Introduction
The objective of this mission simulation is to stress test the approach and in particular to:

- determine if we need further special provisions in the legislation and;
- start the process for developing background material that could be used in the negotiations.

The scope of the exercise is both to address the co-design of missions and to explore options for their implementation. In the following text there is a description of the objectives of missions, the possible legal text, how missions could be co-designed and how they could be implemented. This text is followed by two examples of how missions could look like in a future call in FP9.

Objective of missions
A mission-oriented approach in the FP9 Global Challenges pillar is expected to contribute to a number of objectives, notably to:

- Give a much stronger public visibility to the EU's research and innovation (R&I) actions and engage the public more strongly;
- Maximise and make tangible the impact for economy and society of EU R&I and enable the demonstration of such impact ('how and where does the EU make a difference') across the entire FP;
- Leverage private sector R&I investment and align national and regional investment;
- Increase multidisciplinary research and innovation and allow for a much less prescriptive approach in calling for research and innovation proposals (clarity on expected impact, openness on the trajectory without relying on single technologies);
- Increase synergies with R&I support through other EU programmes, notably structural funds and agriculture, through a common agenda;
- Better link EU R&I investment with other EU policy objectives and enable regulatory innovation (addressing bottlenecks and informing better regulation);
- Rationalise the EU funding landscape and privilege objectives above instruments.

The entire Global Challenges pillar is expected to become more impact-oriented (including the regular calls for proposals and the partnership initiatives). In addition, a small number of missions with specific goals will be launched from the Global Challenges pillar, but also drawing on relevant activities and outputs from other parts of the programme (ERC, EIC, EIT).

FP9 legal text
The FP9 proposal will set criteria for missions as well as governance and elements of implementation modalities.

Criteria will expand on those in the Mazzucato report\(^1\), with an additional emphasis on EU added value. Account will be taken of the response to the call for feedback, which is open until 3 April 2018 and also the discussion with Member State research ministers (of 12 March 2018).

Governance modalities will deal with issues such as co-design with stakeholders and Member States (including through comitology) and citizen engagement.

Missions are not about prioritising budget but about a different way of working. Therefore there will not be a separate budget for missions, but the necessary resources would come from the relevant thematic areas of the Global Challenges. Missions will often be expected to be cross-cutting and therefore receive budgetary contributions from more than one cluster. The legislative proposal would not define a specific amount for missions, but rather provide an indicative range. The idea would be to start at the beginning of FP9 with a few missions (accounting for example for around 10 percent of the global challenge budget in the first work programme) with the aim of scaling up during implementation (for example up to a maximum of between 20 to 30%). The precise funding of missions will be decided through the regular two-year work programme (which allows for flexibility in revisiting and adjusting missions, which would be expected to span across several work programme cycles).

Provisions will also be made, notably in the Rules for Participation, for dedicated implementation modalities (e.g. to evaluation and selection proposals, and to manage projects, on the basis of a portfolio approach to reach the defined goals and milestones, rather than as individual proposals/ projects). These modalities will be further developed taking account of the ideas put forward by Professor Mazzucato\(^2\).

Annexed are drafts of how the legal text could look like for the FP and RfP (SP still to be developed).

**Co-designing missions**

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\(^1\) Be bold and inspirational, with wide societal relevance; Be ambitious, but with realistic research & innovation actions; Foster cross-disciplinary, cross-sectoral and cross-actor innovation; Set a clear direction: targeted, measurable and time-bound; Require multiple, bottom-up solutions.

\(^2\) Engagement of diverse national and regional stakeholders; Measurement and impact by goals and milestones; A portfolio of instruments to foster bottom-up solutions; Flexibility, pro-active management and building in-house capabilities.
The co-design and definition of FP9 missions will be part of the FP9 strategic planning process, which is expected to be sequenced as follows (with timing for the first cycle):

- Input to identification of mission areas from strategic intelligence e.g. economic analysis, foresight, results of the call for feedback on the Mazzucato report, input from stakeholders etc.;
- Strategic orientations by project team of Commissioners (September 2018);
- Informal (bilateral) soundings take place with MEPs and Member States during autumn;
- Draft strategic R&I plan at DG level involving all relevant DGs (end 2018, and taking account of inter-institutional negotiations on FP9 proposal);
- Consultation on the basis of this plan (throughout 2019);
- A gathering of Member States takes place in early 2019 to discuss this strategic plan;
- Drafting work programmes (early 2020);
- Adoption of first FP9 work programme for 2021 – 22 (summer 2020).

