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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**Annual Report on Research and Technological Development Activities of the European
Union and Monitoring of Horizon 2020 in 2020**

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1. BACKGROUND

This report, prepared in line with Article 190 of the Treaty on the Functioning of the European Union (TFEU) and Article 7 of the Euratom Treaty, Article 31 of the Horizon 2020 framework programme (FP) and Article 21 of the Euratom programme complementing Horizon 2020, provides a concise, non-exhaustive overview of key research and innovation (R&I) activities taken in 2020. It refers to the [Horizon Dashboard](#) for more detailed monitoring data.

2. POLITICAL CONTEXT

2020 was marked by the COVID-19 outbreak and its effects on society. The EU and the Commission had to tackle this challenge alongside other existing challenges.

[The 2021-2027 long-term EU budget, coupled with NextGenerationEU](#), will be the largest stimulus package ever financed in Europe. NextGenerationEU, an exceptional and temporary instrument, is designed to boost the recovery from the economic, social and health crisis caused by the COVID-19 pandemic. The budget reflects the priorities of the Union for 2021-2027, underpinning the green and digital transitions to make the European economy fairer, more resilient and more sustainable for future generations. The R&I supported by the EU plays a significant role in these efforts with its potential to drive growth, boost competitiveness, create jobs and leverage additional investments for each euro invested at EU level.

The new [industrial strategy for a green and digital Europe](#), adopted on 10 March 2020, outlined the key priorities in maintaining the global competitiveness of the EU industry and a level playing field, becoming climate-neutral by 2050 and shaping the EU's digital future.

Following the 2019 Communication on the European Green Deal (EGD), the Commission put forward on 4 March 2020 a legislative proposal for a [European climate law](#) with the aim of achieving climate neutrality by 2050. On 17 September 2020, the Commission adopted a Communication on [the 2030 climate target plan](#), raising the EU's collective ambition to reduce greenhouse gas emissions by at least 55% (compared with 1990s levels). The Commission adopted on 9 December 2020 a Communication on [the European Climate Pact](#), which led to a Commission Communication on the [new EU strategy on adaptation to climate change](#) adopted on 24 February 2021. Following [the Commission's work programme for 2021](#), in order to achieve a climate-neutral Europe by 2050, the Commission will table a 'fit for 55' package to reduce emissions by at least 55% by 2030.

In response to the COVID-19 crisis that has revealed the urgent need to accelerate Europe's digital transformation, and building on the [European Data Strategy](#) and the strategy for [Shaping Europe's digital future](#), the [2030 Digital Compass Communication](#) sets out: (i) a vision for the digital transformation of Europe by 2030, (ii) clear and concrete objectives

along four cardinal points - skills, infrastructures, digitalization of business and of public services - to map the EU's destination for 2030, (iii) a framework for identifying digital principles empowering citizens in the digital world, and (iv) a robust joint governance structure with Member States to ensure effective monitoring and delivery of the 2030 objectives. The EU must build a truly digital single market, secure digital sovereignty, develop and deploy strategic digital technologies, capacities and infrastructure, in order to reinforce its ability to define its own rules and make autonomous technological choices accordingly.

3. POLICY FRAMEWORK

3.1 Horizon Europe

During 2020, the last year of the Horizon 2020 programme, the co-legislators progressed on [Horizon Europe](#), the next FP for R&I, and the Commission took major decisions on the implementation of this programme.

On 11 December 2020, the European Parliament and the Council reached political agreement on the Horizon Europe Regulation and its budget of EUR 95.5 billion in current prices (including EUR 5.4 billion from NextGenerationEU). The [Regulation](#) was formally adopted on 28 April 2021.

The Commission continued to work on the strategic planning for Horizon Europe (including via web-based consultations and the [Research & Innovation Days 2020](#)), and made progress on the first Horizon Europe strategic plan (2021-2024). In particular, the Commission:

- used [the reports delivered by the mission boards](#) to assess the feasibility of developing the identified missions;
- worked further on the designated European Partnerships (the co-funded and co-programmed ones were identified in the strategic plan, whereas a separate Commission proposal on a single basic act on institutionalised European partnerships based on Article 187 TFEU has been [tabled on 23 February 2021](#));
- drew up key strategic orientations, impact areas and impacts for R&I support.

The aim of [this first strategic plan under Horizon Europe](#), adopted on 15 March 2021, is to ensure that R&I contributes to EU priorities, including a climate-neutral and green EU that is fit for the digital age, where the economy works for the people.

On this basis, the Commission has made great progress on the first Horizon Europe work programmes (taking account of EU policies on biodiversity, energy, climate change, migration, asylum and internal security, industrial and digital aspects, food systems, bioeconomy, a new global approach to R&I and new developments, such as the ‘do no significant harm’ principle). It has also advanced on other necessary implementation elements, e.g. the model grant agreement, which addresses approaches such as open science.

