SELEZIONE N. 70/2022

Traccia 1 – Prima parte

La/Il candidata/o descriva l'architettura del Programma Nazionale della Ricerca (PNR 2021 – 2027) del Ministero dell'Università e della Ricerca (MUR), le principali tematiche del PNR e le sinergie/collegamenti con il Programma Quadro della Commissione Europea per la Ricerca e Innovazione "Horizon Europe".

SELEZIONE N. 70/2022

Traccia 2 – Prima parte

La/Il candidata/o descriva le azioni promosse e i relativi bandi di finanziamento emanati dal Ministero dell'Università della Ricerca (MUR) nell'ambito del Piano Nazionale per la Ripresa e Resilienza (PNRR) per la Missione 4 Componente 2 "Dalla Ricerca all'Impresa".

SELEZIONE N. 70/2022

Traccia 3 – Prima parte

Il Regolamento UE 2021/241 del Parlamento e del Consiglio dell'Unione Europea disciplina il Dispositivo per la Ripresa e la Resilienza quale principale strumento di intervento di *Next Generation EU*, il Fondo per la ripresa dal valore di 750 miliardi di euro adottato dal Consiglio europeo al fine di sostenere gli Stati membri colpiti dalla pandemia di COVID-19.
La/Il candidata/o descriva con quale strumento il Regolamento è stato recepito ed attuato dal governo italiano e quali sono le misure a sostegno delle attività di Ricerca ed Innovazione.

SELEZIONE N. 70/2022

Traccia 1 – Seconda parte

La/Il candidata/o riceve una richiesta di informazioni da parte di una/un ricercatrice/ricercatore dell'Università di Trento per la partecipazione dell'Ateneo in una proposta di progetto in risposta al *topic HORIZON-CL4-2021-RESILIENCE-01-20: Antimicrobial, Antiviral, and Antifungal Nanocoatings (Research Innovation Action)* nell'ambito del *Pillar 2 - Cluster 2: Digital, Industry and Space* del Programma Quadro per la Ricerca e Innovazione *Horizon Europe* finanziato dalla Commissione Europea.
La/Il candidata/o descriva: i) gli elementi da considerare nella creazione di un consorzio per la preparazione di una proposta di un progetto di ricerca collaborativa (*Research Innovation Action*) con l'Ateneo in qualità di coordinatore nell'ambito del programma *Horizon Europe* in risposta al *topic* indicato; ii) gli elementi da tenere in considerazione nel coinvolgimento di imprese in attività di ricerca nella tematica descritta dal *topic*.

SELEZIONE N. 70/2022

Traccia 2 – Seconda parte

La/Il candidata/o riceve una richiesta di informazioni da parte di una ricercatrice dell'Università di Trento per la partecipazione ad una proposta di progetto in risposta al *topic HORIZON-HLTH-2022-STAYHLTH-01-04-two-stage: Trustworthy artificial intelligence (AI) tools to predict the risk of chronic non-communicable diseases and/or their progression (Research Innovation Action)* nell'ambito del *Pillar 2 – Cluster 1 Health* del Programma Quadro per la Ricerca e Innovazione *Horizon Europe* finanziato dalla Commissione Europea.

La/Il candidata/o descriva: i) gli elementi da considerare per la costituzione di un consorzio per ricerca collaborativa (Research Innovation Action) con l'Ateneo in qualità di coordinatore nell'ambito del programma *Horizon Europe* in risposta al *topic* indicato; ii) gli elementi da considerare nella sezione dedicata all'impatto (sezione "Impact") del progetto nell'ambito di una proposta di successo.

SELEZIONE N. 70/2022

Traccia 3 – Seconda parte

La/Il candidata/o riceve una richiesta di informazioni da parte di una ricercatrice dell'Università di Trento per la partecipazione ad una proposta di progetto in risposta al *topic HORIZON-CL6-2021-CIRCBIO-01-05: Novel, non-plant biomass feedstocks for industrial applications (Research Innovation Action)* nell'ambito del *Pillar 2 – Cluster 6 Food, Bioeconomy, Natural Resources, Agriculture and Environment* del Programma Quadro per la Ricerca e Innovazione *Horizon Europe* finanziato dalla Commissione Europea.

La/Il candidata/o descriva: i) gli elementi da considerare per la costituzione di un consorzio per ricerca collaborativa (Research Innovation Action) con l'Ateneo in qualità di coordinatore nell'ambito del programma *Horizon Europe* in risposta al *topic* indicato; ii) gli elementi da considerare nella sezione dedicata all'eccellenza del progetto (sezione "*Excellence*") nell'ambito di una proposta progettuale di successo.

