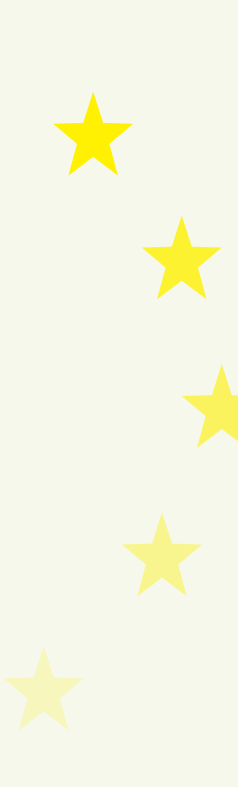


EUROPE IN TRANSITION



manifesto for a comprehensive approach for research and education





In the framework of the French Presidency of the European Union, the five French thematic research alliances¹ organised on 10 March 2022, a high-level conference «Europe in transition: challenges for research and education».

Following this conference, this manifesto with a number of proposals was drafted.

It benefited from contributions from students on international courses, high-level experts from research organisations, university associations, think-tanks, large-scale project coordinators, international training course managers, academics and Directorates-General of the European Commission (Energy, Education, Research and Innovation), a member of the European Parliament and the French Minister for Higher Education, Research and Innovation.

The manifesto sets out proposals and recommendations on research and education issues that are relevant to the various European agendas, the future Horizon Europe 2024-2027 strategic plan, the work programs of the missions² (e.g. the Climate-Neutral and Smart Cities mission , Adaptation to Climate Change³), the European Universities Strategy and the new call for proposals for « European alliances »⁴ . The manifesto has benefited from the contributions of the position paper «Low carbon energy, climate change, environmental health and biodiversity⁵ « built by the French thematic research alliances.

It is intended to be widely distributed: Directorates-General of the European Commission (Research and Innovation, Education, Youth, Sport and Culture, Environment, Energy), French actors, the French Presidency of the European Union (ministries), parliamentarians, stakeholders of research and training.



Europe as a model of reference and opportunity on transitions

Europe is seen as a reference model for many students because it provides high quality education, but it also needs to extend its attractiveness, offering a common base of knowledge on different issues, not only to the most qualified students, but more inclusively. Europe is pursuing pro-active policies in the context of sustainability, such as the Green Deal, which aims to make the European continent climate neutral by 2050. It is the framework for new legislation proposed by the European Commission, to enable the protection and promotion of biodiversity, the reduction of net greenhouse gas emissions to zero by 2050, the promotion of a clean and circular economy through the efficient use of resources, ensuring a «just transition» where every citizen is taken into account and empowered.

Europe is expected to be a pioneering model for energy and ecological transitions while preserving a social model. It must inspire different development models on a common objective with trajectories adapted to regional and national differences. Competences for tomorrow's challenges will have to take into account more interdisciplinarity to address systemic, complex and evolving problems. Thus, curriculum designs should include human and environmentally responsible values, being responsive and adapted to the needs, and interests of new professions for companies and for society. Technology will be fundamental to support the learning process and expand teaching strategies.

Europe must build research programs adapted to the challenges of tomorrow with scientists who are better acculturated

and trained in implementation science and trial-and-error learning approaches. Furthermore, research needs more women and increased diversity to engage with scientific subjects and other disciplines to be agents of change and more representative of society.

In Europe, societies have experience of taking scientific knowledge into account, but the expected changes will have a greater impact if the issues and actions to be taken to accompany these transitions are accepted and shared. Citizens and organisations of the civil society must be involved in the creation of methods, analyses and results, and not merely as "end users". Scientists and research actors can contribute even more to the changes, by enlightening and informing the governance bodies with their knowledge and expertise. The role of social innovation should be enhanced and placed alongside technological innovation in terms of enabling the necessary transitions.

Europe must continue to promote international mobility and global collaboration for the purpose of obtaining a degree, as students trained in Europe are ambassadors within the European Union and well beyond its borders. University alliances have been launched to go beyond student exchanges to promote joint teaching. This allows for thinking across borders, cultures, subjects and countries. Adaptability in order to face new situations is one of the most favoured soft skills, and young people will deliver their contributions to this energy transition, these social and environmental transitions, on a trajectory that is not linear.

