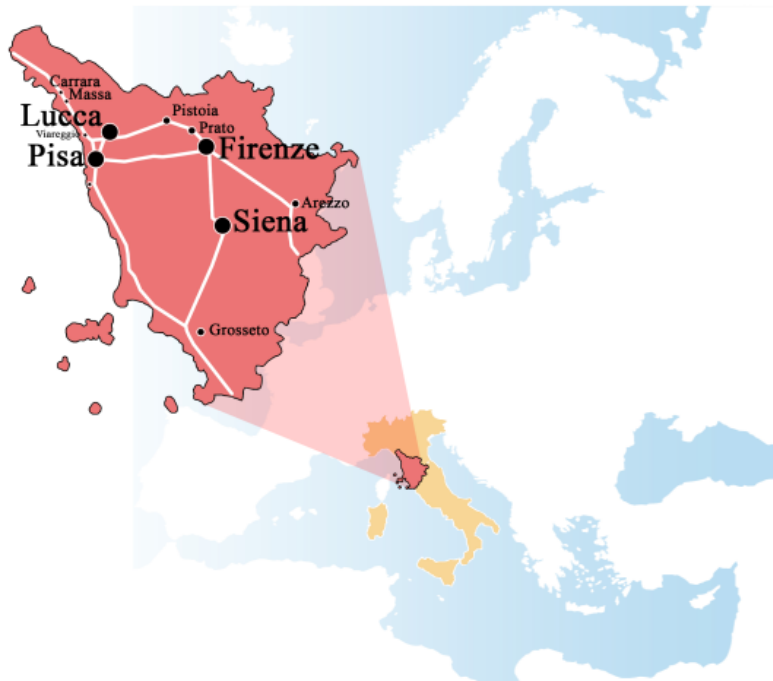**TOUR4EU AISBL**
TUSCAN ORGANISATION OF UNIVERSITIES AND RESEARCH FOR EUROPE

TOUR4HORIZONEUROPE STATEMENT
Contributions on the state of play of Horizon Europe, the Framework programme for Research and Innovation 2021-2027

TOUR4EU is a non-profit association under the Belgian law, promoting Tuscan research in Europe. The Association groups together the Tuscany Region and the 7 prestigious Universities: University of Florence, University of Pisa, University of Siena, University for Foreigners of Siena, IMT School for Advanced Studies Lucca, Scuola Normale Superiore and Sant'Anna School of Advanced Studies.

+ 115,000 students
8,000 staff members (lectures, researchers)
More than 327 laboratories
More than 187 spin offs
288 H2020 projects awarded
(sources: Toscana Open Research Observatory)

Introduction

The TOUR4HORIZONEUROPE statement represents the contribution of TOUR4EU on the state of the inter-institutional negotiation phase of Horizon Europe multi-annual Research and Innovation programming period addressed to all the European Institutions actively involved in the process. This was made possible thanks to the input and comments of all members of TOUR4EU and based on the facts and figures reported on the Toscana Open Research Observatory.

The document is based upon both proposals for a Regulation of the European Parliament and of the Council establishing Horizon Europe - Partial General Approach and the proposal for a Decision of the Council on establishing the specific programme implementing Horizon Europe – the Framework programme for Research and Innovation.

It expresses the views of TOUR4EU members following the architecture designed by the proposal decision and it is structured in the following parts: budget; missions; partnerships; pillar I "Excellence Science"; pillar II "Global challenges and industrial competitiveness"; pillar III "Open Innovation"; programme activity; simplification and evaluation. In "annex I", there are more detailed comments concerning Pillar II of the Decision of the Council on establishing the specific programme implementing Horizon Europe.

BUDGET   **(Art. 4 in accordance with article 9 (1) of the Regulation)**

1. TOUR4EU strongly supports and appreciates <u>the amendment proposed by the European Parliament</u> asking for the increase of Horizon Europe's overall budget to 120 billion euros in 2018 prices and expresses its strong appreciation for the indicative increase from 25.8% to 27.42% in the pillar "excellence science" and in the "global challenges and industrial competitiveness" from 52.7% to 55.48%.

2. In order to leverage synergy effects, TOUR4EU welcomes the combination of funds from different EU funding programmes such as the EU Framework Programme for Research and Innovation and the European Structural and Investment Funds (e.g. in the area of European research infrastructures). It may only be done on a voluntary basis, i.e. with the agreement of the programme administrators. The details require the further agreement of the Member States.

MISSIONS   **(Art. 5 and Annex I)**

1. TOUR4EU believes that missions should be partly built upon science to technology breakthrough necessary to produce the real huge societal impact. The Research agenda in these missions should start from ambitious, long term, high-risk and multidisciplinary research.

