

38th INTERNATIONAL CAE CONFERENCE

**METAMORPHOSIS
TO FULL DIGITAL
MASTERY**

Successful transition through
artful technology deployment

16-18
NOVEMBER 2022

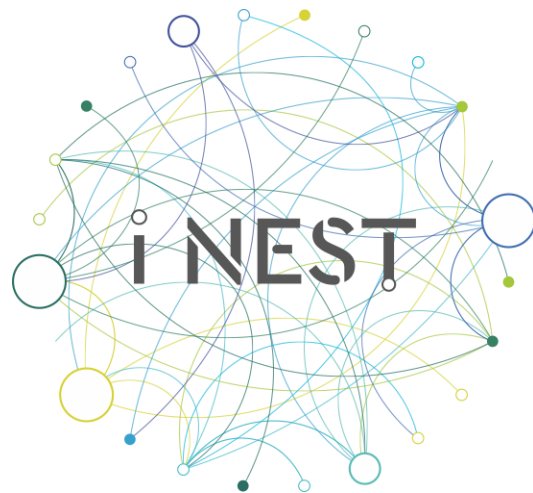


iNEST Interconnected Nord-Est Innovation Ecosystem

L'Ecosistema per l'Innovazione del Nord-Est

Franco Bonollo

Università di Padova, Consorzio iNEST
Presidente Scuola di Ingegneria,
Presidente CdA iNEST



iNEST

Interconnected Nord-Est Innovation Ecosystem



Finanziato
dall'Unione europea
NextGenerationEU



Ministero
dell'Università
e della Ricerca



Italiadomani
PIANO NAZIONALE
DI RIPRESA E RESILIENZA

iNEST

iNEST e gli elementi caratterizzanti del NordEst

- Forte **connotazione territoriale**, che è forza motrice per ogni forma di collaborazione
- **Background comune in termini storici, sociali, culturali**
- Area cruciale per l'economia italiana: 12% della popolazione, **14% del PIL, 20% dell'export italiano**
- **Varietà di vocazioni, dall'ambito industriale a quello del turismo e dei beni culturali**
- Presenza di molteplici intersezioni, come testimoniato dalle **Smart Specialization Strategies**

iNEST e gli elementi caratterizzanti del NordEst

i NEST

MACRO THEMES OF THE REGIONAL INNOVATION STRATEGIES (RIS) IN NORTHEASTERN ITALY REGIONS

	Smart Industries	Smart Agri-food and Nutrition	Health Tech and Services	Smart and Sustainable Living	Creative Industries	Tourism	Technologies and Services for Natural Ecosystem
BOLZANO	Automation & Digital	Food & Life Science	Food & Life Science	Green Infrastructure	Transversal domain, included in Autom. & Digital and Alpine Tech	Transversal domain, included in Autom. & Digital and Alpine Tech	Alpine Technologies
FRIULI VENEZIA GIULIA	Intelligent Factory and Sustainable Dev. of the Made in Italy Supply Chains	Health Quality of Life, Agri-food and Bioeconomy	Health Quality of Life, Agri-food and Bioeconomy	Energy Transition, Circular Economy and Env. Sustainab.	Cultural Heritage, Design, Creativity, Industry, Tourism	Cultural Heritage, Design, Creativity, Industry, Tourism	Maritime Tech. Sust. Waterborn Mobility and its Land Connection
TRENTO	Smart Industries	Health, Food and Lifestyle	Health, Food and Lifestyle	Sustainability, Mountain, Energy Resources	Currently included in ICT & Digital Transformation	Currently included in ICT & Digital Transformation	Sustainability, Mountain, Energy Resources
VENETO	Smart Manufacturing	Smart Agrifood	Smart Health	Sustainable Living	Culture and Creativity	Smart Destination	Currently included in Sustainable Living and Smart Agrifood