1 The thematic research alliances bring together French research organisations and universities around 5 cross-cutting themes: energy, environment, digital, health, humanities and social sciences.
2 https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en
3 <https://climate-adapt.eea.europa.eu/eu-adaptation-policy/eu-mission-on-adaptation>
4 https://ec.europa.eu/commission/presscorner/detail/en/ip_22_365
5 https://www.allianceenergie.fr/wp-content/uploads/2022/02/Position-paper-inter-alliances-EN_Feb2022.pdf

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Transitions require training the younger generation on interdisciplinary and transdisciplinary approaches

Specialisation in scientific disciplines is a development that comes from the deepening of knowledge. It is also a consequence of the disciplinary organisation of education, research structures and socio-economic sectors. However, in the history of science and technology, there are many examples (in biology, physics, social sciences, etc.) where contacts, exchanges and mixtures between disciplines have been immensely fruitful and have led to profound changes.

Today, the complexity induced by the major transitions and the related choices require training the younger generations to be able to think in a creative manner and outside the box, cultivating critical and reflective thinking, capable of thinking beyond disciplinary, geographical, cultural and sectoral boundaries and of providing a systemic vision and solutions within the framework of the transitions. Education and training with challenge-based education approaches, must place values such as the sustainable development goals, human rights and solidarity at the heart of the major transformations of the 21st century, particularly with regard to climate change. There is a need to develop an inclusive education that must bring every citizen to a level of understanding which enables them to handle their future and make informed choices in a democratic context.

Europe must rely on its universities, which ensure a “research-education-society” continuum.

Universities must be actors of transformation by being to mindful to civil society and the economic world; the training must be adapted to these changes, in terms of skills for new professions.

Universities, including European universities alliances must also prepare students for social commitment by developing their ability to work in small as well in large diverse teams, trans-disciplinary, cross-cultural and cross-sectoral environments (companies, NGOs, civil society, etc.).

Universities must have the framework and tools to promote, develop and multiply T-training profiles, preserving a body of specialised disciplinary skills and a range of horizontal skills enabling problems to be tackled in a systemic and interdisciplinary manner. Universities must carry out pedagogical innovations, in particular by involving their students in living-labs, and observatories on a territorial scale, which are places of experimentation of transformations and meeting points between students, researchers, employees of companies and citizens. There is a need for universities to collaborate and support so that all can benefit from this as innovations are happening at different rates in different universities and countries. A closer link between universities, policy makers and industry is key. Alliances of European universities are likely to contribute to these objectives.

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Knowledge, research and society

Moving from knowledge to implementation to start showing results

Major transitions are not only intrinsically complex but also highly interconnected. To this complexity must be added the need to take into account a constantly changing social and political reality. Universities have an important civic role, they are key organisations which have the capacity to bring together and connect many sectors, including society, industry, governments. Citizens can no longer be considered only as end-users but must be involved in the co-creation of solutions (definition of the objectives of the transitions and implementation of the results). Thus, citizen involvement is desirable, through collective commitments and individual actions. The changes that are taking place in society have many other facets than the expected changes in behaviour. They question the scale of values and imaginations and call for the contribution of knowledge from all human and social sciences. In order to reconcile the complexity of transitions and the involvement of citizens in finding solutions, it is necessary to broaden various concepts such as those developed in public health for facing the major challenges of transitions.

Intervention research corresponds to the use of scientific methods to produce and accumulate knowledge on interventions, to translate them into public policies and programs, in order to evaluate both their effectiveness and their cost, but also the conditions for their transferability and generalisation. This is becoming possible through the development of implementation

science, which focuses on the question of how to move from proof of concepts to real contexts. Researchers also need to build on the idea that the interventions they design cannot be effective and transferable without close collaboration and real participation of territorial actors and citizens, which leads to the promotion of participatory research.

Methodological approaches, such as participatory roadmapping⁶ applied to the achievement of sectoral and cross-sectoral objectives such as the decarbonisation of industry⁷, structured, iterative and involving multiple stakeholders (in-



6 <https://www.sei.org/projects-and-tools/tools/roadmap-planner/>

7 <https://www.industrytransition.org/insights/what-are-industry-transition-roadmaps/>

dustrials, representatives of the civil society, politicians, elected representatives), can also contribute to an acceleration of the implementation of scientific knowledge, serve as a platform for discussion, identifying and anticipating barriers. These concepts can and must be applied in the choice of strategies to be favoured in order to bring about these major transitions. Thus, research should provide more knowledge and expertise to all stakeholders and contribute more to implementation and policy-making based on knowledge, facts and evidence.