On synergies between Horizon Europe and other EU programmes, a new framework was created to enable the alternative, combined or cumulative funding of actions and transfers of resources between programmes. An ongoing review of the General Block Exemption Regulation will facilitate synergies between Horizon Europe and other EU programmes and their combination with national and regional programmes.

3.2 Policy developments

COVID-19

[EU leaders](#) have committed to doing everything possible to support COVID-19 research, and have underlined the urgent need to share scientific information and to collaborate both within the EU and worldwide. To translate their commitments into action, the Member States quickly agreed [the ERAvsCorona action plan](#).

This plan supported the creation of [the European COVID-19 data platform](#), which is hosted by the European Open Science Cloud. It is a free-to-use, open digital space for researchers to share and upload data sets. Since its launch on 20 April 2020, it has seen more than 3.6 million web requests from over 170 countries.

The Commission also played a key role in increasing cooperation with partners around the world to support [the EU's global response to the outbreak](#), including its contribution to the international pledging event in May 2020 and by mobilising international partners through various outreach activities.

R&I aspects were reflected in several Commission communications on COVID-19 including: (i) guidelines on different tests and their performance; (ii) the EU strategy for vaccines; (iii) considerations for vaccination strategies and vaccine deployment; (iv) European health union: preparedness and resilience for cross-border health threats; (v) the pharmaceutical strategy; (vi) an intellectual property action plan to support the EU's recovery and resilience; and (vii) the EU strategy for continued control measures.

The Commission and the High Representative adopted [a Joint Communication on Tackling COVID-19 disinformation - Getting the facts right](#); significant R&I aspects involved the setting-up of a specific section on the Europa website on [how research supports the fight against disinformation](#) and [a factsheet on the role of R&I in the fight against disinformation](#).

A Horizon 2020 expert group published [a study on the impact of sex and gender in the COVID-19 pandemic](#). It highlights why gender matters when it comes to the risk of exposure to COVID-19 and the long-term socio-economic consequences in the areas of employment, domestic abuse and inequality.

The temporary framework for State aid measures includes provisions to accelerate COVID-19 relevant research and development (R&D) and to support the testing and upscaling of infrastructures that help to develop products for tackling the pandemic.

Industry

[The 2020 edition of the EU Industrial R&D Investment Scoreboard](#) showed that 421 companies based in the EU account for 20.9% of total R&D and that their investment in R&D grew for the 10th consecutive year, an increase driven by the automotive, ICT and health sectors. The trends for 'green investments' in line with the United Nations (UN) sustainable development goals (SDGs) are particularly promising.

The report [Industry 5.0 – Towards a sustainable, human-centric and resilient European industry](#) demonstrates the importance of industry for achieving societal goals beyond jobs and growth, and its role as a constant contributor to prosperity in the EU.

Work continued on the [second important project of common European interest on battery innovation and development](#), which is the Member States' largest investment in this field to date. Proposals submitted by EU industries were in line with the wider context of the EGD, the [European Battery Alliance](#) and the [strategic action plan for batteries](#).

In July 2020, the Commission adopted a package to modernise [the research programme of the Research Fund for Coal and Steel](#) by revising its legal basis. Its main objective is to support collaborative research in the sectors related to coal and steel in line with the EGD, while also supporting breakthrough technologies leading to near zero-carbon steel-making and research projects for managing the 'just transition' in the coal sector and mining regions, in line with [the Just Transition Mechanism](#).

Energy and mobility

A host of Commission initiatives highlighted the value of R&I:

- [the Communication on Powering a climate-neutral economy: An EU strategy for energy system integration](#) presents R&I as a key enabler for creating and exploiting new synergies in the energy system;
- [the Communication on A hydrogen strategy for a climate-neutral Europe](#) provides a summary of the R&I efforts that the EU needs to make on hydrogen through Horizon Europe (including the clean hydrogen partnership), the innovation fund and other dedicated instruments combined with regional, national and international initiatives (e.g. 'hydrogen valleys');
- [the Communication on An EU strategy to harness the potential of offshore renewable energy for a climate neutral future](#) underlines the importance of Horizon Europe in supporting the development and testing of new and innovative offshore renewable energy technologies, components and solutions;
- [the Communication on A renovation wave for Europe - greening our buildings, creating jobs, improving lives](#) aims for a doubling of the annual energy renovation rate of buildings by 2030 and pays special attention to renovating public buildings, tackling energy poverty and worst performing buildings and decarbonising heating and cooling;
- [the Communication on Sustainable and smart mobility strategy – putting European transport on track for the future](#) points to a future with significantly reduced emissions, thanks largely to EU investments in R&I;
- under the '[European strategic energy technology plan](#)' (known as the SET-Plan) an internal reflection is taking place on how to align priorities with the EGD. Its annual conference focused on various 2020 EGD energy-related initiatives (e.g. hydrogen, energy system integration, offshore renewable energy and the renovation wave). This was a good way of kick-starting new approaches for working together, in line with the objective of the new European Research Area (ERA) to jointly prioritise and programme R&I investments and activities in support of specific policy objectives, and
- The first [Competitiveness Progress Report](#) under the State of the Energy Union which identified a decrease in clean energy R&I spending (both public in private) putting at risk the achievement of our energy and climate ambition. Moreover, the