iNEST e gli elementi caratterizzanti del NordEst

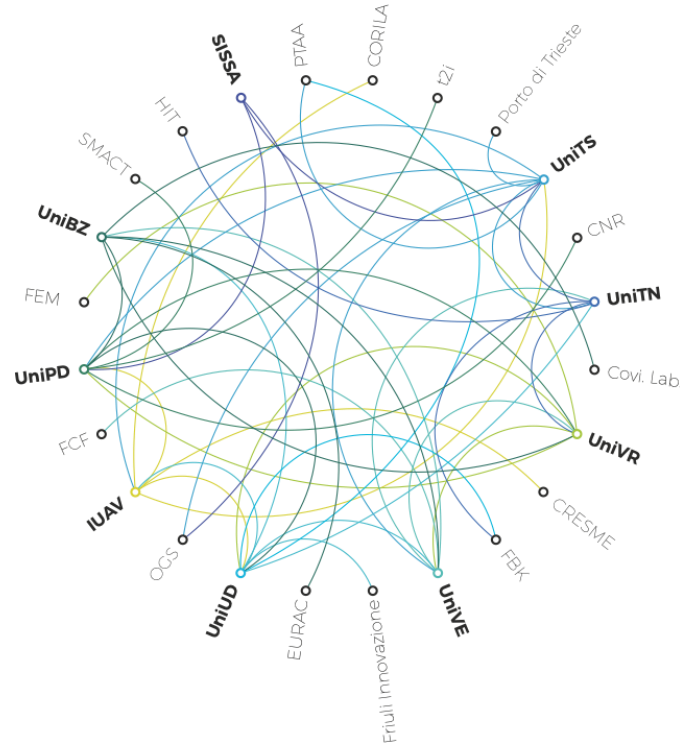
- Per il NordEst serve **nuovo paradigma di Ecosistema** dell'Innovazione,
- **Multi-vocazionalità**
- Capacità di generare valore aggiunto tramite un **approccio integrato e interconnesso**, superando i rischi di frammentazione
- Creazione di reti, con un **approccio basato sulla partnership**
- Strumenti-chiave:
 - Information and communication technologies (ICT) e digitalizzazione
 - Tecnologie innovative per il benessere delle persone, la diffusione della cultura e la crescita economica e imprenditoriale

iNEST e gli elementi caratterizzanti del NordEst

iNEST è l'inteconnessione
di più ecosistemi,
ognuno dei quali
associato ad uno Spoke,
che agiscono
in **simbiosi e sinergia**

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iNEST: 11 Soci fondatori

Università degli Studi di Padova (University of Padua)	UNIPD	
Università degli Studi di Verona (University of Verona)	UNIVR	
Università Ca' Foscari Venezia (Ca' Foscari University of Venice)	UNIVE	
Università IUAV di Venezia (IUAV University of Venice)	IUAV	
Università degli Studi di Trento (University of Trento)	UNITN	
Libera Università di Bolzano (Free University of Bozen-Bolzano)	UNIBZ	
Università degli Studi di Udine (University of Udine)	UNIUD	
Università degli Studi di Trieste (University of Trieste)	UNITS	
Scuola Internazionale Superiore di Studi Avanzati	SISSA	
Consiglio Nazionale delle Ricerche	CNR	
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	OGS	

iNEST: 13 Affiliati

Autorità di Sistema Portuale Adriatico Orientale
(Port Network Authority of Eastern Adriatic Sea)

CORILA – Consorzio per il coordinamento delle
ricerche inerenti al sistema lagunare di Venezia

