

Norway's positions on thematic priorities, instruments and partnerships in FP9

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Introduction

Norway presented its first positions on the next Framework Programme ("FP9") in March 2017. In that paper, we stated our main priorities for the role and structure for FP9. This paper follows up on the first input and presents our main thematic priorities, instruments and partnerships in FP9.

The second input, like the first, is based on consultations with ministries, agencies and Norwegian actors in research and innovation.

Role, design and structure of FP9

In our first input we emphasised that FP9 should build on the achievements of the current Horizon 2020 programme. Excellence should be kept as a core principle in FP9 and the programme should be as simple and user-friendly as possible. We further underlined the need for FP9 to:

- have clear priorities based on considerations of European Added Value
- strive for complementarity with the national level, but not substitute national funding
- provide for a flexible and learning programme and more high-risk R&I projects

These concerns are also echoed in the Lamy-report (LAB-FAB-APP). We find the report to be a very useful input to the debate on the next Framework Programme. We support the proposed three-pillar structure in the report: "Science and skills", "Innovation and competitiveness" and "Global challenges".

We also find the proposal of the missions-oriented approach interesting and look forward to further discussing and contributing to the clarification of the concept of "missions". Our preliminary view is that R&I missions should be:

- linked to the global challenges, but also operate across the pillars of the programme and encompass also basic research and enabling technologies
- defined and launched in a flexible manner throughout the lifetime of the programme to cater for new needs and opportunities as they arise, in close dialogue with participating states
- based on a "high-risk, high-gain" approach with a portfolio of activities and projects.

We agree that missions (and FP9 in general) need to ".....mobilise many actors and investors, including at national level, and induce action across disciplines, sectors and institutional silos".¹

¹ Lamy-report, p 15.

Part I: Thematic priorities in FP9

Securing a competitive economy with sustainable growth, renewal and creation of jobs is a main concern for many European countries, including Norway. FP9 should complement and reinforce national efforts in this regard.

The long-term challenges Europe is facing are to a large degree of a global nature. We agree that the UN Sustainable Development Goals (SDGs) constitute a framework for managing the future risks posed to political, economic and social systems² and support that they should serve as a reference framework for defining global challenges and missions in FP9.³

In addition to the SDGs, the efforts should address the COP21-targets as well as the Aichi targets on biodiversity, and international agreements on chemicals and waste.

Norway has four top thematic priorities for FP9:

1. A green shift towards a low emission society
2. Sustainable blue growth – oceans
3. Societal security, resilience and social cohesion
4. Digitalisation

While clearly not an exhaustive list, we believe that these four priorities represent areas which require greater attention and joint efforts at the European level in FP9. The proposed priorities are of relevance both to a global challenges pillar and to an innovation and competitiveness pillar in FP9, as well as possible large-scale research and innovation missions in FP9.

Assuming a seven-year programme period, FP9 will run from 2021 to 2028, funding research efforts, which will actually take place well into the beginning of the 2030s. Stating thematic research priorities at European level, given such a time-scale and a yet unknown programme structure, calls for a humble approach. Not all priorities can be stated at the outset of the programme. This calls for a flexible FP9.

Below we give a rationale for each priority. We also give suggestions for specific issues under each priority area, which should be updated and complemented during the implementation phase of the programme.

Priority 1: A green shift towards a low emission society

The global climate and environmental challenges have consequences for individuals, businesses, government and society. Research and innovation in FP9 must underpin a green shift and complement efforts in other policy areas to motivate people and to develop the right framework conditions, a future-oriented infrastructure and sustainable management of natural resources. A green shift is relevant to a number of SDGs, in particular SDGs 2, 7-9 and 11-15, as well as for COP21 and Mission Innovation.⁴

We believe that FP9 should continue to contribute to competitiveness and sustainable growth in Europe. The green shift entails opportunities for new growth and jobs through a transition to products and services with significantly reduced negative consequences for the climate and the

² Cf. the report: "New horizons - Future scenarios for research & innovation policies in Europe"

³ Cf. the "Lamy-report" LAB-FAB-APP.