Within this process, the missions could be identified and designed in a collegial manner in three phases:

(i) Identification of a limited number (e.g. 3-5) broad mission areas (e.g. cancer or infectious diseases, oceans, decarbonisation of cities, security) by the end of 2018 as part of the strategic R&I plan (also following strategic orientations from Commissioners); This would involve for instance foresight activities and would involve all relevant Commission services;

(ii) Within the identified mission areas, the co-design of potential missions through engaging leading expertise and end-users (mission boards), targeted and open consultations, and involvement of Member State ministries through a ‘shadow programme committee’, during 2019; and

(iii) College decision in 2020 on the first FP9 work programme (covering two years), with mission calls for proposals alongside normal calls for proposals.

The consultation process (during 2019) would provide for reaching out to the broad stakeholder community and to the public at large, targeting relevant groups (e.g. patient groups in the area of health). For broader engagement, events and workshops could be organised in Member States, for example, organised by local Science Museums, academies, organisations or other entities according to a methodology to be provided by the Commission.

In this first cycle, careful attention will be needed to involve the Parliament and Council in a way which supports, and does not complicate, the inter-institutional discussions on the FP9 legislation.

Implementing missions
Mission boards
On the basis of the Strategic R&I plan, a "mission board" would be set up for each mission area; these would replace and upgrade the Horizon 2020 advisory groups in terms of:

- **Composition**: members to be appointed on a personal basis and should include a mixture of personalities who increase public visibility, end-users (rather than only those having a stake in the development of solutions), experts in the areas, and representatives of the most relevant Commission services. Mission Boards would result from a call for interest. Member States would be invited to make nominations.

- **Mandate**: to propose to the Commission for its decision (following comitology) one or more specific missions within the area, including the definition of precise goals and milestones. The proposals should be justified against the defined criteria (with substantiating evidence), and include supporting advice on implementation (measures, instruments and other activities, such as innovation deals). The mission boards would develop proposals through a co-design process (which will be different from one area to another), including the public consultation with the wider stakeholder community and public outreach. Subject to decisions on which missions to launch in the work programme, the Mission Boards could have an ongoing role in implementation (with renewals of membership as appropriate), including: helping identify the evaluators for the calls for proposals (similar to the role of the Scientific Council in the ERC); establishing the appropriate performance and impact pathway indicators for monitoring missions' progress; advising on re-orientations in the portfolio of projects supported; and monitoring and communicating progress and continuously reaching out to stakeholders and public.

Executive agency and mission manager
Missions would be implemented by a single implementing body (from among the existing executive agencies), which would organise the calls for proposals and manage the contracts.

Missions could be implemented by the executive agency according to the content of the mission. Thus, the executive agency mainly dealing with the content of mission would continue to be the executive agency. This would imply changing the delegation act with the executive agency. Other options could be to decide to have only one executive agency implementing all missions. This would require the consent of all DGs. A third option could be to decide that missions should be evenly spread out across the executive agencies so they de facto do not alter the workload of the executive agencies. Though, this would restrict the choice of the composition of missions.

For each mission, the executive agency concerned should be able to recruit, for a definite period (3 to 5 years), top experts including the mission manager in the field. The latter could get the mandate and leeway to manage the portfolio of FP9 supported activities under guidance from the mission board.
Call text and its content

The calls for proposals should be as non-prescriptive as possible, complemented by possible guidance documents developed by the Mission Board. They could allow for using a variety of instruments (research and innovation grants, inducement prizes, partnerships, innovative public procurement, and financial instruments through EUinvest).