Covision Lab

CRESME Ricerche

EURAC Research

Fondazione Bruno Kessler

Fondazione Ca' Foscari

Fondazione Edmund Mach

Fondazione Hub Innovazione Trentino

Friuli Innovazione

Polo Tecnologico Alto Adriatico Andrea Galvani

SMACT

T2i-trasferimento tecnologico e innovazione

PNAEAS

CORILA

COVISION Lab

CRESME

EURAC

FBK

FCF

FEM

HIT

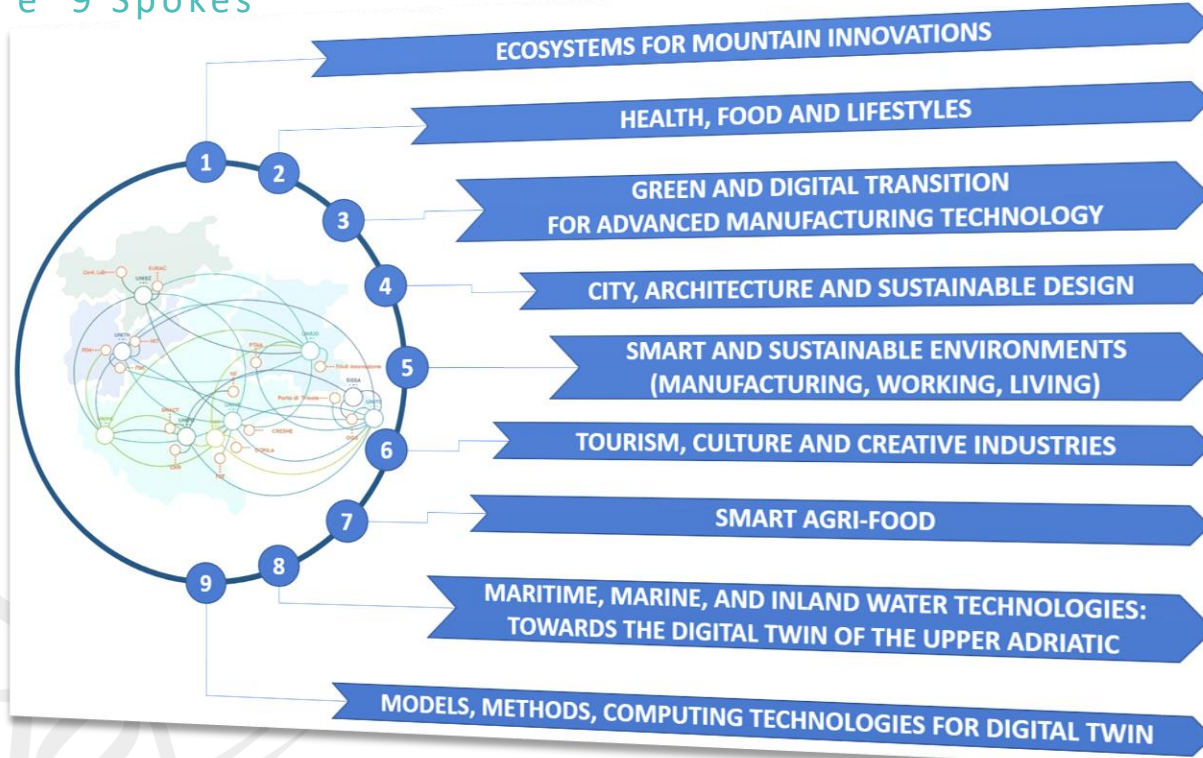
Friuli Innovazione

PTAA

SMACT

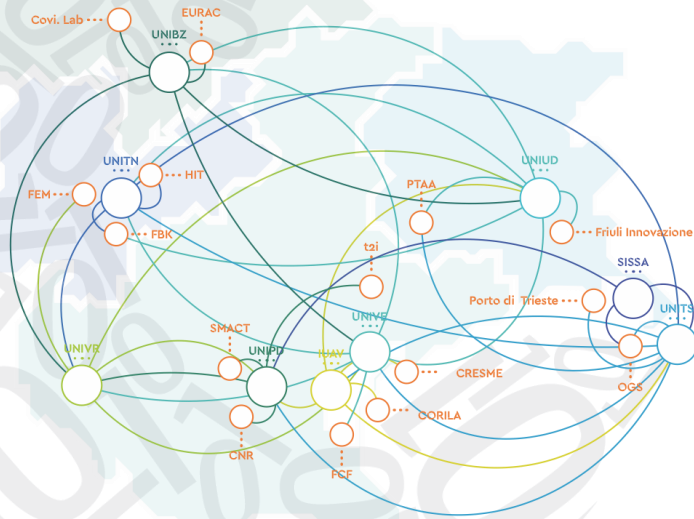
T2i

iNEST: HUB e 9 Spokes



i NEST

iNEST: HUB e 9 Spokes



University of Bolzano
- Ecosystems for mountain innovations



University of Trento
- Health, Food and Lifestyle



University of Udine
- Green and digital transition for advanced manufacturing technology



University IUAV of Venice
- City, Architecture, Sustainable Design



University of Padova
- Smart & sustainable environments (manufacturing, working, living)



Ca' Foscari University of Venice
- Tourism, Cultural and Creative industries



University of Verona
- Smart Agri-Food



University of Trieste
- Maritime, marine and inland water technologies: towards the Digital Twin of the Upper Adriatic



