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Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

II

(Non-legislative acts)

RECOMMENDATIONS

COUNCIL RECOMMENDATION (EU) 2021/2122**of 26 November 2021****on a Pact for Research and Innovation in Europe**

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 in conjunction with Article 182(5) thereof,

Having regard to the proposal from the European Commission,

Whereas:

- (1) On 30 September 2020, the Commission adopted a Communication on 'A New ERA for Research and Innovation', in which it sets out a new vision for the European Research Area (ERA) and announces the intention to propose a Pact for Research and Innovation (R&I) in Europe.
- (2) The Council Conclusions on the New European Research Area, adopted on 1 December 2020, call on the Member States and the Commission to develop in 2021 an ERA policy agenda and a multi-level governance model to deliver on the new ambition for the ERA.
- (3) Over the past two decades, the implementation of the ERA has contributed to some major achievements in areas such as research infrastructures, open science, transnational and international cooperation, gender balance in R&I, joint programming, research careers and the mobility of researchers, as well as to structural reforms. However, the pace of progress on R&I investment at Union level has slowed down overall recently, and more needs to be done to reverse that trend.
- (4) In order to address global challenges and support Europe's competitiveness, international cooperation through ERA should take into account the priorities of the Union's external relations, based on multilateralism and balanced reciprocal openness and should promote a level playing field and reciprocity underpinned by fundamental values and common framework conditions.
- (5) To deliver on an ERA fit for the future, it is necessary to strengthen coordination and to deepen coherence between the Union, national and regional policies. The Commission Communication 'A New ERA for Research and Innovation' therefore calls for mobilising Member States around key common principles and values and for identifying shared priority areas for action. This is particularly relevant at a time when increased and more focused national and regional funding and reforms are necessary to accelerate the contribution to the United Nations (UN) Sustainable Development Goals, the green transition and digital transformation and to implement the Paris Agreement goals, in line with European Green Deal objectives.
- (6) A common set of principles and values is necessary to reaffirm solid foundations for R&I in the Union, underlining values (ethics and integrity; freedom of scientific research; gender equality and equal opportunities), setting out better working conditions (free circulation of researchers, knowledge and technology across the Union; pursuit of excellence; value creation and impact of R&I) and increasing cooperation (coordination, coherence, commitment; global outreach; inclusiveness; societal responsibility).

- (7) Shared priority areas should constitute a clear indication to stakeholders of the areas and actions that the Union and its Member States consider as their common priorities and where they commit to work together on a variable geometry, creating a stable framework for policymakers, public funders, private investors and performers.
- (8) In its Conclusions on the New European Research Area, the Council reaffirmed the target of investing 3 % of Union GDP in research and development (R & D). In order to prioritise investments and reforms, Member States could update their national targets to reflect new Union priorities and national circumstances.
- (9) To qualify their national strategy towards achieving the 3 % target, Member States are encouraged to consider the use of additional sub-targets, striking the right balance between a sufficiently ambitious ERA agenda and one that is achievable and realistic, including for the Member States at national level.
- (10) Strengthening the ERA requires closer cooperation between the Member States and the Commission. This can be achieved by the Commission setting up and maintaining a simplified monitoring and coordination system for mutual learning and enhanced bilateral and multilateral dialogue.
- (11) The coordination of Union and national, including regional, investments and reforms should be enhanced in order to strengthen national R&I systems and increase their impact at Union level: while national R&I policies drive the development of national systems towards national objectives, they also contribute to ERA objectives and other shared Union priorities in strategic areas of common interest,

HEREBY RECOMMENDS THAT:

I. Values and principles for research and innovation in the Union

1. Member States should apply the following common set of values and principles for R&I in the Union in their R&I systems, in close collaboration with stakeholders. Those values and principles should also be promoted by the Member States and the Union in their interactions with third countries in order to achieve a level playing field and common framework conditions.

Upholding values

- (a) Ethics and integrity of R&I: Researchers, research processes and the R&I system overall should comply with strict ethics and integrity rules and practices, which are the foundation of responsible and trustworthy research free from undue interference – a prerequisite for achieving excellence – and underpin the responsibility of researchers to guard against biases and methodological shortcuts, and counteract the spread of pseudosciences and misinformation by increasing the effort of scientific dissemination and its pedagogy;
- (b) Freedom of scientific research: As part of a research culture that is inherent to the ERA, and a necessary condition for researchers to freely define their research questions, theories and methods in an open and secure manner and to produce, share and disseminate knowledge, data and other results;
- (c) Gender equality and equal opportunities for all: Encompassing gender balance in research teams at all levels, including in management and decision-making, combatting gender-based violence and harassment and tackling gender bias, and the integration of the gender dimension in the content of R&I, and taking account of diversity in the broader sense, including, inter alia, gender, racial or ethnic origin, religion or belief, social diversity, disability, age, sexual orientation and combating discrimination on all grounds;