⁴ Through Mission Innovation, 22 countries and the European Union are taking action to double their public clean energy R&D investment over five years.

environment. Innovation, new technologies and incentives for businesses are essential. Further investments in research, innovation and skills under the EU's Circular Economy Package and the Bio-economy Strategy are necessary to contribute to more green innovation and growth.

Research and innovation in sustainable food production, water use and nutrition security are important elements of a green shift. A growing population will enlarge the global demand for water and food and increase the pressure on natural resources. Food and nutrition insecurity and severe water stress constitute threats in many parts of the world and may cause social instability and conflicts.

Energy conversion and consumption generate the largest global share of CO₂ and other greenhouse gas emissions. An increased and reliable supply of renewable energy is a key challenge for the world and for Europe. The Energy Union Package emphasizes that carbon capture and storage (CCS) and carbon capture and use (CCU) for the power and industrial sectors will be critical to reach the 2050 climate objectives in a cost-effective way. In the transition to low carbon energy production, hybrid systems combining gas and renewables also need to be further developed.

Clean energy is also key to achieving clean and sustainable mobility – cf. the "Europe on the Move"-initiative. A key challenge for the FP9 would be to strengthen the knowledge base and support the innovation efforts for sustainable production and use of environmentally friendly energy in industry, buildings, transport etc.

Industrial processes and the construction industry also have significant carbon footprints. FP9 should contribute to industrial innovation and the development of low carbon technologies and solutions, supplementing other incentives. Delayed action in these industries represents risks to European climate goals, economic sustainability and future job creation.

FP9 should contribute to transfer and adaptation of technology, innovation and skills between sectors and industries, including between traditional and emerging industries. This could contribute to the green shift and strengthen European competitiveness.

Possible issues to be covered by a priority or a mission on a green shift towards a low emission society are:

- Circular economy (including the bio-economy) and resource efficiency
- Sustainable food production and nutrition security from land and sea
- Innovative nature-based solutions (including biodiversity and ecosystem services)
- Protection and sustainable use of biodiversity and healthy ecosystems
- Bioprospecting
- Resource demands linked to the food-water-energy nexus
- Transition to a low emission society: energy efficiency, smart and integrated energy systems, industrial processes and construction industry, competitive, smart and sustainable cities
- Sustainable production of environmentally friendly energy
- Pricing and regulations
- Consumer behaviour, incentives and change
- Carbon capture and storage (CCS) and carbon capture and use (CCU)
- Carbon neutral and zero emission transport
- Decarbonizing of fossil energy resources
- Transition pathways to a sustainable energy system

Priority 2: Sustainable blue growth - oceans

The seas and oceans are important to Europe, including in terms of food, transportation and recreation. The importance of the seas and oceans for commercial activity, trade and technological innovation, including in the Arctic, is increasing.

The OECD estimates that the output of the global ocean economy is EUR 1.3 trillion, and that this could be more than doubled by 2030. The seas and oceans are of great economic importance to Europe: Almost 90 % of the EU's external freight trade is seaborne. Europe is the largest market for fish in the world. The ocean floor is important for the extraction of fossil energy and other natural resources. The majority of oil and gas production in Europe takes place offshore. Deep-sea mining is already high on the agenda. Finally, the oceans are an important part of daily and extreme weather conditions, and they act as a moderator for atmospheric heating and CO₂. However, litter and waste in the oceans are of increasing concern.

Research and innovation on the seas and oceans is highly relevant for a green shift, and for the achievement of a number of SDGs, in particular SDG 14 "to conserve and sustainably use the oceans, seas and marine resources", but also SDG 2, 9, 12 and 13.

Ocean and seas research and innovation in FP9 therefore need to take into account the economic opportunities, but at the same time also limits related to climate and environmental challenges.

Particular attention should be paid to the potential for value creation based on technology and knowledge transmission between the oceans-based industries, but also between these and sectors such as energy and health. Special attention should also be given to the Arctic given its growing importance.