SISSA
- Models, Methods, Computing Technologies for Digital Twins

iNEST: HUB e 9 Spokes

iNEST

SPOKE TOPICS	HOST	PARTNERS	DIGITAL	AGRI FOOD	HEALTH	LIVING	CREATIVE	TOURISM	NATURAL
Smart and Sustainable Environments (manufacturing, working, living)	UNIPD (HUB)	UNIVR, CNR, SMACT, T2I	●		●	●			
Green and Digital transition for advanced manufacturing Technology	UNIUD	UNITN, IUAV, UNIBZ, UNIVE, FBK, Friuli Innovazione, PTAA	●			●			
Smart Agrifood	UNIVR	UNIPD, UNIUD, UNIVE, FEM	●	●					
Health, Food and Lifestyle	UNITN	UNIVR, UNITS, FBK, HIT	●	●	●				
Models, Methods, Computing Technology for digital Twins	SISSA	UNITS, UNPD, OGS	●						●
Tourism, Culture and Creative Industries	UNIVE	UNIVR, UNITN, UNIBZ, FCF	●				●	●	
City, Architecture, Sustainable Design	IUAV	UNIPD, UNIUD, UNITS, CORILA, CRESME	●			●	●		
Maritime, Marine and Inland Water technologies	UNITS	UNIPD, UNITN, UNIVE, IUAV, OGS, PTAA, APAO	●		●				●
Ecosystems for Mountain Innovations	UNIBZ	UNIPD, UNIVR, UNIUD, UNIVE, EURAC, COVISION Lab							



Spoke 1: ECOSYSTEMS FOR MOUNTAIN INNOVATIONS

- **UNIBZ:** Faculty of Science and Technology, Faculty of Computer Science, Faculty of Design and Art, Faculty of Education, Faculty of Economics;
- **EURAC:** Institute for Alpine Environment, Institute for Renewable Energy, Institute for Earth Observation and Institute of Emergency Mountain Medicine.
- **UNIPD:** TESAF/DAFNAE/GEOSCIENZE;
- **UNIVR:** Departments of Biotechnology, Business Administration, Economics, Foreign Languages and Literatures, Human Sciences, Neuroscience, Biomedicine and Movement; **UNIUD:** Dept. of Languages, Literature, Communication, Education and Society (DILL), Polytechnic Department of Engineering and Architecture (DPIA), Departments of Agricultural, Food, Environmental and Animal science (DI4A), Department of Legal Sciences (DISG)
- **UNIVE:** Dept. of Environmental Sciences, Informatics and Statistics; COVISION Lab

RT1

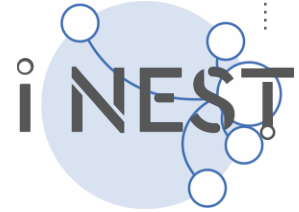
Safety and quality
of life in mountain
Environments

RT2

Resilience of
Mountain production systems and
supply chains

RT3

Decentralization
of mountain
structures and
infrastructures



Spoke 2: HEALTH, FOOD AND LIFESTYLES

- **UNITN:** Departments of Information Engineering and Computer Science (DISI); Cellular, Computational and Integrative Biology (DiCIBIO); Industrial Engineering (DII); Centre BioTech; Centre Agriculture, Food, Environment (C3A);
- **FBK:** Center for Digital Health & Wellbeing Center;
- **UNIVR:** Departments. of Business Administration. Surgical Sciences, Dentistry, Paediatrics, and Gynaecology, Neuroscience, Biomedicine and Movement sciences, Diagnostics and Public Health;
- **UNITS:** Departments of Life Sciences, Environmental Sciences;
- **HIT:** Fondazione Hub Innovazione Trentino.

RT1

Digital Health and Systems for the citizens

RT2

Biotechnologies and Pharmaceutical Technologies

RT3

Devices for Health

RT4

Food and Health



Spoke 3: GREEN AND DIGITAL TRANSITION FOR ADVANCED MANUFACTURING TECHNOLOGY

- **UNIUD:** Departments of Mathematics, Informatics and Physics; Engineering and Architecture; Humanities and Cultural Heritage; Economics and Statistics; Legal Sciences
- **Friuli Innovazione;**
- **UNIBZ:** Faculties of Science and Technology; Computer Science; Design and Art;
- **UNITN:** Departments of Industrial Engineering; Information Engineering and Computer Science; Physics; Civil, Environmental and Mechanical Engineering;
- **UNIVE:** Departments of Environmental Sciences, Informatics and Statistics; Molecular Sciences and Nanosystems; Economics;
- **Polo AA:** Business Units Open Innovation System; Commercial Services Industry 4.0; Start-up and Sustainability; Regional Cluster for Life Sciences; International and European Cooperation;
- **FBK:** Centres for Digital Industry; Sensors and Devices; Cyber-Security; Sustainable Energy
- **IUAV:** Dipartimento di Culture del Progetto.