2. TOUR4EU congratulates European Institutions for the identification of the following five missions' areas still under discussion: "Adaptation to climate change including Societal Transformation"; "Cancer"; "Healthy Oceans, Seas and Natural Waters"; "Climate Neutral and Smart Cities" and "Soil Health". TOUR4EU can provide high-level expertise in all the areas identified.

3. The possibility for Academia, Research and Technology organisations as well as for regional authorities to be involved in the mission **co-design phase** is very important for the preparation of the life cycle of the mission and for the identification of synergies with other funding schemes managed by national and regional authorities. For this reason, TOUR4EU <u>supports in the Inter-institutional negotiation Trialogue phase amendment n° 15 proposed by European Parliament at art. 5</u> "For each mission, a mission board shall be established for **co-designing** and steering implementation. It shall be composed of 15 to 20 independent high-level individuals including R&I representatives **from various sectors and disciplines, academia, research and technology organisations, industry of all sizes, national, regional authorities and civil society organisations**. The members of the mission board shall be appointed by the Commission following an independent and transparent procedure, including an open call for expressions of interest."

4. As proposed in the Horizon Europe Regulation, where relevant, the necessity to ensure the overall coherence of **the portfolio of projects** could be considered when evaluating proposals. However, it remains essential that the excellence-focused H2020 evaluation criteria are continued, and that portfolio coherence does not become a formal evaluation criterion. Only after evaluation, this portfolio approach can be implemented. In bottom-up programmes (e.g. Pillar I), the clustering of funded projects in thematic areas can indeed be an efficient way to stimulate inter-project cooperation, joint outreach efforts and other multiplier effects. Where feasible, such clusters could contribute to missions. However, the bottom-up character and independent evaluation process should always be safeguarded.

ANNEX I – STRATEGIC PLANNING AND PROGRAMME ACTIVITIES

1. TOUR4EU supports in the Inter-institutional negotiation Trialogue phase amendment n° 22 proposed by European Parliament concerning Annex I at the following paragraphs "the strategic planning process and the adoption of the strategic R&I plan by means of a delegated act will increase ownership and understanding of the purpose of the Programme by a wider public and will allow the co-legislators, stakeholders and Member States to be fully informed on the envisaged initiatives. The Strategic Planning process will help to develop and implement policy for the relevant areas covered, at Union level as well as complementing policies in the Member States while ensuring that main European policy targets are reflected and supported by Horizon Europe with adequate resources. It will **allow simplification of the funding landscape, avoid duplication and overlaps between funding possibilities while leveraging additional private and public funding and promote faster dissemination and uptake of research and innovation results. A systemic, cross-disciplinary, cross-sectoral and cross-policy approach to research and innovation will ensure that societal and economic challenges can be tackled**, knowledge is generated and where possible, give rise to new competitive and sustainable businesses and industries, social and technological innovation, fostering competition, stimulating private investments and preserving the level playing field in the internal market".

2. TOUR4EU welcomes the paragraph under the 'Global Challenges and Industrial Competitiveness' pillar of the Decision emphasizing the integration of the social sciences and the humanities across all clusters, including specific and dedicated activities. Likewise, activities involving marine and maritime research and innovation will be implemented in a strategic and integrated manner in line with the EU Integrated Maritime Policy, the Common Fisheries Policy Policies and international commitments.

ANNEX I - PILLAR I   EXCELLENCE SCIENCE

1. TOUR4EU points out that to provide for wider support in frontier research as the foundation for ground-breaking achievements and innovation should be reflected in: a) a boost in the resources allocation to Pillar I, in particular for Marie Skłodowska-Curie actions; b) the objective of increasing the success rate in ERC grants; c) increase the weight of the excellence component in the evaluation of proposals, including collaborative proposals. The budget allocations should be reconsidered, particularly as the ERC and MSCA have a clear track record as popular, effective and excellent schemes, whilst other elements of the Programme proposals are newer and yet relatively untested.

2. FET Flagships have proven to be an effective and efficient instrument, delivering benefits for society in a joint, coordinated effort by the Union and its Member States, and existing flagships that have proven their benefits should continue to be supported. TOUR4EU agrees with GIURI position that FET Flagships (Human Brain Project, Graphene, Quantum Technologies) should be maintained as such in Horizon Europe and that the other FET Flagships launched by the end of Horizon 2020 should be continued as R&I Missions in Horizon Europe.

3. Tour4EU welcomes the emphasis on excellence in Horizon Europe by supporting in the Inter-institutional negotiation Trialogue phase amendment n° 16 and 17 proposed by European Parliament concerning the rename of the pillar I in "Excellence science" and paragraph 4 "the Scientific Council shall act exclusively in the interest of achieving the ERC's goals, according to the principles set out in Article 6. It shall act with **complete independence**, integrity and probity and carry out its work efficiently and with **the greatest possible transparency and openness maximising ERC's contribution to achieving the EU R&I policy objectives and Horizon Europe's goals in particular"**.