Compared to the normal calls a few differences could be foreseen:

- There would be no detailed topics but four 'topics' for projects, partnerships, public procurement and prizes respectively;
  - The project topic will be bottom-up for the entire mission call text and request innovative solutions contributing to achieving the mission target including concrete deliverables;
  - The partnership topic would be open for existing or new partnerships. Partnerships including a broad range of actors, representing both the supply and the demand-side, should be encouraged;
  - Finally, the topics funding prizes and public procurement would focus on a limited number of highly visible prizes rewarding innovative solutions or public procurement contributing to the mission target. This topic will thus not be bottom-up for the entire mission call text but target particular needs.

Evaluation of proposals

Proposals will always be evaluated and selected by independent evaluators who will be briefed by the mission manager (following the steering by the Mission Board). Relevant evaluation and selection criteria will, along with the evaluation method (e.g. to ensure portfolio approach), will be defined in the work programme.

Implementation of projects in the missions

To ensure a portfolio approach projects within a mission could be linked through CSAs and special requirements in the consortium agreements requesting a dedicated work package targeting linking between projects. Pre-existing projects from the past could be encouraged to be linked to the missions for instance through the participation in a CSA.

If relevant projects should also be connected to the EIC, though in terms of timing this would be difficult since projects coming out of a mission call would in most cases not reach a stage within the lifetime of FP9 for it to be ready to reach a high enough TRL level. Though, if pre-existing projects are linked to the mission, these could more naturally be linked to the EIC (and InvestEU).
Furthermore, it could be possible to have budgetary top-ups to running projects and the mission manager could be able to launch complimentary calls to ensure that the mission objectives are met if gaps are identified (see also the draft legal text for the RfP).

The mission board could provide recommendations for how to improve the regulatory environment, which could be followed up by the relevant services in the Commission.

When a project is running it could be possible to stop a project on the grounds that it is no longer relevant to achieve the mission for instance in a situation where other technologies have outperformed the ones developed in a project.

Partnerships (with Member States, with private sector, with Foundations) can be used to support the implementation of a mission, but a mission cannot be equated with a single partnership. The strategic programming process would identify potential partnerships and how they would be expected to contribute to missions.

**Monitoring of missions**

The monitoring of each mission will have to be tailor-made to the targets of the particular mission. For this purpose a baseline study could be carried out. The monitoring could be the primary responsibility of the mission manager who reports to the mission board. This way the stakeholders through their membership of the mission board would know if a mission is on track and thereby ensure transparency.
Annex 1 – draft legal texts for the FP and RfP

Framework Programme

"Part of the activities will be implemented through a limited number of missions. Each mission will be a large-scale assignment given to a portfolio of R&I actions to achieve an ambitious but realistic goal within a set timeframe. Missions will be designed to create a very powerful and measurable impact, with a transformative potential for science, technology, industry and society. They will require sustained cross-sectorial and interdisciplinary effort, and a deep involvement of stakeholders from beyond the R&I community, including policy-makers, end users and civil society. They should also have the potential to set the direction for related work in the Member States, regions, local actors and cities. Missions must be readily understandable to the public, captivating in nature, and therefore liable to incite the active engagement of concerned citizen groups.

Missions will be selected according to the extent to which they:

(i) Are bold, inspirational with wide societal relevance;
(ii) Have a clear direction: They should be targeted, measurable and time-bound;
(iii) Are ambitious but realistic in terms of research and innovation;
(iv) Have activities cutting across scientific disciplines, policy sectors and include many types of actors;
(v) Allow for multiple bottom-up solutions;
(vi) Have EU-added value.

Missions will be implemented through non-prescriptive open calls to allow for creative ideas from applicants. The process for identifying missions, involving citizens and stakeholders, is set out in the Specific Programme."

Rules for Participation

Article 13 Evaluation

"For the specific purposes of achieving the objectives of the EIC and of missions, dedicated evaluation and selection procedures will be laid down in the Work Programme."

To implement EIC’s transition activities and mission activities identified in the work programme and within the budget allocated therein, the RAO may launch a dedicated call to complement existing projects or develop new actions. The RAO shall justify his selection of proposals with regard to the consistency of the related portfolio of projects and its assigned objectives.