Investing in socio-technical experiments on a territorial scale to give concrete expression to the commitment of research

Faced with the complexity of the phenomena of climate change and the achievement of climate neutrality, research must become involved and have the means to observe, analyse and be more place-based, in full awareness of the multi-scalar nature of the phenomena and the responses required. Research and universities must work to measure the social impact of their research, with active monitoring at different scales (regional, national and transnational).

Territories defined as places of life, activity, imagination, research, experimentation, citizen and democratic debate, are spaces where strategies for energy transition (for example, the deployment of hydrogen technologies) can take place. They also include mitigation policies (e.g. generating carbon sinks by changing land use), adaptation policies, and policies to protect populations and biodiversity from climate change. Understanding territories in this dual dimension is a challenge for research and innovation in order to analyse interactions in a systemic way, to investigate the effects of available solutions, to involve stakeholders, including civil society, in the process of implementing and disseminating practices, and to do so with less complexity than on a more global scale (national, international).

It is necessary to encourage the creation of socio-technical demonstrators (living labs) and «human-environment» observatories, particularly those associated with land-ocean continuum or trans-national territories, led by multidisciplinary teams involving scientists from different research sectors, stakeholders (citizens, collectivities, public actors, companies, elected representatives, etc.) from the design, testing and deployment phases of transition technologies or policies. Built

around specific targets and organised over time, these observatories are intended to give concrete expression to the commitment of research to anticipate transitions and face up to the changes underway by promoting collective learning in conjunction with the stakeholders.

Enriching and providing access to modelling tools

Modelling tools are essential for formalising knowledge, taking account of the systemic, multidimensional and interdependent nature of transition phenomena, for drawing up prospective analyses and scenarios, and for defining probable, plausible or preferable futures and thus helping in decision-making.

The decisive role of these tools calls for a triple commitment from research and innovation.

► **Firstly**, to increase their capacity, reliability, agility and stochastic dimension in order to take into account co-dependencies, the integration of unforeseen events and non-linear trajectories, and the possibility of associating distinct spatio-temporal scales.

► **Secondly**, by strengthening the explanatory capacity and credibility of modelling tools through an open approach, subject to critical debate of the different issues, foundations, methods and sources. It is fundamental to integrate structural changes into the models (e.g. the conversion of sectors in a context of carbon neutrality) and to confront them with qualitative approaches from the human and social sciences.

► **Thirdly**, by developing prospective modelling tools focused on the problems to be solved (e.g. carbon neutrality), associating sectoral and territorial dimensions, by analysing the socio-economic, institutional and legal conditions for their mobilisation as a support for participatory processes aimed at citizens and targeted stakeholder consultations in order to enrich the construction of scenarios.

The use of prospective models to support ongoing transitions requires original cooperation to investigate the interactions between the physical components of the climate, the biological and ecological components, the dimensions of social justice and environmental ethics, and the industrial and economic issues. Thus, models (and their construction methodology) also constitute a pedagogical and explanatory issue that can be used to prepare and fuel public debates and must be integrated into the science-society debate. The dissemination of modelling methods and tools in order to fuel public debates that is of enormous importance.

The drafting of this document benefited from the contributions of the working group of the five French thematic research alliances: Thierry Heulin, Basile Chaix, Jacques Sainte-Marie, Muriel Thibaut, Philippe Casella, and Fabrice Lemoine.

List of the speakers at the conference of 10 March 2022 Europe in transition: challenges for research and education Gender balance: 8 women, 15 men

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|---------------------------|--------------------|------------------------|---------------------------|
| ► Rosalinde van der Vlies | ► Jean-Marc Daniel | ► Oliver Günther | ► Carle Bonafous Murat |
| ► Frédérique Vidal | ► Chris Fould | ► Frédérique Fournier | ► Lilia Alvarez |
| ► Gökçe Mete | ► Kurt Wagemann | ► Pierre-Franck Chevet | ► Adrien Hamot |
| ► Fabrice Lemoine | ► Hervé Le Treut | ► François Houllier | ► Tea Alikaj |
| ► Sébastien Treyer | ► Patrick Levy | ► Tine Delva | ► Carlos Perez Villanueva |
| ► Sabine Gabrysch | ► Douglas Halliday | ► Christophe Grudler | |