report analysed the competitive status of key clean energy technologies through a value chain analysis, therewith strengthening the analysis on the 5th pillar of the Energy Union on research, innovation and competitiveness.

Other sustainability policies

The following have highlighted the role of R&I:

- [The farm to fork strategy](#), which aims to accelerate the transition to a fair, healthy and environmentally-friendly food system and acknowledges R&I and technology as enablers for food systems transformation;
- [The chemicals strategy for sustainability](#), which highlights the importance of R&I to address pressing environmental and health concerns and introduces a ‘safe and sustainable by design’ approach for chemicals and materials, which is a pre-market approach that focuses on providing a function, while avoiding volumes and chemical properties that may be harmful to human health or the environment;
- [The biodiversity strategy for 2030](#), which acknowledges the importance of R&I to improve knowledge, education and skills in order to develop green solutions.

Security and migration

The Commission presented three key policy strategies on security and migration: [the EU Security Union Strategy](#), [A Counter-Terrorism Agenda for the EU: Anticipate, Prevent, Protect, Respond](#), and [the Communication on a New Pact on Migration and Asylum](#). The different policy documents make explicit reference to the importance of modern technologies and relevance of the R&I cycle. As such, the development and deployment of innovative security technologies and solutions along the security value chain will enable attaining the intended policy objectives.

International aspects

The COVID-19 pandemic showed that international cooperation on R&I is more crucial than ever to tackle pressing global challenges. The Commission worked throughout 2020 on revamping its strategy with a view to [a Communication on a global approach to R&I](#), which was adopted in May 2021. This approach has been designed to contribute to help deliver the Commission’s key strategic objectives and to adapt to the current geopolitical context, supporting the post-COVID-19 economic recovery and promoting and protecting Europe’s values and increasing its resilience in line with its model of open strategic autonomy.

The Commission continued strengthening R&I cooperation with strategic partners and regions, e.g. with Africa with the organisation of [the first EU-African Union R&I ministerial meeting](#), and the work on an ambitious EU-China joint roadmap for future science, technology and innovation cooperation, focused on reaching a level playing field and reciprocity. The partnership for Africa provided the frame for further developing in Horizon Europe the cooperation initiated in Horizon 2020 between the EU and the African Union on renewable energy. Cooperation with Latin America and the Caribbean region was strengthened in particular through the successful organisation of the [EU-CELAC joint initiative on R&I senior officials meeting](#), which paved the way for the adoption of a 2021-2023 strategic roadmap covering infrastructures, mobility, global societal challenges and a new pillar of cooperation on innovation.

The Western Balkans ministerial meeting to further strengthen regional ties to the EU in education and training, and R&I, which took place in December 2020, endorsed the content of the Western Balkans agenda on innovation, research, education, culture, youth and sport. The panel on R&I under the Eastern partnership discussed a proposal for new post-2020 deliverables for R&I.

Mission Innovation (one of the key international cooperation platforms through which the EU promotes the global outreach of the EGD) reached the end of its first 5-year mandate. It is now ready to launch its second phase at the next ministerial meeting in Chile in June 2021.

The UN Educational, Scientific and Cultural Organization (UNESCO) published [a draft recommendation on open science](#) (to which the Commission has contributed), which puts forward shared values and principles, and sets out concrete measures and commitments to facilitate the production and dissemination of scientific knowledge and research data around the world.

The International Rare Disease Research Consortium, co-led by the Commission, published an [Orphan drug development guidebook](#), which aims to accelerate drug development for rare diseases by organising the resources and tools available in the EU, the United States, and Japan in a standardised framework.

Preparations for non-EU countries' associate membership of Horizon Europe intensified. Negotiations with the United Kingdom led to the EU-UK Trade and Cooperation Agreement that covers the participation of that country in Union programmes.

3.3 Partnership with Member States

The Commission adopted [the Communication on A new ERA for research and Innovation](#) (a New ERA) on 30 September 2020 for a revitalised European Research Area with a forward-looking agenda. This announced, among other measures: (i) dedicated actions to update and develop guiding principles for creating value from knowledge; (ii) a code of practice for the smart use of intellectual property; and (iii) actions to develop common industrial technology roadmaps, supporting the implementation of the new industrial strategy and speeding up the transfer of research results into the real economy. This will help EU industry to tackle the twin – green and digital - transitions and become more resilient. Following the adoption of the Council conclusions on the new ERA in December 2020, and in close relation with [the European Research Area and Innovation Committee](#), the Commission set up [the ERA Forum for Transition](#).