RT1

Energy

RT2

Smart Manufacturing, Mechatronics and Robotics

RT3

Materials

RT4

Artificial Intelligence and Data Science

RT5

Organizational, economical and legal aspects



Spoke 4: CITY, ARCHITECTURE AND SUSTAINABLE DESIGN

- **IUAV: Department of Architecture and Arts;**
- **UNIPD: Department of General Psychology;**
- **UNIUD: Polytechnic Department of Engineering and Architecture (DPIA);**
- **UNITS: Department Of Engineering and Architecture;**
- **CRESME;**
- **CORILA.**

RT1

Strategic plan for the development of the construction and sustainable design sectors

RT2

Technological solutions for the construction and sustainable design sectors

RT3

Interaction between environments and human beings in the construction and sustainable design sectors



Spoke 5: SMART AND SUSTAINABLE ENVIRONMENTS (MANUFACTURING, WORKING, LIVING)

- **UNIPD:** Departments of Information Engineering (DEI), Industrial Engineering (DII), Management and Engineering (DTG), General Psychology (DPG), Developmental Psychology and Socialisation (DPSS), Philosophy, Sociology, Education and Applied Psychology (FISSPA), Economics and management (DSEA), Physics and Astronomy (DFA), Chemical Sciences (DiSC), Human Inspired Technology Research Center (HIT);
- **UNIVR:** Dept. of Computer Science (DCS);
- **CNR:** Institutes of Electronics, Information Engineering and Telecommunications (IEIIT), Construction Technology (ITC), Atmospheric Sciences and Climate (ISAC/CNR), Geo-Hydrological Protection (IRPI/CNR), Photonics and Nanotechnologies (IFN/CNR).
- **SMACT;**
- **t2i**

RT1

New and Emerging
Technologies for Human Centric
Manufacturing and other industrial
working environments

RT2

Digital Twin in Industries 5.0

RT3

People, organization, and
processes for Industry 5.0

RT4

Personalized Assistive
Technologies and Smart Environments for
Inclusive Living in private and public
spaces



Spoke 6: TOURISM, CULTURE AND CREATIVE INDUSTRIES

- **UNIVE:** Departments of Economics, Management, Environmental Sciences, Informatics and Statistics, Linguistics and comparative cultural studies, Molecular Sciences and Nanosystems, Asian and North African Studies, Humanities, Philosophy and Cultural Heritage;
- **UNIBZ:** Faculties of Science and Technology, Computer Science, Design and Art;
- **UNITN:** Departments Economics and management, Sociology and social research;
- **UNIVR:** Departments of Business Administration, Foreign Languages and Literatures, Cultures and Civilization, Computer Science;
- **Fondazione Università Ca' Foscari (FCF)**

RT1

New Digital Technologies

RT2

Data Analytics

RT3

Sustainable Business Models

RT4

New Narratives and
Communication Strategies

Spoke 7: SMART AGRI-FOOD



- **UNIVR:** Departments. of Biotechnology, Business management, Computer science;
- **FEM:** Center for research and innovation (CRI);
- **UNIPD:** Departments. of Agronomy, Food, Natural resources, Animals and Environment (DAFNAE); Land, Environment, Agriculture and Forestry (TESAF); Comparative Biomedicine and Food Science (BCA); Animal Medicine, Production and Health (MAPS);
- **UNIUD:** Dept. of Agricultural, Food, Environmental and Animal Science (DI4A).
- **UNIVE:** Departments of Management, Molecular sciences and nanosystems, Environmental sciences, informatics and statistics.

