framework with ongoing EU level and Mission-specific evaluations, assessments, and monitoring work, the EG conducted a series of consultations with:

- EC services carrying out portfolio analysis of projects funded within the HE programme as well as those funded by other European programmes;

- EG leading the monitoring exercise of HE Partnerships with a view to setting up implementation synergies in data collections;

- Separate meetings with all Mission Secretariats and project management teams of the five Missions;

- Joint meetings with the EG, Mission Secretariats, Mission Implementation Platforms, DG RTD and other Commission Services such as DG MARE and DG SANTE;

- Three meetings with TRAMI - the TRAnsnational cooperation on the Missions approach - an EU funded project focussed on Making Missions Work by bringing together MS and AC funding agencies, ministries, regions etc., creating Communities of Practice, exchanging knowledge and offering mutual learning with a view to setting up implementation synergies in data collection and exchange of survey results.

Several clear directions arose from these consultations and were considered in developing and refining concrete approaches to be used in the monitoring framework for EU Missions as a policy approach:

- other monitoring work in progress is relevant and shall be taken into consideration to ensure that the monitoring framework for Missions as a policy approach and the monitoring frameworks of individual Missions are aligned and complement each other;

- engagement of different constellations of EU MS/AC representatives is essential for tracking the progress and impact of Missions at EU and national level (and at regional and local level if appropriate); this engagement must be based on a thorough understanding of the broad landscape of Mission-related activities; such an informed engagement will foster trust and facilitate mutual learning, informed decision-making and can lead to cascading involvement at national, regional and local levels;

- national, regional and local practices should be considered to avoid burdensome data collection exercises;

- monitoring of private sector investment may require separate coordination efforts at EU and national levels;

- it will be important to draw lessons from short-term activities that end as these will be beneficial for the further development of current Missions and any future Missions that may be launched, and for a sustainable monitoring framework for Missions as a policy approach.

4.1. Monitoring Framework and Indicators

Building on the conceptual and empirical work described above, a Monitoring Framework for EU Missions as a systemic policy approach, with a specific focus on the 'beyond HE' dynamics of Missions is proposed (Table 1b). The proposed indicators capture unique elements of EU Missions as a policy approach and are structured into four key pillars that are crucial to achieve the desired outcomes and impacts.

Annex II provides a description of the conceptualization and rationale for the proposed indicators under each pillar as well as a short methodological guide for further development and testing of the indicators.

4.2. Usage of the Monitoring Framework

The proposed monitoring framework is designed to provide an **additional monitoring lens to that of the HE KIP, and the Missions' own implementation monitoring approaches** currently being developed (see especially indicators in Pillar 1 and Pillar 3 suggested to be included in Mission-specific monitoring systems).

Importantly, the existing monitoring and evaluation approaches, and especially the HE KIP framework, do not cover all proposed key pillars and do not focus on the beyond HE context. For example, while the HE KIP indicators provide monitoring and evaluation data on EU Mission activities within HE, they do not provide insights on how the R&I potential created and delivered is being utilized and valorised in the "beyond HE" activities of the EU Missions.

The HE KIP framework is reliant on HE projects and participants as the core primary information sources to which reporting of other data is linked. The starting point for indicators in the proposed monitoring framework for EU Missions as a policy approach is non-HE

projects/participants' Mission-related activities. Whilst there may be some overlap in the data captured, the two monitoring frameworks complement each other in the types of data collected and monitoring perspectives provided. Table 2 compares associated indicators in the proposed and HE KIP frameworks.

Pillar	Sub-aspect	Proposed indicator	Level of data gathering	Timing
1. Knowledge creation and valorisation		**1.1.1** New knowledge created in different Mission units (living labs, lighthouses, cities, demonstrators, hubs, etc)	Data per Mission (Mission-based specifications needed)	From 2024+ and as part of Missions' own monitoring systems
		1.1.2 Novel solutions further developed and piloted (lab scale) in different Mission units	Data per Mission (Mission-based specifications needed)	From 2024+ and as part of Missions' own monitoring systems
2. Governance	**2.1 Mission-oriented governance mechanisms**	**2.1.1** Mission-oriented governance mechanisms at EU level to implement EU Missions	Common assessment across Missions	EC supported studies collected data on this indicator in 2023 (see Section 5). Further data collection exercises should be launched in the coming years.
		2.1.2 Mission-oriented governance mechanisms at MS and AC level to implement EU Missions	Common assessment across Missions	Piloted in 2023 by the EG through the SPC Survey
	2.2 Acceptance of Mission-oriented innovation policy	**2.2.1** Acceptance of Mission-oriented policy approach for complex societal challenges beyond original five EU Missions	Common assessment across Missions	From 2025+ onwards and via EC coordinated study
3. Participatory engagement of citizens and stakeholders	**3.1. Co-creation of Mission solutions with citizens in programs beyond HE**	**3.1.1** Number of actions developed by Mission units where citizens contribute to the co-creating of solutions	Data per Mission (Mission-based specifications needed)	In line with the KIP indicators and monitoring, part of Missions' own monitoring systems
		3.1.2 Number of actions reported in 3.1.1 that have considered inclusiveness criteria	Data per Mission (Mission-based specifications needed)	In line with the KIP indicators and monitoring, part of Missions' own monitoring systems
	3.2 Citizens engaged in processes and activities in line with the Missions	**3.2.1** Number of formal engagement mechanisms developed by Mission units	Data per Mission (Mission-based specifications needed)	In line with the KIP indicators and monitoring, part of Missions' own monitoring systems
		3.2.2 Presence and relevance of Mission goals in social media	Common assessment across Missions – social media survey	Special EC coordinated survey from 2024 onwards

	3.3 Strong civil engagement with R&I solutions for societal challenges achieved	**3.3.1** Citizen awareness of the EU Missions	Common assessment across Missions – Eurobarometer	Special EC coordinated survey from 2024 onwards
		3.3.2 Citizen engagement in the EU Missions domain	Common assessment across Missions – Eurobarometer	Special EC coordinated survey from 2024 onwards
4. Pooling and scaling-up	**4.1 Pooling and Leveraging of public and private funds**	**4.1.1** Mission-oriented budgets/funding in EU programmes other than Horizon Europe	Data per Mission (Mission-based specifications needed)	EC supported studies collected data on this indicator in 2023 (see Section 5). Further data collection exercises should be launched in the coming years.
		4.1.2 Mission-oriented budgets/funding in shared management programmes disbursed by EU MS/AC; Co-programmed and co-funded Horizon Europe Partnerships allocations by EU MS/AC; National and regional R&I programmes	Common assessment across Missions	Piloted in 2023 by the EG
		4.1.3 Mission-oriented private sector investment (InvestEU and direct investments by companies) and Mission-oriented donations from charities and philanthropic organisations	Common assessment across Missions	Piloted in 2023 by the EG
	4.2 Scaling of transformative solutions and supportive measures	**4.2.1** Innovative Mission solutions (technological, social, financial, political, educational etc) further tested and deployed across countries and regions to support Mission goals	Common assessment across Missions	From 2025 onwards
		4.2.2 Number and types of institutional changes (standards, regulations, policies, processes etc) explicitly adopted to support scale-up of Mission solutions	Common assessment across Missions	From 2025 onwards

Table 1b. Pillars and corresponding indicators of the proposed monitoring framework

As can be seen from Table 2, the indicators of the proposed monitoring framework for the EU Missions as a policy approach are explicitly intended to capture interventions and progress "beyond HE". These include actions and activities that extend far beyond R&I to other sectoral interventions that may or may not be stimulated by R&I funding (through HE).

Taken together, data from the two fameworks should provide a holistic picture of the progress of EU Missions as well as the overall progress of the policy approach of Missions. **The usage of the monitoring framework and its indicators shall be agreed upon at EU, MS/AC and**

Mission stakeholder levels based on added value of the indicators, variables to collect, their definitions and avoidance of duplication of efforts.

The monitoring framework is designed to track progress towards achieving the objectives of the Missions as a generic policy approach via **short, medium- and long-term actions** in relevant sectoral policies by public actors, private sector, and civil society, as well as through pooling of adequate funding. Hence, the proposed indicators do not have to be launched all at the same time but can be gradually introduced – staring initially with indicators focusing on enabler and transforming outcomes and moving later to transformative outcomes – to both Mission-specific and policy-level monitoring exercises. A few indicators (focusing on setting-up basic processes) can also be phased out as Missions evolve and mature over the years and move towards the 2030 targets.

The monitoring framework, therefore, includes proposals on the timing/launch of the data gathering and monitoring exercises as indicated in Table 1b. The proposals take into consideration that Missions are designed based on a long-term and sequential pathway into 2030 (and beyond) where some of the key outputs and outcomes will be targeted at later stages.

Eventual launch should be of course aligned with relevant mission-specific and other monitoring and evaluation practices to avoid mistiming and duplication of activities. Therefore, an important consideration that the EG emphasized in its development work is that the monitoring framework shall build upon **data reporting in on-going and/or planned activities by the five EU Missions, HE KIP framework, and the EU MS/AC activities.** As the monitoring framework proposes new indictors and thus may entail additional reporting, simplification of efforts through mid-point and end of FP as timepoints for more extensive stakeholder consultations for collection of data may be considered.

At the same time, one must keep in mind that as a novel policy approach Missions tend to **lack appropriate "legacy" indicators** i.e. there are no common baselines and benchmarks. Thus, at least in the first stages of monitoring the beyond HE dynamics of Missions, one needs to rely on exploratory and more intensive data gathering processes, which can in time, as the actual practices become more institutionalised, be codified, and automated.

In keeping with this, we have proposed (Table 1b) that:

- some of the proposed indicators (especially in Pillar 1 and 3) are **included, through necessary customisation, in Mission-specific monitoring systems,** but these should be also coordinated accross the different EU Missions to enable common policy-approach level monitoring of these aspects (especially the R&I and participation elements of EU Missions);

- some of the data for the indicators may be collected and analysed by the **EC or by EC supported external initiatives** (e.g., as part of Commission surveys such as the biennial EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise, Eurobarometer surveys);

- the type and frequency of data collection shall be coordinated to **coincide with the Missions' life cycle and with on-going and/or planned initiatives,** such as Mission-specific KIP monitoring, HE monitoring and evaluation exercise, and specific studies, e.g. the TRAMI survey.

Monitoring Framework for EU Missions as a policy approach	Horizon Europe Key Impact Pathways Framework
Pillar 1 - Knowledge creation and valorisation	**Relevant KIP indicators and their differences compared to EG proposed indicators**
1.1.1. **New knowledge created** in different Mission units (living labs, lighthouses, cities, demonstrators, hubs, platforms etc).	**KIP 1 Short- and medium-term indicators (publications and citations)** are limited to publication and citation counting and do not focus on regional and local knowledge creation and usage. **KIP 1 Long-term indicator (world class science)** focuses on worldwide recognition (top1% citation) and does not focus on regional and local knowledge creation and usage. The EG proposed indicator focuses beyond HE and on the transformative processes at regional and local levels that go beyond technology (and using both qualitative and quantitative data).
1.1.2. **Novel solutions further developed and piloted** (lab scale) in different Mission units.	**KIP 5 Short- and medium-term indicators (Mission results and outcomes)** is limited to counting of products and technological and commercial innovations in specific HE projects potentially relevant for R&I Missions, but it does not focus on regional and local pick-up and usage. **KIP5 Long-term indicator (Mission targets)** is a broad indicator on achieved Missions' targets using mostly qualitative information using impact studies, and where possible quantitative date, that could benefit from the more detailed indicators of this report. **KIP6 Long-term indicator (societal R&I uptake)** is focusing on the uptake of HE co-created scientific results and innovative solutions, but it does not focus on Missions-specific regional and local pick-up and usage. The EG proposed indicator focuses beyond HE and on the transformative processes at regional and local levels that go beyond technology and economics (using both qualitative and quantitative data).
Pillar 2 – Governance	Not covered in HE KIP
Pillar 3 - Participatory engagement of stakeholders/citizens	**Relevant KIP indicators and their differences compared to EG proposed indicators**
3.1.1. **Number of actions developed** by Mission units where citizens contribute to the co-creating of solutions	**KIP 6 Short-term indicator (co-creation)** is a simple count of all ongoing and finished HE projects where EU citizens, workers and other end-users contribute to the co-creation of R&I content. The EG proposed 3.1.1 indicator suggests to extend this indicators to "beyond HE" activities of Mission units.
3.1.2. **Number of actions reported in 3.1.1** that have considered inclusiveness criteria	Not covered in KIP
3.2.1. **Number of formal engagement mechanisms** developed by Mission units	**KIP 6 Medium-term indicator (engagement)** - number and share of FP beneficiaries with citizen and end-user engagement mechanisms after HE projects. The EG proposed 3.3.1 indicator suggests extending this indicators to "beyond HE" activities of Mission units.
3.2.2. **Presence and relevance of Mission goals in social media**	Not covered in HE KIP

3.3.1. **Citizen awareness** of the EU Missions	Not covered in HE KIP
3.3.2. **Citizen engagement** in the EU Missions domain	Not covered in HE KIP
Pillar 4 - Pooling and Scaling-up	**Relevant KIP indicators and their differences compared to EG proposed indicators**
4.1.1 **Mission-oriented budgets/funding in EU programmes** other than HE	**KIP 9 Short-term indicator (co-investment)** measures the amount of public and private investment mobilised with the initial investment from ongoing and completed Horizon Europe projects listed by participants as EU and total contributions in their HE applications.
4.1.2 **Mission-oriented budgets/funding in shared management programmes** disbursed by EU MS/AC; Co-programmed and co-funded Horizon Europe Partnerships allocations by EU MS/AC; National and regional R&I programmes	**KIP 9 Medium-term indicator (scaling up)** measures the amount of public and private investment mobilised to exploit or scale up FP results as declared by the beneficiary entities themselves as part of their final reports in terms of investment mobilised from regional schemes / national schemes / private sources / other European schemes & the amount of private follow-up investment mobilised by FP companies derived using Orbis Zephyr, Dealroom and/or Crunchbase data.
4.1.3 **Mission-oriented private sector investment** (InvestEU and direct investments by companies) and Mission-oriented donations from charities and philanthropic organisations	The EG proposed indicator looks at co-investment and mobilisation of investments beyond explicit links to HE projects and with specific focus on EU Missions.
4.2.1 **Innovative Mission solutions** (technological, social, financial, political, educational etc) further tested and deployed across countries and regions to support Mission goals – includes Horizon Europe R&I funded solutions and non-Horizon Europe R&I and other sector solutions	**KIP 5 Short- and medium-term indicators (Mission results and outcomes)** is limited to counting of products and technological and commercial innovations in specific HE projects potentially relevant for R&I Missions. The EG proposed indicator looks at results and outcomes beyond explicit links to HE projects. **KIP 5 Long-term indicator (Mission targets)** is a broad indicator on achieved Missions' targets using mostly qualitative information using impact studies, and where possible quantitative date, that could benefit from the more detailed indicators of this report. It is to be noted that for indicator 1.1.2, Mission units are the units of analysis whereas for indicator 4.2.1, Horizon Europe R&I funded solutions and non-Horizon Europe R&I and other sector solutions are included.
4.2.2 **Number and types of institutional changes** (standards, regulations, policies, processes etc) explicitly adopted to support scale-up of Mission solutions – data is captured at EU level and mostly at MS and regional levels	**KIP 6 Long-term indicator (societal R&I uptake)** is focusing on the uptake of HE co-created scientific results and innovative solutions, but it but it does not focus on Missions-specific solutions and its pick-up and usage. The indicator 4.2.2 proposed by the EG takes an explicitly Missions-specific focus on uptake on R&I and other relevant solutions stemming for Missions as a policy approach.

Table 2. Comparison of associated indicators in the Monitoring Frameworks for EU Missions as a policy approach and Horizon Europe Key Impact Pathways

5. PROGRESS REPORT ON EU MISSIONS

The progress reported in this chapter will shed light on:

- The effectiveness of the new policy approach for EU Missions and the extent to which it generates a higher mobilisation of critical mass and resources towards the achievement of objectives and impacts;

- The progress of EU Missions and underlying activities according to their objectives and targeted impacts (individually and collectively; at the EU, national and, where relevant, regional and local levels);

- Early implementation barriers and drivers towards impacts, e.g. in terms of contributions, coherence, mobilisation of resources, leverage of additional public and private funds, engagement and collaboration;

- First results achieved, in view of their further demonstration, exploitation and valorisation, including for policy making by Commission Services and national administrations.

The EG's assessment of the progress on EU Missions as a policy approach is based on the following data gathering steps:

1. Synthesis of relevant findings from:

- Horizon Europe Strategic Plan for 2021-2024
- Horizon Europe Work Programmes
- EU Missions Implementation Plans
- Mission areas review report[14]
- Cancer Mission assessment report[15]
- Mission Adaptation to Climate Change assessment report[16]
- Mission Climate-neutral and smart cities assessment report[17]
- Mission A Soil Deal for Europe assessment report[18]
- Mission Restore Our Ocean & Waters and Waters assessment report[19]

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[14] European Commission, Directorate-General for Research and Innovation, Angelis, J., Reid, A., Griniece, E. et al., *Study supporting the assessment of EU Missions and the review of Mission areas – Mission areas review report*, Reid, A.(editor), Publications Office of the European Union, 2023,

[15] European Commission, Directorate-General for Research and Innovation, Angelis, J., Boski, I., *Study supporting the assessment of EU Missions and the review of Mission areas – Cancer Mission assessment report*, Publications Office of the European Union, 2023,

[16] European Commission, Directorate-General for Research and Innovation, Nauwelaers, C., Phillips, C., Study supporting the assessment of EU Missions and the review of Mission areas – Mission Adaptation to Climate Change assessment report, Publications Office of the European Union, 2023,

[17] European Commission, Directorate-General for Research and Innovation, Kaufmann, P., Wieser, H., Kofler, J. et al., Study supporting the assessment of EU Missions and the review of Mission areas – Mission Climate-neutral and smart cities assessment report, Publications Office of the European Union, 2023,

[18] European Commission, Directorate-General for Research and Innovation, Janssen, M., Schiele, J., Study supporting the assessment of EU Missions and the review of Mission areas – Mission A Soil Deal for Europe assessment report, Publications Office of the European Union, 2023,

[19] European Commission, Directorate-General for Research and Innovation, Griniece, E., Rantcheva, A., Study supporting the assessment of EU Missions and the review of Mission areas – Mission Restore our Ocean & Waters and Waters assessment report, Publications Office of the European Union, 2023,

- Transnational Cooperation on the Missions Approach (TRAMI) – Mapping analysis report
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. EU Missions two years on: assessment of progress and way forward. COM/2023/457 final
- Staff Working Document (SWD) accompanying EU Missions two years on: An Assessment of progress in shaping the future we want and reporting on the review of Mission Areas and areas for institutionalised partnerships based on Articles 185 and 187 TFEU

2. **Consultations with the following experts and policy actors:**

- Separate meetings with Mission Secretariats and project management teams of the five Missions;
- Joint meeting between the EG, Mission Secretariats, Mission Implementation Platforms, DG RTD and other Commission Services such as DG MARE and DG SANTE;
- Discussions with experts from DG REGIO;
- A discussion with the expert group monitoring HE Partnerships
- Three meetings with TRAMI with a view to setting up implementation synergies in data collection and exchange of survey results;
- European Regions Research and Innovation Network (ERRIN) that has adopted EU Missions as a key priority;
- Region Blekinge, Sweden on its joint Smart Specialisation Strategy (S3)-EU Missions Strategy;
- European Investment Bank (EIB) on its support to EU Missions;
- Business Europe on private sector engagement in EU Missions & its Position Paper in reply to the HE mid-term review public consultation:

3. **A survey of the Strategic Configuration of the HE Programme Committee and members of the Missions Working Groups - SPC Survey** (Annex III) **carried out by the EG between 13.09.23-12.10.23 with responses provided at the level of MS and AC.**

The EG designed a questionnaire which focused on process oriented indicators in short- to mid-term in Pillars 2 and 4 of the monitoring framework, taking into account that

- EU Missions were launched in 2021;
- A first monitoring report should provide insights on the actual progress in implementing Missions;
- Data gathering capacity at national level is varied;
- Other studies and evaluations on EU Missions had been carried out in 2023.

The survey was sent to the SPC with a request to coordinate national level responses into one national level response per country. In total, **21 country responses** were received: **17 from the EU MS and 4 from AC.** A few EU MS informed that their progress on EU Missions was at an early stage and as thus did not permit useful completion of the survey.

In the following sections, we provide the overview of the current state of the implementation of the EU Missions by highlighting progress on each of the Pillars of our monitoring framework. Indicators in Pillars 1 and 3 require reporting from Mission units and aggregation of data from individual
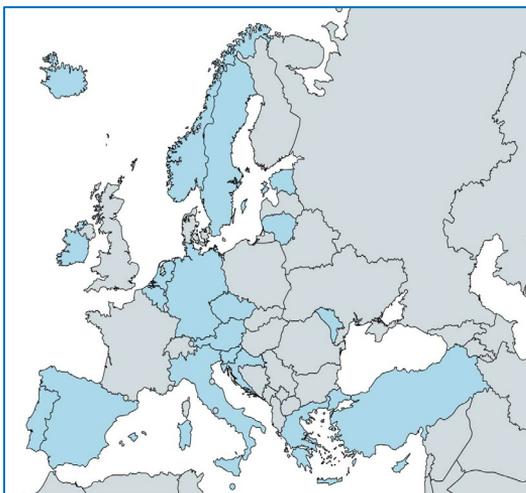
Figure 5. Participation in the SPC Survey.

Missions. As the different Mission units are still in the launch phase and as individual Missions have not yet fully finalised their monitoring systems (including defining and collecting data from Mission units), the SPC Survey did not include questions on Pillars 1 and 3. For these Pillars, a synthesis of findings available in other Missions-related studies and evaluations is presented. Findings from the SPC Survey and a synthesis of findings from other Missions-related studies and evaluations are reported for Pillars 2 and 4.

It was clear that the respondents arranged via the SPC did not have access to all information and/or that they were not aware of all on-going processes in their respective countries. Despite this, in relation to Pillar 2 questions, we noted that majority of respondents were able to provide assessments on all building blocks in the SPC Survey. In cases where respondents completed the questions by Mission, we noted diversity across Missions per respondent. We take this to indicate that respondents can report progress in governance of Missions. In addition, open responses to explain the progress in different building blocks indicated that respondents were able to assess and describe the building blocks as envisioned in the proposed monitoring framework.

5.1. Pillar 1: Knowledge creation and valorisation

As the different Mission units are still in the launch phase, it is not yet timely nor possible to synthesise information pertaining to the two Pillar I indicators on new knowledge creation and on solutions beyond the R&I actions launched within HE. Also, the already completed studies and evaluations of EU Missions have not defined Mission units as units of analysis, nor collected regional and local level data pertaining to Mission units. Hence, the evidence discussed below covers knowledge creation and valorisation processes in a broader context of the EU Missions.

The five EU Missions have different maturity levels in terms of knowledge creation and valorisation. This is evident from the proportions of RIAs, IAs, CSAs and procurement actions (including framework contracts etc) launched within HE Missions-related Work Programmes. For example, there were a higher percentage of RIAs than IAs in the Soil and Cancer Missions until 2023. In the Ocean & Waters and Cities Missions, almost half of the actions launched in the period 2021-2022 and most calls launched in 2023 were IAs

supporting the testing, piloting, and validation of transformative and innovative solutions. This indicates greater emphasis on usage and valorisation of existing bodies of knowledge.

RIAs and IAs are included in the HE KIP monitoring and evaluation framework. However, the activities of CSAs and the procurement and framework contracts will not be as well covered. The latter could entail important R&I elements as exemplified by the Cities Mission Implementation Platform that funds several innovation pilot projects implemented by selected cities considered as Mission units. This type of data, may therefore, not be captured via the HE KIP monitoring framework.

As indicated in section 3.4, knowledge valorisation is dependent on a Mission portfolio approach covering R&I actions and activities beyond. In this respect, the portfolio mapping of the Ocean & Waters Mission identified over 800 relevant projects, past and current, from different EU level programmes with a budget of around 4 billion contributing to the Mission objectives and enablers (from H2020 and HE to LIFE, Interreg etc)[20]. Therefore, the Mission is acting as catalyst for synergies and complementarities across different EU, national and regional programmes, already pooling funds beyond R&I. Further, the recent SWD on "EU Missions" emphasised that the pledges to the Ocean & Waters Mission Charter have grown rapidly with more than 480 signatories joining the initiative and putting forward initiatives with a budget allocation of approximately 3.72 billion EUR.