In the domain of researchers' careers and mobility, the new ERA aims to: (i) provide a framework for research careers, including a skills taxonomy for researchers to raise the profile of their profession; (ii) build on the commitment to encourage “brain circulation” and ensure inclusiveness; and (iii) create attractive conditions for researchers.

The October 2020 report [Towards a 2030 vision on the future of universities in Europe](#) set out thematic and cross-cutting strands of R&I action. Further synergies between the ERA and the European Education Area in the form of a ‘European Strategy for Universities’ to be developed with the Member States and stakeholders in 2021 will benefit European universities.

As part of the 2020 European semester cycle of economic policy coordination, 21 Member States received a country specific recommendation to boost R&I investment. In support of this, the 2021 annual sustainable growth strategy (issued on 17 September 2020) set out broad lines for the [Recovery and Resilience Facility](#) and the Commission helped Member States draw up recovery and resilience plans (RRPs) for 2021-2023, which will allow them to access the Facility's support for reforms and investment. So far, most of the Member States that have produced RRP's are focusing on R&I investment and reforms in hydrogen, clean energy, sustainable mobility, climate-friendly renovation and construction, and decarbonising industry.

The policy support facility has already provided specific support activities for Cyprus, Latvia, Armenia and Malta, as well as knowledge exchange on international cooperation.

[The first transitions performance index report](#) provides a simplified framework for Member States to monitor progress and identify priority actions on the four transitions Europe must address to ensure sustainability: economic, social, environmental and governance.

4. IMPLEMENTATION OF HORIZON 2020

4.1 Response to calls (for the time period 2014-2020)

According to the [Horizon Dashboard](#) (as of 21 June 2021), 967 Horizon 2020 call deadlines had passed by end-2020 and 283 078 eligible proposals had been submitted, requesting a total EU contribution of EUR 473.2 billion. Of these proposals, 33 791 were selected for funding, bringing the overall success rate of eligible proposals in the first 6 years to 11.94%. 35 027 grant agreements had been signed, with an EU budget allocation of EUR 66.23billion.

Higher education organisations remain the largest group of recipients (39.4% of all recipients), while 24.73% of EU funding under the 'industrial leadership' and 'societal challenges' priorities goes to SMEs.

4.2 Selected features of Horizon 2020

COVID-19

The first priority in 2020 was to mobilise Horizon 2020-supported R&I efforts conducted in the EU and together with international partners to combat the pandemic. The Commission launched [dedicated R&I activities](#) already in January, as part of a [pledge](#) to address various challenges arising from the pandemic, where the EU has taken the lead at global level, including as a contributor of aid. Horizon 2020 funding has helped existing multilateral research platforms accelerate their efforts to develop effective treatments, vaccines, therapeutics and diagnostics, and to ensure universal availability at an affordable price.

[So far](#), EUR 602.3 million of Horizon 2020 funding has been awarded to projects aiming to develop diagnostics, [treatments](#) (including repurposing of existing treatments, blood plasma, monoclonal antibodies), [vaccines](#), epidemiology, preparedness and response to outbreaks, socioeconomics, mental health, production and digital technologies, as well as the infrastructures and data resources that enable this research.

A first emergency call to address the pandemic was launched under the ‘Health’ part of the work programme in record time on 30 January 2020, the day on which the World Health Organisation declared COVID-19 a public health emergency of international concern, possibly making it the first call worldwide. This resulted in 18 projects receiving a total of EUR 48.2 million in EU funding. A second call under the same work programme part in May resulted in 23 projects receiving EUR 128 million in EU funding. An additional approximately EUR 22.7 million in funding was mobilised and awarded to seven ongoing grant agreements to cover additional activities relating to the pandemic.

Furthermore, EUR 400 million from the Horizon 2020 InnovFin has been allocated to accelerate the development of vaccines (e.g. from BioNTech and CureVac) and other interventions, drugs, medical and diagnostic devices (e.g. Scope Fluidics) or novel critical R&I infrastructures (including production facilities). Other EU-funded projects (e.g. EAVI2020, EHVA, TBVAC2020, Rabyd-vax) are developing and making use of a wide range of technologies (DNA, RNA and viral vectors) to expand vaccine candidate pipelines. ADITEC and OptiMalVax are among the projects developing new immunisation technologies and taking these forward in clinical trials to make vaccines more effective – also for unmet needs of the elderly and young.