HORIZON-HLTH-2022-STAYHLTH-01-04-two-stage: Trustworthy artificial intelligence (AI) tools to predict the risk of chronic non-communicable diseases and/or their progression

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 60.00 million.
Type of Action	Research and Innovation Actions

Expected Outcome: This topic aims at supporting activities that are enabling or contributing to one or several expected impacts of destination 1 *"Staying healthy in a rapidly changing society"*. To that end, proposals under this topic should aim for delivering results that are directed, tailored towards and contributing to all of the following expected outcomes.

- Clinicians, medical professionals and citizens have access to and use validated AI tools for disease risk assessment. Hence, citizens are better informed for managing their own health.
- Health care professionals utilise robust, trustworthy and privacy-preserving AI tools that help them to assess and predict the risk for and/or progression of chronic non-communicable diseases. Hence, citizens benefit from improved health outcomes.
- Health care professionals develop evidence-based recommendations and guidelines for the implementation of AI-based personalised prevention strategies. Hence, citizens benefit from optimized health care measures superior to the standard-of-care.

- Health care professionals employ quantitative indicators in order to identify and follow-up on individuals with high risk for the development and/or risk for the progression of chronic non-communicable diseases.

Scope: It is widely recognised that health systems must put more emphasis on prevention and adopt a person-centred approach. Artificial intelligence (AI) along with the increased availability of health data hold great potential to pave the way for personalised prevention and enable progress towards risk prediction and early detection of chronic non-communicable diseases.

This topic will support multidisciplinary research, build on broad stakeholder engagement and support proposals developing novel robust and trustworthy[23] AI tools to enable timely personalised prevention approaches for chronic non-communicable diseases/disorders. The topic does not exclude any diseases/disorders.

Proposals are expected to develop and test AI tools for assessing and predicting the risk of developing a disease and/or the risk of disease progression once it is diagnosed, taking into account the individuals' (or groups) genotypes, phenotypes, life-style, occupational/environmental stressors and/or socio-economic and behavioural characteristics, as necessary. Sex and gender aspects should be considered, wherever relevant.

The AI tools may include a broad range of technological solutions on their own and/or in combination with other relevant state-of-the-art technologies (i.e. AI algorithms, mobile apps and sensors, robotics, e-health tools, telemedicine etc.)

Proposals should implement proof-of-concept studies to test and validate the performance of their AI tools in the real-world setting and compare their performance to the established practice.

The applicants should ensure that the AI tools developed are driven by relevant end-users/citizens/health care professionals needs. Therefore, the proposals are expected to introduce concrete measures for the involvement of the end-users throughout the AI development process and not only in the last phases of development. SME(s) participation is encouraged with the aim to strengthen the scientific and technological basis of SME(s) and valorise their innovations for the people's benefit.

Proposals should address all of the following:

- Leverage existing high-quality health-relevant data from multiple sources (i.e. cohorts, electronic health records and registries, taking into account the individual's genotypic/phenotypic, medical, life-style, socio-economic, behavioural data etc.) and/or generation of new high-quality health data necessary for the rigorous development of the AI disease-risk tools.

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[23] Ethics Guidelines for Trustworthy AI, published by the European Commission's High Level Expert Group on Artificial Intelligence, https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top.

- Develop the adequate performance metrics to assess the technical robustness of the developed AI tools for risk assessment of disease and/or disease progression and in particular their accuracy, reliability, reproducibility and generalisability. Proposals should assess the possible inherent bias introduced to the AI tools originating from the data quality used for their development.

- Develop the criteria to assess the effectiveness of the AI tools for disease risk assessment in terms of improving health outcomes and enabling personalised prevention strategies.

- Implement proof of concept and/or feasibility studies to validate the AI tools for risk assessment of disease and/or disease progression in a relevant end-users environment and/or real-world setting and assess their performance in comparison to the standard-of-care.

Proposals should adhere to the FAIR[24] data principles and apply good practices for GDPR-compliant personal data protection. Proposals are encouraged to implement international standards and best practices used in the development of AI solutions.

Integration of ethics and health humanities perspectives to ensure an ethical approach to the development of AI solutions. In relation to the use and interpretation of data, special attention should be paid to systematically assess for gender and ethnic bias and/or discrimination when developing and using data-driven AI tools.