RT1

Business models for sustainable agri-food at different levels

RT2

Process/product innovation for sustainable agri-food

RT3

Circular economy

RT4

Logistics, supply chain and vertical coordination

Spoke 8: MARITIME, MARINE, AND INLAND WATER TECHNOLOGIES: TOWARDS THE DIGITAL TWIN OF THE UPPER ADRIATIC



- **UNITS:** Departments of Life Sciences, Mathematics and Geosciences, Engineering and Architecture;
- **OGS:** Section of Oceanography;
- **UNITN:** Departments of Civil, Environmental and Mechanical Engineering, Information Engineering and Computer Science;
- **IUAU:** Department of Architecture and Arts;
- **UNIVE:** Departments of Environmental Sciences, Informatics and Statistics, Molecular Sciences and Nanosystems;
- **UNIPD:** Departments of Comparative Biomedicine and Food Science, Biology, Civil, Environmental and Architectural Engineering, Geoscience, Industrial Engineering;
- **PNAEAS**

RT1

Biology of hydrosphere ecosystems

RT2

Physical-chemical risks and impacts on the hydrosphere

RT3

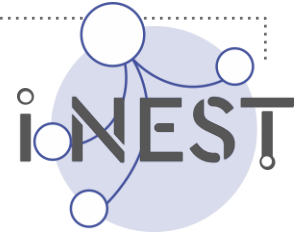
Sustainable waterway mobility

RT4

Land-sea integrated maritime and spatial Planning

RT5

North Adriatic Digital Twin



Spoke 9: MODELS, METHODS, COMPUTING TECHNOLOGIES FOR DIGITAL TWIN

- **SISSA (Mathematics Area), SISSA mathLab,**
- **UNIPD (Mathematics Dept.),**
- **OGS (Oceanographic Dep.),**
- **UNITN (math and geosciences dept.)**

RT1

Mathematical, numerical and data-driven modeling

RT2

Model Order Reduction

RT3

Automatic learning for Digital Twins

RT4

Applications of DT in industry, medicine, Environmental sciences, daily life

iNEST: Attività Cross-cutting

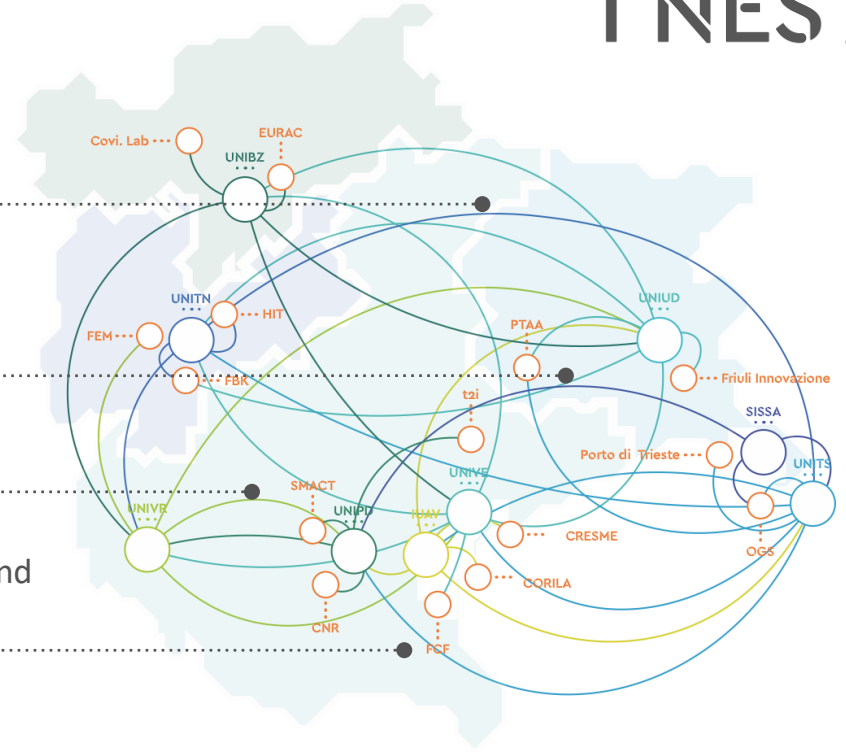
i NEST

Education, from ITS to Lifelong Learning

Creation of a network of joint strategic labs between universities and companies

Citizen engagement initiatives

Support to the generation and the development of start-ups and spin-offs



iNEST Crosscutting: Support to the generation and the development of start-ups and spin-offs

- A decentralized, yet coordinated, **management of the Pre-Acceleration phase**, as a course of action entrusted to the individual Spokes to generate and select innovative ideas to be turned into research start-ups e spin-offs. Decentralized management allows to help the neo-entrepreneurs-to-be (students, PhDs, researchers, etc.), while the coordination allows reaching economics of replication, designing methodologies and technological platforms applicable to all Spokes, starting from the best cases of each university;
- A centralized **management of the Acceleration & Fundraising phases**, as a course of action for the definition of the business model of the research start-ups and spin-offs and the management of the investment rounds, to get those to enter the market and consequently scale up. Centralized management of the phases, along which the new enterprises face the real market (clients and investors), allows reaching economics of scale, using methodologies and technological platforms already developed and tested.