1. The new configuration in the Pillar "Global Challenges and Industrial Competitiveness" in thematic Clusters better reflect a balance among areas. TOUR4EU is particularly happy to see a devoted cluster named "Culture and Inclusive Society". At this stage, TOUR4EU recommends that the individual funding areas should be adequately financed in the new structure.

2. TOUR4EU believes that all TRL levels up to 8 should be covered in this pillar of Horizon Europe without prejudice to Union competition law.

3. TOUR4EU strongly supports the strategic role that social sciences and humanities should have in interpreting and facing the challenges of contemporary societies (as reported on amendment n°48 proposed by European Parliament), also with reference to the frontier achievements of the so-called "hard sciences". A strong emphasis should be given to the ethical dimension and societal impacts of the research and innovation funded under Horizon Europe, a contemporary example is represented by all ethical aspects in the scenarios of Artificial Intelligence.

4. Tour4EU supports in the Inter-institutional negotiation Trialogue phase amendment n° 44 proposed by European Parliament. In addition it would like to draw the attention to the role that linguistic diversity and multilingual citizenship and identities can play in relation to democratic citizenship and political engagement, as well as EU founding values such as respect, tolerance, cooperation or dialogue (annex I chapter 2 on "cluster culture and inclusive society"). In addition to include in "governance and democracy" a paragraph quoting "the contribution of civil society and social movements to the development of alternative visions and practices of democracy.

5. TOUR4EU underlines the importance of fostering policies related to copyright and IPR issues in Cultural Heritage and for harmonising Cultural Heritage's national legislations. Otherwise, many transnational projects will not be able to reach ambitious goals.

1. TOUR4EU recognises that the European Innovation Council Board (in a function similar to that of the ERC Scientific Council) should also play a key role in influencing the policies supporting innovation, providing further input to the action of the European Commission to remove barriers to innovation, through the simplification of procedures and the rationalisation of existing regulatory instruments. To do so, the EIC should also look at the good practices of countries and regions outside the EU with a high rate of innovation (United States, South-East Asia) and at the virtuous experiences within the Member States.

2. TOUR4EU supports the European Commission's plans to enhance the EU's innovation capacity and rationalise existing innovation instruments through the creation of a European Innovation Council (EIC). Universities should be at the heart of its development and implementation, alongside with industry and other partners. Knowledge exchange is a priority for TOUR4EU's universities sharing the European Commission's aim to ensure those with bright ideas and the ambition to scale up internationally. Furthermore, the presence in the Association of Tuscany Regional authority allows to co-design synergies among policies and funding schemes.

3. TOUR4EU supports in the Inter-institutional negotiation Trialogue phase, amendment n° 19 proposed by European Parliament concerning Article 10 paragraph "The EIC Board shall be composed of 15 to 20 independent high-level individuals drawn from various parts of Europe's **research** and innovation ecosystem, including entrepreneurs from

companies of all sizes, economists, investors, **researchers and academic experts** on innovation policy. It shall contribute to outreach actions, with EIC Board members striving to enhance the prestige of the EIC brand.

The EIC Board shall have a President who shall be appointed by the Commission following a transparent recruitment process. The President shall be a high-profile figure with a proven expertise in **research** and innovation. (…) The President shall chair the EIC Board, prepare its meetings, assign tasks to members, and may establish dedicated subgroups, in particular to identify emerging technology trends from EIC's portfolio. He or she shall promote the EIC, its role in achieving the Programme and the Union's R&I goals, act as interlocutor with the Commission and represent the EIC in the world of research and innovation. The Commission shall provide for administrative support for the President to undertake his or her duties."

4. TOUR4EU underlines the role of EIC together with other parts of the Horizon Europe in stimulating all forms of **scientific** and **technological** innovation ranging from **breakthrough and disruptive innovation** to incremental and market-driven innovation and it points out the importance of not having budgetary restrictions to the Pathfinder.

5. The expertise of researchers and academic experts can enhance the management and implementation of the EIC. Annex I to Specific Programme notes that EIC programme managers "will come from multiple spheres, including companies, universities, national laboratories and research centres" – we support and encourage this type of diversity among the programme managers and the explicit inclusion of universities. In addition, the EIC Board should ensure it captures the full breadth of relevant expertise, including academic experts (e.g. technology transfer specialists).

PARTNERSHIPS (Annex I a)

1. TOUR4EU welcomes the European Commission position to «take a new and more impact-focused approach to partnerships», in order to rationalise «the current plethora of European Partnerships […] so that they can continue in simplified forms that are open to all (such as academia, industry, Member States, and philanthropic foundations), while ensuring that they can effectively contribute to the general and specific objectives of Horizon Europe».

