



PNO CONSULTANTS  
INNOVATION. GRANTED!



# TENDENZE DELL'INNOVAZIONE NELL'INDUSTRIA METALMECCANICA, AGROALIMENTARE E TESSILE

UN APPROCCIO GUIDATO DAI DATI PER IL NETWORKING E LA  
REALIZZAZIONE DI PROGETTI EUROPEI DI SUCCESSO

WEBINAR: 15/06/2021



LA TUA SFIDA | LA NOSTRA SOLUZIONE

# CONTESTO E OBIETTIVI

## ID Card del WEBINAR

**OBIETTIVO:** IDENTIFICAZIONE di tendenze dell'innovazione e iniziative di progetto di successo

**TOPIC:** MANUFACTURING, AGROALIMENTARE E TESSILE

**QUANDO:** 15 Giugno 2021

## APPROCCIO

Analisi guidata dai dati e panoramica degli obiettivi e delle tendenze dell'innovazione con un focus sulle industrie specific ate per :

1. Individuare gli **obiettivi delle principali politiche europee** relative ai temi selezionati
2. Evidenziare i **progetti vincenti** e portare **alcuni casi d'uso**
3. Identificazione di **alcuni key-players**
4. Illustrare **come costruire un'iniziativa di successo** partendo da un corretto posizionamento basato sui dati
5. **Esaminare potenziali idee di progetto** definendo un buon concetto di progetto

# PROGRAMMA DEL WEBINAR

1. INTRODUZIONE E OBIETTIVI DEL WEBINAR - IL PANORAMA DEI FINANZIAMENTI
2. UN APPROCCIO SISTEMATICO PER MIGLIORARE FORTEMENTE I TASSI DI SUCCESSO NEI PROGETTI DI R&S  
**Relatore Principale:** Dr. Ron Weerdmeester (CiaoTech – PNO Consultants)
3. UNA PANORAMICA DELLE TENDENZE DELL'INNOVAZIONE NELL'INDUSTRIA PESANTE/METALMECCANICA  
**Relatore Principale:** Dr. Marco Molica Colella (CiaoTech – PNO Consultants)
4. UNA PANORAMICA DELLE TENDENZE DELL'INNOVAZIONE NELL'INDUSTRIA AGROALIMENTARE E TESSILE  
**Relatore Principale:** Dr. Patrizia Circelli (CiaoTech – PNO Consultants)
5. Q&A e Dibattito



# CONTESTO E OBIETTIVI

## DI COSA PARLEREMO

- Cosa è innovativo e può essere finanziato nell'industria pesante e tessile
- Strutturare e organizzare il processo dal posizionamento strategico, alla generazione dell'idea di innovazione attraverso la selezione dell'idea, il networking, lo sviluppo del progetto e della proposta e il reperimento dei finanziamenti

## LOGICA DELL'APPROCCIO DATA-DRIVEN

- Incorporato nel processo di innovazione (stage-gate) della TUA organizzazione
- Concentrato sul posizionamento strategico dell'organizzazione verso le visioni europee, le agende strategiche di ricerca e le tabelle di marcia
- A supporto della preparazione tempestiva di partenariati costruiti su network esistenti e casi di successo
- Che sfrutti le opportunità di Open Innovation per cercare collaborazioni esterne dove c'è valore aggiunto; collegarsi ai leader del settore!
- Utilizzare le opportunità di finanziamento pubblico disponibili per cofinanziare progetti R&S





# IL TEAM DI ESPERTI



**Dr. Patrizia Circelli (PhD) - Team Manager & Cross-border sector team leader per il settore agroalimentare e della bioeconomia**

Laurea in biotecnologie genomiche presso l'Università di Roma "La Sapienza". Dottorato di ricerca in biotecnologie vegetali presso l'Università di Viterbo "La Tuscia". Più di 10 anni di esperienza nella progettazione e nel coordinamento di Progetti UE di Ricerca e Innovazione (es. LIFE, H2020, Fondo Innovazione, EIC, ERC). Esperta Senior per Horizon Results Booster della CE)



**Dr. Marco Molica Colella (PhD) - Team Manager, trasporto pulito energia e ingegneria**

15 anni in R&S: MSc in Ingegneria Meccanica e PhD in Ingegneria Aeronautica all'Università Roma Tre. Esperto in Open Innovation e Finance (Luiss Business School, SAA School of Management). Senior Innovation Consultant per la definizione e il coordinamento di progetti di R&S e di grandi infrastrutture (es. LIFE, H2020, Innovation Fund, CEF, EIC, ERC). Esperto senior per Horizon Results Booster della CE)



**Dr. Ron Weerdmeester – Team Manager & Responsabile dei servizi di innovazione strategica**

> 25 anni in Innovazione e Finanza (FP 3,4,5,6, HORIZON 2020, LIFE) Diritto europeo - Rijksuniversiteit Groningen. Laurea in "Sistemi informativi nelle organizzazioni", Boston University. Formazione su innovazione e finanziamento con IHF e IDP, visione, tabelle di marcia e agenda di ricerca per l'industria di processo UE, acqua, tessile, bioeconomia, economia circolare. Nuove metodologie di Innovation Intelligence basate sui dati. Esperto Senior per Horizon Results Booster della CE