Working better

- (d) Free circulation: Free circulation of researchers and support staff, scientific knowledge and technology should be promoted, attracting talent and avoiding potential talent drain. This involves sharing scientific knowledge, data and tools as early as possible, in particular through open science practices, attractive and merit-based

careers, the recognition of researchers' and support staff's skills throughout their careers, enhancing framework conditions for researchers' mobility, contributing to the circulation of researchers across the Union, encouraging exchanges between academia and industry (as well as other sectors), diffusing innovation and supporting open access to research infrastructures, technology infrastructures and their services;

- (e) Pursuit of excellence: The commitment to programme, perform or support research of the highest possible quality, with the aim of achieving and rewarding excellence as a prerequisite for scientific, technological, economic, policy and societal impact, thus expanding Europe's overall knowledge base. This implies that public support for R&I should aim to select and fund high quality initiatives – quality implies that the research is world-class, produces verifiable and reproducible results and is carried out through transparent research processes and methodologies and through research management which allows the systematic re-use of previous results. The research assessment system – for research, researchers, teams and institutions – should comply with this principle and reward quality accordingly; public support should recognise that fundamental research is essential for ensuring excellence, attractiveness and the competitive edge of R&I ecosystems and should strike a balance between 'curiosity-driven' and 'mission-oriented' research;
- (f) Value creation and societal and economic impact: Increasing the impact of R&I by transforming Europe's leadership in knowledge creation by making use of the knowledge in society, for instance through products, services, processes and solutions that support the wellbeing of citizens on a sustainable planet, economic prosperity, open innovation, evidence-informed policymaking and strategic autonomy while preserving an open economy; this involves, inter alia, working across various policies, encouraging and rewarding a stronger interconnection between actors in multi-disciplinary and cross-sectorial collaboration, investing in people, the availability of research and technology infrastructures, interaction with industry and other actors, and promoting investigator-driven basic research and its role in generating breakthrough advancements and a broader knowledge base;

Working together

- (g) Coordination, coherence and commitment: Member States bring the European dimension into national and regional R&I policies and ensure greater national buy-in and commitment to successfully implementing the ERA priorities. Member States, with the Union's support, coordinate their R&I policies and programmes in areas of common interest, including by ensuring complementarity and fostering synergies with the Union framework programmes for R&I and other Union programmes and funds, thereby facilitating transnational cooperation in the ERA, and direct R&I investments and reforms towards achieving the ERA and speeding up the green transition and digital transformation;
- (h) Global outreach: Member States engage in mutually beneficial and reciprocal collaboration and joint activities on R&I with partners from third countries and regions, based upon the Union's strategic interests, values and the principles set out in this Recommendation, in the UN Sustainable Development Goals and in other relevant international instruments;
- (i) Inclusiveness: Member States should strive to develop the full potential of the ERA in order to be competitive at global level; accordingly, Member States and regions that perform less well should be advised and supported with a view to stepping up their efforts to increase the performance and size of their R&I systems and develop their capacities, both human and infrastructural, including by exploiting synergies between their national and regional funding and Union funds. Efforts should be supported at the Union level to unlock the excellence potential in Member States and connect R&I performers from lower-performing regions with excellent European networks across the Union;

- (j) Societal responsibility: Striving to be responsive to society's needs to expand collective capacities and achieve greater societal and environmental impact and to increase trust and commitment in science and innovation by engaging stakeholders, local communities and citizens in the design and implementation of R&I policies, by enhancing science communication activities and by ensuring that those policies are adaptable, flexible and able to adjust to unexpected challenges.

II. Priority areas for joint action in the Union

2. Member States should take up on a voluntary basis the following priority areas for joint action in support of the ERA, on the basis of which the ERA actions in the ERA policy agenda will be designed. Those actions should ensure close alignment with and appropriate support for the values and principles for R&I in the Union, as set out in this Recommendation.