2. In PPPs/JUs in particular where research is more science-driven than technology-driven, the expertise of researchers and academic experts can enhance the Scientific Committee in providing input to the vision, priorities and topics.

SIMPLIFICATION

1. Success rates of Horizon 2020 are notably lower than in the previous Programme, with particular challenges under the Excellent Science pillar. This needs to be addressed, in order to continue encouraging high-quality applications. In addition to increasing the overall budget, which will allow the European Commission to fund more projects, TOUR4EU suggests that success rates should also be improved by making changes to the two-stage proposal system. For example, a higher threshold could be set for passing stage one and the second stage should be much more meaningful, with a good chance of success. A further simplification the European Commission should consider is **where two-stage application processes are used, the evaluation from the first stage should carry forward to the second stage, with only the new content evaluated at stage two** (rather than re-evaluating elements which have already been evaluated). This would generate efficiencies for both researchers and evaluators by reducing duplication of effort and workload.

2. A collaborative approach to drawing up new guidelines between the European Commission, experienced beneficiaries, the Research Executive Agency and auditors would be helpful. In addition, the European Commission should seek close engagement with experienced beneficiaries, including universities, to understand and assess how

proposed changes under Horizon Europe are working in practice once the Programme is underway. This could be done on an ongoing basis and TOUR4EU universities would be pleased to help providing practical feedback.

3. To fully embed SSH in Horizon Europe, the European Commission should ensure there is sufficient SSH expertise when writing the calls and appropriate representation of the SSH community in those evaluating proposals. This could be reflected in an amendment to Article 26 - Evaluation. It might be worth exploring whether there should be a minimum number/proportion of SSH evaluators on each panel, for example, and ensuring appropriate representation across the breadth of disciplines (e.g. an economist is unlikely to be best placed to evaluate philosophy research proposals).

4. TOUR4EU strongly supports the compromise amendment n°6a proposed by the European Parliament: "the Programme shall provide for all beneficiaries the possibility to apply for funding in a faster manner. Several research and innovation actions shall apply a Fast Track to Research and Innovation logic where time-to-grant shall not exceed 6 months. This shall allow a faster, bottom-up access to funds for small collaborative consortia covering actions from fundamental research to market application. Calls under the Fast Track to Research and Innovation approach shall be continuously open with cut-off dates and be implemented in the work programmes under clusters, the EIC and the "spreading excellence" part.

EVALUATION

1. Expert evaluation is a central element, ensuring that the programme is focused on excellence. It supports the principle at the heart of the world's leading scientific systems: that decisions on individual research proposals are best taken following an evaluation of the quality and likely impact of the proposals through a peer review process. To ensure fair, transparent processes, expert evaluators should always be appointed following a call for expressions of interest. We therefore propose amendments to Article 44 to specify that alternative processes can only be used if a call fails to identify suitable candidates. Where a call is not used for justifiable reasons, transparency and accountability must be ensured.

2. The European Commission has used on-site consensus panel meetings less frequently in Horizon 2020 and should consider reintroducing these instruments in order to ensure consistency and quality in evaluations, especially where calls are very competitive e.g. for MSCA ITNs.

For more information please contact: Simona Costa Head of Office TOUR4EU s.costa@tour4eu.eu /+32 2 2868666

ANNEX I

PROPOSED AMENDMENTS
Specific Programme, Pillar II "Global challenges and Industrial Competitiveness"

1.2.2.Environmental and Social Health Determinants	
Original Text	**TOUR4EU Proposed amendments**
Improved understanding of health drivers and risk factors determined by the social, economic and physical environment in people's everyday life and at the workplace, including the health impact of digitalisation, **migration,** pollution, climate change and other environmental issues, will contribute to identify, prevent and mitigate health risks and threats; to reducing death and illness ~~from exposure to chemicals~~ and environmental pollution; to supporting safe, environmental-friendly, healthy, resilient and sustainable living and working environments; to promoting healthy lifestyles and consumption behaviour; and to developing an equitable, inclusive and trusted society.	Improved understanding of health drivers and risk factors determined by the social, economic and physical environment in people's everyday life and at the workplace, including the health impact of digitalisation, **migration,** pollution, climate change and other environmental issues, will contribute to identify, prevent and mitigate health risks and threats; to reducing death and illness **from toxic waste** and environmental pollution; to supporting safe, environmental-friendly, healthy, resilient and sustainable living and working environments; to promoting healthy lifestyles and consumption behaviour; and to developing an equitable, inclusive and trusted society.

Explanatory note Death and illness from "exposure to chemicals" **is a misconception**, which biases everybody against chemistry. All medicines are "chemicals" in the most proper sense. The term "chemical" is systematically associated with toxic if not fatal, forgetting on the one hand the contribution of chemistry to progress and well-being and on the other hand how many dangers lurk in an uncritical exaltation of a benevolent nature.