Possible issues to be covered in a priority or a mission on sustainable blue growth – oceans are:

- Marine and maritime sciences and technologies, including autonomous systems
- Better knowledge of the physics and chemistry of the oceans and the geography and geology of the sea floor
- Political and economic frameworks for activities in and protection of the oceans
- Sustainable seafood and marine bio sources
- Sustainable growth in aquaculture
- Marine ecosystems and ecosystem services
- Development of the coastal economies
- Deep-sea mining
- The Arctic

Priority 3: Societal security, resilience and social cohesion

Europe and the rest of the world face challenges in terms of ensuring secure, stable and well-functioning societies and democracies. The challenges include adaptation to climate change, migration and integration, interdependency when it comes to critical infrastructure, social inequality, challenges to minorities, lack of access to healthcare, unemployment, political and religious radicalisation and demographic change.

Research and innovation in areas such as these are highly relevant for the achievement of a number of SDGs, in particular goal 1, 4, 5, 10 and 16. Research, innovation and renewal is important also to secure and develop further the welfare models in European states.

The need to understand the challenges related to social security, resilience and social cohesion and to propose common European as well as regional and national solutions require a broad range of research and innovation efforts. We need comparative studies, multi- and interdisciplinary approaches and broad collaboration between researchers, society and businesses. Furthermore, we need different perspectives and approaches, experimentation with technology and engineering where appropriate and new approaches to economy, public management and health care administration.

Possible issues to be covered by a priority or a mission on societal security, resilience and social cohesion are:

- A changing threat and security landscape
- Resilience and societal safety
- Understanding the risks posed by climate change, including risks from prolonged heat-waves, drought and flooding to critical infrastructure, food and clean water
- Preconditions for securing open, stable and democratic societies
- Trust in institutions in an age of rising populism
- Social cohesion and resilient societies
- Innovative and resilient regions, indigenous peoples and local communities
- Research for promotion of health and prevention of disease, maintaining sustainable health care systems while ensuring equal access to healthcare for all
- Inclusive growth, well-functioning labour markets and welfare systems, including education and skills
- Tackling migration flows and enabling successful integration of migrants
- Transfer of knowledge from outside of Europe in areas such as heterogeneous societies, cosmopolitanism, plurality of gender, citizenship and identity, narratives of past and future, and conceptions of creativity and innovation
- Educational research

Priority 4: Digitalisation

Digitalisation is a process that leads to profound changes in technology, industry, society, economy, and people's lives. Advances in digital technology are at the core of these changes. Our ability to imagine, exploit, enjoy and appropriately regulate these opportunities must be strengthened.

A significant and sustained European effort in ICT R&I is essential for European productivity and competitiveness and the development of a Single Digital Market, as well as the future quality of our societies and our lives. This includes the challenge for European industry of having to adopt to new paradigms of innovation and manufacturing as well as challenges of digitalisation to our social interaction, communication patterns, entertainment, labour markets, education, research and requirements for qualifications. Digitalisation therefore encompasses both technology and societal challenges, and cuts across the three possible pillars of FP9.

FP9 must support generic and collaborative ICT research (including research on future and emerging technologies) to strengthen the European competence base and secure future competitiveness. To increase innovation, FP9 must exploit the potential of open and interoperable digital platforms. Such platforms are relevant in a wide range of sectors, including energy, manufacturing, smart cities, transport, environment, health, public services, and welfare technologies.

FP9 must also support a broader range of interdisciplinary research addressing the societal challenges and opportunities associated with digitalisation. Internationally, and in Europe, the capabilities to handle these opportunities and challenges vary greatly. Improvements in this regard will be to the benefit for the economy, the digital single market and to European cohesion.