Article 15 Time to grant

The periods referred to in paragraph X may be exceeded for actions of the ERC, for multi-step evaluations as referred to in Article XX, for missions, and in exceptional, justified cases, in particular where actions are complex, where there is a large number of proposals or where requested by the applicants.
Article 16 Implementation of the grant
The RAO may terminate an action where expected outputs have lost their relevance for the Union due to technical or economic reasons, including in the case of EIC and missions the achievements of other actions implemented therein.
Annex 2 – examples of missions "A Plastic-Free Ocean"

- **Mission statement**
Science, Research and Innovation are at the heart of this mission. It will drive EU policies, Sustainable Development Goals (notably SDG 6 and 14), regulatory and governance actions and address concerns of citizens to provide solutions so that the EU:

- Strengthens its role as the world leader in preventing marine litter cleaning seas and oceans and restoring their health and productivity;
- Strengthens its role as the world leader in developing alternatives to plastics and developing technologies to prevent marine litter;
- Reduces the amount of plastic entering the marine environment by 90% by 2027;
- Removes the amount of plastics and microplastics in the seas and oceans each year after 2025 by 2 million tons;
- Transforms recyclable waste into a flourishing market of secondary raw materials.

- **Underlying challenge/opportunity**
Our plastic full seas and oceans are a symptom of a systemic problem of inefficient and unsustainable use of plastics as the main material for consumer products in the global economy.

Worldwide, an estimated 10 million tons of litter, mostly plastics, enter the seas and oceans each year, some of it as macro-plastics, but also micro-plastics. It is estimated that only 30% stays at or close to the surface. The plastics may persist for hundreds of years before eventually degrading completely. During this time they adsorb toxins, concentrating them before getting into the food chain and affecting animal and human health.

It is estimated that the impact of plastic pollution on the economy is at least USD 8 billion per year.

An underlying challenge is the effective implementation of policies, for example the Waste Directive, the Marine Strategy Framework Directive, the Circular Economy Package, notably the Circular Bioeconomy, the Plastics Strategy and the Single Use Plastics legislation, which are essential for the realisation of plastic-free oceans and seas.

Research and Innovation challenges will create new markets for new products, and above all will reduce the clean-up costs, damage to the economy and health effects by billions of euros per year.

International cooperation in research, technology and innovation development and deployment, as well outreach and education activities will be essential to achieving plastic-free oceans, seas, coastal areas, rivers, lakes and drinking water.

- **Activities**
Research and Innovation activities across the whole innovation chain will be essential in achieving this mission. Activities will be underpinned by the 4R's - Reduce, Reuse, Recycle, Recover. Activities will be regrouped into knowledge production, prevention of marine litter and restoration of the health of the oceans and seas. The innovation actions (design, material, social, information, etc.) must be combined with effective public policy and regulatory actions, be cross-disciplinary, cross-sectoral and cross-actor, and include education activities (curricula) and outreach campaigns for society and behavioural change of consumers (notably tourists), policy makers and waste and water managers. These activities must underpin and drive the efforts to combat marine litter, notably on the prevention side (the volume of the seas and oceans is 1300 million km³), but also by reducing the existing marine litter.

The prevention of marine litter will be key for achieving success of this mission. Consequently it will benefit from the many actions related to the Circular Economy Package, the Single Use Plastics legislation, the Marine Strategy Framework Directive, the Plastics Strategy, and
international cooperation activities, for example the Galway and Belém Statements, the BLUEMED, International Ocean Governance, G7 and G20 initiatives. Other voluntary commitments, incentives, regulations and legislations can further contribute to reaching the target of this mission.

Actions will be intrinsically linked and well-coordinated in order to reinforce each other and the 4 R’s to (not an exhaustive list):

- **Develop knowledge and tools for its use for decisions and monitoring of their impact.**
  - Improve knowledge on the scale and distribution of the problem and its societal impact; sources and drivers; pathways; effects (on health, economy etc.); development of methods for observation, monitoring, assessment of impacts; evaluation of progress; tools for decision-makers to use this knowledge and to inform citizens.