While these represent positive developments contributing to the achievement of the goals of EU Missions as a policy approach, the interviews carried out in the Ocean & Waters Mission assessment report suggest that the contribution logic and added value of the Charter initiative is not well understood by target audiences. Regional representatives stated that local actors did not see a clear process for, and clear benefit of, joining the Charter. Hence, not all regional actors made a pledge. According to the SWD assessing the EU Missions, the most concrete achievement of the Ocean & Waters Mission seems to include the development of connections between dedicated initiatives and targeted efforts of the Implementation Platform and Mission Charter to overcome institutional fragmentation. The Mission's added value in terms of R&I valorisation and development of effective solutions remains to be determined.

In the case of the Cancer Mission, the portfolio mapping identified existing and ongoing R&I projects worth more than 4 billion EUR (from FP6 onwards) as well as complementary projects under other policy initiatives (e.g. Beating Cancer Plan, Digital Europe etc) that can potentially improve cancer understanding and research capabilities in the EU. Portfolio mappings have been carried out for other Missions covering H2020 and HE but not beyond[21]. It is likely that we will see a large diversity in the contribution of past and current FPs' projects towards the Missions as well as in how different EU programmes led by DG SANTE, DG CLIMA, DG ENV, DG MARE etc. contribute to the Missions.

Such portfolio approaches only indicate a potential pool of R&I and other outputs that can be used in the context of different Missions. This does not mean that all this potential is deemed relevant and will be utilised and valorised. Even in the case of the Mission-specific RIAs and IAs funded under HE, one cannot guarantee that the R&I outputs of these projects will be

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[20]European Commission, Directorate-General for Research and Innovation, Chimini, G., Failler, P., Galgani, L. et al., Portfolio analysis, EU mission "Restore our Ocean and Waters by 2030" – Analysis of a portfolio of projects financed by sixteen EU programmes contributing to the objectives and enablers of the mission ocean and waters, Publications Office of the European Union, 2023.
[21] EU-funded projects contributing to the EU Missions - European Commission (europa.eu)

directly picked up and valorised. This is because the projects are selected via open calls and implemented by actors who are not necessarily formally engaged in the Missions.

A key aspect of EU Missions as a policy approach is the ability to bring together a critical mass of cross-disciplinary and cross sectoral actors who can identify innovative potential in projects and go forward on testing, demonstrating, piloting, scale-up and deployment. Herein, **Mission Units as dedicated structures play a crucial role in knowledge valorisation as they are set up to foster the involvement of a large spectrum of key stakeholders.** Mission units are set up at national, regional or local levels and as such they are vital in connecting to on-going national and [sub-]regional activities, such as European and Regional Digital Innovation Hubs, for example.

These activities may not be directly supported under the EU Missions even though they may have relevance for the achievement of Missions' objectives. Mission units, with pre-set Mission objectives covering various phases to contribute to Mission goals, can serve as designated and defined spaces for the assembly of diverse actors and expertise. This is foreseen in Mission Soil where Living Labs and Lighthouses can play a central role in the work done to harmonize the R&I agenda, enhance the current capacity, and involve a large spectrum of stakeholders, ensuring a better trans-disciplinary approach.

However, as seen in the roll out of Cancer Mission hubs which are its Mission units, such an engagement has been challenging because of limited cross-disciplinary and cross-sectoral cooperation in the national and regional contexts. Supporting this, earlier studies and evaluations expressed **concern in relation to valorisation of Mission projects at EU, MS and sub-regional levels,** reporting that it has been challenging for Mission Implementation Platforms to coordinate and assemble various stakeholders to participate in Mission units. This is because the R&I focus of Missions is centred on the HE framework and there is less emphasis on the engagement of EU MS/AC level actors and activities, even though there could be important local level actions and initiatives that could contribute to the Mission activities and targets.

The Climate Mission's implementation in France is another exemplification of this observation. A few regional and local authorities are partners in Climate Mission's projects, but they do not appear to have an approach to these projects different to other European projects. Integration of French long-lasting efforts on climate change adaptation (3 National Adaptation Plans, 2011 – current), that started years before EU Mission has not yet occurred[22].

Lack of steering and support from national governments, lack of management of local participation and a lack of communication processes lead to a lack of engagement of regional or local governments in Missions.

Further, there is a perception among the stakeholders that it is unclear as to how to engage in Missions, outside of the usual suspects skilled in EU programmes. Earlier studies showed that organisations with experience in international projects and mobilisation of a large variety of science, actors and practices, seemed to be better equipped for participating in the Missions. Herein, in the case of the Cities Mission, the main difference between 112 selected and 224 non-selected cities was their previous participation in EU-funded projects. While

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[22] European Commission, Directorate-General for Research and Innovation, Angelis, J., Reid, A., Griniece, E. et al., *Study supporting the assessment of EU Missions and the review of Mission areas – Mission areas review report*, Reid, A.(editor), Publications Office of the European Union, 2023.

72% of selected cities were previously involved in international projects, only 2% of non-selected cities had this experience. Further, of the 10 cities that signed the Climate City Contracts, 6 cities were from Sweden and Spain where similar practices had existed before and were in fact used as examples for the Cities Mission.

Considering the above challenges, CSAs, procurements, and framework contracts are highly utilised in the implementation of the five EU Missions, more than for example in the HE Pillar 2 clusters. In the period 2021-2022 almost 1/3 of all actions in the HE Missions Work Programme were CSAs. This indicates a focus on consolidating and engaging a wide community of relevant stakeholders, and further on supporting the complex governance structures. Mission Implementation Platforms and other dedicated structures, such as Mission units, put in place by the five EU Missions, are meant to play a key role. They should strongly focus on mutual learning and fostering exchanges and they should facilitate the involvement of a large spectrum of stakeholders supporting knowledge valorisation.

Hence, monitoring of R&I activities in Mission units that follow through from knowledge creation to valorisation, can provide insights of the relevance of the existing R&I project portfolios for the Missions, and indicate whether EU Missions as a policy approach adds significant value to the valorisation of R&I.

Overall, implementation structures such as Living Labs have only recently been established for the EU Missions. Therefore, it is too early to judge the impact of EU funded projects and the role of Mission units in supporting knowledge creation and valorisation. The creation of new knowledge is still central in EU Missions, and it is relevant to monitor both the creation of, and usage and valorisation of knowledge by different Missions within their focal Mission units as proposed by the indicators in Pillar 1.

5.2. Pillar 2: Governance

The following synthesis is based on findings from prior studies and the SPC Survey regarding achievements and challenges on governance mechanisms across the three indicators in the Governance pillar.

Indicator 2.1.1 Mission-oriented governance mechanisms at EU level

This indicator was not directly piloted in the SPC Survey as several prior studies gathered evidence on the progress of setting up the governance systems at EU level.

All five Missions have, as of now, designed similar governance structures and are set up as cross-EC undertakings. Typically, one DG operates as Mission manager, while another has taken up the role as deputy Mission manager. All Missions have an EC Owner group which represents the DGs and agencies involved in the Mission. The composition of these owner groups varies considerably across the Missions, with for instance the Owner group of the Cancer Mission consisting of over 25 EC entities, while other Missions have less than ten, mostly sectoral DGs involved[23].

The role of Mission Secretariat is usually taken up by the Mission manager's and deputy manager's DGs. All Missions have a Mission Board composed of independent experts. The Mission Board has an advisory role as spelled out in the HE Implementation Rules. Some

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[23] Not all Mission Implementation Plans listed the full composition of the Owner's Group as they were not completed at the time of publishing these Plans.

Missions have additional advisory mechanisms, e.g. the Cancer Mission is supported by the subgroup on cancer under the Steering Group on Health Promotion, Disease Prevention and Management of Non-communicable Diseases (SGPP) set up by DG SANTE and DG RTD.

All Missions except the Cancer Mission have by now established a Mission Implementation Platform which is a structure to implement Mission activities and to interact with stakeholders. The UNCAN.eu platform of the Cancer Mission has a narrower and more targeted focus compared to the platforms of other Missions. Some Missions have chosen existing networks to host their Mission Platform such as the NetZeroCities platform for the Cities Mission and the Climate-ADAPT forum for the Climate Mission. The Mission Implementation Platforms can be considered as temporary project-based activities as they are implemented through fixed term public procurement contracts (limited by the duration of the HE Strategic Plan period).

Overall, prior studies have highlighted several **strengths and good practices** indicating positive progress in launching some of the key building blocks of this indicator:

- **Shared ownership** of Mission management by the EC across key DGs (DG RTD and one or a few sectoral DGs);

- Positive **synergy and coordination** between the Mission and (upcoming) regulations/ strategies at EU level (e.g., Europe Beating Cancer Plan, Green Deal policies, Common Agricultural Policies, upcoming Soil Directive);

- **Strong connections to global policy** coordination activities and initiatives as well as UN SDGs;

- Introduction of **novel interventions and instruments** to trigger Mission-oriented changes (e.g. Climate City Contracts, Soil Manifesto etc);

- Emergent attempts to build **portfolios of projects and policies** based on past and ongoing EU FPs on R&I;

- Emergent **reflexive learning practices**: CSA projects in HE (TRAMI and Mission-specific CSA projects), Mutual Learning Exercises (MLE)/Policy Support Facility (PSF), Enhanced Dialogues, external assessments, development of policy and Missions-level monitoring frameworks.

Still, the same studies also highlighted several **governance challenges** where corrective actions are needed:

- **Weak coordination and alignment** between some EU funding streams and Missions (e.g., especially ERDF);

- Complete set of **governance mechanisms deemed too complex and non-transparent (**e.g. Mission Owners Groups considered in some cases too broad to be effective) and lack of strategic implementation aspects (high-level discussion, learning, steering);

- Limited involvement of the European Parliament (except Cancer Mission);

- **Low involvement of other DGs** outside the management group in some Missions (e.g., Cities) or sometimes diverging interests;

- Insufficient staffing and resource allocation to handle all Mission governance tasks;

- Insufficient governance mechanisms and capacities to co-create Missions with EU MS/AC and regions (and pool resources) in most Missions;

- **Limited coordination between Missions regarding monitoring and evaluation systems** may make it harder to pool Mission-specific input into common monitoring and evaluation exercises of Missions.

Overall, while all Missions have set up the formal governance mechanisms, it has also become evident that further implementation of Mission activities may need revisions of governance mechanisms. A general finding is that the EU level governance structure is considered too complex, and it is not sufficiently transparent when it comes to responsibilities of each body in the governance structure.

A common feature for all Missions is the Programme Committees that assist the EC in the implementation of HE and provide opinions on the HE Work Programmes. The members are delegates and experts of national governments of EU MS. For each of the five Missions the EC has established a dedicated working group ("sub-group"), composed of MS' experts, under the Strategic Configuration of the HE Programme Committee (SPC). These sub-groups give advice on the Mission work programmes. However, the final and official opinions and decisions on any issue around the Missions are taken by the SPC itself. The sub-groups have a focus on the R&I component of the Missions and, therefore, most delegates are from R&I ministries across Europe. Some Missions have organised additional national delegates to take part in the SPC to broaden the policy focus.

The governance of the engagement with MS, AC, regions, and cities varies considerably across the Missions. Each Mission has different types of mechanisms and degrees of effort to engage with national and regional governments and other stakeholders, depending on their specific knowledge eco-systems.

- The Soil and Cancer Missions focus mostly on national level government authorities. The Soil Mission intends to build mechanisms to involve EU MS/AC and regions through their Living Labs and Lighthouses.

- The Cancer Mission is building up National Cancer Mission Hubs and has strong links with the European Parliament through the Special Committee on Beating Cancer.

- The Climate Mission makes use of existing governance structures to engage with EU MS/AC such as the Working Group 6 of the EU Climate Change Committee.

- The Cities Mission has a strong focus on governance mechanisms for engagement with regional and local actors such as cities that are members of the NetZEROCities platform.

- The Ocean & Waters Mission has a wide set of governance mechanisms not only with national and regional government authorities and stakeholders, but it also operates at macro-regional level (e.g., Sea Basin Convention, All Atlantic Ocean & Waters Research Alliance) and global level (e.g., UN and International Ocean & Waters Governance Forum).

Indicator 2.1.2 Mission-oriented governance mechanisms at MS level

The analysis below combines responses for this indicator in the SPC Survey (for full set of results, see Annex IIIb) and findings from prior studies and documentation. In the SPC Survey, we asked EU MS/AC to describe their governance approach to support EU Missions from the perspectives of **policy approach** and **building blocks of governance**. Overall, we find that EU MS/AC are in rather early stages in rethinking and revising their governance approaches to align or support EU Missions.

Policy approach

In the SPC Survey, six countries responded that they have a **unified policy approach** across all five EU Missions and a further four countries indicated that this is being planned. Four countries reported that they have **Mission-specific policy approaches** in place for all or some of the Missions while nine countries indicated that this is in the planning stages.

From our sample, a few larger countries (Germany, Turkey, the Netherlands) indicated that they have or are planning both generic and Mission-specific policy approaches. Importantly, a few countries with both unified and decentralized approaches reported that they plan to contribute to EU Missions relying on existing policy and governance approaches with no plans to rethink them. We take this to indicate that while there are countries planning to build **bespoke governance systems** to contribute to EU Missions, most of the countries will rather try to **integrate and adjust EU Missions with their existing policy approaches** and interpret or prioritize Missions from these perspectives.

The decentralized and variated nature of EU Missions implies that any desired improvement by the EC would need to recognize this diversity and develop **Mission- and country specific approaches to vertical coordination and implementation** of the EU Missions. While in some countries, there might be one contact/entry point for Mission-relevant activities, in most countries we are likely to see contribution to the EU Missions coordinated by different types of actors. Therefore, looking at all EU Missions from the same lens may prove to be difficult.

As EU MS/AC level activities differ considerably in terms of a centralisation of Mission policy or rather a decentralised approach by specific Mission, **it is also likely that the speed and scope of Mission achievements and commitments in countries will also vary considerably.**

Governance styles

Our proposed indicators on governance for EU Missions consist of 8 building blocks. In the SPC Survey, we asked respondents to provide progress assessments on all building blocks and to provide explanation in case a certain building block has achieved at least partial implementation. The sub-questions on governance building blocks pertaining to citizen engagement and budgeting will be discussed under the respective Pillars 3 and 4 below.

While 10 out of 21 of respondents reported that their unified or Mission-specific policy approaches are in place, **a significantly fewer number of countries reported 'in place and functioning' governance building blocks**. For the common approach, only one of the countries reported consistently that the system is functioning, relying on existing institutions and arrangements of the "whole of governance" approach to contribute to EU Missions.

For the countries reporting and providing Mission-specific information on governance, the landscape of responses was more diverse (Fig. 6):

- majority of the respondents reported that the **development of different governance building blocks is still in rather early stages** (building blocks not in place, under development or not yet implemented);

- across the different Missions, the Cities Mission stands out as the Mission with the largest (though still minority) number of countries reporting progress in at least partly implementing different building blocks (see Annex IIIb for detailed graphs);

- between different building blocks, development of **policy commitment and introduction of novel implementation structures** have been progressing the most, although still only a minority of countries reported at least partial functioning (and especially for Cancer and Cities Missions);

- the **vertical coordination** building block – a crucial element for linking EU and MS/AC level activities – has advanced the furthest in the Cities Mission, probably as existing platforms were used that were already active before the start of the EU Mission;

- the least emphasis has been put on setting up **monitoring and evaluation** systems to track the progress of EU Missions.
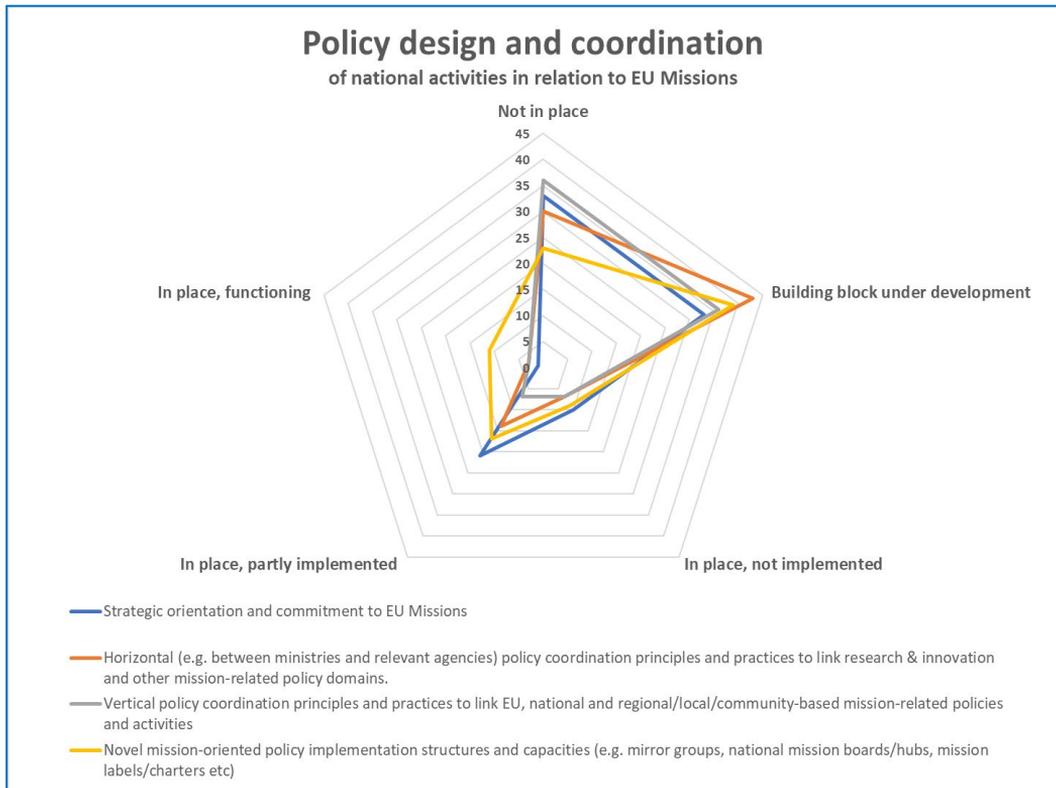
Figure 6. SPC Survey - Strategic orientation and commitment of MS & AC to EU Missions
[99 total responses from 21 countries]

Based on the SPC survey, we can pinpoint the emergence of several modalities of how EU MS/AC are integrating EU Missions and national policies and strategies:

- When Missions fit existing sectoral strategic policy processes and their timelines, formal policy commitment and reference to Missions is easier to achieve. In other cases, we are more likely to see the introduction of governance instruments emulating the EU approach (mirror groups, Mission hubs, National Contact Points, coordination groups under SPC) to provide national input to EU processes and increase local success in receiving HE funding etc. For example, Spain has integrated Climate and Cancer Missions in national policy documents and plans, and for other Missions, mirror groups and similar instruments have been established.

- Alternatively, the **centralized Missions model** (found or developed in e.g. Austria, Germany, the Netherlands, Spain) proceeds by **integration of Missions with the**

national R&I strategies (or at least its horizontal and vertical coordination initiatives). This creates, from the R&I policy perspective, a more holistic and coherent national approach to Missions, but it will likely face the **challenge of integrating sectoral ministries and their strategic processes with the Mission approach**. The case study of Austria shows the magnitude of horizontal and vertical coordination needed at the national level to make such a model work.

- **EU Missions can trigger** national initiatives for relevant strategies and policies if these have been lacking. For example, the Netherlands has reported that the discussions on the Cancer Mission triggered debates on local cancer strategy/policy and for the very first time, a national cancer strategy was presented in November 2023.

- While a few Missions can be differentiated at the EU level, they may seem to be rather similar or fall into a **common institutional landscape and may lead to common governance institutions and processes at EU MS/AC level.** This is seen in discussions in the Netherlands over joint governance for Climate and Cities Missions.

- A few countries claim to have built **linkages between EU Missions and other EU policy structures** in their countries. For example, Portugal reports links between Soil Mission and Common Agriculture Policy (CAP). Greece and Cyprus report strong overlap between Mission areas and the S3 and Recovery and Resilience Facility (RRF) flagship investments and targeted programs to support Greek municipalities in the process of sustainability and digital transformations under the broad umbrella of the Cities Mission.

- Some countries are also reporting discussion on aligning national and EU policies through **re-addressing or topping up of existing national R&I programmes** that can be used for the Mission objectives. From the SPC survey, it is difficult to assess in how far these are genuinely aligned or whether these programmes co-exist with the HE Mission work programme calls. The survey did not identify dedicated new programmes to co-fund national stakeholders active in the EU Missions.

Overall, governance mechanisms dedicated to the co-creation of Mission policies across EU, national, regional and local levels are largely missing. Many countries have shown a particular policy interest for those Missions that fit with their own national challenges and/or research and innovation interests and not necessarily with all five Missions.

For a few EU Missions, the emphasis of implementation and EU MS/AC-level contributions are at the regional and local levels and the coordination and alignment on the national level is not well developed. In other thematic Missions, the alignment with national and trans-national strategies is crucial for achieving the Mission goals. In the case of Cancer, Ocean & Waters and Soil Missions, the alignments with national strategies are reported to work well.

Indicator 2.2.1 Acceptance of Mission-oriented policy

This indicator was not piloted and monitored by the EG in the SPC Survey, but prior studies and observations indicated a few critical aspects to be considered in the future development of Missions as a policy approach.

As of now, we can see that the EU Missions are often viewed more as **EC's Missions rather than "EU-wide" Missions.** There are critical aspects that need to be refined to enable greater ownership and acceptance of Missions and Missions as a policy approach:

- While the process of public consultations around Missions was extensive, several prior studies indicated that the **translation of the consultation results to actual Missions**

was not transparent enough (e.g. redefinition of Cities and Climate Missions through omitting the citizens/societal aspects) limiting the external understanding and hence legitimacy of the processes;

- While most assessments and MIPs emphasize the importance of EU MS/AC in overall implementation of Missions (from pooling of resources to enabling scaling-up via domestic policies), there is **no clear and formal role for EU MS/AC level actors as of now.** Most effort has been put into setting up horizontal coordination practices at EC level, while Missions mostly tend to focus their concrete implementation at regional or local level;

- Long-term sustainability and acceptance of the novel governance arrangements engaging several DGs around the Missions will be crucial. Therefore, renewed and

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The "Austrian model" of central policy coordination of EU Missions

a) EU Missions became an element in the Austrian STI Strategy 2030, and therefore in the legal obligations of key STI actors in Austria.

b) A dedicated Working Group on EU Missions under the STI Task Force consisting of the Directors-General of Federal Chancellery, the Finance Ministry, and the three STI ministries was established. It is co-chaired by the Ministry of Education, Science and Research, and the Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology. Members of the "Working Group on EU Missions" are the ministries of the "STI Task Force" next to further relevant sectoral ministries, and the eleven central STI institutions who have a legal mandate to implement the EU Missions through their portfolio. The "Working Group on EU Missions" created five "Mission Action Groups", one for each of the EU Missions, co-chaired by a sectoral and a STI ministerial official and consisting in total of about 300 Austrian stakeholders in the fields of the EU Missions. Jointly they drafted a strategy document called "Implementation Plan for the EU Missions of Horizon Europe in Austria" which forms the basis for developing action plans for the EU Missions. In addition, we had two international advisory boards (one on strategic intelligence, another one on foresight and citizens) to give guidance at the early stage on the design of the Austrian governance structure. Both advisory boards determined their work in the meantime. A "Mission Management Group" was established to bring the co-chairs of the "Working Group in EU Missions" together with the co-chairs of the "Mission Action Groups" to discuss issues of relevance for all five EU Missions. In late 2023, Austria launched a tender to establish a Mission Facility for Policy Learning, Foresight, Monitoring and Evaluation to facilitate the necessary flexibility but also consistency and overview on the activities during the implementation phase of the EU Missions in Austria.

c) During the early phase of establishing the EU Missions in Austria, the Ministry of Education, Science and Research had regular contact with the Austrian Conference on Spatial Planning (ÖROK), a major actor at the intersection of national and regional policies. In spring 2023, ÖROK launched a project called Regional Innovation and Transformation in which context EU Missions might become a prominent example. In addition, it will be a platform to discuss the future orientation of EU Structural Funds towards societal challenges. In summer 2023, bilateral talks with the "Verbindungsstelle der Bundesländer" (Contact Point of the Federal Regions) started to include the regions in the development of the action plans for the five EU Missions. In parallel, the representatives for Austrian cities, and the representatives for Austrian communities have also been invited to take part actively in the development of the action plans. The continued and structured co-development of the action plans for the five EU Missions started at a workshop in October 2023.

