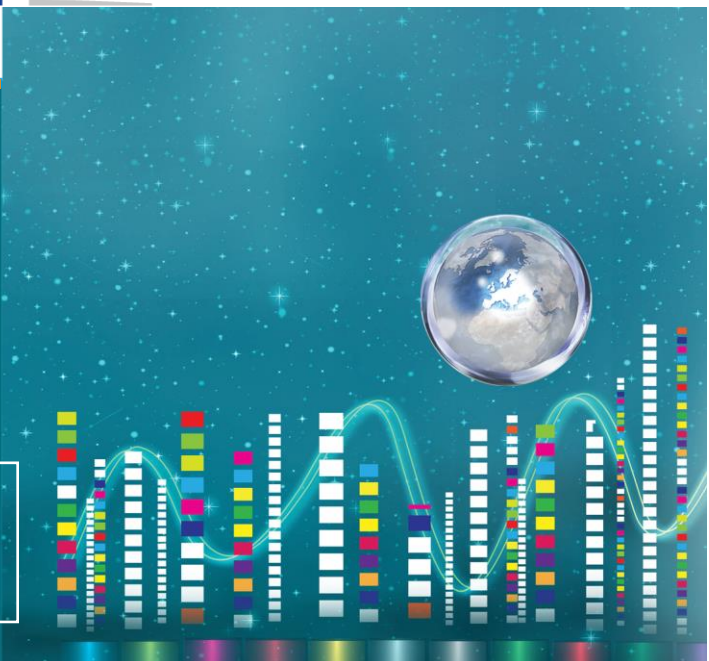


Evaluation study on the relevance and internal coherence of Horizon 2020 and its policy mix

Executive summary

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Report



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EXECUTIVE SUMMARY

The purpose of this study is to provide the Commission with the specific data and analyses needed to support the ex-post evaluation of Horizon 2020 regarding the evaluation criteria 'relevance' and 'internal coherence' as well as its policy mix. Further, the study's conclusions and recommendations shall inform the implementation of Horizon Europe, and potentially future framework programmes (FP).

The study covers the whole Horizon 2020 programme (2014-2020) and its policy mix defined as the set of activities, instruments, and types of actions used to implement Horizon 2020. It is performed in line with the [Better Regulation guidelines](#) as applicable to all EU expenditure programmes.

The focus of the evaluation is on the relevance and internal coherence evaluation criteria. The 'coherence' criterion splits broadly into internal and external coherence, and it is internal coherence that is considered in this study. Evaluating 'effectiveness', 'efficiency' or 'EU added' value is not part of this assignment and will be addressed in related Horizon 2020 impact area studies.

In the context of this specific study, and building on the corresponding baseline definitions in the Better Regulation toolbox, 'relevance' and 'internal coherence' of the policy mix and the processes established to ensure relevance and internal coherence are defined as follows:

Relevance of the design: The programme's relevance to the needs, priorities, problems and issues for R&I to be addressed at the European level; the relevance of Horizon 2020 to the European political priorities; the responsiveness to emerging needs and priorities.

Relevance of the policy mix: The degree to which the policy mix addresses the Horizon 2020 objectives; the adequacy in addressing the needs of target groups.

Relevance of processes: The extent to which processes supported relevance, for example different types of consultation and evidence used in Horizon 2020 programming.

Internal coherence of the policy mix: The translation of Horizon 2020 objectives into work programmes and calls, and coherence across the programme parts; the complementarity and consistency of established and new instruments, activities, or actions within the policy mix.

Internal coherence of processes: A set of process characteristics, expected to support the successful design of the programme.

Methods

Evidence was gathered during the period August 2021 to September 2022 using a mix of quantitative and qualitative methods. Data collection and analysis was structured in five phases.