Broad Lines	
–Technologies and methodologies for assessing hazards, exposures and health impact of ~~chemicals,~~ pollutants and other stressors **such as**~~, including~~ climate-related**, workplace, lifestyle**──and environmental stressors, and combined effects of several stressors;	Technologies and methodologies for assessing hazards, exposures and health impact ~~of~~ pollutants and other stressors such as climate-related**,** workplace, lifestyle and environmental stressors, and combined effects of several stressors;

| –Risk assessment, management and communication, supported by **transdisciplinary approaches, where relevant, and** improved tools | Risk assessment, management and communication, supported by **transdisciplinary approaches, where relevant, and** improved tools for evidence-based decision-making, including tissue engineered |

for evidence-based decision-making, including alternatives to animal testing;	pathophysiological organ models and in-vitro and in-silico alternatives to animal testing

Explanatory note
Integrated approaches are necessary and it should be specified.

*1.2.5. Tools, Technologies and Digital Solutions for Health and Care, **including personalised medicine***	
Health technologies and tools are vital for public health and contributed to a large extent to the important improvements achieved in the quality of life, health and care of people, in the EU. It is thus a key strategic challenge to design, develop, deliver, implement and evaluate suitable, trustable, safe, user-friendly and cost-effective tools and technologies for health and care, taking due account of the needs of people with disabilities and the aging society.	Health technologies and tools are vital for public health and contributed to a large extent to the important improvements achieved in the quality of life, health and care of people, in the EU. It is thus a key strategic challenge to design, develop, deliver, implement and evaluate suitable, trustable, safe, user-friendly and cost-effective tools and technologies for health and care, taking due account of the needs of children and adolescents, people with disabilities and the aging society.

Broad Lines	
Original Text	**TOUR4EU Proposed amendments**
– Tools and technologies for applications across the health spectrum, including medical imaging, and any relevant medical indication, including functional impairment;	
– Integrated tools, technologies, medical devices and digital solutions for human health and care, including artificial intelligence, mobile and digital solutions for human health, mobile and telehealth;	Integrated tools, technologies, medical devices and digital solutions for human health and care, including artificial intelligence, mobile, open source and digital solutions for human health, mobile and telehealth
– Innovative processes and services for the development, manufacturing and rapid delivery of tools and technologies for health and care;	Innovative processes and services for the development, manufacturing and rapid delivery of tools and technologies for health and care including biomedical engineering and cell-based technology.

Explanatory note
Biomedical engineering is missing throughout the text

1.2.6. Health Care Systems	
Broad Lines	

Original Text	TOUR4EU Proposed amendments
– Supporting the knowledge base for reforms in public health systems and policies in Europe and beyond;	
– New models and approaches for health and care and their transferability or adaptation from one country/region to another;	New models and approaches for health and care and their transferability or adaptation from one country/region to another, including open source and collaborative design methods.

Explanatory note Biomedical engineering is missing throughout the text

2. CLUSTER CULTURE AND INCLUSIVE SOCIETY'

2.1. Rationale

Original Text	TOUR4EU Proposed amendments
The EU stands for a unique way of combining economic growth with sustainable development goals and social policies, with high levels of social inclusion, shared values embracing democracy, human rights, gender equality and the richness of diversity. This model is constantly evolving and needs to deal with the challenges from amongst other things, globalisation and technological change and rising inequalities.	
The EU must promote a model of inclusive and sustainable growth while reaping the benefits of technological advancements, enhancing trust in and promoting innovation of democratic governance, combatting inequalities, unemployment, marginalisation, discrimination and radicalisation, guaranteeing human rights, fostering cultural diversity and European cultural heritage and empowering citizens through social innovation. The management of migration and the integration of migrants will also continue to be priority issues. The **reciprocal** role of research and innovation in the social sciences, the arts and the humanities in responding to these challenges and achieving the EU's goals is fundamental.	The EU must promote a model of inclusive and sustainable growth while reaping the benefits of technological advancements, enhancing trust in and promoting innovation of democratic governance, combatting inequalities, unemployment, marginalisation, discrimination and radicalisation, guaranteeing human rights, fostering cultural and linguistic diversity and European cultural heritage and empowering citizens through social innovation. The management of migration and the integration of migrants will also continue to be priority issues. The **reciprocal** role of research and innovation in the social sciences, the arts and the humanities in responding to these challenges and achieving the EU's goals is fundamental.