An additional 586 projects funded by Horizon 2020 and its predecessor, the 7th framework programme (FP7), were identified as having contributed to scientific knowledge or technologies, such as new disinfectant coatings for protective clothing, safe transport of patients, wastewater treatment and digital applications.

[The European and developing countries clinical trials partnership \(EDCTP\)](#) launched three successive emergency calls for research activities to manage and/or prevent the spread of COVID-19 with a combined budget of EUR 35 million. In addition, the two major EDCTP networks for strengthening African countries’ capacities to respond to outbreaks of infectious diseases immediately redirected efforts to address COVID-19 issues.

The fast-track ‘Call 21’ under the [innovative medicines initiative](#) was launched for research proposals responding to the COVID-19 outbreak, with funding of EUR 72 million from Horizon 2020 and industry commitments of EUR 45 million.

As part of the policy response to address the economic disruption caused by COVID-19, the InnovFin SME Guarantee Facility was amended to facilitate the availability of finance to innovative businesses, in particular liquidity facilities and working capital finance. As at 31 December 2020, over 3 300 companies, primarily SMEs, received funding amounting to EUR 1.7 billion. Moreover, a new Recovery Equity Facility for Innovative Technology companies was established under InnovFin Equity to alleviate the impact of the COVID-19 crisis on the venture capital market and in particular, the increased cash burn at the level of the portfolio companies. An amount of EUR 100 million was made available to provide InnovFin Financial Intermediaries with additional investment capacity necessary to support portfolio companies negatively impacted by the COVID-19 crisis.

The ‘research infrastructures’ part of the work programme was amended to include tailored additional ad-hoc support in specific areas of need. These included the EU-wide and worldwide dissemination of the SARS-Cov2 diagnostic assay (with the European Centre for Disease Control and the World Health Organisation) and targeted vaccine R&D support, and

the creation of a new population health information research infrastructure (which is at the same time a starting point for building a European health data space).

Specific exploitation obligations were introduced for the COVID-19 emergency calls, along with [a Manifesto for EU COVID research](#) to maximise research results that already has over 2 200 signatories and has been endorsed by the World Health Organisation.

The portfolio of projects on climate neutrality modelling (mainly integrated assessment models) was mobilised with the aim to investigate the impacts of the pandemic on climate action and to formulate policy recommendations for a green and resilient recovery. Several research projects are also under way to assess the links between pandemic risk and biodiversity loss.

To cope with the administrative problems created by the pandemic, consortia receiving funding from Horizon 2020 were invited to request at their discretion a 6 month extension to their projects without further justification and were allowed to submit their periodic report and request payments later than originally foreseen.

European Green Deal

The expected budget shares for climate action and sustainable development over the duration of the Horizon 2020 programme were 35% and 60% respectively. By the end of 2020, expenditure had reached 31% for the former and 65% for the latter. Despite a considerable increase compared to FP7, investment for climate action has not yet reached its target.

Targeted action was taken to address this, including a new European Green Deal call launched in September, which will eventually bring the climate expenditure above the 35% threshold (to 36%). This EUR 1 billion call aims to respond to the climate crisis, provide more protection for biodiversity and habitats under threat, and accelerate a sustainable recovery. The call was a first step towards climate-neutral and socially innovative cities and addressing Green Deal energy priorities, namely innovative land-based and offshore renewable energy technologies, demonstration of a 100MW scale electrolyser for hydrogen production, and accelerating the green energy transition in Africa and energy efficiency in buildings. The call also addressed the integration and demonstration of innovative ways of preventing and fighting wildfires. Clear and tangible solutions are expected in eight areas corresponding to the EGD priorities and two horizontal areas: ‘strengthening knowledge’ and ‘empowering citizens’. The call also addressed innovation opportunities to support the transition to sustainable food systems, at the core of the EU farm to fork Strategy. The call closed on 27 January 2021, with more than 1 500 proposals submitted on the 20 thematic topics. It is expected that grants will be signed in the last quarter of 2021.

Throughout Horizon 2020, projects have contributed to efforts to upscale Europe’s Earth observation capacities and to develop solutions for specific users’ needs. Towards the end of Horizon 2020, the outcomes and results of these projects contributed to various activities of the group on earth observation (GEO) and to the EuroGEO initiative, in particular for the SDG and the Paris Agreement adopted under the UN framework convention on climate change. These efforts will continue under Horizon Europe.

International cooperation

In 2014-2020, participants in Member States received 90.41% of funding, with the rest going to associated countries (8.85%) and other non-EU countries (0.74%). While the associated countries' participation share (7.68%) is in line with the funding received, that of non-associated non-EU countries is significantly higher (4.0%), indicating an interest in international openness, decoupled from funding.