To ensure citizens' trust, wide uptake by user communities and scalability of the solutions across clinical contexts, actions should promote the highest standards of transparency and openness of the AI tool, going well beyond documentation and extending to aspects such as assumptions, architecture, code and underlying data.

Applicants are highly encouraged to deliver a plan for the regulatory acceptability of their technologies and to interact at an early stage with the regulatory bodies, whenever relevant.

All projects funded under this topic are strongly encouraged to participate in networking and joint activities, as appropriate. These networking and joint activities could, for example, involve the participation in joint workshops, the exchange of knowledge, the development and adoption of best practices, or joint communication activities. This could also involve networking and joint activities with projects funded under other clusters and pillars of Horizon Europe, or other EU programmes, as appropriate. Therefore, proposals are expected to include a budget for the attendance to regular joint meetings and may consider to cover the costs of any other potential joint activities without the prerequisite to detail concrete joint activities at this stage. The details of these joint activities will be defined during the grant agreement preparation phase. In this regard, the Commission may take on the role of facilitator for networking and exchanges, including with relevant stakeholders, if appropriate.

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24 FAIR data are data, which meet principles of findability, accessibility, interoperability, and reusability.

HORIZON-CL6-2021-CIRCBIO-01-05: Novel, non-plant biomass feedstocks for industrial applications

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B.

Expected Outcome: Successful proposals will contribute to the impacts of this destination and European policies it supports, in particular the European Green Deal, the circular economy action plan and the bioeconomy strategy. They should help to improve European industrial[212] sustainability, competitiveness and resource independence by lowering environmental footprint (including on biodiversity), enabling climate-neutrality and higher resource efficiency (in particular upcycling and cascading use of biomass) along and across value chains, developing innovative bio-based products. They should engage all stakeholders, and improve their knowledge and understanding of science, in particular biotechnology-based value chains.

Project results should contribute to all of the following expected outcomes:

- More effective prospecting and greater use of biological diversity to generate verifiably more sustainable biomass feedstocks, including through improved harvesting, and processing, and commercially valuable climate-neutral circular bio-based, materials and products. This covers more robust verification of sustainability via life-cycle assessment approaches.

- Greater resource efficiency of production pathways, by applying upcycling and the cascading use of biomass residues or side-streams (e.g. as growing substrates), leading to

212 In connection with European partnerships under Cluster 6, in particular Circular Bio-based Europe (CBE).

lower land dependence for biomass[213], and thus reducing any conflict with food/feed production.

- Higher capacity and engagement of SMEs, contributing to skilled job creation and economic benefits, and improving industrial competitiveness due to the expanded range of natural ingredients for the new applications in industrial sectors. Higher functional performance of the pursued value chains and products, and more sustainable industrial practices and resource independence of the EU Member States and associated countries.

Better public understanding across the EU Member States and associated countries of biotechnology, and of the biodiversity conservation and enhancement objectives enshrined in the EU biodiversity strategy and respect to the principles of access and benefit sharing (UN Biodiversity Convention), via clear, inclusive and transparent communication strategies.

Scope: The innovative bioeconomy sectors need to diversify and to deliver technological and industrial solutions based on available and sustainably accessible biomass. In particular, current plant-based biorefining may need upgrading to leave more land available for biodiversity protection and food production, while allowing the substitution of fossil-based resources with bio-based ones. The scope therefore covers the production of key bio-based products such as food and feed ingredients, including proteins, lipids and fibres, antioxidants and other substances with biological activities, and key bio-based materials (e.g. bio-based plastics, composites, fibres) or chemicals[214], in a resource-efficient approach[215]. This calls for identifying and optimising sources as microorganisms, insects, fungi or mixotrophic algae, which requires defining certain growing conditions in suitable systems such as biofermentors[216], where they need to be efficiently processed, extracted and converted into industrial outputs of interest. Proposals should increase circularity, in particular for the use of biomass residues or side-streams used as feed material, and should deliver necessary upgrades to and upscaling of the strategies for the cultivation, production and extraction systems.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing research projects (especially under the Bio-based Industries Joint Undertaking or on microbiomes). Proposals should:

a. Develop and demonstrate techno-economic viability of the bio-based production platforms applying the resource efficiency principles (ensuring savings on water, energy, chemical inputs, biomass waste, side-streams or residues), getting more out of less by making use of autotrophic plants and heterotrophs, and applying the modern biotechnological principles. This covers the development of a bio-based microbial production platform for high-value biologically active substances, food/feed ingredients,

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213 Lowering the negative environmental impacts of growing biomass without use of land (zero pesticides, reduced emissions and energy use)