Source: As reported in the SPC Survey

sustained **political and policy commitment** to Missions would ensure that Missions can progress with a supported policy approach.

5.3. Pillar 3: Participatory engagement of citizens and stakeholders

Citizen and stakeholder participation is one of the constitutive elements of EU Missions as a policy approach to achieve Europe-wide value and relevance of Mission-oriented R&I. Citizen and stakeholder participation can be operationalised via two complementary lenses: participation in **Mission-oriented R&I projects** and participation in the overall **design and implementation of EU Missions** as a broader policy approach. While the monitoring framework proposes indicators for both lenses, given the present early implementation stages of EU Missions, these indicators were not piloted in the SPC Survey.

The previous studies on Missions' implementation[24] have stated the following conclusions related to citizens´ engagement:

- Inclusion of citizens and stakeholders in the implementation of Missions has, in general, been weak, although some good practices have been identified;

- The awareness or the engagement of industry, NGOs, regulators, and the professional community seems to be slightly more positive, but still a challenge. In this connection, the TRAMI project indicated that the anchoring of the Missions in the wider public (civil society) is currently weak, or difficult to assess due to the lack of information.

- **Social factors that can drive or hinder the expected changes** must be considered alongside technological challenges for achievement of Missions' actions and goals.

- **A socio-cultural approach** shall be followed during the definition process of Missions, and mainly in the implementation stages to increase the participation of citizens.

- New approaches and processes based on social sciences and humanities are required for reinforcing engagement. Cross-disciplinary research is pointed out as the solution to develop new participation channels;

Hence, existing evidence on citizens engagement in the five EU Missions indicate that **activities in this pillar are not yet sufficiently or systematically developed**, due to the early stage of the initiatives, but also because of inadequate and non-targeted communication on the benefits of Missions to generate a culture shift in society.

Given the emphasis on the importance of stakeholder participation – which is not common and extensive in traditional policy-making based on R&I – our SPC Survey included a question on how EU MS/AC are approaching this element of Missions and are rethinking participation practices to match the ambition of Missions.

According to the SPC Survey, **practices at national level for engaging citizens and stakeholders in Missions' implementation is under development in most of the 21 countries** that answered the questionnaire (Fig.7). The work towards systemic engagement of private sector actors (industry, financial sector etc) is at an early stage (Fig.8).

As the preferred forms of stakeholder engagement in R&I actions are part of different national governance traditions, there is inevitably high heterogeneity in the importance placed and actual designs of citizen and stakeholder engagement in EU Missions. An additional factor to be considered is the **lack of a common framework for defining and managing**

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[24] European Commission, Directorate-General for Research and Innovation, Angelis, J., Reid, A., Griniece, E. et al., *Study supporting the assessment of EU Missions and the review of Mission areas – Mission areas review report*, Reid, A.(editor), Publications Office of the European Union, 2023.

stakeholders' engagement. We noticed among EU MS/AC, different interpretations of this aspect of Missions that lead to different approaches being pursued and very different answers to the same question in the SPC Survey. Still, some trends common to the five EU Missions amongst EU MS/AC can be identified based on the information provided by the SPC Survey:

- Most of the respondents stated that engagement of stakeholders is carried out through participation in HE calls, in RIAs and mainly in CSAs.

- In the same way, **dissemination actions** are understood by most EU MS/AC as engagement mechanisms. They are fostered by the implementation structures or platforms or carried out by the Mission units (living labs, lighthouses).

- **New policy coordination structures** such as national Mirror Groups and Hubs are also expected to play a relevant role in engagement of stakeholders.

- **Initiatives promoted or engagement mechanisms hosted by existing bodies** such as ministries, innovation agencies, research councils or boards in different fields, are also mentioned. In this regard, citizens science movements, are remarked in those countries where it is an established practice, for instance, Norway.

Overall, based on the SPC Survey and the synthesis of prior studies and evaluations, we can conclude that **citizen engagement activities of Missions are at different stages**, in accordance with the specific context of each Mission. **Engagement processes are being developed in parallel to the governance and implementation structures**, mainly led by the Mission Implementation Platforms and the Mission Secretariats.
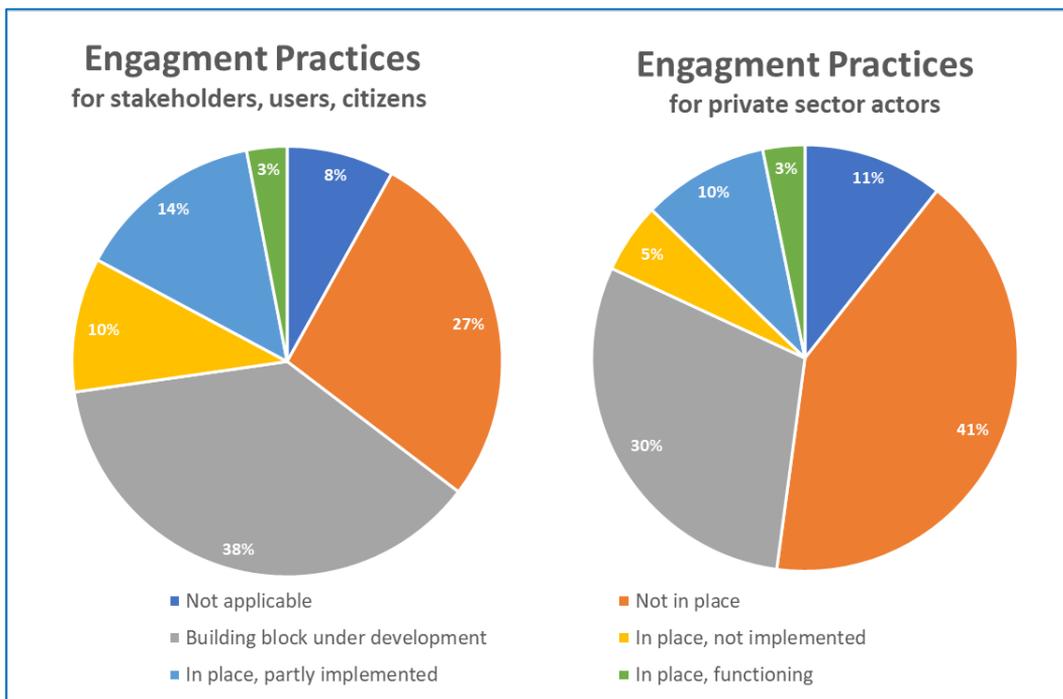
Figure 7 (left). SPC Survey - Practices (e.g. formal procedures, charters, contracts etc) for engaging stakeholders, users, citizens in different stages of implementing the EU Missions (planning, implementing, monitoring & evaluation). [No of responses:99 // 21 countries]

Figure 8 (right). SPC Survey - Practices (e.g. formal procedures, charters, contracts, manifestos, endorsements, labels) to engage private sector actors (firms, associations, financial sector etc) in the implementation of the EU Missions [No of responses:94 // 21 countries]

Within the context of HE, engagement has been directly supported in the Work Programmes of Missions by means of specific calls for co-creation in RIAs or in CSAs. The content, scope, and approach of HE calls in each Mission are considered a key reference in terms of definition of relevant stakeholders, their roles and expected contribution.

While the HE KIP framework proposes indicators that focus on the engagement and co-creation elements in R&I projects, our monitoring framework proposes that individual Missions could adopt similar Mission-specific indicators at the level of Mission units to monitor whether the Mission-oriented approaches trigger wider participatory dynamics outside the traditional RIA and IA projects of HE.

In addition, through MIPs, we can pinpoint several emerging practices that boost citizen and stakeholder participation at the broader policy level. For example:

- The specific stakeholder engagement frameworks – Charters in Climate and Ocean & Waters Missions; the Climate City Contracts in Cities Mission, the Soil Manifesto – provide the advantage of defining engagement paths and, therefore, are a very valuable reference for EU MS/AC aimed at developing governance and engagement mechanisms that are, to some extent, new for them.

- Networking events and actions related to literacy and citizen awareness have been supported in the five Missions, e.g. through initiatives such as EU4Ocean & Waters and the Blue Forum, the Soil Manifesto and the European Climate Pact.

- Novel governance mechanisms, such as Mission hubs or national networks, are open to relevant stakeholders, as in the case of Cancer and Cities Missions.

- To give visibility to the "beyond HE actions", the Charter of the Ocean & Waters Mission offers a platform for initiatives from different stakeholders aligned with the Mission goals. Currently, more than 350 actions have been registered. Initiatives could be related, among other issues, to "Citizen engagement, citizen-science, youth-led initiatives, communities of practice, ocean & waters and water literacy, outreach, awareness raising and participatory approaches" and "Education and training".

In this regard, ERRIN stands out for its engagement and activities in contribution to increasing awareness and engagement of regions in EU Missions.

The plethora of these activities is likely to be monitored through Mission-specific monitoring approaches being developed. The overall challenge for EU Missions as a policy approach, once we move from the initiation and piloting to the scaling-up phase of the Missions, is **to trigger broader societal awareness and acceptance of the challenges to facilitate stakeholder and societal mobilisation and behavioural changes**. As of now, Missions are close to scientific and technological models but have not sufficiently influenced the behaviour of citizens. This can become a main barrier to achieve the goals of Missions.

Therefore, in the forthcoming years, an effort should be done towards social innovations and dissemination of good practices. Hence, the monitoring framework proposes more macro-level indicators of awareness and acceptance of Missions that monitor whether societal readiness to go alongside the transformative changes is sufficient and extends beyond the narrower R&I and policy actions directly funded and implemented under the EU Missions.

ERRIN'S Support to EU Missions

ERRIN has played an active role in shaping and implementing the Missions right from the beginning of their development process, representing the regional and local perspectives. Led by its Smart Cities Working Group, ERRIN has been a key contributor to the Cities Mission since its early development stages. Notably, ERRIN provided input to the Mission Board members in 2019. Moreover, ERRIN's involvement in the Cities Mission extends to its previous participation in the Cities Mission Assembly, and one of its members, Francoise Guaspare from the Ile-de-France Region, currently holds a position on the Cities Mission Board.

Building on this foundation, ERRIN also took an early and proactive role in shaping the Mission on Adaptation to Climate Change. ERRIN produced an initial input paper to refine the selection criteria and enhance the engagement of regions and communities in this Mission. Since then, ERRIN has been consistently contributing to shaping other Missions, including Soil, Ocean & Waters and Cancer. These contributions take the form of various events, input papers, and both formal and informal dialogues with the EC.

For the period 2022-2023, EU Missions have been identified as a top priority for ERRIN. The network has established an internal governance system dedicated to EU Missions. To ensure that the regional and local perspectives remain central to the Missions, ERRIN has appointed a dedicated EU Missions Policy Officer, responsible for coordinating ERRIN's work related to the EU Missions. Furthermore, ERRIN operates five topical Working Groups (WG) and a Task Force (TF) that work on each of the EU Missions: Smart Cities WG, Blue Economy WG, Bioeconomy WG, Health WG and Adaptation TF. In addition, the ERRIN Management Board and the Policy Working Group address strategic and transversal aspects related to EU Missions. ERRIN's active participation in HE Missions-related projects underscores its commitment to furthering the objectives of the Missions. ERRIN also cooperates with key lead organisations to promote central Mission related activities. For example, in April 2023, ERRIN, together with the EC, launched the Soil Mission Manifesto to mobilise local ecosystems on soil health.

ERRIN has also established a close collaboration with the TRAMI project, which aims to enhance the cooperation and coordination between EU, national, regional and local actions in support of the implementation of EU Missions. By co-organising two Mutual Learning Events on the role of the regional policy and the triple helix collaboration, ERRIN and TRAMI provided a platform for sharing best practices and fostering collaboration among industry, academia and the public sector to drive innovations for the EU Missions. This collaboration helps bridge the gap between policy objectives and practical implementation, encourages cross-sectoral cooperation, and promotes knowledge exchange, ultimately accelerating progress towards the Mission goals.

In the Mutual Learning Events organised with the TRAMI project, regions voiced their concern that the Missions run a risk of turning into a set of running Horizon projects rather than supporting solid political ambitions. As the implementation process of the Missions is moving forward, there is a need to tighten coordination within the EC.

It is very clear that EU Missions need to be better rooted at national, regional and local levels for implementation of EU Missions to be successful. Through its membership spanning 120 regional organisations from 21 European countries, ERRIN is well positioned to focus on ways to mainstream EU Missions within regional ecosystems and public policies. Its role is to help establish local and regional ownership of EU Missions while facilitating collaboration among stakeholders involved in the Missions' on-the-ground implementation. Going forward ERRIN can assist in identifying the main obstacles to Mission implementation at regional level and propose measures to overcome them and to engage in cross-cutting Mission relevant issues, in partnership with the European Mission Network (EMiN) established in the TRAMI project.

Useful links: **Horizon Europe Missions , ERRIN input to Horizon 2021-2027 consultation**

Source: Interview with ERRIN.

5.4. Pillar 4: Pooling and Scaling-up

Sub-category 4.1. Pooling and Leveraging of public and private funds

Pillar 4 of the proposed monitoring includes sub-indicators 4.1.1, 4.1.2 and 4.1.3 on pooling and leveraging of public and private funds especially with a view of beyond HE contributions.

Indicator 4.1.1 (Mission-oriented budgets/funding in EU programmes other than HE) was not piloted in the SPC Survey as Missions assessment reports recently attempted to pool data on these aspects. These reports showed that across the five Missions between 40-67% of respondents answered that allocation of resources at EU level (e.g. from LIFE and Digital Europe Programme etc) was more than sufficient to achieve the goals of the Missions. At the same time, respondents stated that EU MS/AC and regional level activities were insufficient, and more emphasis should be placed on aligning and pooling resources from these levels.

For indicators 4.1.2 and 4.1.3, the SPC Survey asked respondents to report on the development and progress on aligning and pooling of current funds as well as allocating new designated funds to contribute to the implementation of EU Missions. In addition, the SPC Survey requested respondents to provide exact amounts or estimates of budgets/funds in EU, EU-MS/AC shared management, national and other programmes and initiatives and private sector investments in support of EU Missions, as well as feedback on challenges in collecting the data.

Based on the SPC Survey (Figures 9 and 10) we can report that:

- Most countries have not yet considered the need to revise budgetary processes and activities to align national and/or regional funds with the EU Missions – only three to five countries responded that such alignment actions are under development or partly/fully implemented either at the national level (as a common approach) or for specific Missions.

- Processes to allocate designated national and/or regional funding envelopes to Missions are in early stages.

- The respondents in the SPC Survey were in general not able to report exact amounts of aligned or pooled funds as actual funding decisions have not yet been made, or the information is too scattered between different organisations and instruments.

- EU MS/AC were not able to provide systematic information on the role of the private sector in contributing to Missions confirming prior findings that **private sector contributions to Missions are still only emerging and fragmented.**

Countries that reported developments in alignment and pooling of funds, highlighted **several types of mostly "soft" guidance and coordination activities to achieve alignment/pooling**: setting up multi-level, cross-sectoral support structures whose responsibilities include mapping of different funding instruments and resources for EU Missions; providing advice for the effective alignment, allocation, consolidation, and implementation of funds; creation of National Steering Forum and Implementation Roadmaps and assessment of 'fit for purpose' of existing funding programmes for specific Missions.

Four countries mentioned **direct alignment of national, regional or local funding for EU Missions' objectives and activities**, although exact amounts were not readily available as responsibilities are distributed amongst different ministries. The funds in these countries come through a variety of channels that are not necessarily R&I, such as Fundo Azul in Portugal, German national funding programmes, municipalities in Germany and Lithuania, Viable Cities initiative in Sweden and funds of the Lithuanian Ministry of Environment. A few

countries also indicated that they were taking measures for concordance of national R&I projects in support of EU Missions (Spain, Belgium, Austria, Portugal) and Mission Implementation Platforms were referenced as possible channels to capture such budgetary commitments.

National authorities are **aware of different existing funding programmes at EU, EU-MS/AC, national and regional levels, as well as funding programmes of charities and philanthropic organisations with relevance for Missions, as was reported by 9/21 countries in the SPC Survey**. However, respondents stated that the **necessary conditions to pool and leverage public and private initiatives and funding instruments and programmes to contribute to the objectives of EU Missions were not yet in place**. Respondents listed several reasons for this: lack of political ownership, lack of policy commitment and government-led processes to bring together funds to implement Missions, and/or limited budgetary coordination by agencies able to identify correlation between national and European instruments.

Looking at specific funds and programmes:

- In the SPC Survey, budgets in **Recovery and Resilience Plans** (RRP) were mentioned by three countries in relation to EU MS/AC shared management programmes. In all three cases, neither exact amounts nor estimates for Mission-oriented activities were provided; or these were budgets allocated to priority areas that aligned with, but not dedicated to, EU Missions. In the previous assessment reports of the five Missions, budgets in national RRPs to fulfil Missons' objectives were mentioned, although not systematically in all EU MS/AC (e.g. in support of the Cancer
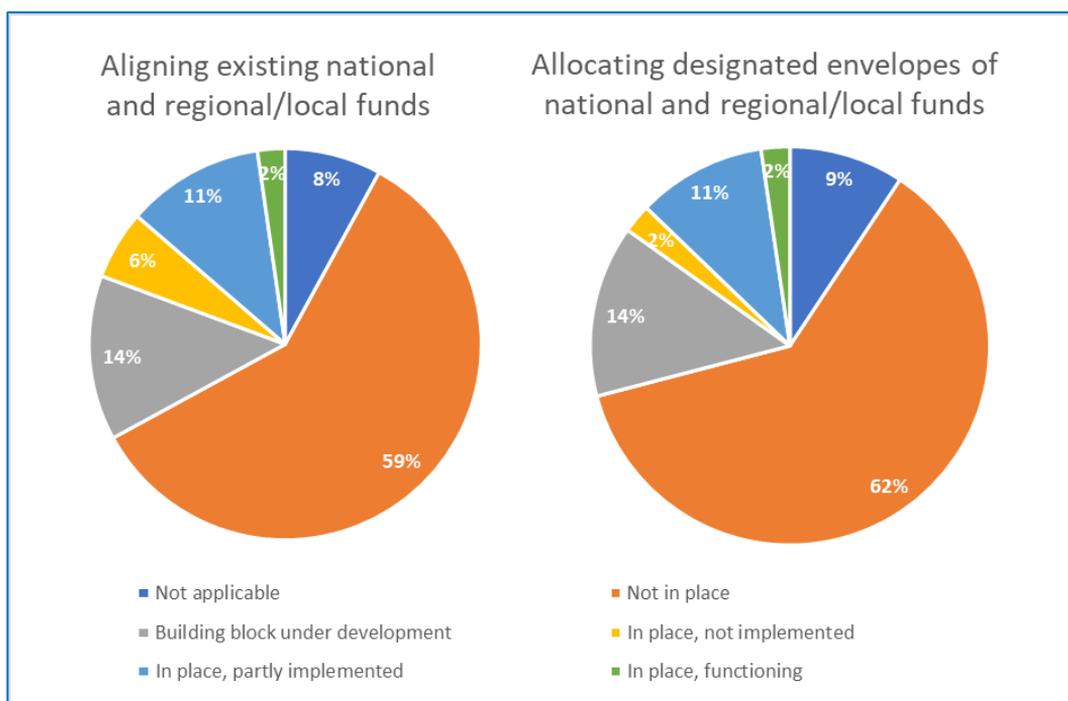
Figure 9 (left). SPC Survey - Budgetary processes for aligning existing national and regional/local funds with the EU Missions.
[No of responses:88 // 21 countries]

Figure 10 (right). SPC Survey - Budgetary processes for allocating designated envelopes of national and regional/local funds for the EU Missions.
[No of responses:86 // 21 countries]

Mission, it is estimated that 450 MEUR has been allocated in the RRPs of Czech Republic, Croatia and Greece). The EC SWD on EU Missions reported that EUR 10.7 billion EUR from the RRF will be allocated to Ocean & Waters Mission by end 2023.

- **Shared management and sectoral programmes** under the umbrella of the European Structural and Investment Funds (ESIF) (namely ERDF, European Social Fund, Cohesion Fund, European Agricultural Fund for Rural Development, European Maritime, and Fisheries Fund), Interreg, European Urban Initiative, etc represent mechanisms for alignment between EU and national and regional levels. These programmes may serve as complementary funds that may be utilized at national and interregional levels for piloting, demonstration, deployment and diffusion of innovative solutions. The previous assessments of the five Missions reported that alignment of these programmes to Missions' objectives for actionable activities at EU MS level is in progress and information on the support from these programmes is not yet available. This may underlie the lack of mention of these funds in the SPC Survey replies.

- **Co-Funded Partnerships** in HE are instruments that involve EU MS/AC contributions and through which EU MS/AC could contribute to Missions' objectives. However, these Partnerships have been late in launching and synergies with Missions are not systematic even though Missions shall catalyse and leverage significant funds at national level through instruments such as Partnerships[9]. In both the SPC Survey and in the previous Mission assessment reports, respondents specified co-funded Partnerships as examples of instruments with synergies to EU Missions (3 countries) and in a few cases were able to report national contributions to the Partnerships but were not able to pin-point exact amounts/estimates directed toward EU Missions.

One important finding from the SPC Survey is that from the perspective of EU MS/AC**, alignment, or pooling of EU funds (under-co-management with EU MS/AC) might be difficult due to the complexities of the EU funding system and logic** where competing goals and priorities of different programmes may make it harder to align activities with the EU Missions. As was well summarised by one country respondent:

''If it is intended that funds from programmes such as CAP, ESF, ERDF, etc. are to be implemented in the [soil] Mission in national activities then this must be explicitly communicated by the people responsible in the Commission to the bodies responsible for (i) the programming of these programmes at Union level but also to (ii) the responsible implementing bodies at national level. The funds from these programmes are all currently allocated to specific national activities and are already oversubscribed. As such, there is little willingness amongst the national implementing bodies - who have no connection to the Missions or to Horizon Europe - to expand the portfolio to include Mission-related activities without explicit direction to do so.''

Supporting this finding are several examples (see Case Studies in 3 and 4) both at national and regional levels where operationalisation actors have tried to use funds from the RRF or implement S3 to contribute to EU Missions, and have had to overcome restrictive conditionalities and/or have had to be persistent and creative in pushing alignments through multi-level policy processes. We find this to be a **crucial bottleneck in triggering EU MS/AC and regional level commitments to EU Missions.** To date, EU Missions are still largely perceived as EC initiatives. If in addition, pooling other EC funding to Missions comes with restrictive conditionalities, it may make it less likely for Mission operationalisation actors to take further efforts to pool their own national and/or regional resources in contribution to EU Missions.

Overall, **at EU and EU-MS/AC levels, there is evidence that some pooling of funds is taking place. However, despite the existence of various funding mechanisms with relevance for Missions, the pooling effect is low at national, regional, and local levels, and has not been triggered at scale.** These findings are not surprising considering the relatively early stage of implementation of the EU Missions and the dominant decentralized policy approach by EU MS/AC. Nevertheless, for further implementation progress on EU Missions as envisioned in the MIPs, it is assumed that efforts towards mobilization of resources for significant pooling of public and private resources shall be led by EU MS/ACs. As such, the insufficient level of pooling and leveraging of funds at national, regional, and local levels if not corrected, will become an issue.

Embedding EU Missions in Romanian R&I policy through alignment with EU Programmes

The Romanian Ministry of Research, Innovation and Digitization proposed the establishment of competence centres to foster collaboration between the private sector and public research organisations to reduce the fragmentation of the national R&I system. These centres were to be supported via the 2021 Romanian Recovery and Resilience Plan's investment in education. The Ministry was inspired to align the competence centres to the EU Mission policy approach. However, it was difficult to deviate from the agreed RRP investment plans in 2021 as the EU Missions were not yet launched in Horizon Europe. Thereafter, the Ministry decided to establish the competence centres in 2022. To align to the EU's Mission approach, the Ministry published an open competitive call matching the competence centres to be established to the thematic domains of the five EU Missions.

Today five competence centres are established for Cancer, Adaptation, Oceans & Water, Climate-neutral and Smart Cities and Soil. They have been designed as a platform for collaboration between several higher education institutions and the private sector. The Competence Centres must address only one mission and develop national joint R&I agendas and roadmaps in line with the EU Missions' agenda. It is expected that these competence centres will increase the participation of the public and private sectors in Horizon Europe's Mission funding.