- **Stop sources of marine litter and their negative impact on the environment (phase out single use plastics (notably packaging); improve sustainability of packaging; develop alternatives to non-biodegradable plastics; improve recyclability; reduce and even prevent the input of primary microplastics; outreach actions).**
  - Develop effective technologies and techniques for retaining plastics and microplastics in waste water, storm water and run-off water; innovations to stop waste leakages; development of alternatives to plastics and less harmful substances (micro-bead free cosmetics and tyres with reduced wear); ways to reduce of pollutants that adhere to and concentrate on marine litter.

- **Recycle:** Develop new materials and processes to ease recycling most plastics, and be potentially systematically transformative in scope, addressing all forms of innovation and allowing for experimentation of solutions and engage citizens, managers and decisions makers.
  - Design and material innovation to make products durable, repairable, reusable and recyclable; new compostable or biodegradable materials that are collected and introduced into the compostable materials stream; new ways to minimise packaging and littering, and maximising collection and recycling; social innovation for change of consumer behaviour; recycling of lost or broken fishing gear.

- **Reuse:** Develop ways to reuse used plastics as raw materials, as well as optimising the plastic packaging value chain.
  - Develop new plastic materials that are easier to feed into associated reuse chains.

- **Remove:** Removal of marine litter at a faster pace than litter is entering the oceans.
  - Development of effective technologies for removal of plastics (including microplastics) from the oceans and seas (autonomous stations) and recycling of the collected materials; and development of techniques for removal of plastics from fluvial and marine sediment.

- **Encourage behavioural change of consumers, educators, citizens and increase sustainability of tourism.**
  - Massive outreach campaigns (tourism, consumers, fishers, Science Lab exhibition which will be at EP in April 2018), primary and high school curricula, local authorities (mayors, regions, cities, waste and waste water managers), socio-economic research to optimise collection systems, work with NGOs and international organisations (UN bodies).
- A research and innovation topic to cover the research and innovation activities and to cover outreach activities;
- A partnership topic (to be defined, could be for example on ocean observations, including monitoring of effectiveness and knowledge about pathways and toxins), bringing together Member States, industry (cf. 2017 Our ocean conference commitments);
- X-Prize and other awards, for example litter free island (2021), litter and micro litter free large non-coastal city (2023), technological breakthrough to prevent marine micro-litter (2025), best film on marine litter and its prevention (2027);
- Innovative procurement: for example reuse plastics obtained through a 'fishing for litter initiative' as raw materials and increasing additionality;

**Outside Framework Programme for R&I:**
Synergies with structural funds and other EU programmes such as the LIFE Programme amongst others, including EIB and ESIF, Member State funding, private sector and foundations.

- **KPIs and specific targets**
Success will be measured by:
  i) the availability of technologies to prevent and remove marine litter by 2025;
  ii) the reduction of input of plastics by 90% by 2027 has been nearly achieved in the European Seas;
  iii) the removal of 2 million tons of plastics per year is operational in 2025;
  iv) relevant consumer products are either recyclable or biodegradable in marine water by 2030;
  v) all cities above 100000 inhabitants have waste water treatment that treats storm water and captures 95% of plastics by 2030.

**Mission board**
- Ellen MacArthur, Pierre-Yves and Céline Cousteau
- 5-7 end-users: policy developers, NGOs, waste and waste water managers, waste and recycling industries, producers of packaging materials, industries active in the food chain, tourism industry,
- MEP (Ricardo Santos?)
- DG ENV, DG SANTE, DG EAC, DG MOVE, DG MARE, DG EMPL
- 2-3 representatives appointed by Member States

**Executive agency**
Responsible executive agency: need to select one executive agency
Annex 2 – examples of missions - Decreasing the Burden of Dementia or Fighting Dementia for more healthy years or Fighting Dementia: healthy brains for better life

Mission statement
Reduce by half the human burden of dementia and add more healthy years by avoiding or delaying occurrence and reducing progression of the disease within 10 years. This requires better prevention, early detection and early intervention, in order to give more healthy life years to millions of people, lower the burden for caregivers and contain costs for society.