The 2018-2020 work programme included over 30 'international cooperation flagships' with an EU budget of close to EUR 2 billion to reverse the falling trend of international cooperation during the first years of Horizon 2020. The flagships had a positive impact, with the participation of entities established in non-associated third countries in collaborative projects up from an average of 2.4% in 2014-2017 to 3.3% in 2018, 3.2% in 2019 and 2.6% so far for 2020. The contribution from participants established in non-associated third countries increased from an average of EUR 44 million/year in 2014-2017 to EUR 82 million in 2018 and EUR 153 million in 2019 (EUR 42 million so far for 2020). Overall, participants established in non-associated third countries have contributed almost EUR 560 million to Horizon 2020 projects.

Marie Skłodowska Curie Actions (MSCAs) continued to account for over half of all participations by entities established in non-associated third countries. Numerous joint science and technology meetings and policy dialogues were held with non-associated third countries in order better to exploit the international outreach potential of MSCAs at policy level.

European Research Council (ERC)

The ERC issued five calls for proposals for frontier research and proof of concept projects. With a combined budget of EUR 2.2 billion, these attracted 9 428 applications and resulted in 1 178 new grant agreements. The ERC conducted a portfolio analysis of projects linked to understanding the pandemic, identifying over 185 relevant projects. Two ERC principal investigators in particular - Prof. Uğur Şahin (CEO of BioNTech) and Prof. Adrian Hill (University of Oxford) - were at the forefront of developing two COVID-19 vaccines.

Widening participation

Following the last Horizon 2020 call under the 'spreading excellence and widening participation' part of the work programme, a total of 97 grants for a total amount of EUR 119 million were signed. Of these, 20 will help establish new research teams around ERA chairs in widening countries (as defined in this part of the work programme) and 77 twinning projects will establish new partnerships with leading research centres to boost the level of excellence.

The second call of the 'widening fellowships' pilot (modelled on the MSCA individual fellowships) continued to help excellent researchers that had not been funded through the MSCAs to undertake 2-year individual fellowships in a widening country. The call resulted in a 12% increase in applications and another 42% increase in the number of fellowships in widening countries, with 39 widening fellowships in addition to 92 individual fellowships funded in widening countries. An indication of the high quality of these proposals was that the lowest score for a successful proposal was 90.4%.

To provide researchers with disabilities with fair access to doctoral education, research training, skills development and knowledge transfer, and to stimulate inclusive, non-discriminatory R&I labour market participation, the MSCA ‘special needs lump sums’ pilot was continued in 2020. Financial support was provided for 16 MSCA fellows with special needs.

Gender, social sciences and humanities (SSH), and open science

To support the ERA policy work on gender equality, some new projects are developing a community of gender equality and institutional change practitioners across Europe. One project has started to work on scenarios for an award/certification system for gender equality in research organisations and universities, and a new R&I action aimed at enhancing the gender dimension of the EU’s scientific dialogue with international partners. MSCAs contribute to the very high participation rate of female researchers, which has remained stable over the years (41% of all MSCA fellows).

The fifth monitoring report (for 2018) on SSH integration in Horizon 2020 published in 2020, showed encouraging results and considerable improvements: 65% of projects demonstrated good SSH integration and 391 were funded under the flagged topics, up from 262 in 2017. The projects had a total budget of EUR 1.9 billion, up from EUR 1.2 billion in 2017.

The Open Science Policy Platform delivered its final report on the implementation and further development of Open Science in the EU in May 2020, stating that the main instrument for further advancing open science is the current rewards and incentives system for researchers. The report was presented to the Competitiveness Council on 27 November 2020. The interim governance for the European Open Science Cloud (EOSC) finalised its work setting up a governance structure that ensures the future rollout of EOSC. It is ensured through an EOSC Association which was established in July 2020 and which at the end of 2020 counts more than 180 organisations. The renewed EOSC ambition is to develop a Web of FAIR (findable, accessible, interoperable and reusable) data and services for Science, with common standards and core software, allowing research objects such as publications, datasets and software to be FAIR by design. This ambition was recalled in [the EOSC declaration presented by the German Presidency to the Ministers of Research on 27 November 2020](#). The Member States confirmed their intention to engage in the future developments of EOSC.

Following the launch of Open Research Europe - the open-access publishing platform for Horizon 2020 and Horizon Europe beneficiaries that was envisaged in the New ERA Communication - preparations are under way for the official launch in 2021 with manuscripts ready to be openly peer reviewed.

European Innovation Council (EIC)

An enhanced EIC pilot continued on from the first pilot, bringing a fully-fledged EIC closer to reality. So far, every euro of EIC pilot support has triggered EUR 2.4 in follow-on investments. In March 2020, the Commission amended the ‘EIC pilot’ section of the 2020 work programme to include a EUR 300 million budget for game-changing, market-creating innovations that contribute to the goals of the EGD and the UN’s 2030 agenda for sustainable development.