2.2.1. *Governance and Democracy*	
Original Text	**TOUR4EU Proposed amendments**
Broad Lines	
Add	ADD: The contribution of civil society and social movements to the development of alternative visions and practices of democracy
– The history, evolution and efficacy of democracies, at different levels and in different forms; ~~digitisation aspects and the effects of social network communication and~~ the role of education and youth policies as cornerstones of democratic citizenship;	

– Strategies to address populism, **polarisation, corruption,** extremism, radicalisation, terrorism and to include and engage citizens;	Change into Strategies to address racism, **corruption,** extremism, radicalisation, terrorism and to include and engage citizens;

Explanatory note
Populism is a controversial concept, used by scholars also in positive meanings. What needs to be addressed as a challenge especially racism and xenophobia

– The role of multi-cultural citizenship and identities in relation to democratic citizenship and political engagement, as well as EU founding values such as respect, tolerance, cooperation or dialogue;	The role of multi-cultural and multilingual citizenship and identities in relation to democratic citizenship and political engagement, as well as EU founding values such as respect, tolerance, cooperation or dialogue;

2.2.2. *Cultural Heritage*	
Cultural heritage is the fabric of our lives, meaningful to communities, groups and societies, giving a sense of belonging. It is the bridge between the past and the future of our societies. (*) A better understanding of our cultural heritage and how it is perceived and interpreted are vital to creating an inclusive society. It is **also** a driving force of local economies and a powerful source of inspiration for creative and cultural industries.	(*) Moreover, it may show how cultural identities of present-day communities are in fact the result of past complex interaction and integration processes.

Explanatory note

It is important to prevent cultural identity studies from resulting as a support for localism, nationalisms and even racism.

Broad Lines	
– Access to and sharing of cultural heritage, with innovative patterns, exploitation of digital technologies and uses and participatory management models;	Access to and sharing of cultural heritage, with innovative patterns, exploitation of digital **technologies** and uses and participatory management models with special emphasis on collaborative projects for research in the field of the transfer of knowledge across the linguistic boundaries, past and present.

Explanatory note
Importance of fostering policies related to copyright and IPR issues in Cultural Heritage, and for harmonising Cultural Heritage's national legislations. Otherwise, many transnational projects will not be able reach ambitious goals.

–Conservation, safeguarding, enhancement, restoration **and sustainable management** of cultural heritage and languages **including** the use of cutting-edge technologies including digital;	Conservation, safeguarding, enhancement ~~and~~, restoration **and sustainable management** of cultural heritage and languages **including** the use of cutting-edge technologies including digital; combating trafficking in cultural goods;

Explanatory note
The use of virtual reconstruction for research and dissemination purposes can be a relevant support tool as well as predictive modelling

3.1.2. Protection and Security	
Original Text	**TOUR4EU COMMENTS**
There is a need to protect citizens from and to respond to security threats from criminal including terrorist activities and hybrid threats; to protect people, public spaces and critical infrastructure, from both physical (including CBRN-E) attacks and cyber-attacks; to fight terrorism and radicalisation, including understanding and tackling terrorist ideas and beliefs; to prevent and fight serious crime, including cybercrime, and organised crime; to support victims; to trace criminal financial flows; to support the use of data for law enforcement and to ensure the protection of personal data in law enforcement activities; to support air, land and sea EU border management, for flows of people and goods and to understand the human factor in all these security threats. It is essential to maintain	It would be better to divide it into two lines, one oriented to the fight against terrorism and one oriented to cybercrime and threats that involve the information ecosystem. On the second point the following problems could be added (in addition to those already present):

1. Creation and dissemination of fake media (in addition to the classic fake news) as images, video and audio counterfeit or create scratch for the purpose of polarizing public opinion, discredit various personalities (politicians etc), create panic or social alarm
2. Spread of particularly hateful cybercrime such as the use of fake images and videos for cyberbullying |

flexibility rapidly to address new security challenges that may arise.	(see face swapping techniques), revenge porn, etc ... 3. Security of the AI. Given the increasingly widespread use of AI techniques, it is necessary to study its safety with particular reference to the possibility of altering the functioning of AI systems through i) the creation of input art that stimulates the wrong behavior of the systems ii) the interference with the training processes underlying modern AI systems (with reference to this, the US defense ministry has just launched a vast campaign to study the vulnerabilities of AI systems and to develop adequate defenses.) 4. Identity theft: the possibility of deceiving biometric recognition systems, in particular (but not only) facial and vocal recognition.