Deepening a truly functioning internal market for knowledge

- (a) Open science: Support and reward a true open science culture across the Union, including mainstreaming open access to scholarly publications and research data (i.e. following the 'as open as possible, as closed as necessary' principle) and the diffusion and uptake of open science principles and practices, whilst considering differences between disciplines and cultural differences, including multilingualism, supporting the development of open science skills, and further developing and integrating the underpinning digital infrastructure and services;
- (b) Research infrastructures: Develop further the open access to, and better exploitation and connection of existing and new European and national research infrastructures, including e-infrastructures, in all the fields of science; exploit better their integrative function in the knowledge and innovation ecosystem and their potential in providing solutions to global challenges, in forming partnerships and pooling resources and connection to the European Open Science Cloud; improve their connection and interaction with technology infrastructures and industry to increase their impact; promote the creation of new infrastructural capacities on a European scale. Doing so will provide foundations for scientific excellence and help European science collaborate and compete globally, contribute to bridging the R&I gap and foster inclusiveness in the ERA; this will require, inter alia, employing a broader range of funding sources for world-leading research infrastructures and exploring novel ways of funding transnational and virtual access;
- (c) Gender equality, equal opportunities for all and inclusiveness: Ensure fair, open, inclusive and gender-equal career paths in research to facilitate systemic institutional and structural change in R&I funding and performing organisations; counteract gender-based violence and sexual harassment; remove inequities regardless of gender, racial or ethnic origin, religion or belief, disability, age or sexual orientation; monitor and evaluate national gender equality policies and plans in R&I;
- (d) Researchers' careers and mobility and research assessment and reward systems: Give greater attention to researchers' careers in general and specifically early and mid-stage researchers' careers, including the specific barriers that women face in those stages, make their careers more attractive and equip them with the training and skills required to meet the changing needs of the researcher role across the Union, including leadership and teaching; building-upon and ensuring consistency with instrumental programmes such as Marie-Sklódowska-Curie Actions. This will be achieved by creating stable, attractive, inclusive, supportive and transparent working and employment conditions and by providing clear, more diverse career paths and guidance to make informed career choices. Address the unbalanced circulation of researchers across the Union as well as across sectors and public administrations, while preventing talent drain and increasing attractiveness towards talents from the world. Further develop current research assessment systems for

research, researchers, teams and institutions, to reward quality, impact, open science practices, leadership and engagement with society and collaboration with industry and other sectors of activity, including independent scientific advice for evidence-informed policy makers; consider a wide range of research outputs and activities, also taking into account teaching at higher-education level, and allowing for diverse career paths. Reward systems should pay due attention to ensuring transparency, openness and merit, and avoiding bias, discrimination and unfair treatment. This should be made effective and regularly monitored through the use of adequate indicators and the observatory of research careers;

- (e) Knowledge valorisation: Increase cooperation and interlinkages between R&I actors, and better coordinate policies and programmes at Union, national and regional level, in particular through R&I-friendly frameworks, including regulatory and policy support, for knowledge valorisation, improving the uptake of and access to research results, upskilling and intellectual asset management;
- (f) Scientific leadership: Boost capacities and funding for bottom-up fundamental research and for applied research. This will help the Union achieve a leading position as a knowledge society and a global scientific powerhouse, which is a precondition for effective innovation policy and for the Union's ability to understand, prepare for and react to future challenges, such as climate change or health crises;
- (g) Global engagement: Develop a coherent global engagement strategy and common tools, promoting shared European values and principles for R&I in terms of international cooperation and capitalising on the attractiveness of research in the Union; ensure the Union's scientific and innovation strategic autonomy while preserving an open economy; promote a level playing field and reciprocity based on fundamental values; enhance R&I partnerships and strengthen, broaden and deepen collaboration with third countries and regional organisations.

Taking up together the green transition and digital transformation and other challenges with impact on society, and increasing society's participation in the ERA

- (h) Challenge-based ERA actions: Bring together the Member States and the Commission, including regions and local entities, as well as third countries, R&I stakeholders and industry, combining strengths through close coordination, co-design, cooperation, data sharing and joint funding to foster R&I-based solutions and mitigate future risks in view of developing sectorial policies to support Europe's resilience and sustainability goals of the green transition and digital transformation; those ERA actions should:
 - build on Union research framework programmes and instruments such as R&I Missions, European Partnerships, including the European Institute of Innovation and Technology Knowledge and Innovation Communities (EIT KICs), joint programming initiatives, as well as other actions beyond Union research framework programmes, such as multilateral R&I alliances;
 - address new and persistent challenges such as climate change, biodiversity loss and biodiversity preservation, energy and digital transitions, migration, pollution by plastics, cancer, age-related and rare diseases or public health threats, including (re)emerging infectious diseases;
 - build on the contribution of the full spectrum of disciplines, allowing the challenges to be addressed comprehensively;
 - draw from experiences of existing coordination initiatives such as the Strategic Energy Technology Plan, National Energy and Climate Plans, and the example of the ERAvsCorona initiative;