In the exploration phase, a cross-cutting basis of relevant data was developed based on European Commission sources (e.g. extracts from eCORDA database, call texts etc.), as well as compiled through the analysis of documents (Horizon 2020 programming documents, policy documents, evaluation studies, expert advice etc.). Subsequently, first qualitative (performance and SWOT analysis, exploratory interviews) and quantitative analyses (programme data analysis, text mining) were performed, which provided orientation to the subsequent steps of the study. In the third phase, 20 Horizon 2020 policy mix case studies were complemented by ten worldwide comparison case studies. While the worldwide comparison case studies provided inspirational knowledge on leading practices, they were not used as benchmarks, as their contexts were not comparable to that of Horizon 2020. For both Horizon 2020 policy mix case studies and worldwide comparison case studies, we conducted 75 targeted interviews to support the sense-making on the cases. In the synthesis phase, insights and conclusions from the study were assessed and validated in two policy workshops, which included targeted stakeholder consultations of altogether 63 participants. From the concluding meta-analysis we derived lessons learnt, areas for improvement and operational recommendations for Horizon Europe.

Conclusions on key ambitions and challenges for the relevance and internal coherence of Horizon 2020

The relevance of the design of Horizon 2020

- Horizon 2020 intervention was highly relevant given the needs, priorities, problems and issues for R&I to be addressed at the European level. All three rationales, which eventually became the cornerstones of Horizon 2020, namely i) the reinforcement of scientific excellence, ii) the turn towards innovation, and iii) the more political and impact-oriented framing of the thematic top-down funding programmes, were anticipated and brought forward by research communities. In that way, the three-pillar structure of Horizon 2020 covered the major needs for R&I in Europe at the time when the programme was designed, while responding at the same time (more than ever) to political priorities.
- Horizon 2020 took place in an era of dynamic global change, having been conceived during the aftermath of the 2008/09 financial crisis and extending into a period of increasing geopolitical uncertainty, a more acute awareness of the unfolding climate crisis and, finally, the first major pandemic of the 21st century. Overall, Horizon 2020 addressed these political priorities by adding them to the work programmes, calls and funded projects. Likewise, issues and needs emerging from within the research and innovation (policy) arena during the Horizon 2020 implementation phases, such as open science and societal impacts of research, were picked up in work programmes.
- A limitation on the relevance of Horizon 2020 design was that the inclusion of emerging themes as additional topics in the work programmes was not carried out on the basis of a strategic (refocusing, redirecting) approach. However, emerging topics – coming either from new political priorities or bottom-up emerging needs from the research communities – could be addressed by the budget, mostly by reallocating portions within the same programme heading. As these budget envelopes tended to be based on political priorities, the budgetary discretion of the EC was largely limited to shifts within the programme headings.

- Two major events brought about new impulses to re-orient the last programming period of Horizon 2020 and give directions for Horizon Europe. These were the 'Report of the Independent High Level Group on Maximising the Impact of EU Research & Innovation Programmes' (also called the 'Lamy Report') following the interim evaluation of Horizon 2020 in 2017 and the arrival of a new European Commission along with new priorities, in particular the European Green Deal, in 2019. The transformative change called for by the Green Deal was addressed by dedicated calls in the last year of Horizon 2020.
- The EU is beginning to catch up in artificial intelligence – which is one of the most dynamic technology fields with regard to patenting and start-up activity in the EU – yet, there still is a significant gap between itself and the US/China. While the EU remains one of the global leaders in AI science, it still lags in AI innovation, among other areas, due to a lack of available big data sources.
- Overall, the EU's industrial R&D investment in ICT, ICT services as well as in the health sector (in particular in biotechnology) has remained below that of its competitors for a number of years.

The relevance of the Horizon 2020 policy mix

- Overall, the Horizon 2020 set of instruments, activities and types of action (the 'policy mix') proved well matched to its expected outputs and impacts, and thus found to be 'relevant'. In each of the three main programme parts (Excellent Science, Industrial Leadership, Societal Challenges), a specific policy mix was brought to bear, which corresponded to their specific objectives.

More specifically:

- The ERC is regarded as a crucial building block of European scientific excellence. Together with other bottom-up schemes supporting frontier research, it is important from a responsiveness and preparedness perspective, exploring a wide range of novel research paths and thus acting as a reservoir of possible response options to a variety of emerging needs. The development of the COVID-19 vaccine by BioNtech/Pfizer is one of the most remarkable recent examples of this preparedness: an ERC grant to Ugur Sahin and his team was among the grants that provided the relevant knowledge.
- The policy mix of the Industrial Leadership pillar put a strong focus on SMEs and was thus highly relevant for the specific objectives of strengthening SME innovation performance and growth. Further, all programmes of the Societal Challenges pillar adopted the cross-cutting policy of strengthening SMEs, although the SME Instrument was used with varying intensity. The analysis of call texts reveals in this regard frequent mentions of 'SMEs' and 'technological innovation' in the Excellent Science pillar, which indicate a certain degree of relevance to (and of course coherence with) the Industrial Leadership pillar's objective of fostering industrial competitiveness, not the least because of the ERC's Proof of Concept scheme.
- The availability of skilled staff and the ability to attract talent was the most important challenge for many start-ups and growth-oriented SMEs across the EU during the framework programme. Actions supporting training, capacity building and access to talent proved to be particularly relevant to these needs, including the Marie Skłodowska-Curie Actions in the Excellent Science part and the Enterprise Europe Network and INNOSUP Actions in the Industrial Leadership pillar (About 10% of companies' participations in Horizon 2020, equivalent to 6.500 in total numbers, was in MSCA).
- The slow uptake of mission-oriented and transformative policy approaches in the Societal Challenge programmes was identified as a limitation in Horizon 2020 – slow compared to some leading Member States such as Sweden (which has included such policies since 2011), Germany, the Netherlands and UK (all since 2018). Over the course of Horizon 2020, Societal Challenges programmes have developed towards more innovation and market orientation, which is shown by the importance of the SME Instrument and Innovation Actions in the SC policy mix. Nevertheless, the policy approach remained traditional, as it continued to focus on technological innovation and market-based solutions. This hampered, for example, the participation of 'practice partners' such as public authorities and CSOs (see also below). Changes in the direction of transformative

approaches in research and innovation activities started only in the last year of Horizon 2020 in response to the European Green Deal and calls, and included (i) the acknowledgement that research and innovation activities should aim to support processes of social change, (ii) a more open understanding of different types of generalisation processes allowing for 'location-based innovation' among other examples, and (iii) a more explicit call for multi-disciplinarity (strengthening the role of SSH) and trans-disciplinarity (strengthened role for 'practice partners' due to greater focus on research supporting the implementation of solutions).

- Throughout Horizon 2020, the integration of SSH in multidisciplinary projects remained challenging, as they focused primarily on technological change.
- The aim of Horizon 2020 to increase the participation of CSOs especially in the Societal Challenges pillar proved difficult to meet. Although their participation increased as compared to FP7, CSOs often faced obstacles meeting participation rules and assessment criteria for project research funding. The share of funding was even lower (4%) than their numerical share of participation (6%), which indicates that CSOs seemed to generally take on non-core roles in research project consortia and, rather, participating more in research communication, coordination, and results dissemination/uptake activities. Although the participation of CSOs showed signs of increasing from work programme 1 to 3, the generally low numbers indicate that Horizon 2020 lacked coherence and understanding on how exactly they should be involved. The Green Deal calls, which gave more weight to implementation, generalisation and uptake, started to fill this gap, by for example requiring 'practice partners' to take on the responsibility of local experimentation.
- The number of participants and the net EU contributions requested by the research institutions show a very uneven distribution between EU-13 and EU-15 countries. The largest recipients of funds were still the EU-15 countries with a share of 79% of the requested EU net contribution, followed by the EU-13 countries with 7%. The two most significant barriers to widening participation within public research were: 1) oversubscription, which often led to self-exclusion, and 2) missing support mechanisms (both nationally and institutionally).
- The current study has identified challenges in terms of openness and entry levels for newcomers in partnerships, especially if coming from small countries, although a clear distinction must be made between the individual partnerships. This was a concern as specific topics were only covered by partnership activities, but not by Horizon 2020 work programmes.
- The introduction of a reference to the TRL classification gradually spread to encompass the majority of the Horizon 2020 programmes (except actions such as MSCA, ERC funding, Access to Finance), and was used in about 20% of the calls. It spawned two interrelated shortcomings: as the practice evolved to introduce clearer specifications of the levels at which projects should start, and the expected levels that the projects should reach, this tended to support a linear intervention mode, which does not fit all programme parts and intervention logics. Second, in cases where a systemic or holistic approach was expected, and societal engagement considered key for advancing the solution towards higher adoption levels (for example, topics in Societal Challenge 5), TRLs limited the solution scope at the technology adoption/diffusion end.
- Several instruments and actions under Horizon 2020 proved to be very useful in responding to the COVID-19 pandemic, for example, the InnovFin Infectious Diseases action and the IMI partnership. The possibility to award grants without a call for proposals, together with newly introduced emergency funds, enabled the programme to respond even faster to the COVID-19 crisis compared to the previous Ebola and Zika outbreaks.