This Mission-oriented approach is unique in that it requires the involvement of the private sector from the start. Each competence centre must include at least five public research organisations and at least five SMEs. Large enterprises can join the centres as well. Companies will co-fund their activities within the centre (SMEs at 25% and LSE at 50% of eligible costs for industrial research). In the short time that these competence centres have been operational, each of them has already secured considerable amounts of private sector co-funding from national and international partners.

This example shows that national authorities can be flexible in reorienting their activities to the Mission approach, even if they have not been explicitly agreed in investment agreements of other European funding programmes. It also shows that there may be more private sector engagement in Mission approaches than can be monitored with currently used methods.

Source: Consultations with Romanian government representatives.

EU Missions and Smart Specialisation Strategies

EU Missions as a policy approach and Smart Specialization Strategies (S3) share commonalities: i) EU Missions address grand societal challenges whilst S3 represent priorities established by regional authorities to address the region's unique socio-economic conditions – herein there is broad scope for thematic alignment between the two approaches focused on sustainability as a key principle; ii) EU Missions are applicable across the EU and balance socio-economic-environmental innovations whereas S3 balance placed-based technological and social innovations; iii) open and participatory principles and empowerment of actors characterise both policies - EU Missions' implementation requires coordination of policy makers and engagement of citizens and stakeholders whilst S3 shall be an inclusive process of stakeholders' involvement centered on 'entrepreneurial discovery' processes where actors of the quadruple helix are involved.

Operationally, complementarities and synergies between EU Missions and S3 have not been formalized. This may result in inefficiencies mainly related to mismatches in the setting of priorities (top-down vs. bottom-up mechanisms), budgetary periods (annual vs. pluriannual commitments) and in the scheduling of calls and funding activities. This explains the general finding that linking EU's regional development funds and EU Missions has been a challenge for MS. Further, current evidence shows that the alignment of the two policies is mainly in the hands of regional and local policy makers and depends on their willingness to take extra steps beyond formal conditionalities of the S3.

Nevertheless, certain regional governments have been inspired by, and have considered, the principles of the EU Mission policy approach. In Spain, the Navarra region launched a specific instrument as part of its S3 – the Strategic R&D Projects for sustainability which include pluriannual commitments for specific challenges or "missions" on topics that are also covered by the five EU Missions. In the Andalucia region, the Mission approach is embedded in the overall designing of S3, to the point that it has been changed to Smart Specialisation Strategy for Sustainability (S4).

The Blekinge Region in Sweden has followed a similar path, linking sustainability goals with growth goals by incorporating the Mission-oriented approach and EU Missions as the core element in S3. This came about through the selection of Oceans & Waters, Cities and Climate Adaptation Missions that have strong potential for the utilization of regional strengths of the business sectors in Blekinge, namely digital skills and manufacturing skills for car and marine industries. There was strong industry involvement in the strategy process from the beginning. The local business sector was keen to engage as the co-benefits included sustainability transitions for companies encompassing directionality, diversification, and creation of solutions via trans-disciplinary and cross-sectoral linkages and the breaking of silos. Yet, all these proactive steps came a bit as a surprise to the national authorities who did not expect creative approaches beyond the mandatory conditionalities for S3. At present, interaction of the local university and the region has strengthened, and top-down regional funding has been allocated to oceans and marine research conducted by the university. There are also mission pilots in the pipeline, with the objective to increase the understanding of missions in the regional context.

In conclusion, despite the policy design challenges, the examples show that the S3 and EU Missions approaches and resources can be integrated, especially if there is support from national governments to extend the S3 approach beyond its narrower conditionalities and sufficient commitment from industrial and academic stakeholders.

Source: EG consultations with the regions.

According to prior Mission assessment reports, **there is no significant private sector participation nor private sector investment in the five Missions.** Also, only two countries responded to this question in the SPC Survey, stating that information pertaining to private sector investment was not known. Whilst these findings outline the current general observations, there is some evidence that private sector contributions in Missions within the HE framework are progressing. For example, the Soil Mission attracted 25% private for-profit companies in funded projects from the first two Work Programmes (2021-2022). The Connected, Cooperative and Automated Mobility Partnership (CCAM), Toward Zero EMission Road Transport Partnership (2Zero) and the Cities Mission launched a Horizon Europe Mission Innovation Action ([HORIZON-MISS-2023-CIT-01](#)) on co-designed innovative passenger mobility and freight transport concepts. This tripartite consortium includes industry and other private sector investment and engagement.

Even if private sector contributions to the Missions have not yet reached significant levels, it should be noted that the national and regional examples (Case Studies 3 and 4) highlight possibilities to trigger this by linking EU Missions to other policy concepts (from national R&I strategies to S3). This is especially so where there is explicit focus on industrial development and private sector innovation. It seems that the current focus on launching the public policy side of the Missions (linking R&I with core public policy concerns in specific domains of e.g. health, climate etc) may have **underplayed the industrial and innovation elements of Missions** that will become crucial once the Missions move from launch and pilot phases to scaling-up and diffusion stages. While the reliance on the EIB to develop the "fundability" of actions under the EU Missions is a good example of developing this focus, we find that underused possibilities such as linking EU Missions and S3 type industrial and innovation activities can bring about the necessary strengthening of private sector engagement and contribution to EU Missions.

Further to EIB, EU initiatives and programmes such as InvestEU that supports sustainable investment, and Connecting Europe Facility could be used together with EIB-backed instruments to leverage private sector investments. The groundwork to support such leveraging in the Missions is starting to take place. Examples from Mission assessment reports:

- **Adaptation Mission:** A particular focus has been given to synergies with Cohesion policy and the EIB adaptation strategy.

- **Cancer Mission:** Collaboration with the EIB focusses on an investment agenda to support the development of Comprehensive Cancer Infrastructures and cancer control services (e.g. screening, vaccination, training) in MS.

- **Cities Mission:** Contacts are ongoing with EIB, the European Bank for Reconstruction and Development and national development banks, with philanthropic organisations and with other private actors, in relation to making the Mission Label a meaningful tool to facilitate access to funding and finance.

- **Ocean & Waters Mission:** The Mission has mobilised and aligned EUR 500 million from the European Investment Fund (EIF) BlueInvest for developing and marketing solutions for blue economy. The "Blue champions" pilot scheme, launched in 2023, will provide advisory support for 15 companies to qualify for EIB scale-up funding. A market assessment study by EIB has the objective to select 25 priority projects from the EIF BlueInvest II project portfolio for further investment.

- **Soil Mission:** As regards buy-in from within the private sector, discussions with philanthropic institutions are at an advanced stage as regards the co-design and coordination of activities and complementary funding. The EIB is carrying out a study

to assess the demand and supply sides for private-sector investment in relation to soil health. It is also developing a pipeline for large scale soil investments in connection with InvestEU.

Overall, as EU Missions move from establishment phase to scaling up phase, the time is now opportune to engage in dialogue with the private sector to lay the ground and create conducive conditions for increased engagement, involvement, and financial contributions.

The European Investment Bank's support in implementation of the EU Missions

The European Investment Bank (EIB) offers loans, guarantees, equity investments and advisory services for private companies and public institutions. The minimum EIB loans to the corporate sector are around €25 million, lower amounts are in certain cases possible. The Advisory Services include technical and financial expertise available to EIB's clients to develop and implement investment projects and programmes, and to improve institutional and regulatory frameworks.

The EIB has put in place a framework to ensure that the projects it supports are aligned with the goals of the Paris Agreement and the Sustainable Development Goals (de facto alignment since 2020). The EIB Group will support €1 trillion of investments in climate action and environmental sustainability in the period 2021-2030. The EIB will gradually increase the share of its financing dedicated to climate action and environmental sustainability to exceed 50% of its operations in 2025. In 2022, the share of EIB investments that went to climate action and environmental sustainability projects totaled €36.5 billion, or 58% of the EIB's own resource financing.

The EIB, through EIB Advisory, has supported the EC with the initial development of investment plans around the five Missions at their conceptualisation stage and is currently providing technical and financial advisory services for their implementation. The bankability potential (i.e. ability to attract repayable finance for certain types of investments) differs from Mission to Mission. As part of the normal EIB operations, some cities for example have already been granted long-term Framework Loans for developing their infrastructure. Advisory services are, among others currently engaging in awareness raising campaigns.

For the Cancer Mission, the EIB is already active in the financing of wider life sciences investments, while for Soil and Ocean & Waters Missions the bankability perspectives are currently being investigated. In collaboration with the EC and the Mission managers, the EIB Advisory Service is currently carrying out market assessments for Soil and Ocean & Waters Missions, including an identification of finance gaps/barriers and the development of a pipeline of potentially investable projects.

Potential finance gaps can be addressed by the mobilisation of public capital (e.g. risk sharing and/or blending) thereby levering private investments. For more risk-intensive investments, special risk sharing facilities could be used for providing greater access to credit for a wider range of SME clients. Also, guarantee, equity and capacity building investments to support Europe's SMEs by the European Investment Fund (EIF) and the grants and equity provided by the European Innovation Council (EIC) are relevant for speeding up the deployment of new technologies in some of the Missions.

Source: Consultation with the European Investment Bank

Sub-category 4.2 Scaling of transformative solutions and supportive measures

The ultimate success of EU Missions lies to great extent with national and regional policymakers who are able to identify transformative solutions and adapt/implement regulations, laws, and incentives for deployment at scale. The deployment shall consider cultural shifts and behavioural changes necessary for solutions to be inclusive and equitable. Pillar 4 in the proposed monitoring framework includes indicators 4.2.1 and 4.2.2 on scaling of transformative solutions and supportive measures. Considering that the Missions were launched in 2021, and that most Missions are still in the early phases, scaling of transformative solutions and supportive measures is proposed as a mid- to long-term outcome in the proposed monitoring framework and as such the respective indicators were not piloted in the SPC Survey.

At this stage, it is important to capture processes in relation to sub-indicators 4.2.1 and 4.2.2 that can inform on the extent to which the transformative pathway in EU Missions as a policy approach is taking place, i.e. developments in the chain of *co-creation, piloting and testing – validation – demonstration – supportive regulatory and legal frameworks – equitable and inclusive deployment – diffusion*.

Based on data from previous assessments, information available on EU Missions and the qualitative input provided by respondents of the SPC Survey, the following types of enabling **transformative processes are on-going** and may be used as short-term indicative measures of the progress in setting-up the pathways and framework for scaling-up of activities in relation to EU Missions:

- **Scaling-up:** DG RTD has adopted a portfolio approach of previous and on-going R&I FP projects that identifies projects ready for scaling-up and is extending this to a 'portfolio of actions approach' that will systematically link R&I actions with policy activities (e.g. finance, regulation etc).

- Synergies with EU Programmes and Initiatives:

  – Work is on-going to link the Missions to relevant centralized EU Programmes and shared management programmes for leveraging of financial envelopes, reinforcement of synergies and maximizing impacts, as well as horizontal policy integration and vertical governance that require regional and/or local authorities to engage and commit to Missions. Synergies between Missions and centralized EU programmes may take the form of co-created calls, cross-referencing programmes in calls, provisions for complementary funds, joint promotion in relevant stakeholder communities, awarding of bonus points for projects that make demonstrable use of research outcomes from other EU funded projects and a seal of excellence for projects that may facilitate access to national, regional and other funds.

  – Transformative processes that support testing, deployment and scale-up of innovative Mission solutions are underway but more directionality is required to link to the New European Innovation Agenda, HE Pillar III, European Digital Innovation Hubs and instruments backed by the EIB.

- EU Missions-driven bottom-up actions at regional level

  – The Climate Mission has developed joint activities with the European Cohesion Policy; is an enabler for the EIB's Strategy on Smarter Adaptation and will cooperate with the European Environmental Agency to showcase results on the Mission through the Mission Implementation Platforms.

- In the Ocean & Waters Mission, scale-up of R&I solutions through testing and replication is happening in more than 100 associated regions in Europe. This is being helped by the Ocean & Waters Mission Work Programmes that mostly comprise IAs. The IAs shall involve associated regions other than those involved in the projects, to demonstrate the viability and replication of innovative solutions (validation, testing, demonstration, prototyping, piloting) in relation to the Mission objectives. Furthermore, the associated regions scheme is implemented together with the BlueInvest and the Blue Champion mechanisms co-designed with the EIB to provide a high potential for upscale and replication of innovative solutions.

  - In relation to the Cancer Mission, regional health innovation ecosystems act as living labs for testing and deploying new solutions through different funding schemes and partnerships.

- Mission Charters and Labels may facilitate further access to financing sources and private investment.

  - Ten European cities were awarded the Label of the EU Mission for Climate-Neutral and Smart Cities. The Label can facilitate access to EU, national and regional financing sources, and private investment. The Label is awarded based on a Climate City Contract co-created with public and private sectors as well as citizens, and includes an action plan and an investment strategy.

  - Missions Charters - More than EUR 3.72 billion has been mobilized through 480 concrete submitted actions (projects, initiatives, and activities) that signed Mission Ocean & Waters Charters. These are not actions funded via the Mission, but rather on-going actions funded via European as well as national and other funds that can contribute to the objectives of the Mission.

- Mission Implementation Platforms are taking a supportive and communicative role.

  - Climate Mission Implementation Platform will, from 2023-2025, provide technical assistance to at least 200 regions (as compared to target of 150 regions and communities) to become climate resilient by 2030.

  - The Cities Mission Implementation Platform is running the Pilot Cities Programme aimed at supporting European cities in testing and implementing innovative approaches to rapid decarbonisation, working across thematic areas and functional silos in support of systemic transformation.

- Early processes towards new Mission-driven regulatory approaches

  - The adoption and implementation of the proposed Soil Monitoring Directive could massively drive the upscaling (uptake) of place-based solutions.

  - The Circular Cities and Regions Initiative (CCRI) brought together policymakers, business leaders, and experts on the circular economy as well as the public to explore how cities, regions and their partners across Europe are advancing from their political decisions and strategies towards the deployment of systemic solutions.

Overall, the on-going transformative processes can contribute to the further deployment and scale-up of innovative solutions, as well as, pooling of funding across countries and regions. It is important that different types of activities finally lead to the development of permissive (new) regulations, policies and strategies that will be necessary for the cross-sectoral problem solving and action-oriented approach that Missions need to take.

CONCLUSIONS AND RECOMMENDATIONS

In response to the mandate provided by the EC, the EG has proposed a monitoring framework for EU Missions as a systemic policy approach. The comprehensive monitoring framework goes through different stages of implementation with a specific focus on how Missions evolve outside the Horizon Europe framework.

The monitoring framework complements the general HE KIP framework that focuses on a range of impacts of the EU's R&I policy interventions, including Missions. It also seeks to complement the Mission-specific monitoring frameworks being currently set-up to monitor the launch and implementation of individual Missions and how the Missions progress in achieving their specific goals and impacts.

Missions are a novel policy approach in the EU context, in the early phases of implementation, with **no "baseline" indicators** and **no baseline policy and governance processes.** The monitoring framework proposed by our EG focuses mostly on process-level elements which include the setting up of different proceedings and governance systems that are crucial for enabling the achievement of the goals of EU Missions as a policy approach. The analytical focus on EU Missions as a policy approach, as opposed to individual Missions as HE instruments, has enabled us to distinguish crucial elements of the systemic policy approach. This entails changing how R&I is done and used in the EU and is summarized in the 4 Pillars of our framework that do not fall into the traditional logic of HE interventions and monitoring.

Main findings

The EG deployed the short- to mid-term indicators of the monitoring framework through a survey that targeted EU Member States and Associated Countries. This enabled a review of the state-of-play of the following three key tasks (Fig. 11):

> **Key Task I:**
>
> *Monitoring EU Missions beyond Horizon Europe, looking at the contribution of other funding programmes at EU and national, regional and local levels towards the achievement of Missions' objectives.*

A first general observation is that **EU Missions as a novelty of the EU's Research and Innovation Framework Programme has been a significant trigger for Mission-oriented policy discussions and developments across the EU, and at different levels of the EU**. The share of EU Member States and Associated Countries participating in different knowledge sharing exercises (e.g., TRAMI project, Mutual Learning Exercises and Enhanced Dialogues focusing on Missions) indicates that there is interest and willingness across the majority of the European countries to engage in Mission-oriented thinking and policy innovation. At the same time, we note that our survey findings, as well as other prior studies, indicate that **in terms of concrete actions, most countries are at early stages in their contributions to EU Missions**.

Our main finding from the first monitoring survey is that the **majority of the European countries and regions are setting up a variety of mechanisms to integrate the EU Missions in their policies and policy initiatives**. However, considering the short timeframe

since the launch of Missions, **targeted contributions and pooling of significant financial and non-financial resources from the public sector, community actions and private initiatives towards the achievements of the objectives of EU Missions have not yet synergised**.

> **Key Task II:**
>
> *Monitor whether the EU Missions are on track to deliver against their objectives and targeted impacts.*

Missions have largely progressed following the overall design of the approach and specific models of each Mission as proposed in respective Mission Implementation Plans. Whilst EU level structures and processes are mostly set up and specific research and innovation activities such as piloting and scaling-up of solutions have been launched via calls in Horizon Europe, **EU Missions are not yet at a stage where monitoring of their contribution to the substantive transformative goals of each Mission can be done.**

At EU level, the role of Missions as a policy approach and how to structure its implementation was set in the formal Horizon Europe regulations and in the implementation activities of each Mission. **Beyond Horizon Europe, and at national, regional and local levels, most actors are still in the process of "sense making" and exploring and experimenting with appropriate roles and logic models for the approach mainly based on the existing structures**. The EG's survey showed that the "sense making" stage is under development in terms of visions of how to plan and coordinate EU Missions and integrate specific Missions into national context. Nevertheless, viewed broadly, **the on-going process transitions in terms of knowledge creation and valorisation, governance, participatory engagement of citizens and stakeholders and pooling and scaling-up in the EU Missions are indications that directionality towards achievement of the Missions' objectives and targetd impacts is taking place.**

> **Key Task III:**
>
> *Monitor supportive measures implemented to enable EU Missions, including policy interventions, governance approaches, deployment actions and involvement of end-users.*

There are several new governance approaches to support the EU Missions at EU, national and regional levels. At EU level, **horizontal governance mechanisms involving the Commission's sectoral Directorate-Generals for the co-management of Missions seems to be an accepted and functioning novelty.** Herein, a greater inclusion of the Directorate-General for Regional and Urban Policy and its programmes in the broader portfolio of Mission-oriented activities is necessary to trigger further coordination and pooling of resources at the Member State level.

At national level, some countries are developing nationally coordinated governance approaches across the five Missions, whilst others are building more decentralized and Mission-specific models. The Mission Data Platform introduced by the TRAMI project (https://mission-data-platform.eu) provides a very detailed overview of these actions as well as a potential platform for future gathering and sharing of these practices.

Our findings further indicate that **in cases where the EU Mission's objectives are closely aligned to pre-existing European and national policy strategies, and when the introduction of EU Missions has overlapped with national policy planning cycles, faster and deeper integration of EU Missions with national systems and processes has occurred** (e.g. the Europe Beating Cancer Plan, the upcoming Soil Directive in the Common Agricultural Policies, the national sustainable cities programmes, the national climate change adaptation plans). Also, in these cases the chances of finding new policy interventions alongside research and innovation funding decisions are highest. Apart from this, there are not many concrete examples of additional supportive policies and strategic activities.

The inclusion of citizens and stakeholders and co-creation aspects are emphasised in the design of EU Missions as a policy approach. However, beyond traditional engagement practices as part of policy making and implementation of Horizon Europe funded and similar projects, **citizen and stakeholder engagement in the implementation of EU Missions is rather limited and requires further elaboration and conceptualization**. Given that Missions' goals require significant transformation of investment, consumption and other behaviours, it seems paramount that stakeholders are engaged, brought on board and actively participate in the Missions prior to the scaling-up of potential solutions.

The EG recognizes that the EU Missions as a policy approach is at a relatively early stage of its evolution and that EU Missions have triggered discussions, policy debates and developments on the contributions of different EU and national level actors. Taking this into consideration, **the report proposes recommendations for improving EU level actions to support the functioning and roll-out of the approach in a 'beyond Horizon Europe' context.**

Figure 11. The three Key Tasks.

Recommendations for corrective actions

1. **Provide stronger political and policy anchoring of EU Missions.** This can be achieved via reinforced anchoring of Missions in the EU Green Deal processes as well as in the EU, national and regional R&I policies (New European Innovation Agenda, Smart Specialization Strategy, Recovery and Resilience Facility).

2. **Build stronger and wider co-ownership of EU Missions in EU MS/AC** by opening different stages of the policy processes – from defining Mission areas and launching specific Missions to designing specific Mission interventions to take place in EU MS/AC – to **more transparent collaboration with MS/AC**.

3. **Broaden both the EC-wide participation as well as engagement of different MS/AC and regional actors in different phases (from establishment to deployment and scale-up) of EU Missions.** This can be achieved via better alignment, timelines, permissive conditionalities and design of EU policies and programmes to allow co-funding of Mission activities so that Mission actors can include these programmes and resources in their Mission-level activities. These include the main relevant policy concepts (S3, the Regional Innovation Valleys Initiative), key supportive programmes and activities (ERDF, RRF, Digital Europe, I3 Instrument, Horizon Europe Partnerships) and the use of different labelling tools such as Seals of Excellence and Mission Labels for the earmarking of funds for EU Missions.

4. **Clarify the expected role and value of citizen and stakeholder engagement in Missions as a policy approach** and share good practices (by developing frameworks and guidelines) of how this can be designed and achieved beyond traditional approaches to policy engagement and R&I project implementation.

5. Start already now **building stronger societal visibility of Missions** to prepare societal actors across EU MS/AC for the scale-up stage of Missions' implementation where individual and collective behavioural changes become pivotal for pooling necessary resources and triggering scale-up actions.

6. Focus on developing and communicating **clear business cases/pathways for the different Missions** to trigger wider pooling of resources. For Missions to achieve their transformative goals, significant private sector engagement (and re-alignment from current practices) needs to be triggered, but this needs stronger inclusion of these actors in the Missions' debates and processes.

7. Next to the desired financial pooling effects of Missions, **the scale-up stage of Missions needs to focus also on the integration of Mission goals and activities in the broader national and regional policy landscapes.** EU MS/AC level policy and regulatory support, standards development etc. are needed to enable large scale piloting and scaling-up of Mission solutions.

8. **The proposed process level monitoring framework for EU Missions as a policy approach can complement and supplement other monitoring, evaluation, and assessment exercises of Horizon Europe as well as of individual Missions to provide a combined picture of the progress towards Missions' objectives.** While some of the proposed indicators can be taken up in the monitoring system of individual Missions, for buy-in of EU MS into EU Missions as a policy approach, **anchoring and linking this monitoring framework to the biannual EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise is encouraged.**

EXPERT GROUP

RECOMMENDATIONS

1 Stronger political and policy anchoring of EU Missions

…reinforced anchoring of Missions in the EU Green Deal processes as well as in the EU, national and regional R&I policies…

… by opening stages of the policy processes… to designing specific Mission interventions to take place in EU MS/AC …

2 Build stronger and wider co-ownership of EU Missions in EU MS/AC

3 Broaden the EC-wide participation of different MS/AC and regional actors

… from establishment to scale-up phase via better alignment, timelines, permissive conditionalities and design of EU policies

… share good practices of how this can be designed and achieved beyond traditional approaches …

4 Clarify the role of citizen and stakeholder engagement as a policy approach

5 Build stronger societal visibility of Missions

… to prepare societal actors for the scale-up stage where individual and collective behavioural changes become pivotal …

… to trigger wider pooling of resources... to achieve transformative goals, via private sector engagement …

6 Clear business cases/pathways for the different Missions

7 Focus on the integration of Mission goals & activities in the broader landscapes

…EU MS/AC level policy and regulatory support, etc. are needed to enable large scale piloting and scaling-up of Mission solutions …

… a combined picture on the achievement of progress towards Missions' objectives may be obtained …

8 Complement other monitoring, evaluation, and assessment exercises

Figure 12. Main recommendations of the Expert Group.

ANNEX I – THE FIVE EU MISSIONS AT A GLANCE

Main Problem

Cities consume over 65% of the world's energy and account for more than 70% of global CO2 emissions.

Why has the main problem arisen?

- Overpopulation of cities.
- Not enough integration in funding approaches.
- Fragmentation of the EU's cities' policy.
- EU mechanisms do not favour a holistic strategy aiming at climate neutrality.
- Only a few European cities working towards climate neutrality.
- Lack of citizens' and stakeholder engagement.
- Inadequate monitoring, evaluation, and communication framework.

What are the consequences?