214 Production of bioethanol and other biofuels falls outside the scope of this topic

215 e.g. by fully exploiting the cascading use of biomass resulting from agricultural production as growing substrates

216 In connection with topic HORIZON-CL6-2021-CIRCBIO-01-06 "Contained biomass solutions for sustainable and zero-ILUC production systems for high value applications"

or bio-based materials as well as efficient separation and extraction approaches for products of interest.

b. Identify and implement the best combination of appropriate technical solutions and practices for specific industrial value chains (justifying the choice, including on level of innovation and business viability), as well as the barriers and drivers derived from e.g. governance and market aspects, while seeking the engagement and understanding of all actors.

c. Develop and transparently communicate the key parameters to monitor and measure the qualitative and quantitative impacts of these solutions and practices for different sourcing, optimization and production systems, the potential of replacing available traditional alternatives, if relevant, and trade-offs, including on biodiversity, and the associated improvement in socio-economic resilience of businesses, for the creation of jobs and industrial competitiveness.

d. Develop and test mechanisms involving all actors and specifically including bio-based industries active in knowledge co-creation, exchange, feedback and communication. Demonstrate them to all actors (e.g. agricultural operators, farmers, SMEs and civil society) and help them implement and understand solutions for new or improved bio-based products and processes and for addressing other environmental impacts e.g. lowered pressure on land and on biodiversity sourcing.

e. Consider contributing data and results to the European Commission's Knowledge Centre for Bioeconomy hosted by the JRC

In this topic it is not mandatory to integrate the gender dimension (sex and gender analysis) in research and innovation content..

- Sustainable synthesis of nanocoatings (including bio-based materials) especially with effectiveness against a range of pathogens.

Scope: Inorganic nanomaterials have demonstrated enhanced anti-microbial and anti-viral activity. They are also stable at high temperatures, robust, and have a long shelf life, compared to organic anti-microbial coatings. Research areas should address new antiviral and antibacterial nanocoatings for a range of applications addressing use on both surfaces of so-called high-traffic objects (e.g. door and window handles in public places, public transport, hospitals, public buildings, schools, elderly homes etc.) and/or coatings for textiles (e.g. protective clothing in food processing plants, laboratory coats, face masks, etc.).

The research should address the following aspects:

- Sustainable synthesis of nanocoatings/nanocomposites (including bio-based materials) with effectiveness against a range of pathogens;
- Application methods (both on surfaces and textiles);
- Surface adhesion and durability via assessing performance against wear (e.g. abrasion, washing, etc.) and degradation in the application environments on a variety of surfaces (e.g. glass, metals and various alloys, copper and steel, marble and stone slabs, ceramics and tiles, textiles and plastics);
- Toxicity of nanocoatings.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the introduction to this Destination.

This topic is directly related to the well-being of citizens in the context of COVID-19 virus pandemic.

Materials and data cross-cutting actions

Proposals are invited against the following topic(s):

HORIZON-CL4-2021-RESILIENCE-01-25: Biomaterials database for Health Applications (CSA)

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 2.00 and 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 6.00 million.
Type of Action	Coordination and Support Actions

The topic is open for international cooperation, while excluding industrial competitors from countries where the safeguarding of IPRs cannot be guaranteed[75]

HORIZON-CL4-2021-RESILIENCE-01-20: Antimicrobial, Antiviral, and Antifungal Nanocoatings (RIA)

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 4.00 and 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 23.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to start at TRL 3 and achieve TRL 6 by the end of the project – see General Annex B.

Expected Outcome: The recent outbreak of the COVID19 virus has demonstrated that costs in both human life and economic terms can be immense if measures are not in place to contain a spread of infection. It is apparent therefore that passive measures are in place to minimise the impact of current and future infection outbreaks. Nanoparticle filled coatings such as metal nanoparticles, carbon nanotubes, metal oxide nanoparticles, heterostructures, patterned surfaces and graphene-based materials have demonstrated up to 99.9998% effectiveness against bacteria, mould and viruses.

Projects are expected to contribute to the following outcomes:

- Minimise the risk of spread of infections from harmful pathogens arising from everyday human activities;
- Create a healthier living and working environment and offer holistic solutions to people with health issues;
- Improve citizen health and enhance the EU's reputation as a public health best practice region;
- Enhance economic benefits through reduction of lost hours of work through illness;
- Boost research, development and innovation in the EU;
- Provide business opportunities especially for SMEs;

[75] SWD(2021)97 final, Report on the protection and enforcement of intellectual property rights in third countries (2021)