How Horizon 2020 processes support the relevance of the programme

- The programming up to FP7 by and large responded to the needs and interests of the research communities. Yet, in cases of crises and new political priorities the responses were reactive. With Horizon 2020, strategic programming evolved into a tool that allowed policymakers to shape and direct political priorities.

- Over the course of the three programming phases, this process was further refined, as were the different approaches to consultation and the gathering of evidence in the process. Advisory groups and the preparation of scoping papers was seen together with the coordination between EC services as the major elements contributing to the expected benefits of the strategic programming process. These benefits included a better (and more prospective) response to new developments and challenges from the R&I side while contributing significantly to the EU's overall policy objectives.
- Coordination between the European Commission directorates general (DGs) has considerably improved in Horizon 2020 and can be characterised in particular in its last phase (and the transition to Horizon Europe) in the following ways: (1) It is one of few co-created EC programmes at the time and involved the highest number of DGs; (2) Before Horizon 2020, coordination of framework programmes within the Commission happened primarily at cabinet level, but with Horizon 2020, DG RTD managed to establish a more integrated programming approach that included operational-level coordination which enriched the programming process and supported increased coherence compared to FP7. The evaluation study notes as downsides of the co-creation process that (1) power dynamics between DGs were evident in setting the WP-related decisions, and hindered to some extent the benefits of widespread consultations, and (2) work programme development – especially the updating process – resembled a 'collection exercise', where new topics were added to the work programmes and little consideration given to refining down or removing topics deemed to be less effective. Co-creation was one of the major reasons the number of topics increased.
- Despite well noted approaches to improve the consultation among the stakeholder groups, several problematic issues remained. Most importantly, open consultation mechanisms were not designed in a way to include the distinct views of external stakeholders. The survey structure asked whether topics were relevant, but leaves no possibility for differentiated feedback. In its current structure, the survey is perceived as an instrument for legitimising the current EC priorities, not as one that can open the discussion and bring in new aspects. In addition, the stakeholder consultation, in particular the informal channels, favoured the dominant R&I stakeholders (who know the game and have the resources to act), which put newcomers at a disadvantage, especially those stakeholders representing the end-users of research and innovation processes, in particular civil society.
- With the orientation towards impacts and the consecutive opening up of new consultation arenas (European R&I Days, Green Deal public consultation), in its last phase, Horizon 2020 made notable improvements; introducing societal needs and societal interests more directly via consultation into the framework programme.
- Strategic use of foresight and policy feedback (i.e. interactions of funded research projects with policy) were not systematically institutionalised by the end of Horizon 2020, despite having significant potential to inject some longer-term thinking into the Commission's efforts to better orientate the framework programme.
- The SRIAs of partnerships fulfilled important roles during the FP, helping to orientate partners and guide their strategies. The increased use of collaborative methods also raised the level of legitimisation – and thus relevance – which helped balance different interests between various stakeholder groups. Although SRIAs followed different timelines to work programmes, some partnerships aligned more strategically with PCs than others because of overlapping memberships in partnership steering bodies and programme committees.
- The reaction to COVID-19 and the mobilisation of budget from the emergency funds in Societal Challenge 1 (Health) happened rapidly. It was concluded that the emergency procedure developed after Ebola and Zika outbreaks served the response to COVID-19 pandemic well.
- Although the amount of crisis funding mobilised in response to COVID-19 turned out to be too little, the existence of the emergency funds proved to be very useful in ensuring a swift reaction to the resulting crisis.