1. A high percentage of greenhouse gas emissions come from cities.
2. Inability of cities to test, develop and scale innovative solutions.
3. Limited integrated interventions.
4. Many cities face substantial challenges related to the
   - operational (skills & expertise) capacities,
   - availability of funding,
   - and political support from voters and national governments.

The Mission

Rationale: The high share of Cities in energy consumption and global CO2 emissions make them an important part of European efforts to achieve the goals of the European Green Deal.

Goal: Deliver 100 climate-neutral and smart cities by 2030 that enables others to follow suit by 2050.

Climate-Neutral & Smart Cities

Specific Objectives:

SO-1: A "demand driven" and city-focused process based on R&I and focused on the preparation of Climate City Contracts (CCC).
SO-2: Tailored R&I pilots & Scale-up and replicate solutions.
SO-3: Synergies and mutual support with EC initiatives.
SO-4: Access of cities and businesses to EU skills and expertise.
SO-5: Upgrade Cities' administrative, financial & policy capacity & buy-in from citizens, stakeholders, and regions.
SO-6: A transparent monitoring system of the progress.
SO-7: Assistance from national, regional, local authorities, banks and private investment, through regulatory & funding levers.

Interventions

Building Blocks

- Mission Platform
- Climate City Contracts
- Mission Label
- Global Knowledge Exchange Centre
- National, local, and regional authorities' network

Intervention Logic:

Challenges → Objectives (SOs 1-7) → Activities (Act. 1-10) → Results

Figure 13. Mission Climate-Neutral and Smart Cities

Main Problem

2.7 million people are diagnosed with cancer and 1.3 million lose their lives due to the disease each year in Europe.

Why has the main problem arisen?

- Increasing challenges of health systems including shortages of care workforce.
- Fragmented research & policy initiatives.
- Lack of understanding of cancer development, prevention, diagnostics, treatments quality of life of patients during and after cancer treatment.
- Room for improvements in cancer control through screening programmes in Central and Eastern Europe.
- **Lack of:** networking | capacity & skills | digital infrastructures | novel mechanisms for citizens engagement.

What are the consequences?

- Increased demand for cancer-care and pressure on EU health systems.
- 200€ billion costs in Europe (2018).
- Fragmentation of EU cancer research, healthcare providers, patient care communities & industries. Absence of patient/citizen engagement.
- A high percentage of cancer could be prevented with prevention, screening and early detection programmes.
- Lack of equal access to innovative treatments across countries, regions & socio-economic groups.

The Mission

Mission Cancer

Rationale: Europe's Beating Cancer Plan is an ambitious goal. The Mission aims to spark cross-sectoral collaboration on an ambitious European scale to improve prevention and control by integrating innovative approaches to R&I, public health policies, data sharing, and citizen engagement.

Goal: The Mission goal is improving the lives of more than 3 million people by 2030, through prevention, cure, and for those affected by cancer to live longer and better.

In addition, it aims to improve the baseline scenario for reducing mortality from 14% to 20% for females & 30% to 40% for males.

Specific Objectives:

SO-1: Improve the understanding of cancer.
SO-2: Prevention including screening and early detection.
SO-3: Optimise diagnostics and treatment.
SO-4: Support quality of life.

Interventions

Building Blocks

1. Foster Innovation through generation of knoweldge & evidence.
2. Promote innovation, test, validate, demonstrate & upscale solutions.
3. Track progress and monitor inequities in access to knowledge, reserac
4. Engage with cancer community, citizens/patients and society at large.

R&I Programme
Living Labs
Monitoring System
Health Literacy

Intervention logic:

- Understanding
- Prevention, screening, and early detection
- Diagnosis & Treatment
- Quality of life detection

Key Novel Activities:

- Development of a common strategic R&I agenda to steer national efforts & streamline investments towards its objectives.
- The exploitation of existing R&I results and acceleration of their transition into public health.
- Linking R&I, EU/national policies & implementation of Europe's Beating Cancer Plan.
- Increase cross-sectoral collaboration by bringing together R&I, finance, social sciences, and humanities for a continous interaction.

Figure 14. Mission Cancer

Main Problem

**The hottest decade on record has just concluded.
The climate impacts will continue for decades.**

Why has the main problem arisen?

- Our planet is vulnerable to CC.
- CC is happening today, with rising intensity.
- Too late to prevent climate impacts already occurring.
- All sectors are impacted.
- Adaptation is not fast, smart & systemic
- Only few relevant actions submitted to the Covenant of Mayors (2020).
- Societal transformation needs education & behavioral changes.

What are the consequences?

- Regions with low growth have less capacity to adapt.
- Both infrastructures and social structures are underprepared.
- How prevent the un-adaptable and adapt to the un-preventable?
- Public finances or regulations are not sufficient to face the challenge.
- Adaptation and mitigation actions should not be antagonist but complementary & in parallel.

The Mission

Rationale: The 2021 EU Adaptation Strategy integrates the Mission as an essential delivery mechanism for demonstrators to induce leverage effect on 1:10.

Goal: Accompany by 2030 at least 150 Europan regions and communities towards climate resilience.

Adaptation to Climate Change

Objectives:

BUILD RESILIENCE — 75 demonstrations

ACCELERATE TRANSITION TO A RESILIENT FUTURE — 150 communities and regions

PREPARE EUROPE FOR CLIMATE DISRUPTIONS — Citizens, communities and regions

Ob1: Preparing and Planning for climate resilience

Ob2: Accelerating transformations to climate resilience

Ob3: Demonstrating systemic transforms to climate resilience

Interventions

implementation Steps

- Cross-border Value — Ob3
- Impact at Scale
- Innovative Solutions
- Vision & Pathways — Ob2
- Partnerships & Engagement
- Opportunities and Risks — Ob1

Mission Implementation Platform:

- Coordination and management.
- Support and development
- Monitoring, learning and evaluation.
- Broader citizen engagement, communication, dissemination, and exploitation.
- Connect to/collaborate with the activities of EEA, JRC, EIB, EIT's Climate-Knowledge and Climate-KIC.

Implementation Phases

Supporting system 60-100 regions & communities to be fully engaged

Adjustments Activate all actions to unfold full potential, + 50 - 100 regions & communities

Develop legacy & Seek to sustain the momentum achieved

2021 — 2023 — 2024 — 2027 — 2030

build-up — deployment — consolidation

Figure 15. Mission Adaptation to Climate Change

Main Problem

60-70% of European soils are in an unhealthy condition.

Why has the main problem arisen?
- Human activities affect the health of the soil, associated with:
  - Consumer Demand Patterns
  - Intensive Land Use, Urbanisation
  - Agro Production Processes
  - Industry Processes
  - Climate Change.
- Fragmented public policies & limited coordination of R&D capacities.
- Weak engagement of citizens.
- Limited ecosystem services and enormous costs of degraded soils.

What are the consequences?
Low capacity of soils to supply ecosystem services such as:
- producing adequate quantities of safe and nutritious food & feed,
- storing and purifying water,
- recharging aquifers, & reducing the impact of droughts & floods,
- capturing carbon & reducing the eMission of greenhouse gases,
- supporting crop productivity and reducing contamination
- preserving biodiversity and landscapes.

The Mission

Rationale: Healthy soils are essential for all life-sustaining processes on Earth. The Mission's aim is to significantly increase the share of healthy soils in Europe to levels that are in line with Green Deal commitments and targets by 2030.

"A Soil Deal for Europe"

Goal: The Mission will establish 100 living labs and lighthouses to lead transition towards healthy soils by 2030.

Specific Objectives:
SO-1: Reduce desertification
SO-2: Increase soild organic carbon stocks
SO-3: Stop sealing & re-use of urban soil
SO-4: Reduce pollution & enhance restoration
SO-5: Prevent erosion
SO-6: Improve soil structure
SO-7: Reduce the EU global foorprint on soil
SO-8: Improve soil literacy in society

Interventions

Building Blocks:
1. An Ambitious inter- and transdisciplinary R&I programme.
2. 100 Living Laboratories for experimentation and Lighthouses to accelerate the uptake of solutions.
3. An EU framework for Soil Monitoring and Reporting.
4. Soil literacy and citizen engagement.

R&I
LLs
Literacy
Monitor

Timeline:
Induction & Pilot
2021-2025
Expansion & Innovation
2024-2030
Scaling Up & Mainstreaming
2027-2030

Other Initiatives as Examples:
The **NATI00NS** project acts as a messenger by raising awareness through dedicated events at MS&ACs and discussions on the best Living Lab facilities to address regional soil needs.
The **PREPSOIL** project is increasing awareness by reaching out to a wider audience: from universities, students up to society at large.
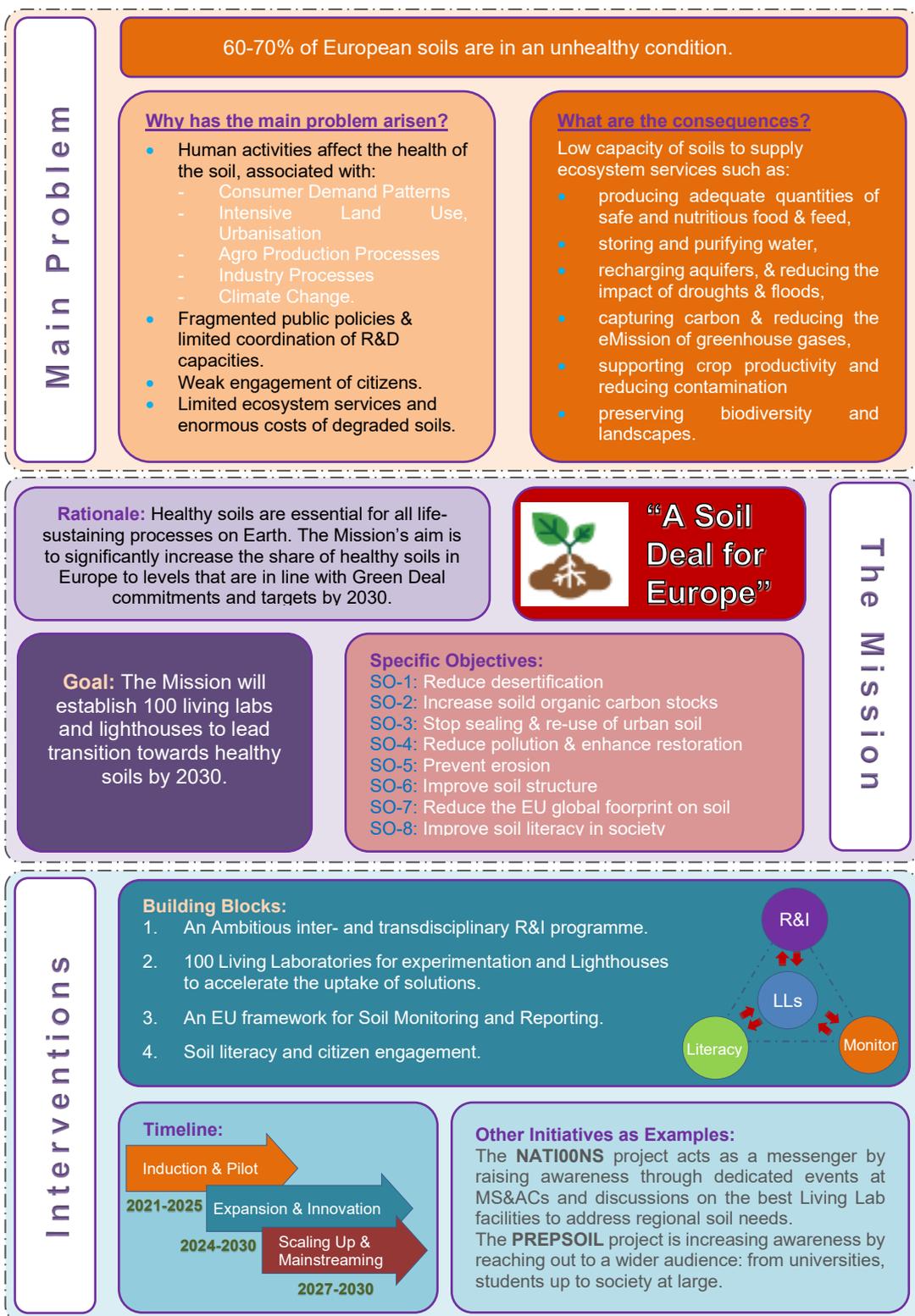
Figure 16. Mission A Soil Deal for Europe

Main Problem

The EU's Ocean & Waters, seas and freshwater ecosystems are rapidly degrading as a result of human activities.

Why has the main problem arisen?

- Unsustainable exploitation of marine and freshwater resources.
- Pollution is affecting the water system notably plastics and microplastics, nutrients, chemicals, and underwater noise.
- Climate change is altering the physical and biological state of the Ocean & Waters, seas, and waters and disturbing their ecosystems.

What are the consequences?

- Threatening of the natural capital, the essential goods and services & risks to perturb the self-regulatory characteristics of the water system.
- EU fish stocks are not in good status.
- Aquatic species and habitats are endangered.
- Reducing Ocean & Waters's capacity to act as CO_2 sink.
- 1 billion tons of CO_2 are released annually from degraded coastal ecosystems.
- Extreme sea level events and floods are likely to occur more frequently threatening EU's communities and population.

The Mission

Restore our Ocean & Waters & Waters

Rationale: To restore the hydrosphere's health and its essential functions and services, its degradation must be reversed. To achieve it, all the principal drivers – unsustainable exploitation, pollution, climate change & insufficient citizen engagement and knowledge – a systemic approach should be applied.

Goal

The Missions is to restore the health of the EU's Ocean & Waters and waters by 2030.

2030 Objectives

RESTORE OUR OCEAN AND WATERS

- Filling the knowledge and emotional gap
- Zero pollution
- Revamping governance
- Regenerating marine and freshwater ecosystems
- Decarbonising Ocean & Waters &

Interventions

Mission Lighthouses:

Sites to pilot, demonstrate, develop and deploy the Mission activities across EU seas and river basins

- Baltic & North sea basin
- Mediterranean sea basin
- Danube river basin
- Atlantic & Arctic coast

Restore our Ocean and Waters by 2030

PROTECT AND RESTORE MARINE AND FRESHWATERS ECOSYSTEMS AND BIODIVERSITY
- Protect at least 30% and strictly protect 10% EU's sea areas
- Restore 20.000 km free flowing rivers
- Marine nature restoration targets (incl. degraded seabeds, coastal ecosystems)

PREVENT AND ELIMINATE POLLUTION OF OUR OCEANS, SEAS AND WATERS
- Reduce by at least 50% plastic litter
- Reduce by at 30% microplastics
- Reduce by at least 50% nutrient losses, chemical pesticides

MAKE THE BLUE ECONOMY CARBON-NEUTRAL AND CIRCULAR
- Net zero maritime emissions
- Zero carbon aquaculture
- Low carbon multipurpose use of marine space

Implementation Phases

2021-2023: 1st Implementation Phase
- Launch of basin-scale Mission lighthouses
- Piloting and testing of innovative R&I solutions
- Blue Parks
- Citizen science campaigns and engagement initiatives
- Digital Knowledge system precursor
- Other enabler actions
- 2023 Mission review report under Article 7(3) HE Regulation

2024-2026: Mission mid-term review
- 2025 Mission mid-terms review report
- First call for scale up actions

2026-2029: 2nd Implementation phase
- Extension of Mission lighthouses
- Blue Parks
- Scale up actions for further deployment and replication of solutions
- Citizen science, literacy campaigns and engagement
- Completion of Digital Twin Ocean
- Building of dynamic investment ecosystem
- Other Enabler actions

2030: Results and benchmarking
- Implementation assessment
- Final report

MISSION CHARTER

To mobilize stakeholders to achieve the Mission's goals of strengthening cooperation, aligning efforts and achieving critical mass for the transformational change.

Figure 17. Mission Restore our Ocean and Waters

ANNEX II – INDICATORS AND METHODOLOGIES

Annex II provides a short conceptualization and rationale for the proposed indicators under each pillar as well as a short methodological guide for further development and testing of the indicators.

Pillar 1 - Knowledge creation and valorisation

According to the intervention logic model for Missions as a policy approach, the monitoring system proposed for Pillar 1 - Knowledge creation and valorisation - is composed of the following additional indicators supplementing the EU's KIP and portfolio approaches:

1.1 Knowledge valorisation at regional and local levels for transformative Mission-oriented solutions
1.1.1 New knowledge created in different Mission units (cities, living labs, lighthouses, hubs, platforms, etc.)
1.1.2 Novel solutions further developed and piloted (lab scale) in different Mission units (living labs, lighthouses, cities, demonstrators, hubs, platforms, etc.)

1.1 Knowledge valorisation at regional and local levels for transformative Mission-oriented solutions

1.1.1 indicator: New knowledge created in different Mission units (cities, living labs, lighthouses, hubs, platforms etc)

Definition: Knowledge created in Mission units with a potential for contribution to solutions that address Mission challenges.

Rationale and assumptions: This short- to mid-term indicator monitors whether Mission units selected or created as part of the Missions are creating, through their co-creative and bottom-up activities, new knowledge that potentially enables solutions to tackle Mission challenges. Novel knowledge for Mission solutions should contribute to scientific, societal, and economic impacts across countries and regions in the long run (see the HE KIP). While the HE funds significant knowledge creation and different portfolio exercises and HE KIP indicators monitor these processes, in some cases, the bottom-up and co-creative logic of Missions could enable also local Mission units to define their own needs and purse R&I actions. In the short term, these transformative processes initiated by the Mission Units are usually linked to the Horizon Europe funding. For example, in the Cancer Mission the CSA ECHoS supporting the establishment of national mission hubs, an example of Mission Units, is planning to define guidelines, best practices, capacity building activities in knowledge exchange programmes. Some knowledge produced by the ECHoS consortium could not be tracked only by the regular HE funded projects reporting, especially in a mid-term frame and might need a more active involvement of Mission Units. This can include new concepts or new ways to address a specific issue or challenge and that may lead to the convergence of multiple innovative solutions. The monitoring should cover productions embracing both traditional R&I outputs (scientific publications), but also other outputs from grey literature and science-policy advice to new methods and concepts supporting Mission objectives, on efficient solutions at regional and local level.

Baseline: The starting points are Mission units promoted by each Mission (living labs, lighthouses, cities, demonstrators, hubs, platforms, etc.) to initiate the changes that will generate the expected goals (defined in section 3.4). As the Missions focus on different types of problems and activities (e.g. different types of pilot activities, engagement practices etc), these Mission units can be mostly monitored at the level of individual Missions through customization of generic indicators for specific Missions, but the Mission-specific monitoring results can still be aggregated into policy level monitoring.

Benchmark: Possible comparative benchmarking between Missions and Mission units

Frequency of measurement: Biennial reporting by problem solving Mission units, or as per Mission-specific monitoring schedule

Methodology:
- Calculated as count of R&I outputs (and their type, such as publications, science-policy advice, communication events, patents, etc…) reported in all ongoing and completed actions developed in and linked to Mission units.
- Build-up of well-designed survey/questionnaire for each Mission unit to identify R&I outputs created with potential for scale-up/transfer across countries and regions in the EU. Questions could monitor R&I outputs, the interdisciplinary approach, new R&I questions, contributing actors (gender) and the geographical coverage.

Dimensions:
- Data pooled into averages and comparison related to each Mission unit on R&I outputs resulting from Mission unit activities.
- Data related to each Mission unit on number of R&I outputs produced characterized by innovation types (strategic, operational, technological, social, financial, political, educational, etc.) to enable solutions.

Data sources:
- Data/statistics from problem solving Mission units
- Data collection from professional networks (websites and other communication sources)
- Data/statistics from MS, AC and regions

Interpretation: The EG recommends a combined quantitative (publications, patents, and classical R&I outputs) and qualitative approach. This will add value by identifying the innovation types, the novelty to enable solution, the interest of national and regional actors to support the further scaling and the potential new R&I questions/investigations resulting from R&I actions, interdisciplinary and cross sectoral cooperation. Such a combined approach will be beneficial in the long-term to capture the value chain of outcomes and impacts.

Reporting obligation: We suggest including this indicator in the monitoring system of each Mission.

1.1.2 indicator: Novel solutions further developed and piloted (lab scale) in Mission units (living labs, lighthouses, cities, demonstrators, hubs, platforms, etc.)

Definition: Knowledge-based Mission solutions (technological, social, financial, political, educational, etc.) that contribute to/underlie policies, strategies, incentives, regulations, investments further developed and piloted in Mission units.

Rationale and assumptions: This short- to mid-term indicator measures whether the Mission units are developing further (via e.g., piloting) relevant knowledge outputs and innovative solutions with the potential of being further scaled across the EU. Each Mission unit (living labs, lighthouses, cities, demonstrators, hubs, platforms, etc.) will nurture and accelerate innovations – either stemming from internal R&I outputs (see indicator 1.1) or from the overall pool of Mission-relevant R&I outputs (national and international) – by developing further and piloting new approaches at (living) "lab" scale. This indicator should use both quantitative and qualitative measures and be able to capture R&I solutions that have the potential for scale-up. The R&I actors involved in Mission units should be able, through a selection of existing knowledge and R&I actions at lab scale, to identify solutions that can be further scaled across countries and regions.

The innovative solutions could be conceptualized following the HE KIP indicator 4 "Solutions" as new or significantly improved: methods, technologies, and instruments / commercial goods

/ commercial services / scientific or industrial processes / business models. This conceptualization should be further customized for each Mission to capture the particularities and include, where relevant, other categories such as improvements in social, financial, political, educational practices and instruments.

Baseline: The starting points are Mission units promoted by each Mission (living labs, lighthouses, cities, demonstrators, hubs, platforms, etc.) and their planned and implemented activities.

Benchmark: No common benchmark, but possible comparative benchmarking between Missions and Mission units

Frequency of measurement: Biennial reporting by problem solving Mission units, or as per Mission-specific monitoring schedule

Methodology:
- Qualification/Identification of R&I actors and engaged users that contribute to the monitoring per Mission unit.
- Gathering of data beyond usual publications, use of grey literature, events, media and social networks text analysis.
- Build-up of well-designed survey/questionnaire for each Mission unit to identify planned and implemented actions aimed at further developing and piloting novel solutions.
- Questions should monitor the scale of activities (e.g. person years), the R&I fields involved (disciplines, trans-disciplinarity), the potential R&I outputs, type of participants, countries and regions actively contributing.

Dimensions:
- Data pooled into averages and comparison related to each Mission unit in specific R&I fields involved.
- Data pooled into averages and comparison related to each Mission unit on R&I pilot actions developed/implemented or under development.
- Data pooled into averages and comparison related to each Mission unit on inter- and transdisciplinary interactions (number and what disciplines/sectors/communities are contributing).

Data sources:
- Data/statistics from Mission units
- Data/statistics from identified R&I actors
- Data/statistics from identified users
- Data collection from social networks using text analysis on Mission solution uses

Interpretation: Qualified knowledge-based Mission solutions (technological, social, financial, political, educational, etc.) that contribute to/underlie policies, strategies, incentives, regulations, investments, user satisfaction developed and piloted in Mission units.

Reporting obligation: We suggest including this indicator in the monitoring system of each Mission.

Pillar 2 - Governance

Based on the intervention logic of the Missions as a policy approach, we propose to gradually introduce the following processes focused monitoring indicators for governance that cover different elements / building-blocks of governance systems as well as capture the likely/ideal evolution of the systems:

2.1 Mission-oriented governance mechanisms
　　2.1.1 Mission-oriented governance mechanisms at EU level to implement Missions
　　2.1.2 Mission-oriented governance mechanisms at MS and AC levels to implement Missions
2.2 Acceptance of Mission-oriented innovation policy
　　2.2.1 Acceptance of Mission-oriented policy approach for complex societal challenges
　　　　beyond original five Missions

2.1 Mission-oriented governance mechanisms

2.1.1 indicator: Mission-oriented governance mechanisms at EU level to implement EU Missions

Definition: Mission-oriented governance mechanisms at EU level to coordinate activities within and between the HE domain and specific policy domains

Rationale and assumptions: This indicator monitors and measures the governance arrangements at the EU level implementation of Missions. While the original proposals and regulations of Missions as part of HE envisioned specific governance mechanisms (Mission boards, secretariats, owners groups, implementation platforms, visions of how financing instruments etc should be pooled to support Missions etc), the process of implementation of the five Missions in practice will show the fit-for-purpose of the mechanisms for different types of Missions as well as the overall sustainability of the governance mechanisms (e.g. how will the procured services, such as Mission Implementation Platforms, prove themselves and become institutionalized).