4.2. Areas of Intervention	
4.2.1. Manufacturing Technologies	

Broad Lines	
Original Text	**TOUR4EU Proposed amendments**
– Breakthrough innovations using different enabling technologies (e.g. converging technologies, artificial intelligence, digital twin, data analytics**,** **control technologies, sensor technologies,** industrial, collaborative and intelligent robotics, human-cantered systems, bio-manufacturing, advanced batteries **and hydrogen and fuel cell technologies, advanced plasma and laser technologies**) across the value chain;	Breakthrough innovations using different enabling technologies (e.g. converging technologies, artificial intelligence, digital twin, data analytics**,** tele assistance, **control technologies, sensor technologies,** industrial, Telecommunication Technology, collaborative and intelligent robotics, human-cantered systems, bio-manufacturing, advanced batteries **and hydrogen and fuel cell technologies, advanced plasma and laser technologies**) across the value chain;

- Combatting disinformation and fake news with implications for security	Fake media

4.2.2. Key Digital Technologies

Original Text	TOUR4EU Proposed amendments
– Efficient and secure sensing and actuating technologies and their co-integration with computational units as the enabler of industry and the Internet of Things, including innovative solutions on flexible and conformable materials for human-friendly interacting objects**, new medical technologies** ~~or automated driving~~;	…new medical technologies or autonomous vehicles;

Explanatory note
Autonomous vehicles include vessels, planes, trains and other forms of mobility.

– Computing architectures and low-power processors for a wide range of applications including neuromorphic computing powering artificial intelligence applications, edge computing, digitisation of industry, big data and cloud, smart energy and connected ~~and automated driving~~;	…smart energy and connected and autonomous vehicles;

4.2.3. Advanced Materials

Original Text	TOUR4EU Proposed amendments
Broad Lines	
– Materials (including polymers, ~~plastic,~~ bio-, Nano-, two-dimensional, smart and multi-materials, metals and alloys) and advanced materials (e.g. quantum, composite, responsive and photonic materials) designed with new properties and functionalisation and meeting regulatory requirements (while not leading to increased environmental pressures during their **whole life-cycle, from** production~~,~~ **to** use or end-of-life);	materials (e.g. quantum, Nano composite**,** responsive and photonic materials)

Explanatory note
Composite materials are interesting for additive manufacturing and it is important to define their whole life-cycle assessment.

4.2.4. Artificial Intelligence and Robotics

Original Text	TOUR4EU Proposed amendments
Broad Lines	

– Enabling AI technologies such as explainable AI, ethical AI, unsupervised machine learning and data efficiency and advanced human-machine interactions;	…ethical AI, unsupervised machine learning, data efficiency and advanced…

Explanatory note There is a whole blend of learning styles under the general umbrella of machine learning, which covers supervised, unsupervised, reinforcement learning, weakly supervised and semi-supervised, etc. Committing at this stage to a single paradigm is too restrictive (weakly supervised can be as good as unsupervised in terms of data efficiency).

– Technologies for open AI platforms including software algorithms, data repositories, robotics and autonomous systems platforms.	Technologies for open AI platforms including software algorithms, data repositories, neuromorphic platforms, brain-machine wet-labs, robotics and autonomous systems platforms.

Explanatory note Innovative computing fabric will be key to the next generation of AI

5.2.4. Buildings and Industrial Facilities in Energy Transition	
Broad Lines	
Original Text	**TOUR4EU Proposed amendments**
– Buildings life-cycle design, construction, operation**, including ~~heating and cooling~~,** and dismantling, taking into account circularity, energy and environmental performance, for energy and resource efficiency, for well-being and health impact on the inhabitants, climate resilience, carbon footprint and recycling;	Buildings life-cycle design, construction, operation, including thermal energy management, and dismantling…

7 CLUSTER 'BIOECONOMY, FOOD NATURAL RESOURCES AND ENVIRONMENT'	
7.1. Rationale	
Original Text	**TOUR4EU Proposed amendments**
Meeting the goals of sustainable development, guaranteeing the production and consumption of safe and healthy food, promoting sustainable practices in agriculture, aquaculture, fisheries and forestry, ensuring access to clean water, soil and air for all, cleaning up the seas and oceans, preserving	Meeting the goals of sustainable development, guaranteeing the production and consumption of safe and healthy food, promoting sustainable practices in agriculture, aquaculture, fisheries and forestry, ensuring access to clean water, soil and air for all, cleaning up the seas and oceans, preserving

and restoring the planet's vital natural systems and environment requires that we harness the potential of research and innovation. But the pathways for the transition to sustainability and ways to overcome resilient barriers are hardly understood.	and restoring the planet's biodiversity and environments to preserve ecosystem functions and services in aquatic and terrestrial ecosystems requires that we harness the potential of research and innovation.
They will help to maintain and enhance the provision of biodiversity and secure the long-term provision of ecosystem services, climate change adaptation and mitigation and carbon sequestration (both on land and sea). They will help reduce greenhouse gas (GHG) and other emissions, waste and pollution from primary production (both terrestrial and aquatic), processing, consumption and other human activities. They will trigger investments, supporting the shift towards a circular economy, sustainable bioeconomy and blue economy, whilst protecting environmental health and integrity.	They will help to maintain biodiversity and secure the long-term provision of ecosystem functions and services, reduce the risk of regime shifts and promote climate change adaptation, mitigation and carbon sequestration (both on land and sea).