Underlying challenge/opportunity
Dementia refers to a set of diseases that includes Alzheimer, stroke etc. It affects 10.5 million people in Europe, at a cost of some €270 billion a year, and is expected to rise by 78% and affect 18.7 million people by 2050. This is a huge global challenge and an opportunity for Europe to enhance patient-centred approaches through the development of new technologies, drugs and services for monitoring, early diagnosis, treatment and care. This would also allow enhancing new markets for drugs and services, including through social innovation.

Awareness of dementia disease is low, prevention is limited and underdiagnosed or diagnosed late. Concomitant diseases are also under-reported, which in turn can accelerate decline in health and quality of life for patients and their families. In addition, there is no effective treatment and care can also be improved.

Large investments in transdisciplinary research are needed, but equally better coordination and collaboration among the major efforts deployed in both the public and private sectors, including national programmes, research infrastructures and partnerships.

Activities
Research and innovation activities for this mission are based on priorities broadly recognised by the research community and where there is high EU added value:
1) Understanding the origins of dementia and identifying risk factors to enable better prevention, diagnosis and treatment.
2) Effecting behavioural changes at population level to avoid or delay the onset of dementia.
3) Accelerate research through European or global initiative(s) bringing together resources and expertise.
4) Improving drug-development to provide therapies for Alzheimer’s and other causes of dementia.
5) Determining the main factors that affect disability and quality of life, so as to better monitor the effectiveness of drugs and other interventions.

4 Strategic Research & Innovation Agenda of EU Joint Programme - Neurodegenerative Disease Research (JPND) http://www.neurodegenerationresearch.eu/initiatives/strategic-research-agenda/
6) Develop digital approaches to provide patients and carers with the means to prevent and alleviate memory loss (through physical & mental activity and social interaction), improve compliance, monitor symptoms or provide support to enhance independence and support assisted living.

Outside Framework programme for R&I

7) Establishing a clinical trial network covering all MS to accelerate the validation of new therapies and ensure rapid, broad and equitable access. [Structural funds – cohesion policy]

8) Assessing strengths/weaknesses of formal and informal care approaches and infrastructures across Europe, including the principles of access and equity, as a prelude to implementing best practices and evidence-based systems. [DG SANTE]

Topics

- A topic to cover the research and innovation activities, including leveraging infrastructures
- A partnership programme to cover:
  - Comprehensive coordination of national strategies and research programmes;
  - Partnerships with charities and philanthropic organisations;
  - Large-scale academia-industry and intra-industry collaboration, including small and medium-sized technology driven enterprises;
  - Develop an ecosystem enabling rapid growth of emerging enterprises;
  - International collaboration increased through programme level cooperation;
- A topic for incentives/prizes for specific cases (e.g. pre-symptomatic diagnostics, assisted living, social innovation);
- A topic for Innovative procurement for health uptake.

KPIs and specific targets

- Average diagnosis 3 years earlier;
- Onset of dementia delayed by 5 years;
- Reduce by 50% the progression of dementia in affected patients;
- Impact on costs (TBD);
- Develop an appropriate evaluation system adapted to various development stages of dementia;
- XX % of patients monitored at home (with XX% less visits to doctor/hospital;
- Develop M-Apps for the monitoring, predictions and support which are clinically validated;
- Measures of physical & mental activity and social interaction;
- 10% of AD patients benefiting from the most innovative therapies (e.g. under clinical trials);
- 10 indicators validated for very early detection of disease;
- 5 new interventions (drug or non-drug) clinically validated with significant patients’ benefit.

Mission board
• Celebrity: XXX YYY (should be an active middle-aged person)
  5-7 end-users: patients, formal and informal caregivers, payers (eg Alzheimer Europe, Stroke Alliance for Europe (SAFE), European Patient Forum (EPF), European Federation of Nurses Associations (EFN), European Brain Council (EBC)…)
• 3-4 DGs: SANTE / CNECT / JRC / MOVE* / EMPL
  (*smart cities / linked to physical activity)
• 2-3 representatives from MS

Executive agency
• To be determined.