iNEST Crosscutting: Creation of a network of joint strategic laboratories between universities and companies

- In order to develop a close relationship with the territory and the enterprises, universities and research institutions started promoting a different model of collaboration between universities and companies centered on **lab villages**.
- A lab village is a hub of joint laboratories for advanced research and development, where university researchers, post-docs, master and PhD students, and R&D company employees work together, in a continuative and systematic way, by sharing know-how and research structures with the aim of contributing to the development of the territory.

iNEST Crosscutting: Citizen engagement initiatives

- The Nord-Est is working -with the iNEST project– to promote a sustainable, fair, innovative and more resilient macroregional area. For doing this, we need a strong research, education and innovation foundation, grounded on scientific excellence and competitive innovation policies for citizens and businesses. Our future prosperity and well-being will largely depend on it. In this view, a more active citizens and societal role and engagement is absolutely strategic.
- The **engagement of citizens, local community and civil society** is at the core of the new ERA as well as of all recent communications and strategies of the European Commission. The society must be directly involved, not only at a level of information and communication but also in a phase of planning and realization; citizens are called to co-design, co-implement and co-evaluate all programs. Many are in fact the benefits from citizens involvement, mainly to raise awareness of the importance and impact of research and innovation in people's daily lives and to increase trust in science. The covid experience has taught us the importance of communicating in a clever and inclusive way.

iNEST Crosscutting: Education, from ITS to Lifelong Learning



- Developing the knowledge, skills, attitudes and values that enable people to contribute to and benefit from an inclusive and sustainable future is a process based on two pillars:
- **Education**, to equip students with the skills they need to become active, responsible and engaged citizens, also in view of rapid economic, environmental and social changes, with jobs that have not yet been created, technologies that have not yet been invented, to solve social problems that have not yet been anticipated (OECD, The Future of Education and Skills, 2018).
- **Lifelong Learning**, which is a strategic instrument for implementing innovation into society, with special attention paid to SMEs. Empowering workers to up- and reskill throughout their entire lives is the key-challenge for next years, to increase permeability between different education pathways/systems and improve flexibility.

iNEST: Azioni e Prospettive

- **9 Spokes**, focalizzati su linee di ricerca e innovazione verticali,
- che sviluppano complessivamente **36 specifici Research Topics**,
- **4 attività di carattere trasversale**, che coinvolgono in varia misura tutti gli Spokes,
- **Bandi a cascata (2023-2024)** con una quota finanziata di oltre 40 milioni di euro (e quindi con un valore circa doppio, considerando il cofinanziamento richiesto alle aziende),
- che corrisponderanno ad oltre **100 progetti di ricerca e innovazione**,
- Coinvolgimento di oltre **250 ricercatori ed esperti di trasferimento tecnologico già strutturati** presso Università, Enti Pubblici di Ricerca, Centri di Competenza ed Enti di Trasferimento Tecnologico
- Reclutamento di quasi un **centinaio tra ricercatori a tempo determinato e tecnologi di ricerca**, e di un **numero elevatissimo di dottorandi, assegnisti, contrattisti e borsisti di ricerca**.
- Settembre-dicembre 2022: azioni organizzative e pianificazione attività
- 2023-2025: piena operatività e sviluppo del programma
- **Budget complessivo: 110 milioni di euro**



Padova, 7 dicembre 2022

iNEST References & Contacts

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Presidente Consorzio iNEST

Presidente Scuola di Ingegneria

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**Finanziato
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Ecosistemi dell'innovazione

PNRR - Missione 4: Istruzione e Ricerca
Componente 2: dalla ricerca all'impresa

Investimento 1.5, finanziato dall'unione Europea - NextGenerationEU
Progetto: ECS_00000043 (Area tematica: Digital, Industry, Aerospace)

Avviso MUR n. 3277 (30/12/2021)

Decreto Direttoriale di concessione del finanziamento n. 1058 (23/06/2022)

Atto d'Obbligo e di Accettazione firmato in data 01/08/2022

Consorzio iNEST

Sede: c/o Area Ricerca e rapporti con le imprese

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