Possible issues to be covered in a priority or a mission on digitalisation are:

- Intelligent systems, including cognitive computing, artificial intelligence, machine learning and deep learning, transport and mobility
- Digital security, including cyber and information security
- Cyber-physical systems, including the Internet of Things
- Robust, resilient and secure communication infrastructures
- Digital platforms and big data ecosystems
- Scalable systems, including distributed systems, High Performance Computing, quantum computing
- Verification of software and hybrid systems
- Robotics technology
- Standardisation and certification
- Human – Machine Interaction
- Creation and loss of jobs and adaptation working practices
- Collaborative economy and societies
- Creativity and (digital) cultural heritage
- Promotion of healthy lifestyles and social interaction
- The digital divide
- Digitalisation of healthcare: improved diagnostics and overall impact
- The impact of robotics
- Digital privacy and human rights

Part II: Instruments and partnerships in FP9

Both instruments and partnerships should be rationalised and streamlined in FP9 compared to the current Horizon 2020 programme.

Instruments

Norway's main general messages in terms of instruments in FP9 are:

- Instruments to support bottom-up innovation and excellent research (SMEI, ERC, FET, MSCA, RI) must be kept
- Collaborative projects must be maintained as a main instrument for supporting research and innovation in FP9, but should be made more SME-friendly
- The EIC should be created as a tool to support radical and market-creating innovation. In addition, innovation instruments must be secured throughout the entire programme
- Frameworks for consistent collaboration environments between research organisations and industry (including SMEs), such as "Digital Innovation Hubs", should be continued
- Instruments for cross-sectoral transfer of innovation and technology should be considered

- Include education activities in relevant parts of the programme and secure synergies with the next EU framework programme for education

We would also like to emphasize the following to strengthen impact of the activities in FP9:

Simplify support to industry and SMEs

The landscape of instruments for research and innovation in industry and SMEs has become highly diverse with EIT, COSME, the SME instrument, Eurostars, Innovation Actions, Fast Track to Innovation and the EIC. We recommend a consolidation of instruments, making it easier for businesses to find their way to relevant funding opportunities. Large companies should be able to cooperate with innovative SMEs as well as other actors through the consolidated instruments.

Financing innovation is challenging due to its high-risk nature and the fact that it often is capital intensive. Improving access to sources of debt and equity financing and absorption by innovative companies of all sizes should be a priority for FP9.

Secure a better integration of social sciences and humanities

We believe that we can further improve the societal impact through a stronger emphasis on mainstreaming social science and humanities, responsible research and innovation and gender issues across FP9. We can also ensure stronger impact of FP9 by engaging citizens and societies - including the young - more broadly in the design and implementation of the new Framework Programme.

Involve the public sector more in priority setting

Public sector innovation should be an integrated part of the global challenges and of possible large-scale R&I missions. The public sector should be more included in priority setting to strengthen the relevance of the R&I activities, and increased cooperation between public, private and societal actors should be stimulated. Instruments for innovative procurement should be further developed in FP9, and development of novel public-private innovation models should be promoted.

Partnerships

The partnership instruments introduced into the European R&D and innovation landscape over the past 15 years can potentially play important roles in addressing societal/global challenges and enhancing innovation and competitiveness in FP9. However, the landscape needs to be simplified and streamlined. This should be done with a systemic view to the need for the partnerships to contribute to high impact and support the goals and missions of the next Framework Programme. Modalities should be expanded and adjusted to achieve this, including better links between actors from different sectors and more ambitious innovation agendas.

Co-funding of calls from FP9 should give priority to partnership initiatives that are related to the goals and missions of the programme. In *other areas* where Member States and Associated Countries want to cooperate, FP9 should provide support of the operational costs of the cooperation activities, which often tend to be difficult to finance. This support should be given in flexible and non-bureaucratic ways. Funding of the research and innovation activities should however be provided by the Member States and Associated Countries, without co-funding from FP9.

Industry driven initiatives should be based on strong commitment from industry and focused in areas where industrial R&I cooperation across borders is crucial, and where there is a clear European Added Value. It is important to ensure that the activities are open for all participants that could make important contributions, and to avoid tendencies of "closed clubs".

New partnerships should be open and transparent from their inception, not only when they are formally constituted. Partnerships should always be open to associated countries.