The internal coherence of the Horizon 2020 policy mix

- Horizon 2020 objectives were translated very well into work programmes and calls. Further, key objectives of Horizon 2020 were addressed across pillars, in particular the policy focus on SMEs and on Societal Challenges.
- Horizon 2020 integrated newly emerging themes exhaustively in the calls. Societal Challenges programmes were the most prominent domain under which new themes were addressed.
- The Excellent Science pillar featured a coherent policy mix. The mono-beneficiary grants of MSCA and ERC were the cornerstones of this policy mix. This is where the age profile of the MSCA fellows was complementary to ERC grantees, i.e. the MSCA fellows were all younger or at earlier stages in their career.
- At the same time, opportunities for collaborative basic research decreased with the Industrial Leadership and Societal Challenges programmes focusing on higher TRLs. The Future and Emerging Technologies (FET) programme could not fully compensate for this change, as it was too narrow in scope and low in volume.
- Among the new instruments and types of actions, in particular the SME Instrument and the EIC Accelerator Pilot, which encompassed the previous SME Instrument, showed complementarities with many other actions – in the Industrial Leadership and Societal Challenge pillar: (1) In terms of target groups, as a mono-beneficiary grant, it complemented the FTI pilot scheme and the Eurostars programme, the aim and the scope of which were very similar; (2) The EIC was the only instrument covering almost the entire TRL spectrum, and it supported the commercialisation of innovations across all sectors and technology domains. Thus, the introduction of European Innovation Council helped to improve the internal coherence of the framework programme.
- Innovation procurement added a strategically important diversity to the Horizon 2020 policy mix as it focused on innovation used to solve problems and allowed high-end research to play into the needs of the public sector. However, as a counterpart to the framework programmes' overall supply-side approach, a shortage of capacity on the part of interested procurers was deemed to be the main reason for poor uptake. In practice, supply-side measures dwarfed demand-side efforts in Horizon 2020.
- Focus areas as a means to establish cross-pillar linkages had very little structuring effect on the coherence of processes within the EC. Focus areas were entirely perceived within the EC – led by DG RTD and aimed at boosting policy relevance and obtaining more buy-in from other DGs. This worked to some extent well, but there were no processes established to maintain interest among higher levels in the hierarchy. Further, budget rigidities prevented a true cross-over between work programmes, the selected portfolios were not systematically followed up, and systematic linking between projects only developed in the last WP.

How Horizon 2020 processes support the internal coherence of the programme

- The strategic programming process was developed during Horizon 2020 and there was a constant ambition to learn and to improve, with the effect that by the time of the third programming cycle many of the process parts had taken shape, and were carried on into the governance of Horizon Europe.
- Because of staff mobility policy, contracts ending, and other staff moves, EC units responsible for framework programme governance could not sufficiently accumulate knowledge. Horizontal mobility was floated as an idea to avoid silo-thinking and enable learning and cross-fertilisation across domains. Today, the balance between continuity and mandated staff mobility – both at managerial and operational levels – remains an issue for knowledge management and policy learning in DG RTD.
- Scouting of emerging topics, upcoming needs and challenges was not fully enshrined in the strategic programming process in Horizon 2020, which meant it lacked (systematic) approaches to

deal with future uncertainties in highly volatile contexts and adequately cover societal needs and mechanisms.

- Consultation mechanisms used in the (strategic) programming process of Horizon 2020 were lacking transparency on how the input from EC external stakeholders is used; feedback from the various consulted groups needed to be integrated to improve the outcomes and justify the resource-intensive consultation procedures. This was especially true for the open consultations and the Advisory Groups. A positive development was observed – greater transparency and openness – as part of the consultation process for the Green Deal call; indeed, it was made public from the beginning and provided easier access for all stakeholders.
- The drive for more open calls compared to earlier framework programmes revealed different understandings of openness/prescriptiveness among those involved in programming. Evidence collected for this study suggests that the dominant understanding of these terms turned out to be the following: calls should be prescriptive in specifying intended impacts, but open in defining approaches, methods or technologies. Against the backdrop of the worldwide comparison case studies performed for this study, it was found that this approach has been used for the UK Strategic Priorities Fund since 2018. Further evidence suggests that the approach started to become institutionalised in Horizon 2020.

Recommendations

The study offers two sets of recommendations following from the findings of this study and in response to the requirement to draft recommendations with relevance for Horizon Europe: (1) 'quick wins': operational recommendations, which should be addressed in the short term in the implementation of Horizon Europe, and (2) areas for improvement requiring structural change. While acknowledging that structural change needs a mid- to long-term perspective for its implementation, the identified areas for improvement were highly relevant to Horizon Europe. We took into account the improvements already made during the first two years of HEU when formulating our proposal for the future. These recommendations have been discussed and were further substantiated in a policy workshop with stakeholders and DGs involved in the framework programme.