We propose to unpack "governance" into the following "key building" blocks that should be monitored for each Mission (separately and also pooled into overall monitoring and assessment):
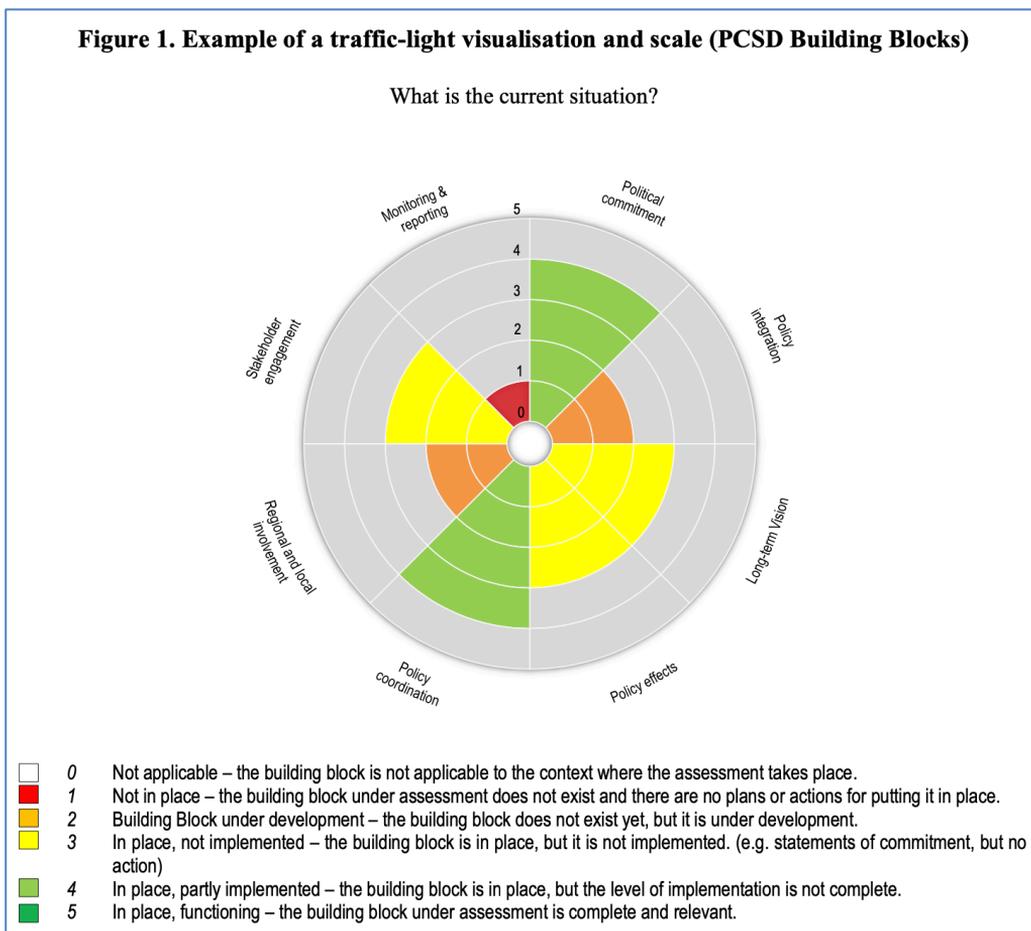
a. Strategic orientation and commitment (explicit inclusion of Missions in political statements, strategies, action plans, legislation) beyond HE (in specific Mission-related policies domains and directorates)

b. Engagement practices (e.g. formal procedures, Mission labels/endorsements etc) for engaging stakeholders, users, citizens in different stages of Mission implementation (planning, implementing, monitoring & evaluation)

c. Budgetary process for aligning and pooling funds for Missions from beyond HE sources (e.g. linkages between HE and sectoral/domain budgets, ERDF, RRF, EIB etc)

d. Horizontal policy coordination routines (principles and practices) to link R&I and other Mission-related policy domains (including coordination between DGs and lower-level units)

e. Vertical policy coordination routines (principles and practices) to link EU, national and regional/local/community-based Mission-related policies and activities

f. Novel Mission-oriented policy implementation structures and capacities (e.g. have Mission Implementation Platforms been put in place and function beyond existing funding periods)

g. Novel Mission-oriented policy portfolio/mix (e.g. have new comprehensive policy portfolios been developed to implement Missions)

h. Monitoring and evaluation system that allows for constant revision of Missions and approach to implementation

All building blocks can be monitored through the following scale that allows for monitoring both the progress in rethinking governance (in specific blocks and overall, and either on the level of specific Missions or EU as a whole) as well as at Missions level differences in styles of governance (what building blocks are considered relevant for Mission governance and how these are being designed, rethought):

0 Not applicable – the building block is not applicable to the context where the assessment takes place.
1 Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.
2 Building Block under development – the building block does not exist yet, but it is under development.
3 In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action).
4 In place, partly implemented – the building block is in place, but the level of implementation is not complete.
5 In place, functioning – the building block under assessment is complete and satisfices the need of Mission-oriented approach.

The monitoring exercise can both gather data on progress (though answers in the scale from 0-5) and detailed qualitative insights through open questions and qualitative data provision (e.g. why a certain building block is not developed, or what a specific building block consists of).

Figure 1. Example of a traffic-light visualisation and scale (PCSD Building Blocks)

What is the current situation?

	0	Not applicable – the building block is not applicable to the context where the assessment takes place.
	1	Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.
	2	Building Block under development – the building block does not exist yet, but it is under development.
	3	In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action)
	4	In place, partly implemented – the building block is in place, but the level of implementation is not complete.
	5	In place, functioning – the building block under assessment is complete and relevant.

Example of how the results can be visualized based on OECD work on monitoring policy commitment for SDGs. Given the exploratory nature of the EU's Mission approach, in first instances, these building blocks can be more qualitatively mapped and characterised as different varieties of (emergent) novel approaches, or *governance* styles (e.g., top-down, bottom-up; hierarchical, contractual, network based). Mapping of these approaches allows to monitor what is done differently on governance level to support Missions (novel mechanisms, novel styles, focus on some functions vs less focus on others) and reveal novel and functioning practices to be shared across different Missions. Over time, once the practices mature, a more coherent Mission governance approach(es) can be defined and codified.

Baseline: Existing formalised designs of governance as stated in HE regulations and MIPs

Benchmark: Formal baseline as benchmark. Possibility to carry out comparative benchmarking between Missions (e.g. by number of implemented governance mechanisms, styles of governance etc to support Missions).

Frequency of measurement: Annual or biennial stock-taking exercises (e.g. mutual learning exercises between Missions, EC coordinated survey/study/assessment).

Methodology: Expert assessment and joint learning based on:

- interviews and/or focus groups with Mission Secretariats (assessing the building blocks on the proposed scale + providing qualitative information)
- comparison of approaches against baseline, against own internal evolution (2nd stage), against other Missions
- open-ended questions with brief explanations (e.g. what type of governance mechanisms could be included / excluded) to key policy makers
- secondary supportive data from policy websites such as TRAMI, STIP Compass

Dimensions: data and values for this indicator may be disaggregated by:

- simple count of governance mechanisms implemented to support the Missions (as a whole, or per each Mission), i.e. what are key elements of governance to support Missions
- differences in functions such as planning, coordination, engagement, implementation, monitoring and evaluation
- types of mechanisms for coordination, implementation, engagements (e.g., roundtables, co-creation tools, implementation platforms etc)
- qualitative assessments on the functioning of novel governance mechanisms based on interviews, case studies, policy documentation and other qualitative sources
- funding attached to the mechanism (for implementation and for Mission activities)

Data sources: Biennial reporting by Missions (Secretariats, Implementation Platforms) based on strategies, policies, plans, instruments (including justification/explanatory documents).

Linkage with other indicators: The Mission-oriented governance mechanisms are intended to bring a lasting effect on novel (R&I) policy approaches to tackle the societal challenges of the Missions, with cross-cutting policy approaches generating a wider pool of funding and resources from a wider set of stakeholders. Hence, as part of the common monitoring framework, these insights from governance can be linked and related to the ability of different units to e.g. pooling of funding or engaging with stakeholders to support the implementation of Missions. In addition, one can carry out comparative analyses on e.g. what types of governance styles are able to engage and/or pool more people and resources.

Reporting obligation: We suggest launching this as biennial stock-taking and peer learning exercise (or link it to planned assessments and evaluations) coordinated by the EC Mission policy unit and implemented through e.g. mutual learning exercises between Missions, EC coordinated survey/study/assessment.

Definition: Mission-oriented governance instruments introduced at relevant policy levels (EU MS/AC level; regional/city/community level; for each Mission).

Rationale and assumptions: This indicator monitors and measures whether the novel governance mechanisms have been adopted and are functioning across the EU MS/AC in support of the five EU Mission objectives and the Mission policy approach. The outputs to be measured can be categorised in terms of typical governance mechanisms identified, across several functions explicitly supporting Missions. Combining prior conceptual thinking on governance of Missions (see Mazzucato 2019[25], Larrue 2021[26]) and how to monitor novel emergent policy coordination and coherence initiatives in the context of complex transformative goals (see OECD work on policy coherence for SDG implementation), we propose to unpack "governance" into the following key "building blocks":

a. Strategic orientation and commitment (explicit inclusion of Missions in political statements, strategies, action plans, legislation)

b. Engagement practices (e.g. formal procedures, charters, contracts, manifestos, endorsement) for engaging stakeholders, users, citizens in different stages of Mission implementation (planning, implementing, monitoring & evaluation)

c. Budgetary process for aligning and pooling funds for the five EU Missions (EU funds implemented locally, national/local budgetary sources)

d. Horizontal policy coordination routines (formal and informal principles and practices) to link R&I and other Mission-related policy domains (including coordination between ministries and lower-level units)

e. Vertical policy coordination routines (formal and informal principles and practices) to link EU, national and regional/local/community-based Mission-related policies and activities

f. Novel Mission-oriented policy implementation structures and capacities (e.g. mirror groups, national Mission boards, Mission labels/charters etc)

g. Novel Mission-oriented policy portfolio/mix (e.g. have new comprehensive policy portfolios been developed to implement Missions)

h. Monitoring and evaluation system that allows for constant revision of Missions and their implementation at national or local levels

All building blocks can be monitored through the following scale that allows for monitoring both the progress in rethinking governance (in specific block and overall, either on country levels or for specific Missions) as well as level differences in styles of governance (what building blocks are considered relevant for Missions governance and how these are being designed, rethought):

0 Not applicable – the building block is not applicable to the context where the assessment takes place.
1 Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.
2 Building Block under development – the building block does not exist yet, but it is under development.
3 In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action)
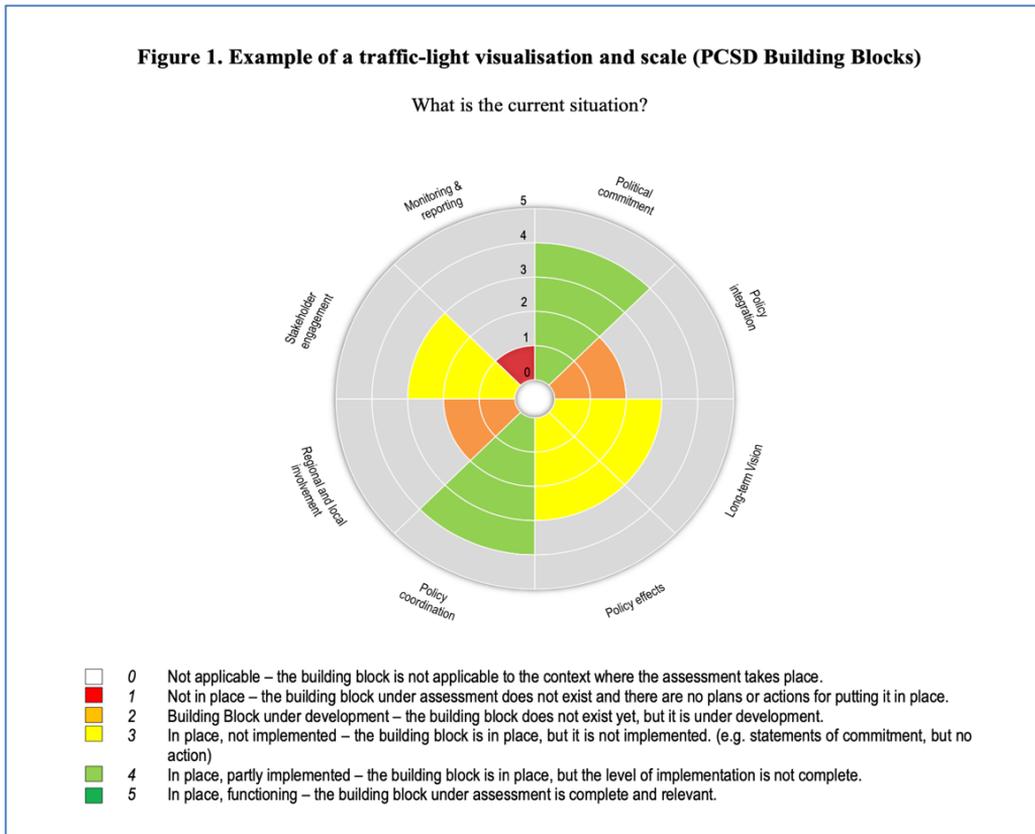
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[25] Mazzucato, M. (2019). Governing Missions in the European Union. *Independent Expert Report*.
[26] Larrue, P. (2021). The design and implementation of Mission-oriented innovation policies: A new systemic policy approach to address societal challenges.

4 In place, partly implemented – the building block is in place, but the level of implementation is not complete.

5 In place, functioning – the building block under assessment is complete and relevant satisfices the need of Mission-oriented approach.

The monitoring exercise can both gather data on progress (though answers in the scale from 0-5) as well as qualitative insights (e.g. open responses on why a certain building block is not developed, or what a specific building block consists of).

Example of how the results can be visualized based on OECD work on monitoring policy commitment for SDGs:

Figure 1. Example of a traffic-light visualisation and scale (PCSD Building Blocks)

	0	Not applicable – the building block is not applicable to the context where the assessment takes place.
	1	Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.
	2	Building Block under development – the building block does not exist yet, but it is under development.
	3	In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action)
	4	In place, partly implemented – the building block is in place, but the level of implementation is not complete.
	5	In place, functioning – the building block under assessment is complete and relevant.

Given the exploratory nature of the EU's Mission approach, in first instances, these building blocks can be more qualitatively mapped and characterised as different varieties of (emergent) novel approaches, or *governance styles* (e.g., top-down, bottom-up; hierarchical, contractual, network based). Mapping of these approaches allows to monitor what is done differently on governance level to support Missions (novel mechanisms, novel styles, focus on some functions vs less focus on others) and reveal novel and functioning practices to be shared across different countries and units. Over time, once EU and national/regional level practices mature, a more coherent Missions governance approach(es) can be defined and codified.

Baseline: No baseline as Mission specific Mission focused governance mechanisms have not existed before. Can be set based on first round of monitoring (e.g are countries building bespoke governance systems or relying on specific national traditions and existing arrangements).

Benchmark: Comparative benchmarking between EU MS/AC, regions and also between Missions (e.g. by number of implemented governance mechanisms, styles of governance etc to support Missions)

Frequency of measurement: biennial monitoring

Methodology:

- Survey or country fiche question for respondents (MS, AC or regional levels) to fill based on pooling of relevant unit level (e.g. MS/AC, region) data assessing the building blocks on the proposed scale and providing qualitative information
- Open-ended questions with brief explanations (e.g. what type of governance mechanisms could be included / excluded) to key policy makers
- Secondary supportive data from policy websites such as TRAMI, STIP Compass

Dimensions: data and values for this indicator may be disaggregated by:

- Simple count of governance mechanisms and their stage of implementation to support the Missions (as a whole or per Mission)
- Differences in functions such as planning, coordination, engagement, implementation, monitoring and evaluation
- Types of mechanisms for coordination, implementation (e.g., mirror groups, Mission advisory boards, national/ regional implementation platforms)
- Qualitative assessments on the functioning of novel governance mechanisms based on interviews, case studies, policy documentation and other qualitative sources
- Funding attached to the mechanism (for implementation and for Mission activities)

Data sources: biennial monitoring through EU MS/AC level reporting on Missions' implementation (e.g. via TRAMI mapping exercises or EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise)

Linkage with other indicators: the Mission-oriented governance mechanisms are intended to bring a lasting effect on novel (R&I) policy approaches to tackle the societal challenges of the Missions, with cross-cutting policy approaches generating a wider pool of funding and resources from a wider set of stakeholders. Hence, as part of the common monitoring framework, these insights from governance can be linked and related to the ability of different units to e.g. pool funding or engage stakeholders to support the implementation of Missions. In addition, one can carry out comparative analyses on e.g. what types of governance styles are able to engage and/or pool more people and resources.

Reporting obligation: We suggest launching this as biennial stock-taking and peer learning exercise through MS/AC level reporting on Missions' implementation (e.g. via TRAMI mapping exercises or EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise)

2.2 Acceptance of Mission-oriented innovation policy

2.2.1 indicator: Acceptance of Mission-oriented policy approach for complex societal challenges beyond original five EU Missions

Definition: The acceptance of Mission-oriented approach as a policy intervention tool among different stakeholders (EU level, MS/AC, general public)

Rationale and assumptions: Missions are not only about solving the specific challenges (the five EU Missions), but also a new and experimental policy approach to increase the effectiveness of the R&I policies and improve coordination between different policy silos (R&I and 'problem' domains). The sustainability (and effectiveness) of this approach is best monitored and evaluated through the routinization of the approach (extensive use to tackle different challenges on different levels of governments) as well as, and especially given the high reliance on stakeholder participation, public awareness and acceptance of the novel intervention model (vs traditional silos and interventions models).

For the public discourse level acceptance of the Mission-oriented approach, we propose to monitor this through the citizen engagement indicators 3.3.1 and 3.3.2 (see the pillar on engagement).

For the public policy discourse level, we propose to unpack the policy level acceptance of Mission-oriented approach through the following scales that can be monitored at the level of EU, MS/AC as well as regional/local levels:

0 – No active debate and use of the EU designed Mission-oriented approach to tackle new challenges (beyond the original 5 Missions)
1 – Continued experimentation with the EU designed Mission-oriented approach to tackle a few new Missions (single governance or policy domain level initiatives)
2 – Continued experimentation with the EU designed Mission-oriented approach to tackle a few new Missions as multi-level and/or cross-domain initiatives
3 – There is a common understanding of one or a few approaches/traditions of how Missions-oriented approach is best designed (*they can be also pre-defined through monitoring*)
4 – There is strategic plan or roadmap or similar to use this common EU-inspired Mission-oriented approach to tackle complex societal challenges (single governance level or policy domain initiatives)
5 - There is EU-wide strategic plan or roadmap or similar to use Mission-oriented approach to tackle complex societal challenges

Baseline: Current state of five Missions as depicted in ongoing reviews (e.g. assessments of existing missions, mid-term evaluation of HE etc).

Benchmark: No common benchmark, but possible comparative benchmarking between policy domains, countries, regions

Frequency of measurement: biennial stock-tacking and reporting by EU, MS and AC and regions/other units responsible for Mission-oriented policy-making

Methodology:

- Interview or survey question or country fiche question for respondents (EU, MS and AC or regional level) to fill based on pooling of relevant unit level (e.g. EU domains, MS and AC, regions)
- Secondary supportive data from policy websites such as TRAMI, STIP Compass

Dimensions: data and values for this indicator may be disaggregated by:

- Simple count of policy domains, countries, regions were Mission-oriented initiatives are discussed/pursued
- Differences in the "deepness" on acceptance of Mission-oriented approach
- Qualitative assessments on the functioning of novel approach based on interviews, case studies, policy documentation and other qualitative sources

Data sources: biennial reporting by EU, MS/AC and regions/other units based on domestic strategies, policies, instruments (including justification/explanatory documents)

Linkage with other indicators: together with engagement level indicators (public awareness and acceptance), it is possible to monitor and evaluate the overall impact of Mission-oriented policy approach on RDI policy and tackling of societal challenges.

Data reporting obligation: We suggest to launch this as biennial stock-taking and peer learning exercise coordinated on the EU level by the EC Mission policy unit and on EU MS/AC level through EU MS/AC level reporting on Missions' implementation (e.g. via TRAMI mapping exercises or EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise).

Pillar 3 - Participatory engagement of stakeholders/citizens

In the monitoring framework, the following indicators are proposed in Pillar 3:

3.1. Co-creation of Mission solutions with citizens in programs beyond HE

> 3.1.1 Number of actions developed by Mission units where citizens contribute to the co-creation of solutions
>
> 3.1.2 Number of actions reported in 3.1.1 that have considered inclusiveness criteria

3.2 Citizens engaged in processes and activities in Mission units

> 3.2.1 Number of formal engagement mechanisms developed by Mission units
>
> 3.2.2 Presence and relevance of Mission goals in (social) media.

3.3 Strong civil engagement with R&I solutions for societal challenges achieved

> 3.3.1 Citizen awareness of the EU Missions
>
> 3.3.2 Citizens' engagement in the EU Missions

3.1 Co-creation of Mission solutions with citizens in programs beyond HE

3.1.1 indicator: Number of Mission-relevant actions developed by Mission units where citizens contribute to the co-creation of solutions

Definition: Number of unique Mission-relevant actions (activities with specific budget and target) developed by Mission units and funded by regional, national or other European organisations where citizens are engaged in the co-creation of knowledge in the domains of the EU Mission. According to the definition adopted in the HE KIP[27], co-creation actions are the following:

- Co-creating R&I visions, agendas, policies or frameworks, R&I action plans or technology roadmaps
- Collecting data for R&D projects, analysing data for the projects
- Providing resources, e.g. computational, space/locations, practical support, monitoring and/or evaluating R&I results
- Testing and experimenting with innovative R&I solutions
- Contributing to scientific publications or patent applications
- Debating R&I findings and their implications.

According to the review of the [engagement approaches included in the domains of the five EU Missions](), "Citizens" refers to stakeholders interested or concerned by the project from different roles: consumers, producers, users and owners. On the other hand, in the co-creation activities they could be acting as co-designers, co-implementers or co-beneficiaries. "Solutions" are defined as projects, scale-up actions and innovations related to the five Mission domains but not funded by HE.

Rationale and assumptions: According to the Mission approach, citizens engagement in co-creation of technological solutions would provide valuable feedback for the R&I process and would enable societal uptake of disruptive innovations. Regional and national governments and the EC should have promoted co-creation actions in the domain of the five Missions and beyond HE calls.

Baseline: Existing co-creation actions supported by regions, MS/AC and the EC.

Benchmark: Possibility to carry out comparative benchmarking between Missions.

Frequency of measurement: Annual or biennial stock-taking exercises as part of Mission-level monitoring.

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[27] European Commission (2022). Study to support the monitoring and evaluation of the Framework Programme for research and innovation along Key Impact Pathways. Indicator methodology and metadata handbook.

Methodology: Counting unique actions supported by regions, MS/AC and the EC implementing co-creation mechanisms

Dimensions: data and values for this indicator may be disaggregated by:
- Type of engagement action
- Type of citizens engaged
- Regional, national or European context
- Missions

Data sources: Annual or biennial stock-taking exercises as part of Mission-level monitoring / Mission Implementation Platforms' data collection actions.

Linkage with other indicators: co-creation actions are directly related with the Pillar 1 - Knowledge creation and valorisation, as they are part of the process adopted by the research teams. Moreover, it is related to Pillar 2 – Governance, as engagement is considered a relevant dimension when defining Mission-oriented governance arrangements and co-creation would be included as a required practice when implementing Missions.

Reporting obligation: no formal obligation but could be formalized in Mission-based reporting system or incentivized via public comparisons and policy learning experiences.

3.1.2 indicator: Number of actions reported in 3.1.1 that have considered inclusiveness criteria

Definition: The inclusiveness concept refers to a fair representation of the society in the co-creation of knowledge, to avoid bias in the results, use and accessibility of the solutions. The most relevant inclusiveness action is the gender dimension. But inclusiveness should be also observed according to the perspective of other collectives, such as handicapped people; migrant populations; disadvantaged groups; rural inhabitants; elderly or young people. Engagement activities considering inclusiveness aspects should have implemented actions guaranteeing a balanced gender participation and a fair representation of vulnerable groups in the co-creation process.

Rationale and assumptions: Citizen engagement actions should be defined and managed following gender equality and inclusiveness criteria to avoid unintended effects of the co-creation processes. Access to technological solutions would be guaranteed by including these criteria. The risk of exclusion of citizens who are interested in Mission-oriented policy can be minimized if co-creation processes are designed accordingly. On the other hand, it is necessary to be aware to what extent inclusiveness is a feasible approach in the co-creation of solutions to manage potential bias.