- (i) Synergies with education and the European Skills Agenda: R&I and higher education are key drivers of innovation, knowledge creation, diffusion and use. Actions should:
- develop, support and exploit synergies between the ERA and the European Higher Education Area, in particular through higher education institutions and research infrastructure, including e-infrastructure, mutually reinforcing open science and open education policies, as well as the EIT KICs;
 - provide guidance and support with relevant stakeholders to the transition of the higher education system towards higher cooperation, inclusion, excellence and digitisation, inter alia, by supporting in a concerted manner at Union and national level the further development of the 'European University' initiative as a catalyst for modern, inclusive and future-oriented higher education institutions in the Union;
 - develop and implement initiatives for equipping researchers with all the skills required by the labour market and for upskilling and reskilling through targeted training;
- (j) Synergies with sectorial policies and industrial policy, in order to boost innovation ecosystems: R&I and an agile industry are key to driving competitiveness and achieving strategic autonomy while preserving an open economy. Actions should:
- develop, support and exploit the synergies between the ERA, cross-sectorial policies and the updated industrial strategy ⁽¹⁾;
 - promote the coordination of R&I policies and programmes to support the development of breakthrough and incremental innovations across the Union, in particular through research as well as technology infrastructures, higher education institutions, the European Innovation Council, Horizon Europe partnerships, including EIT KICs, Industrial Alliances, important projects of common European interest, Joint Cluster Initiatives, thematic smart specialisation platforms, and common industrial technology roadmaps (from basic research to deployment) in key strategic areas, particularly those related to the industrial ecosystems identified in the renewed European industrial policy;
 - be co-developed with Member States, industry (including small and medium-sized enterprises) and other R&I stakeholders; and
 - indicate specific priority areas (or priority value chains) to help align public and private investments;
- (k) An active citizen and societal engagement in R&I in all its dimensions: The contribution of, and the capacity to benefit from, citizens' views and inputs, and promote citizens' involvement, will raise awareness of the benefits and impact of R&I in people's daily lives, ensure a greater diversity of approaches for designing and implementing R&I policy and make R&I more relevant for society by facilitating acceptance and affordability of new solutions;

Enhancing access to research and innovation excellence across the Union and enhancing interconnections between innovation ecosystems across the Union

- (l) More investments and reforms in countries and regions with lower R&I performance: Effectively mobilising Union and national funding for R&I investment, in combination with support and assistance to engage in the necessary R&I reforms;
- (m) Synergies between Union, national and regional funding programmes: Synergies between the Union's funding programmes and national and regional R&I funding schemes should be guided by the values and principles set out in this Recommendation and be encouraged, operationalised and enhanced, on the basis of well-established guidelines for their implementation, in particular between Horizon Europe, cohesion policy and the Resilience and Recovery Facility;

⁽¹⁾ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Updating the 2020 New Industrial Strategy: Building a Stronger Single Market for Europe's Recovery'

- (n) Increased collaborative links and the excellence-based integration of research-performing organisations from countries and outermost regions with lower R&I performance into European scientific networks and innovation ecosystems, more balanced 'brain circulation' within the ERA, appropriate skills and training for enhancing access to excellence;

Advancing concerted research and innovation investments and reforms

- (o) Support to prioritise and secure long-term R&I investments and policy reforms: At all governance levels (Union, national and regional), with improved cross-sectoral coordination and participation, including with regulatory sandboxes and experimentation clauses; their design, implementation and assessment should go hand-in-hand in order to maximise synergies and impact;
- (p) Coordination of R&I investments: By supporting the identification and implementation of coordinated investments and reforms in order to strengthen the ERA dimension across all governance levels in the Union and maximise their impact for the benefit of the Union's science and innovation systems; and by nurturing the interoperability of systems building on lessons learned from joint programming and European research infrastructures.