Quick wins to foster relevance

- **Make processes of knowledge management and policy learning more relevant:** Interactions between FP-funded research and policy should be a two-way process with policy DGs actively engaging with the agencies to absorb the knowledge created in research projects and to communicate their needs. The established 'feedback to policy' framework in HEU should be evaluated in due time (in the long run, organisational change needs to take place: more resources are needed for targeted policy feedback. Greater and easier mobility of staff to and from agencies could be systematically encouraged as part of a career path in the EC).
- **More transparent stakeholder engagement:** Stakeholder organisations do not have equal opportunities to get their voices heard. The consultation for the Green Deal call was different in this regard, as the draft work programme was made public from the beginning and provided easier access for all stakeholders. This open model should be the standard approach for organising consultations on draft work programmes in the future.
- **Aiming for transformative impact:** A new type of action(s) should aim for multi- and trans-disciplinarity, put social change on equal footing with technological innovation, and recognise different generalisation patterns. Now, in Horizon Europe's cluster programmes and missions, there is room to call for transformative research. A general call for more involvement of social sciences and humanities (SSH) – although correct – will not be enough.
- **Valuing the contribution of bottom-up programme parts to political priorities differently:** The approach to work with impact pathways in Horizon Europe should be monitored and evaluated against the following questions: (1) Do these tools help programmers to map the specific characteristics of each part? (2) Are they useful in supporting the design of more transformative types of actions and activities? Further, for cross-cutting targets, like the spending

targets related to SDGs or climate change, it should be made clear that the different parts of the programme are expected to contribute to these targets to varying degrees.

Quick wins to foster internal coherence

- **New collaborative grant scheme for the excellence programme part:** It is recommended to reconsider the option of opening up the framework programme to more collaborative research opportunities at lower TRL.
- **Coordination among different policy domains and broader policy mixes:** With Horizon Europe taking a mission-oriented approach and aiming for broader societal transformation, there arises a need to coordinate the research and innovation missions with the sectoral policy approaches. A holistic approach requires 'systems thinking' to analyse mutual inter-relationships between the policy mixes within the FP and to combine instruments beyond R&I funding (e.g. regulation, public procurement). Thus, cross-policy domain structures and processes should become part of the FP governance and policy cycle.
- **Alignment of partnership strategies with work programme development:** Double memberships in partnership governing boards and programme committees should be further developed and adopted by more partnerships.

Areas, where structural change is needed to improve relevance

- **A true crises budget:** The EU might want to think about a 'crisis response budget line' for any future situations warranting an immediate response, including the non-health related ones. Such a FP crisis budget line should be anchored in the programme in a way, that it can be purposed for other R&I priorities in case no major crisis happens. Further, an FP crisis budget should be part of a broader cross-policy domain crisis reaction mechanism and budget to react to emergencies/situations in a holistic manner, beyond the mere R&I needs that a crisis creates.
- **Focus on 'need owners':** Following the insight that the inclusion of civil society actors in research projects turned out to be difficult, when they had no clear mandate or role in the implementation of the research results, it seems more straightforward to focus on those who have such a role (and thus an own research need). One way to approach this should have been to mobilise so-called 'need owners' (often cities, ministries and other public authorities next to civil society actors) for participation in these projects. The aim should be to strengthen their role the closer a project moves towards implementation. Thus, an 'expanded toolbox' would be needed to stimulate the participation of these actors. Accordingly, participation and funding rules should be adapted in order to adequately support the participation of 'need-owners'.
- **More selectivity and priority setting:** Focus and selectivity on focal topics is needed in work programme development. Selection criteria should be developed in the strategic programming process. They should be based on a good combination of external advice and the EC's internal strategic intelligence. External advice could for example build on a more strategic use of foresight studies.

Areas, where structural change is needed to improve Internal coherence

- **Mandate to focus and (re)direct:** Programme committees working jointly with expert committees could become a decision structure for implementing focus and re-direction in work programmes. This would rebalance the current decision structures by upgrading the role of the programme committees and strengthening expert advice in strategic decision-making. The mechanism to focus and re-direct should be accompanied by more budgetary flexibility.

Disclaimer

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