The specific EIC Accelerator call for ‘Green Deal’ proposals targeting start-ups and SMEs was launched on 19 May 2020 and resulted in over EUR 307 million being awarded to 64 of them. Winning proposals include innovative solutions for the automotive, aerospace and maritime sectors, advanced materials and ‘internet of things’ technologies. These game-changing beneficiaries are based in a wide range of countries, including 17 Member States (seven of which are catching up on their R&I performance), making this the most geographically-diverse EIC call to date.

The EIC has played a crucial role in supporting innovators working on solutions for COVID-19. As well as publishing an accelerator call open to start-ups and SMEs developing innovative solutions to help treat, test, monitor or cope with various aspects of the outbreak, the EIC organised the EUvsVirus [Hackathon](#) and [Matchathon](#), (a virtual event to link researchers and innovators working on COVID-related innovations with interested procurers and potential funders). Following [the first very successful EIC ePitching event](#) against COVID-19 organised on 30 April, the Commission organised [the second ePitching to Procurers against COVID-19](#) on 17 November 2020.

The introduction of blended finance and equity investments to support transformative innovation is a major new development in the EU’s funding of R&I and part of the EIC’s unique value proposition. An EIC Fund, set up in June 2020 as a separate private-law legal entity, is managing equity investments, with the European Investment Bank providing key administration services. Maximum funding (grants and equity) can reach EUR 17.5 million. The EIC Fund aims to fill a critical financing gap faced by innovative companies when bringing their technologies from high technology readiness levels to the commercialisation stage. It will help to fill this gap at the start-up stage, where the EU venture capital market still underperforms by global comparison. It aims to support equality and gender balance, and to make a big contribution to sustainability, with a particular focus on health, resilience and the green and digital transitions. Its role has become even more important in view of the major impact of the COVID-19 crisis, including for many innovative start-ups. A noteworthy novelty was that four EIC programme managers were recruited during the pilot phase, who will proactively manage portfolios and their related communities of beneficiaries and other interested stakeholders.

4.3 Non-nuclear direct actions implemented by the Joint Research Centre (JRC)

The JRC reacted swiftly to the COVID-19 pandemic and provided policy support to initiatives for immediate crisis management and recovery. Modelling of the epidemiological aspects and the potential impact of the crisis in different policy fields contributed to the design of strategies and policies. Control materials were developed in order to improve the reliability of COVID-19 tests.

The JRC’s work on the EU climate pact, the renewed sustainable finance strategy, the farm to fork strategy, the biodiversity strategy, the circular economy action plan, the bioeconomy strategy action plan and the European data strategy related to the green and digital transitions. Its work on the effective taxation and fair minimum wage initiatives helps create a ‘European economy that works for people’. Its contributions to the European gender equality strategy, the Africa strategy and the new pact on migration and asylum helps to make Europe stronger and to promote our way of life.

The JRC has made a key contribution to strategic foresight, including by co-authoring the first annual strategic foresight report focusing on resilience, which recommends focusing the second foresight study on open strategic autonomy.

It also continued to expand its knowledge management activities, with launching new knowledge centres on biodiversity, earth observation and cancer.

It published two new flagship reports on cybersecurity and fairness. More than 1 100 of the JRC's publications related to policy and over 700 were scientific and peer-reviewed publications. Around 45% of its peer-reviewed articles were published in the top 10% most-cited journals.

Finally, the JRC is leading the New European Bauhaus - a design movement that explores new ways of living to support Europe's transformation into the first climate-neutral continent.

4.4 European Institute of Innovation and Technology (EIT)

The largest ever financial contribution (EUR 600 million) was allocated in 2020 to the eight knowledge and innovation communities (KICs) for the implementation of their 2020 business plans.

The EIT community grew to a trusted network of more than 2 200 partners, with over 60 co-location centres and innovation hubs in all Member States, making it one of Europe's largest networked innovation communities. Since its establishment, the EIT and the KICs have supported over 2 500 start-ups and scale-ups that have attracted a total of EUR 3.3 billion in investment, which created more than 13 000 high-skilled jobs and brought over 1 500 new products and services to market. More than 4 000 students have already graduated from EIT-labelled education programmes.

In response to the COVID-19 pandemic, the EIT mobilised EUR 60 million in additional funding in 2020 and launched the [‘EIT crisis response’ initiative](#), which supported 62 innovation projects, bringing together 212 partners from 25 countries, and 145 start-ups, scale-ups and SMEs in 23 countries.

5. IMPLEMENTATION OF THE EURATOM PROGRAMME

5.1 Indirect actions

A total of 33 grant agreements were signed under the Euratom programme, for an overall contribution of EUR 139.8 million. A total of 254 eligible proposals for fission calls have been submitted since 2014, requesting a total of EUR 991.03 million. Of these, 98 were selected for funding, with a contribution of EUR 416.74 million, bringing the overall success rate of eligible proposals to 38% in 2020.