Baseline: Existing co-creation actions including gender equality and inclusiveness criteria supported by regions, MS/AC and the EC.

Benchmark: Possibility to carry out comparative benchmarking between Missions and engagement of different population groups.

Frequency of measurement: Annual or biennial stock-taking exercises as part of Mission-level monitoring.

Methodology: Counting unique actions supported by regions, MS/AC and the EC implementing co-creation mechanisms following gender equality and inclusiveness criteria.

Dimensions: data for this indicator may be disaggregated by:
- Actions considering gender equality
- Actions considering inclusiveness criteria related to vulnerable populations
- Type of engagement action
- Type of citizens engaged
- Regional, national or European context
- Missions

Data sources: Annual or biennial stock-taking exercises as part of Mission-level monitoring / Mission Implementation Platforms' network data collection actions.

Linkage with other indicators: Based on the input from 3.1.1

Reporting obligation: no formal obligation but could be formalized in Mission-based reporting system or incentivized via public comparisons and policy learning experiences.

3.2 Citizens engaged in processes and activities in Mission units

3.2.1 indicator: Number of formal engagement mechanisms developed by Mission units

Definition: Number of unique formal engagement mechanisms developed by Mission units at the regional, national or European level and not funded by HE calls. According to the definition adopted in the HE KIP, engagement mechanisms are the following:
- Virtual or physical permanent structures (Mission hubs, observatories, communities)
- Appointed staff in the organisations
- Rules and standards
- Dedicated events (workshops, assemblies, panels, fora, roundtables)
- Other tools (event-based, web-based, etc.)

Rationale and assumptions: According to Missions as a policy approach, regional, national and European governments should promote the creation of engagement mechanisms to give continuity to the participation of society in the co-creation and scaling-up of solutions. Moreover, it is supposed that Mission units supported by governments have adopted the participatory approach in their internal processes due to their added value in terms of return on R&I investments.

Baseline: Existing engagement mechanisms supported by regions, MS, AC and the EC in the five Missions.

Benchmark: Possibility to carry out comparative benchmarking between Missions and type of mechanisms.

Frequency of measurement: Annual or biennial stock-taking exercises as part of Mission-level monitoring.

Methodology: Counting unique engagement mechanisms developed by Mission units.

Dimensions: data for this indicator may be disaggregated by:
- Type of engagement mechanism
- Regional, national or European context
- Missions

Data sources: Annual or biennial stock-taking exercises as part of Mission-level monitoring. / Mission Implementation Platforms' data collection actions.

Linkage with other indicators: engagement mechanisms are directly related to Pillar 4 - Pooling and Scaling-up. Firstly, resources should be allocated to create supportive engagement mechanisms, beyond R&I activities, and this requires additional budget. On the other hand, permanent structures, as well as punctual events, could be used for scaling up technological solutions and disseminate good practices. Moreover, it is related with Pillar 2 - Governance, as engagement is considered a relevant dimension when defining Mission-oriented governance arrangements and engagement mechanisms would be included as a required practice when implementing Missions.

Reporting obligation: no formal obligation but could be formalized in Mission-based reporting system or incentivized via public comparisons and policy learning experiences.

3.2.2 indicator: Presence and relevance of Mission challenges and goals in (social) media

Definition: Frequency and relevance of comments, opinions and publications in the mass and social media on the challenges and goals of the five Missions. KIPs for social media could be likes, engagement, followers' growth, traffic conversions, social interactions, social shares, web visitors.

Rationale and assumptions: social media is considered a mandatory channel for connecting with the society and a window to the civil reactions and opinions towards social issues. It is supposed that the topics related to the Missions will have a relevant presence in mass media, and especially in social media, if citizens are actively involved and interested in those issues. This indicator provides information on the extent to which the civil population is interested and involved in concrete issues related to Missions. It should be considered that the characteristics of the population using social media could introduce a bias in the indicator.

Baseline: No available data before the implementation of the five EU Missions.

Benchmark: Possibility to carry out comparative benchmarking between Missions.

Frequency of measurement: Periodical (e.g. biennial) measurement of KPIs, according to the monitoring schedule

Methodology: Counting values of KPIs (likes, engagement, followers' growth, traffic conversions, social interactions, social shares, web visitors...), using the available tools and supported by IT experts.

Dimensions: data for this indicator may be disaggregated by:
- Type of social network
- Regional, national or European context
- Missions

Data sources: Social media data

Linkage with other indicators: presence and relevance in social media are related with citizen engagement indicators, as individuals will express themselves throughout these communication channels. Moreover, governments should also use this channel to activate the engagement of citizens in the five EU Missions. Moreover, it is related with Pillar 2 – Governance, as communication actions by governments should be considered when defining Mission-oriented governance arrangements.

Reporting obligation: no formal obligation but can be arranged as designated cross-Missions external study with limited additional reporting obligations.

3.3 Strong civil engagement with R&I solutions for societal challenges achieved

3.3.1 indicator: Citizen awareness of the EU Missions

Definition: Level of awareness of Missions as EU policy and Mission goals

Rationale and assumptions: Missions are expected to involve the society on the achievement of their goals. The transformative effect on the population would not be possible without a broad knowledge of the policy. This indicator will allow to depict to what extent public intervention has transformed the public opinion on EU Missions and their goals, which is a needed change to guarantee success of the policy.

Baseline: No available data before the implementation of the five EU Missions.

Benchmark: Possibility to carry out comparative benchmarking between Missions.

Frequency of measurement: According to Eurobarometer schedule.

Methodology: Eurobarometer is the instrument used by the EC, the European Parliament and other EU institutions and agencies to regularly monitor the state of public opinion in Europe on

issues related to the European Union as well as attitudes on subjects of political or social nature. This tool is appropriated to measure the awareness of the Missions, goals and activities among the civil society. Questions should address specific goals related to each of the Missions, and drafted in order to extract information to measure the level of awareness. The following structure could be used:

At what extend are you aware of the following challenges that EU tries to tackle in collaboration with your government and local authorities? (From 1 to 5, being 1, Nothing and 5, Fully aware).

- Deliver 100 climate-neutral and smart cities by 2030
- Improve the lives of more than 3 million people by 2030, through prevention and cure of cancer, and reduce mortality.
- Supporting by 2023 at least 150 European regions and communities towards climate resilience.
- Establish 100 living labs and lighthouses to lead transition towards healthy soils by 2030
- Restore the health of the EU´s oceans and waters by 2030

Dimensions: data for this indicator may be disaggregated by:
- Regional, national or European context
- Missions

Data sources: Eurobarometer survey (Special or Flash Eurobarometer)

Linkage with other indicators: Citizen awareness of the EU Missions is linked with indicators in Pillar 3, since this is the final result of the engagement process. Moreover, this indicator is related with the transformative outcomes of the other pillars.

Reporting obligation: no formal obligation, but can be arranged as designated cross-Missions external Eurobarometer study with limited additional reporting obligations.

3.3.2 indicator: Citizens' engagement in the EU Missions

Definition: Level of active participation of citizens in actions related to the EU Missions in a continuous way (transformed behaviour concerning the role of citizens in the EU Missions).

Rationale and assumptions: Missions are expected to involve the society on the achievement of their goals. The transformative effect on the population would not be possible without a broad knowledge of the policy. This indicator shows the extent to which public intervention has transformed the role of citizens in the deployment of solutions for the EU Missions. They should not appear as users of technology, but also as developers and pushing forces.

Baseline: No available data before the implementation of the five EU Missions.

Benchmark: Possibility to carry out comparative benchmarking between Missions.

Frequency of measurement: According to Eurobarometer schedule

Methodology: Eurobarometer is the instrument used by the EC, the European Parliament and other EU institutions and agencies to regularly monitor the state of public opinion in Europe on issues related to the European Union as well as attitudes on subjects of political or social nature. This tool is appropriated to measure in the long term the level of engagement of the civil society in Missions goals and activities. Questions should address each of the Missions and drafted in order to extract information to measure the level of engagement. The following structure could be used:

At what extend are or have you been engaged in activities related to the following Missions that EU lead in collaboration with your government and local authorities? (From 1 to 5, being 1, Nothing and 5, Fully engaged).

- Climate neutral and Smart cities Mission (deliver 100 climate-neutral and smart cities by 2030)
- Mission Cancer (improve the lives of more than 3 million people by 2030, through prevention and cure of cancer, and reduce mortality)
- Adaptation to climate change Mission (supporting by 2023 at least 150 European regions and communities towards climate resilience)
- Soil Mission (establish 100 living labs and lighthouses to lead transition towards healthy soils by 2030)
- Oceans & Water Mission (restore the health of the EU´s oceans and waters by 2030)

Dimensions: data for this indicator may be disaggregated by:
- Regional, national or European context
- Missions

Data sources: Eurobarometer survey (Special or Flash Eurobarometer)

Linkage with other indicators: Citizen engagement in the EU Missions is linked with indicators in pillar 3, since this is the final result of the engagement process. Moreover, this indicator is related with the transformative outcomes of the other pillars.

Reporting obligation: no formal obligation but can be arranged as designated cross-Missions external Eurobarometer study with limited additional reporting obligations.

Pillar 4 - Pooling and Scaling-up

For Missions to achieve their desired goals and impacts, one of the most crucial tasks is to **achieve significant pooling of public (beyond HE) and private funding to support knowledge creation and scaling-up of Mission-relevant solutions**. In this context, HE funds allocated to Missions are intended **as seed money to prepare and enable a greater mobilisation of public and private investments**. Hence, it is crucial to monitor the ability of Missions (also through the support of governance and engagement activities) to pool such resources at different levels and subsets of societies. At the same time, scaling-up and institutionalization of Mission-relevant solutions does not only require financial pooling, but also **pooling and alignment of relevant institutional elements (standards, regulation, processes) among different Mission actors.**

Keeping this logic in mind, we propose the following indicators:

4.1 Pooling and Leveraging of public and private funds
4.1.1 Mission-oriented budgets/funding in EU programmes other than Horizon Europe disbursed via projects
4.1.2 Mission-oriented budgets/funding in shared management programmes disbursed by EU MS/AC; Co-programmed and co-funded Horizon Europe Partnerships allocations by EU MS/AC; National and regional R&I programmes
4.1.3 Mission-oriented private sector investment (InvestEU and direct investments by companies) and Mission-oriented donations from charities and philanthropic organisations

4.2 Scaling of transformative solutions and supportive measures
4.2.1 Innovative Mission solutions (technological, social, financial, political, educational etc) further tested and deployed across countries and regions to support Mission goals
4.2.2 Number and types of institutional changes (standards, regulations, policies, processes etc) explicitly adopted to support scale-up of Mission solutions

4.1 Pooling and Leveraging of public and private funds

This indicator can be monitored through 3 sub-indicators that need differentiated monitoring strategies but can be eventually totalled into one pooling and leverage figure:

4.1.1 indicator: Mission-oriented budgets/funding in EU programmes other than Horizon Europe

4.1.2 Indicator: Mission-oriented budgets/funding in shared management programmes disbursed by EU MS/AC; Co-programmed and co-funded Horizon Europe Partnerships allocations by EU MS/AC; National and regional R&I programmes

4.1.3 Indicator: Mission-oriented private sector investment (InvestEU and direct investments by companies) and Mission-oriented donations from charities and philanthropic organisations.

Definition: Pooling and leveraging of public and private sector funding that includes beyond HE EU funds, MS/AC funds, local funds, private funds. Alignment and resources allocations of different funding instruments beyond HE, at EU, MS/AC, shared management, regional and local levels, including private investments to achieve deliberative directionality and scale-up towards achievements of Missions' objectives.

Rationale and assumptions: HE funds allocated to Missions are intended as seed money to prepare and enable a greater mobilisation of public and private investments. This indicator reflects this directional mobilisation beyond HE by capturing the development of complementary activities supported by European, national, regional and local funding programmes as well as activities supported by industry and by charities, in contribution to Missions' objectives. Sub-indicators 4.1.1, 4.1.2 and 4.1.3 quantify the further funding planned and/or allocated at EU level beyond HE through shared management, through national, regional and local funds as well as private sector (industrial business) investments.

Baseline: amount of public and private investment mobilised by Horizon Europe funded Missions projects.

Benchmark: no benchmark available as Missions is a new instrument launched under Horizon Europe

Frequency of measurement: biennial, taking into consideration different call launch timings of the various EU programmes.

Methodology:

Sub-indicator 4.1.1: calculated as a simple amount (in EUR) of planned and/ allocated budgets/funds in all ongoing and completed in EU programmes other than Horizon Europe.

Sub-indicator 4.1.2: calculated as a simple amount (in EUR) of planned and/or allocated budgets/funds in shared management programmes (ESIF, including Interreg, ERDF, Cohesion Fund; CAP, RIS3, RRF, etc) disbursed by EU MS/AC; Co-programmed and co-funded Horizon Europe Partnerships allocations by EU MS/AC; National and regional R&I programmes. Data may be captured by Commission-led Missions portfolio analyses, Mission Implementation Platforms' led monitoring and evaluations. For the Missions-relevant funding in HE Partnerships, we suggest that the Partnerships Monitoring system also collects data on EU and MS/AC level (co-)funding of Missions-relevant activities.

For sub-indicator 4.1.3, it will be important to establish concordance between the European Investment Bank (EIB) and other financial institutions and an InvestEU portfolio linked to Missions because: i) the four policy areas where the programme is active (Sustainable infrastructure, Research, innovation and Digitalisation, SMEs and Social investment and Skills) are essential for scaling of transformative solutions towards achieving the objectives of the Missions and ii) we foresee several challenges in getting a complete picture of Missions-related private/industry investments at EU MS/AC levels. Therefore, as a first proxy of private sector investment, data

collection for sub-indicator 4.1.3 may be coordinated by the EIB based on the InvestEU Missions-related project portfolio. Later, it might be possible to collect data from the private sector, particularly industry, at EU MS/AC level via introduction of a targeted question in a survey proposed for the monitoring framework and/or sub-indicator 4.1.2.

Data collection for these sub-indicators will be cumulative (over years) to demonstrate progressive pooling and leveraging, scaling up, optimisation, as well as alignment of public and private financial instruments and resources at EU, MS/AC levels and by the private sector. Allocation of public funding and private investment shall be used as a proxy of vertical implementation in MS/AC.

Dimensions: data captured for these indicators may be disaggregated by:
- Public and private sector investments
- Complementary capacities in support of Missions' objectives via sub-level analysis of Mission dedicated calls in EU, shared management programmes and other national and regional programmes e.g. the use of Digital Europe Programme to support the development of skills and capacities and the use of ERDF on the development and strengthening of regional and local research and innovation ecosystems and smart economic transformation
- Country/region
- Programme year
- R&I funds and other funds contributing to sectoral policies
- Mission-label associated financial envelopes

Data Sources:
Sub-indicator 4.1.1: Data for this sub-indicator may come from administrative/financial reporting that is already being analyzed as EC-led Mission portfolio of actions and information collected from signatories of Mission Charters/Manifestos/Contracts.

Sub-indicator 4.1.2: A Missions-related data collection may be set up and may be coordinated at EU level in conjunction with MS and AC Programme Committee level groups that may mandate Mission coordinating structures (e.g Mission Implementation Platforms, national Mission mirror groups, Mission-specific monitoring exercises) to conduct a survey and/or liaise with surveys conducted by the European Partnerships, TRAMI etc.

Sub-indicator 4.1.3: Data collection may be coordinated by the EIB based on the InvestEU Missions-related project portfolio. Later, it might be possible to collect data from industry at MS and AC levels via introduction of a targeted question in a survey proposed for the monitoring framework and/or sub-indicator 4.1.2. Mission monitoring exercises may include questions to capture donations from philanthropic organisations and charities.

Reporting obligation: Formalisation in Mission-specific monitoring frameworks and in EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise.

4.2 Scaling of transformative solutions and supportive measures

4.2.1 indicator: Innovative Mission solutions (technological, social, financial, political, educational etc) further tested and scaled across countries and regions to support Mission goals

Definition: Qualified knowledge-based Mission solutions (technological, social, financial, political, educational, etc.) with the potential for large scale deployment at EU, national, regional or local levels.

Rationale and assumptions: This mid- to long-term outcome should be measured to monitor novel solutions created by Mission units and from initiatives at regional, MS/AC and innovation networks/clusters that have been tested and scaled across countries and regions. This indicator is linked to indicator 1.1.2 that measures novel solutions associated to Mission units, but it goes beyond indicator 1.1.2 and measures the portfolio of expanded Mission solutions deployed at EU, national, regional and local levels. In this way, it is an indication of knowledge co-created and

validated into innovations, products and services that are equitable and inclusive across the EU and AC.

Baseline: number of Mission solutions arising from Horizon Europe funded Missions projects.

Benchmark: possible comparative benchmarking between interdisciplinary and intersectoral solutions arising from Horizon Europe projects and Missions-related projects

Frequency of measurement: biennial reporting by EU, MS and AC, regions, Mission units and other initiatives

Methodology:
- Build-up of well-designed survey/questionnaire on EU and MS/AC level to identify deployed solutions.
- Interview question (EU level) and survey question or country fiche question for MS, AC and regional levels
- Grey literature, media and social networks text analysis

Dimensions:
- Qualified count of deployed Mission solution at EU, MS/AC, regional and local levels
- Data pooled into averages and comparison related for each Mission unit to their strategic strands of intervention (objectives, thematic areas, geographic areas)
- Data pooled into averages and comparison between the countries for the five Missions

Data sources:
- Survey or Mission fiche from EC, MS, AC and regions
- Interview question (EU level)
- Case studies of key examples
- Data collection from social networks using text analysis on Mission solution uses

Interpretation: The risk is that a quantitative approach beyond the Mission units, involving MS, AC and regional actors can inflate the number of solutions as solutions not directly linked to the Missions and that are thematically linked to the Missions may be included. Therefore, the survey has to be carefully designed to define the appropriate respondents to make sure that the identified deployed solutions can be associated to Mission activities and are effectively contributing to the Mission goals. An additional qualitative approach that includes interviews of key actors who can link outcomes to development and deployment work of the transformative solutions could help to track the Mission-relatedness of the solutions.

Reporting obligation: Formalisation in Mission-specific monitoring frameworks and in EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise.

4.2.2 indicator: Number and types of institutional changes (standards, regulations, policies, processes etc) explicitly adopted to support scale-up of Mission solutions

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Definition: Scaling of transformative solutions towards achieving objectives of Missions supported via introduction of conducive processes, enabling regulatory and legal environment.

Rationale and assumptions: For Missions to be successful, implementation must go far beyond R&I to develop new solutions and improve the lives of Europeans. This indicator measures permissive (new) regulations, policies and strategies that are conducive for further deployment and scale-up of innovative solutions, as well as pooling of funding across countries and regions. In this way, it will measure the triggers supporting changes in regional and local contexts supporting the deployment of innovative solutions. It will be important to capture the triggers that induce technological and economic solutions and the individual or group behaviour, multi-layer governance and policies that facilitate scale-up and large-scale deployment of Mission-oriented solutions and technologies. This will give a holistic view of the cross-sectoral problem solving and action-oriented approach that Missions need to take to address complex societal challenges.

Baseline: no baseline

Benchmark: possible comparative benchmarking between Horizon Europe projects and Missions-related projects

Frequency of measurement: biennial reporting by EU, MS and AC, regions, Mission units and other initiatives

Methodology: MS and AC shall be encouraged to enable concordance to Missions when developing funding opportunities and in formulations of policies, strategies, and regulation, as well as knowledge valorization chains such that the data captured may be directly associated to Missions.

Dimensions: data captured for these indicators may be disaggregated by:
- Country/region
- Programme year
- Living Labs, Lighthouses etc
- Types of solutions and technologies

Data sources: Data shall be captured at national, regional and local levels. This may be coordinated at EU level in conjunction with MS and AC Programme Committee level groups that may mandate Mission coordinating structures (e.g. Mission Implementation Platforms /Mission mirror groups) to conduct a survey and/or liaise with surveys conducted by the European Partnerships, TRAMI etc. Data may also be obtained via text mining of official EU documents such as EU Semester reports, country fiches, Recovery and Resilience Plans etc.

Data quality assessment: internal quality testing of survey data and other information sources

Reporting obligation: Formalisation in Mission-specific monitoring frameworks and in EU R&I policy questionnaire distributed as part of the OECD STIP Compass exercise.

Annex IIIa – SPC Survey – The Questionnaire

Introduction

This survey is launched to collect **data for a dedicated monitoring report on the implementation of the EU Missions as a policy instrument**. This survey is not intended to evaluate and compare the performance of Member States and Associated Countries in the implementation of EU Missions. The data will be collected as input to determine the extent of the roll-out of EU Missions as a policy instrument in Member States and Associated Countries and to provide suggestions for improving the functioning of the instrument. The monitoring report is led by the Commission EG to support the monitoring of EU Missions and is expected to be published in the end of 2023.

Commission EG to support the monitoring of EU Missions

The Commission's Directorate-General for Research and Innovation took the initiative to set up an EG with a view to developing and deploying a methodology to **monitor EU Missions beyond Horizon Europe**, looking at the contribution of other funding programmes at EU and national, as well as at regional and local levels towards the achievement of Missions' objectives.

Mandate of the EG

The EG has developed a robust framework for monitoring EU Missions beyond Horizon Europe that includes common indicators for the five current EU missions, and that will allow:

- the monitoring over time of achievements, progress towards objectives and impacts, including delivery on EU policy objectives;
- identification of potential needs for corrective measures.

Objective of this survey

The survey will collect data at national level (as well as regional and local levels, where possible) to provide a systematic overview of the effectiveness of the new policy approach for EU Missions and the extent to which it generates a higher mobilisation of critical mass and resources towards the achievement of objectives and impacts. It is also intended to identify early implementation barriers and drivers towards impacts, e.g. in terms of contributions, coherence, mobilisation of resources, leverage of additional public and private funds, collaboration. The EG will use the collected data in a dedicated monitoring report on EU Missions that is expected to be published end 2023. Taking into consideration the short time from the launch of EU Missions and that not all activities have been launched, this survey will collect data for a subset of indicators of the monitoring framework.

Please see the following link for a brief overview of the monitoring framework and a more comprehensive explanatory video presentation of the framework compiled by the EG.

Ideally, we would like to receive **1 coordinated response per country.** Therefore, we kindly ask the designated respondent to contact national representatives and experts, and/or relevant representatives from ministries and other administrative authorities to consolidate the necessary information so that an accurate picture of the progress towards achievement of the objectives and targeted impacts of EU Missions may be obtained.

Personal data

DATA PROTECTION NOTICE: Personal data will be processed in line with Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons regarding the processing of personal data by the Union institutions, bodies, offices, and agencies and on the free movement of such data. As part of the survey, the following personal data will be collected: name and e-mail address. The data collected will be processed only by the EG members contracted by the European Commission to carry out the monitoring exercise and will not be re-used without prior written authorisation.

☐ ***** I confirm that I have read and understood the **data protection notice**.

* First name:

* Last name:

* E-mail: @

National approach

* 1. Please indicate the country you represent:

2. Please indicate which of the following best describes the policy approach to EU Missions in your country

Policy approach to EU Missions	Planned	In place
a. There is a unified policy approach across the 5 EU Missions or a group of EU Missions	☐	☐
b. There are Mission-specific policy approaches	☐	☐
c. Other	☐	☐

2.1 If you selected 2.a, please list the Missions included in the unified approach

1000 character(s) maximum

2.2 If you selected 2.b, please list the Missions for which you have developed a specific approach

1000 character(s) maximum

2.3. If you selected 2.c please briefly explain your answer

1000 character(s) maximum

Policy design and coordination

3. Please describe the development and progress in your country on the following elements of **policy design and coordination** of national activities in relation to EU Missions. ** in the case you have a common approach, you may choose to complete only column 1, or you may complete column 1 as well as provide Mission-specific information.*

1 Not applicable – the building block is not applicable/relevant to the context where the assessment takes place.

2 Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.

3 Building block under development – the building block does not exist yet, but it is under development.

4 In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action).

5 In place, partly implemented – the building block is in place, but the level of implementation is not complete.

6 In place, functioning – the building block under assessment is complete and satisfies the need of mission-oriented approach.