67.2. Areas of intervention	
67.2.1. Environmental Observation	
Original Text	**TOUR4EU Proposed amendments**
The capacity to observe the environment underpins research and innovation for the sustainable use and monitoring of food and natural resources, biomonitoring and environmental monitoring. Improved spatio-temporal coverage and sampling intervals at reduced cost, as well as big data access and integration from multiple sources provide new ways to monitor, understand and predict the Earth system.	use of visualization and immersive visualization technologies for the observation of the environment
Broad Lines	
– Biodiversity status, ecosystem protection, climate change mitigation and adaptation, food security, agriculture and forestry, land use and land use change, urban and peri-urban development, natural resources management, ocean exploitation and conservation, maritime security, decadal environmental trends, changes in seasonal variability, ambient air and atmospheric changes and other relevant domains;	Biodiversity status, ecosystem protection, climate change mitigation and adaptation in marine, terrestrial and freshwater ecosystems, food security, agriculture and forestry, land use and land use change, urban and peri-urban development, natural resources management, ocean observation, exploitation and conservation, maritime security, decadal environmental trends, changes in seasonal

	variability, ambient air and atmospheric changes and other relevant domains;

7̶6.2.2. Biodiversity and Natural Resources	
Broad Lines	
Original Text	**TOUR4EU Proposed amendments**
– The state and value of biodiversity, terrestrial, freshwater and marine ecosystems, natural capital and ecosystem services, including agro-ecosystems;	The state and value of biodiversity, marine, terrestrial and freshwater ecosystems, natural capital and ecosystem services, including agro-ecosystems;
– Holistic and systemic approaches within a socio-ecological framework for the links between biodiversity, ecosystems and ecosystems services and their causality relationships with drivers of change, across different scales and economic activities, including the governance of transition processes to sustainability;	
To add	- Harness the resilience of socio-ecological networks through optimising the multidimensional stability properties of ecosystems and the biodiversity they contain; develop dynamic management procedures that can respond to changing environmental and social conditions over a range of spatial and temporal scales.

7.2.4. Seas, Oceans and Inland Waters	
– Strengthened resilience of marine ecosystems thereby ensuring seas and ocean health, combating and mitigating the effects of natural and human pressures like contaminants and marine litter, eutrophication, ~~indigenous~~ **invasive** species, physical damage to the sea floor, underwater noise, acidification, seas and oceans warming, sea level rise, considering the intersection between land and sea and fostering a circular approach and a better understanding of ocean-human interactions;	- Strengthened resilience of marine ecosystems and minimize the risk of regime shifts thereby ensuring long-term stability of seas and ocean health, combating and mitigating the effects of natural and human pressures like contaminants and marine litter, eutrophication, invasive species, physical damage to the sea floor, underwater noise, acidification, seas and oceans warming, sea level rise, considering the intersection between land and sea and fostering a circular approach and a better understanding of ocean-human interactions;

– Monitoring and predictive/forecasting capacities including sea-level rise and other natural hazards e.g. storms surges, tsunamis as well as cumulative impact of human activities and risk-based assessment (monitoring);	– Monitoring and predictive/forecasting capacities including sea-level rise and other natural hazards e.g. storms surges, tsunamis as well as cumulative impact of human activities and risk-based assessment (monitoring) and their impacts on biodiversity, stability and ecosystem functions and services;

7.2.5. Food Systems

Original Text	TOUR4EU Proposed amendments
Future food systems need to deliver sufficient safe, healthy and quality food for all, underpinned by resource efficiency, sustainability (including the reduction of GHG emissions, pollution and waste production), linking land and sea, reducing food waste, enhancing food production from inland waters, seas and oceans and encompassing the entire 'food value chain' from producers to consumers – and back again., **ensuring resilience.**	Future food systems need to deliver sufficient safe, healthy and quality food for all, underpinned by resource efficiency, sustainability (including the reduction of GHG emissions, pollution and waste production), linking land and sea, reducing food waste, enhancing food production from inland waters, seas and oceans and encompassing the entire 'food value chain' from producers to consumers – and back again., **ensuring resilience** and minimizing the risk of regime shifts.

7.2.7. Circular Systems

– Eco-innovation for prevention and remediation of environmental pollution from hazardous substances and chemicals of emerging concern; looking also at the interface	Eco-innovation for prevention and remediation of environmental pollution from hazardous substances of emerging concern; looking also at sustainable solutions for primary and secondary raw materials production;

NON-NUCLEAR DIRECT ACTIONS OF THE JOINT RESEARCH CENTRE	
1. Health	
Original Text	**TOUR4EU Proposed amendments**
– Safety assessment methods for potential health and environmental risks posed by ~~chemical substances and~~ pollutants;	Safety assessment methods for potential health and environmental risks posed by pollutants;