In 2020, the final commitment was made for [the EUROfusion joint programme](#), bringing the total to EUR 687.8 million since the start in 2014.

5.2 Direct actions implemented by the JRC

JRC scientists published 143 articles in peer-reviewed periodicals and 36 in monographs or other periodicals. The JRC also drafted whole sections of seven policy documents and released seven science-for-policy documents and 81 technical reports, together with 27 reference methods and measurements, technical systems and scientific databases. Limited by the pandemic restrictions, it organised four training courses for professionals and students from Member States and the Commission, and opened up access to its nuclear research infrastructure, developing virtual tools where possible.

The JRC prepared a report on preparedness and response actions to ensure the continued safe operation of nuclear power plants in the context of the COVID-19 pandemic. The report fed into several Commission and OECD-Nuclear Energy Agency initiatives.

To ensure the effective and efficient implementation of the Euratom safeguards system, the JRC analysed about 600 nuclear and 100 environmental samples for Euratom and the International Atomic Energy Agency safeguard authorities. The operation of the Euratom safeguards laboratories continued nearly uninterrupted to enable large flows of nuclear materials even under the demanding conditions caused by the pandemic.

The JRC conducted research on new radioisotope applications and alternative methods of production, and helped assess challenges related to supplying medical radioisotopes to the European public. These activities support other Euratom initiatives, including the work of the European Observatory on the Supply of Medical Radioisotopes, the strategic agenda for medical ionising radiation applications and the ‘EU’s beating cancer’ plan.

6. DISSEMINATION, EXPLOITATION AND COMMUNICATION

The open access provisions in the Horizon 2020 model grant agreement ensure the full availability of about 105 000 publications generated by Horizon 2020 projects, with open access to 98% of articles published in peer-reviewed journals. This makes Horizon 2020’s open access policy one of the most successful in the world.

A new dissemination and exploitation strategy for Horizon Europe results prompted the gradual creation of an integrated exploitation support ecosystem. [The Horizon Results Platform](#) drew investors’ and policy-makers’ attention to the results of Horizon projects. Synergies with EU-funded project investment pipelines like [BlueInvest](#) are being explored. It also contributed to the fight against COVID-19 and against climate change by gathering and promoting relevant project results. The new [Horizon Results Booster](#) started delivering targeted dissemination and exploitation services to beneficiaries based on their needs. The second Horizon impact awards ceremony recognising and celebrating outstanding Horizon 2020 or FP7 projects with demonstrated social value took place during the R&I Days 2020.

Work continued on implementing the data strategy and progress was made on improving the interoperability of FP data with external datasets, such as publications and patents. The ‘European data for R&I policy’ initiative (the former European R&I data hub) went ahead in liaison with Member States and associated countries. Progress was made on CORTEX, a text-mining tool that provides project portfolio creation and clustering, and on the tracking and tracing of FP research results and impact over time.

A clear and effective ‘feedback to policy’ framework was endorsed in the Commission for feedback from the projects funded by the FPs to support policy needs.

An interactive matchmaking tool is being developed by the Commission to highlight synergies between EU programmes and to address beneficiaries’ networking and matchmaking needs. It currently covers inter-regional cooperation and Horizon 2020 programmes as a testbed and helps link project partners by region and by project theme.

[The Horizon Dashboard](#) expanded to monitor the performance of more than 50 000 organisations that have benefited from Horizon 2020 and FP7 funding. In addition, new supporting material was added to ensure that a wider audience can easily exploit its content. [CORDIS](#) continued to produce regular multilingual editorial products to reach the specialised users of research results, including the [Research*eu magazine](#) and thematic results packs, and over 7 800 Results in Brief, news articles and user-friendly descriptions of project objectives, complemented by outreach events and social media. A new section was dedicated to EU-funded projects and results to help fight COVID-19. CORDIS extended the EuroSciVoc taxonomy of fields of science and published a first version of an ontology for research projects, [the European Research Information Ontology](#). This will allow the curation, enhancement and integration of data with linked open data sources across the web.

7. OUTLOOK

In the first half of 2021, all basic acts for [Horizon Europe](#) have entered into force. In parallel, the Commission has adopted all necessary implementing decisions on [the first work programmes](#) under the programme and [published calls for proposals](#) immediately afterwards. The Commission will also make appropriate information on the grant agreements and the evaluation of proposals publicly available.

During 2021, the Commission will assess identified missions under Horizon Europe in order to decide which ones should be developed via work programme calls and be supported by other initiatives at EU, international and national/regional levels.

Building on the positive experience from 2019 and 2020, the R&I Days 2021 will help to maximise the impact of R&I spending for the digital and green transitions by, among other things, highlighting the links between Horizon Europe and the ERA.