	Common approach across the 5 EU Missions or a group of EU Missions indicated in Q2.	Mission- specific answers (one column per mission).
a) Strategic orientation and commitment to EU Missions (explicit inclusion of the EU Missions in national political statement, strategy, action plan, legislation etc)	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
b) Horizontal (e.g. between ministries and relevant agencies) policy coordination principles and practices to link research & innovation and other mission-related policy domains	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
c) Vertical policy coordination principles and practices to link EU, national and regional/local/community-based mission-related policies and activities	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
d) Novel mission-oriented policy implementation structures and capacities (e.g. mirror groups, national mission boards/hubs, mission labels/charters etc)	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
e) Monitoring and evaluation systems that allow for constant revision of Missions and their implementation on national and local levels	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*

3.1 Please describe the practical approach(es) in place in your country in relation to the building blocks (in Q3) for which an assessment level 3-5 was provided (e.g. in case you have introduced or piloted novel governance mechanisms, please elaborate the practices).

5000 character(s) maximum

Engagement of stakeholders

4. Please describe the development and progress on the **engagement of stakeholders/citizens** in the EU Missions in your country.
* in the case you have a common approach, you may choose to complete only column 1, or you may complete column 1 as well as provide Mission-specific information.

1 Not applicable – the building block is not applicable/relevant to the context where the assessment takes place.

2 Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.

3 Building block under development – the building block does not exist yet, but it is under development.

4 In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action).

5 In place, partly implemented – the building block is in place, but the level of implementation is not complete.

6 In place, functioning – the building block under assessment is complete and satisfies the need of mission-oriented approach.

	Common approach across 5 EU Missions or a group of EU Missions indicated in Q2	Mission- specific answers (one column per mission).
a) Engagement practices (e.g. formal procedures, charters, contracts etc) for engaging stakeholders, users, citizens in different stages of implementing the EU Missions (planning, implementing, monitoring & evaluation)	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
b) Engagement practices (e.g. formal procedures, charters, contracts, manifestos, endorsements, labels) to engage private sector actors (firms, associations, financial sector etc) in the implementation of the EU Missions	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*

4.1 Please describe the practical approach(es) in place in your country in relation to the building blocks (in Q4) for which an assessment level 3-5 was provided (e.g. in case you have introduced or piloted novel engagement mechanisms, please elaborate the practices)
5000 character(s) maximum

Aligning and pooling of resources

5. Please describe the development and progress on **aligning and pooling of resources** to contribute to the implementation of EU Missions in your country.
* in the case you have a common approach, you may choose to complete only column 1, or you may complete column 1 as well as provide Mission-specific information.

1 Not applicable – the building block is not applicable/relevant to the context where the assessment takes place.

2 Not in place – the building block under assessment does not exist and there are no plans or actions for putting it in place.

3 Building block under development – the building block does not exist yet, but it is under development.

4 In place, not implemented – the building block is in place, but it is not implemented. (e.g. statements of commitment, but no action).

5 In place, partly implemented – the building block is in place, but the level of implementation is not complete.

6 In place, functioning – the building block under assessment is complete and satisfies the need of mission-oriented approach.

	Common approach across the 5 EU Missions or a group of EU Missions indicated in Q2.	Mission- specific answers (one column per mission).
a) Budgetary processes for aligning existing national and regional/local funds with the EU Missions	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*
b) Budgetary processes for allocating designated envelopes of national and regional/local funds for the EU Missions	*Only values between 1 and 6 are allowed*	*Only values between 1 and 6 are allowed*

5.1 Please describe the practical approach(es) in place in your country in relation to the building blocks (in Q5) for which an assessment level 3-5 was provided (e.g. in case you have introduced or piloted novel budgeting mechanisms, please elaborate the practices).
5000 character(s) maximum

6. **Pooling resources** to contribute to the implementation of EU Missions

6.1 If possible, please provide an exact amount or an estimate of the funds at national and EU co-funded levels that are strategically aligned or pooled (i.e. there has been strategic or budgetary processes to explicitly align or pool funds):
* in the case you have a common approach, you may choose to complete only column 1, or you may complete column 1 as well as provide Mission-specific information.
** this is a first attempt at gathering information on MS/AC level pooling of resources - please try to provide as much information as possible, or if this is not feasible explain the current challenges and progress under questions 6.3 and 6.4.

Millions €	Total for 5 EU Missions	Mission- specific answers (one column per mission).
a) mission-oriented budgets/co-funding in EU programmes (Horizon Europe, EU4Health, Interreg, LIFE, etc) implemented in your country		
b) national R&I funds to support EU Missions (national R&I programmes, etc)		
c) other national funds to support EU Missions (national sectorial programmes, ESIF, CAP, RRF etc)		
d) private sector investments to support EU missions (InvestEU, direct private investments, charities)		

6.2 In case you filled some of the boxes above, please clarify whether these are **exact numbers** or **estimates**. You are also free to provide feedback on the ease and limitations of gathering such data.

5000 character(s) maximum

6.3 If you are unable to provide an exact amount or estimate, please briefly explain the challenges in obtaining this data.

5000 character(s) maximum

6.4 If you are unable to provide an exact amount or estimate, please briefly explain whether there are on-going processes and/or future plans to ensure contribution of these funds to support the objectives of EU Missions.

5000 character(s) maximum

Open comments and suggestions

7. Do you have any other comments and/or suggestions on how to improve the implementation of the mission-oriented approach and the 5 EU Missions?

5000 character(s) maximum

Annex IIIb – SPC Survey – RESPONSES

This Annex reports the MS/AC level responses (21 MS/AC responded to the survey) to all key questions of the SPC Survey. Note that the categories "N/A" and "no answer" indicate that MS/AC opted to responde to other categories of answers (e.g. if countries reported only unified or common approach, they did not provide mission specific answers; some countries responded only for a few and not all missions etc).

Q.2. Policy approach to EU Missions

Please indicate which of the following best describes the policy approach to EU Missions in your country
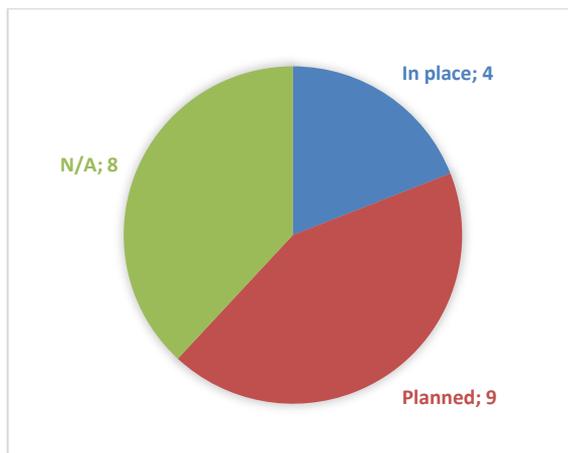
2.a. Unified policy approach across the 5 EU Missions or a group of Missions
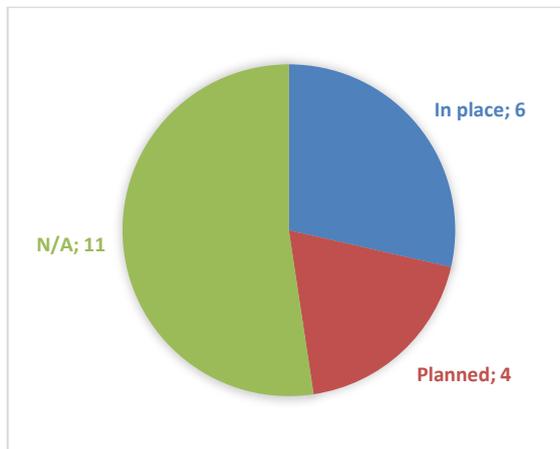
In Place: Spain, Austria, Turkey, Germany, Estonia, Norway

Planned: Netherlands, Portugal, Moldova, Czech Republic

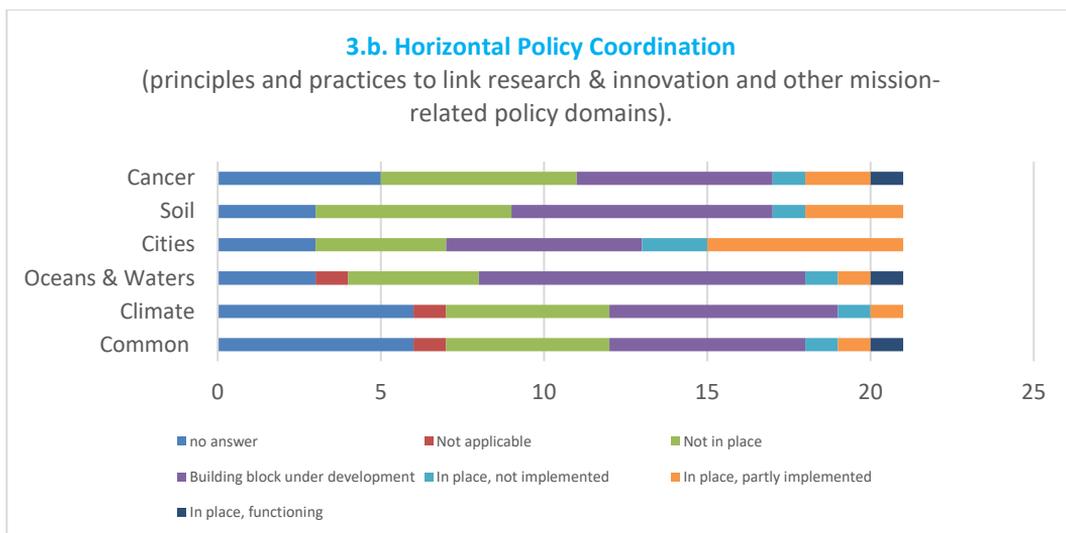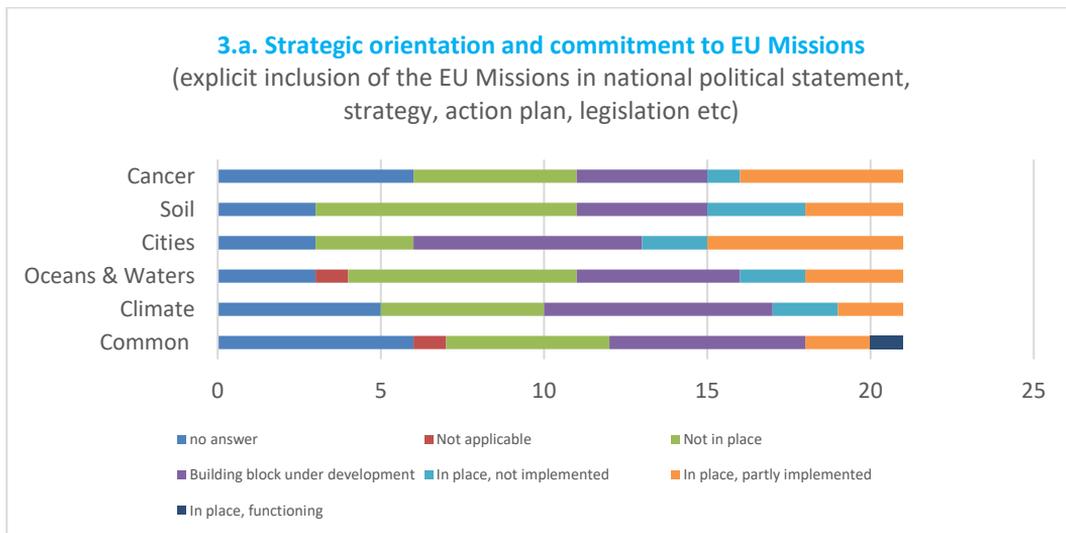### 2.b. There are Mission-specific policy approaches

In Place: Germany, Norway, Lithuania, Croatia

Planned: Belgium, Netherlands, Malta, Croatia, Türkiye, Greece, Italy, Ireland, Slovenia
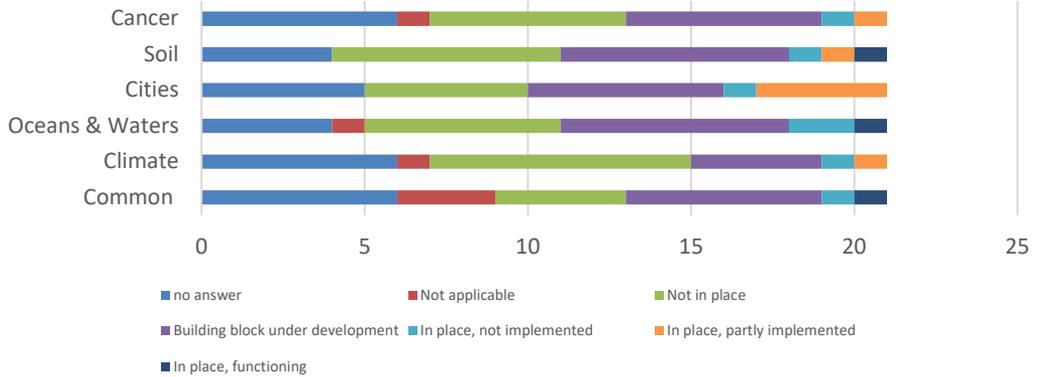
Q.3. Policy Design & Coordination

Please describe the development and progress in your country on the following elements of policy design and coordination of national activities in relation to EU Missions.

3.a. Strategic orientation and commitment to EU Missions
(explicit inclusion of the EU Missions in national political statement, strategy, action plan, legislation etc)

Legend:
- no answer
- Not applicable
- Not in place
- Building block under development
- In place, not implemented
- In place, partly implemented
- In place, functioning

3.b. Horizontal Policy Coordination
(principles and practices to link research & innovation and other mission-related policy domains).

Legend:
- no answer
- Not applicable
- Not in place
- Building block under development
- In place, not implemented
- In place, partly implemented
- In place, functioning

3.c. Vertical Policy Coordination

principles and practices to link EU, national and regional/local/community-based mission-related policies and activities

Legend:
- no answer
- Not applicable
- Not in place
- Building block under development
- In place, not implemented
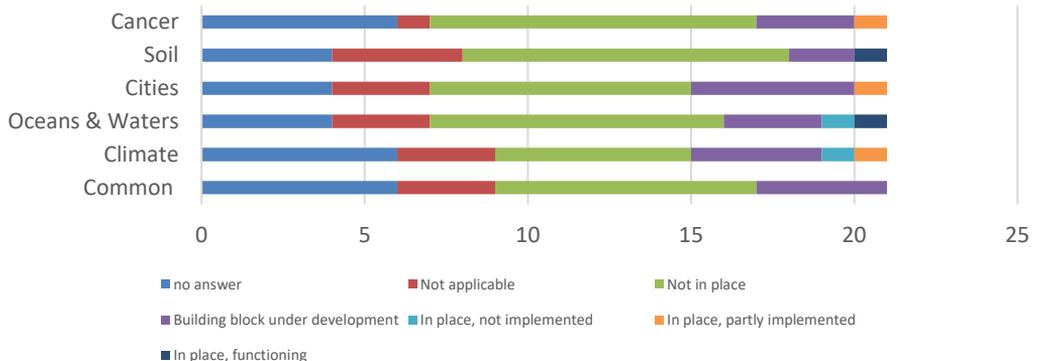- In place, partly implemented
- In place, functioning

3.d. Novel mission-oriented policy implementation structures and capacities (e.g. mirror groups, national mission boards/hubs, mission labels/charters etc)
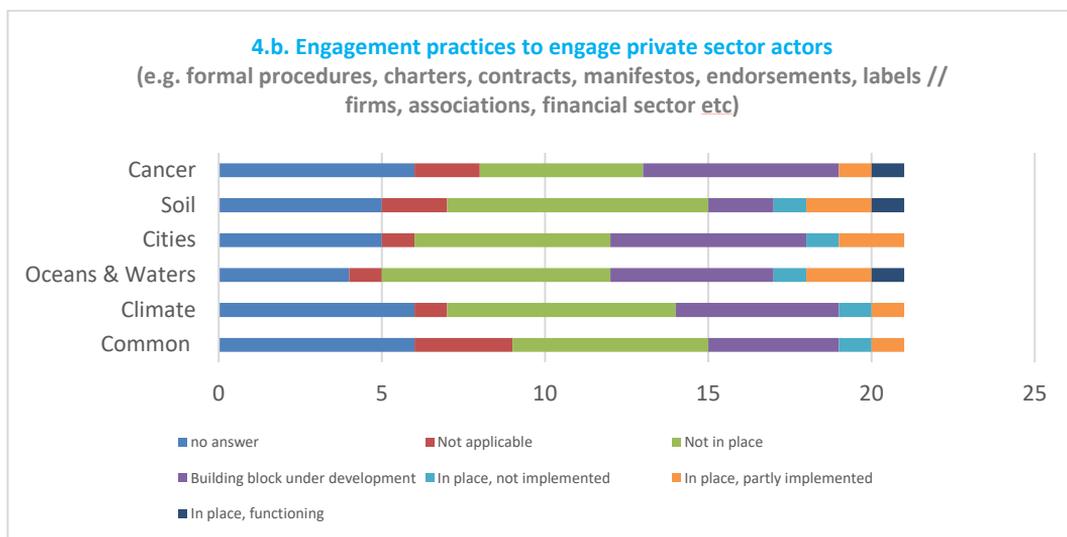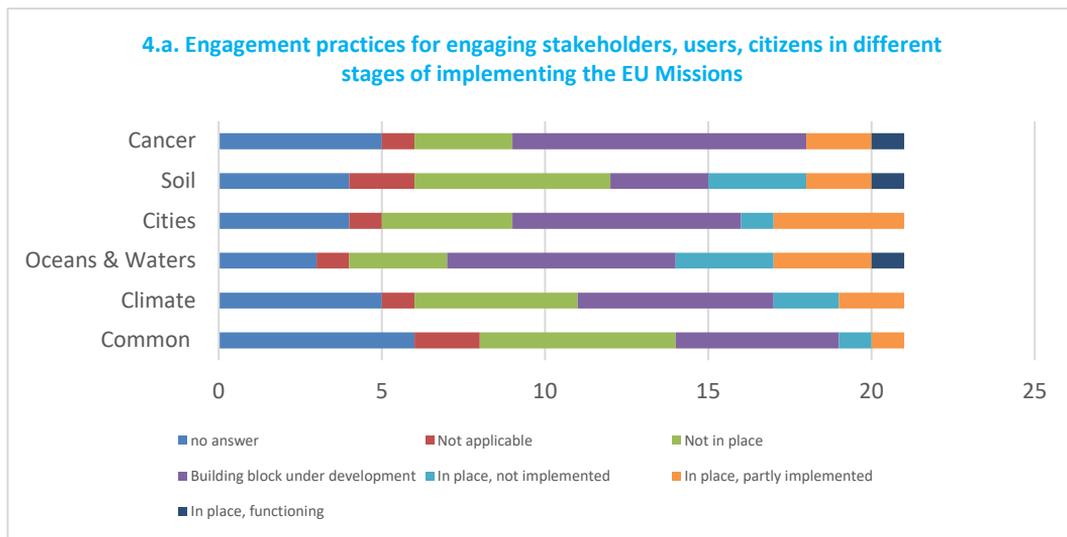

Legend:
- no answer
- Not applicable
- Not in place
- Building block under development
- In place, not implemented
- In place, partly implemented
- In place, functioning

3.e. Monitoring and Evaluation Systems

for constant revision of Missions and their implementation on national and local levels

Legend:
- no answer
- Not applicable
- Not in place
- Building block under development
- In place, not implemented
- In place, partly implemented
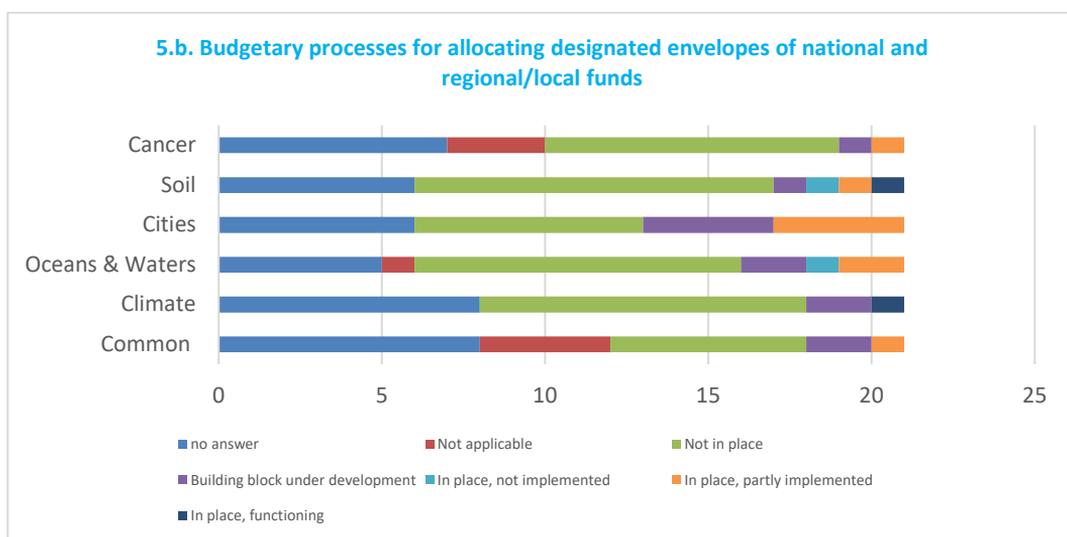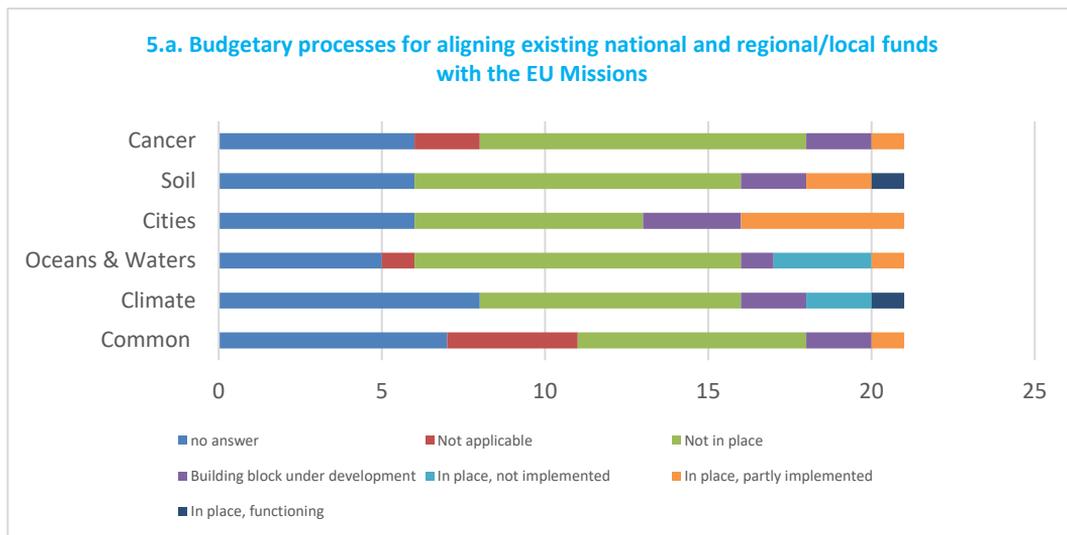- In place, functioning

Q.4. Stakeholders and Citizens Engagement

Please describe the development and progress on the engagement of stakeholders/citizens in the EU Missions in your country.

4.a. Engagement practices for engaging stakeholders, users, citizens in different stages of implementing the EU Missions

4.b. Engagement practices to engage private sector actors
(e.g. formal procedures, charters, contracts, manifestos, endorsements, labels // firms, associations, financial sector etc)

Q.5. Aligning and Pooling of Resources

Please describe the development and progress on aligning and pooling of resources to contribute to the implementation of EU Missions in your country.

5.a. Budgetary processes for aligning existing national and regional/local funds with the EU Missions

5.b. Budgetary processes for allocating designated envelopes of national and regional/local funds

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This report presents the results of the work of the Commission Expert Group (EG) to support the monitoring of EU Missions. The EG developed a conceptual understanding of EU Missions as a policy approach in the context of the EU's research and innovation policy and proposes, in this report, a monitoring framework and indicators focusing on the 'beyond Horizon Europe' scope of Missions' development and implementation.

This policy approach is an original piece of work, adapted to the systemic nature of Missions, based on a 'beyond Horizon Europe' context and identifying its key pillars. Because the focus is on monitoring activities not directly funded by Horizon Europe (HE), it complements the monitoring conducted by the EC and the EU Missions. The work was supplemented by an initial mapping of the current progress in implementing the five EU Missions.

Based on this, the EG proposed a framework and indicators complementing the HE's Key Impact Pathways framework and Mission-specific monitoring and evaluation systems currently in development, to enable a systematic monitoring of EU and individual Missions.

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