III. Prioritising investments and reforms

3. Member States should prioritise investments and reforms that address the ERA priorities and provide the necessary conditions and support for stronger private R&I investment at Union, national and regional level by setting realistic, but ambitious, national voluntary targets for R & D investment and outcomes while recognising national circumstances:
 - (a) Public R & D expenditure and private R&I investments require an adequate policy and regulatory framework to maximise their effectiveness and efficiency and ensure an economic and social impact; conversely, reforming the R&I policy framework or implementing a transformative agenda requires mobilising appropriate resources (e.g. funding, human resources, skills, research posts) to drive change and improve the performance and output of the R&I system;
 - (b) R & D investment targets not only spur the overall rate of increase of R & D expenditure, but also reflect more qualitative objectives, in terms of scientific, technological, societal or industrial orientations; this applies in particular to public R & D expenditure supporting the ERA priorities, including reforms of national and regional R&I systems, a sustainable and competitive economy and the twin transitions.
4. Member States should contribute to the Union-level target of investing 3 % of Union GDP in R & D by setting, on a voluntary basis, national targets for their total expenditure on R & D.
5. Member States should qualify the strategy towards achieving their national targets for total R & D expenditure by voluntarily setting national sub-targets, for example on:
 - (a) the intended public expenditure on R & D, expressed as a percentage of GDP;
 - (b) the percentage of national public R & D expenditure committed to joint programmes and initiatives, research infrastructures and European Partnerships;
 - (c) the expected increase in total R & D expenditure, for those Member States lagging behind the Union average R & D expenditure, expressed as a percentage of GDP.
6. Member States take note of the Commission's proposals to include a new 1,25 % of Union GDP public effort target to be achieved by Member States by 2030 in a coordinated manner in the Union and two new voluntary targets for Member States to commit 5 % of national public R & D funding to joint programmes and European Partnerships by 2030 and to increase by 50 % the R & D investment in those Member States that are below the Union R & D intensity average.

IV. Policy coordination and monitoring

7. The Commission and the Member States should implement an enhanced coordination mechanism, to ensure progress towards the ERA priorities. This should encompass Union-level coordination and support, from the strategic planning and design stages to the implementation and monitoring stages, through a range of simpler and less burdensome policy tools and processes:
 - An ERA policy agenda approved by the Council, which sets out the ERA actions to be implemented jointly and voluntarily in a coordinated and flexible manner, without increasing the administrative burden on the Member States, in support of the principles for R&I and ERA priorities set out in this Recommendation, and addressing challenges faced by Union and national R&I communities and wider society as a whole. The ERA policy agenda should be clear and actionable, and provide real Union-added value, defining and describing each action with a view to its implementation (at the Union and/or national level);
 - A tailor-made national process or policy vehicle, used on a voluntary basis by each Member State, for example in the form of a strategy, National ERA Action Plan or Roadmap, to identify running or planned measures at national or regional level contributing to implementing the ERA policy agenda and to other priority areas for joint action;
 - A user-friendly dedicated ERA policy online platform for informing about (i) the implementation of the ERA policy agenda at Union and national level and (ii) other relevant investments, reforms and activities supporting the principles and ERA priority areas set out in this Recommendation. The ERA policy online platform should be based on existing resources and tools and reduce the administrative burden on Member States and the Commission.
8. The Member States and the Commission should implement an enhanced monitoring mechanism, to ensure a proper basis for evidence-informed policy making in the ERA and to provide evidence and analysis in the context of the European Semester. This should encompass the following:
 - An ERA scoreboard, which monitors progress towards the ERA objectives at Union level, and a more detailed dashboard monitoring progress towards the ERA objectives at national level, through a rich combination of relevant input, outcome and impact indicators and qualitative analyses that accommodate the different circumstances of Member States and that relate to the ERA priorities. The ERA scoreboard should be updated regularly. The ERA scoreboard should assess the overall consolidation and collective progress of ERA priorities and should only display aggregated data at Union level;
 - Regular policy dialogues between the Member States and the Commission – both bilaterally and multilaterally – to actively assess and guide the implementation of the ERA policy agenda, in particular through the sharing of best practices and mutual learning exercises, will also take place in the ERA Forum, notwithstanding other policy dialogues in the European Research Area and Innovation Committee. The Commission will provide further support through the Horizon Policy Support Facility and the Technical Support Instrument.
9. The Member States and the Commission should share information through the ERA policy online platform on their current and planned policies and programmes that contribute to implementing the ERA policy agenda, and more broadly contribute to the principles and priorities set out in this Recommendation.
10. The Commission should review the implementation of the ERA policy agenda every 18 months and issue a report for consideration by the Council on the state of play of its implementation in view of steering the ongoing ERA policy agenda and preparing its reviews and updates that will be discussed and approved by the Council. The Commission should provide annually to each Member State a report on its progress in support of the regular policy dialogues between Member States and the Commission.

V. Review

11. The Council should reassess the priority areas for joint action, set out in recommendation (2), at the latest every 6 years after the adoption of this Recommendation.

Done at Brussels, 26 November 2021.

For the Council
The President
S. KUSTEC

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