**Dr. Anna Franciosini (PhD) – Grant and Innovation Consultant.**

Dottore di ricerca in Genetica e Biologia Molecolare e Master e Laurea in Biotecnologie Genomiche presso l'Università "Sapienza" di Roma. 10 anni di esperienza nella ricerca in biotecnologie e biologia molecolare, scrittura e partecipazione a progetti. Dal 2016 coinvolta in progetti finanziati dall'UE, principalmente del settore BBI (Bio-Based Industry) e SPIRE (Sustainable Process Industry through Resource and Energy Efficiency). Esperta per Horizon Results Booster della CE



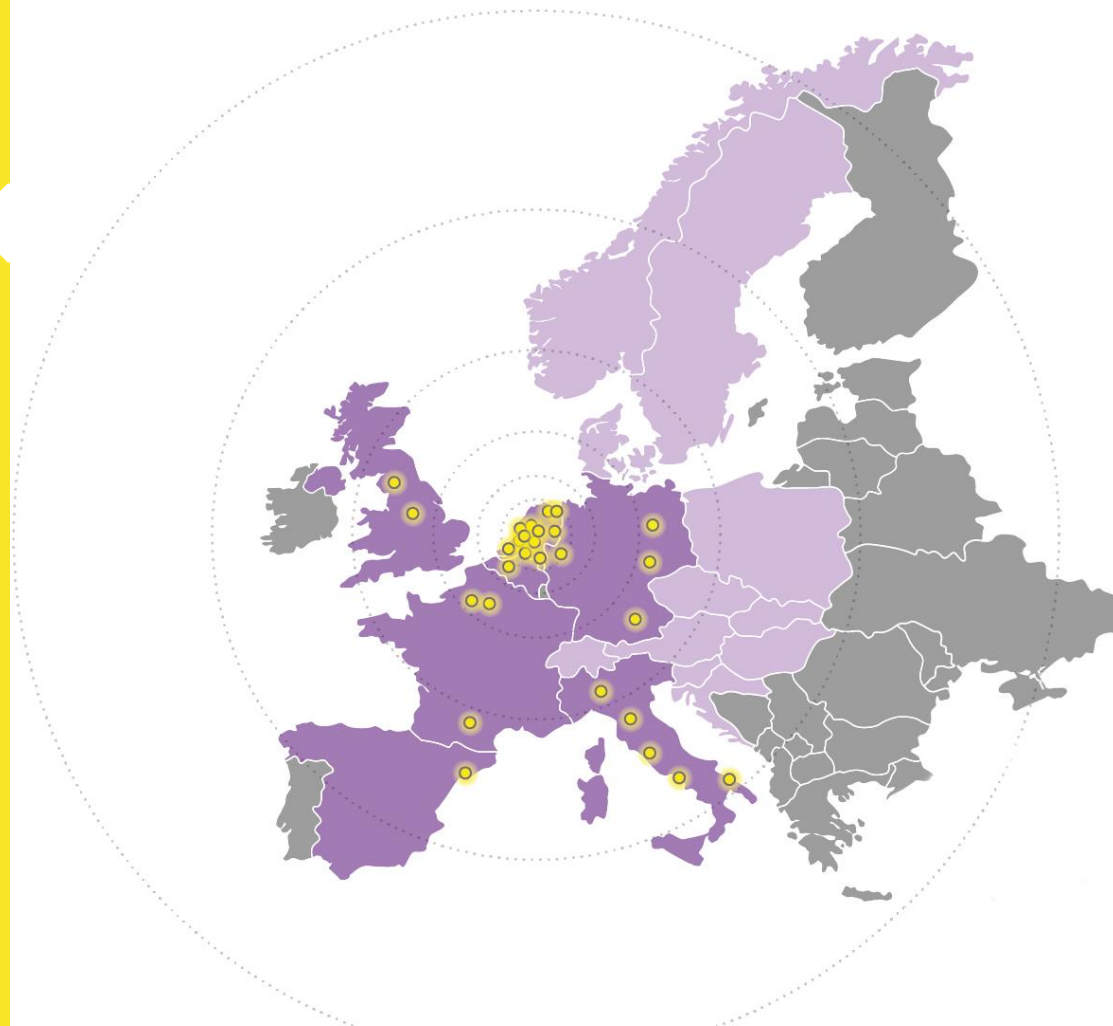
**Dr. Vittoria Novelli (Ph.D) – Grant and Innovation Consultant**

PhD in Chimica dei Materiali presso l'Università UPJV di Amiens (FR) e un MSc in Chimica Inorganica e Fisica ottenuto nel 2013 presso l'Università di Roma La Sapienza (IT). Ha lavorato come ricercatrice in un dipartimento R&D di una PMI a Manchester (UK) e presso l'Università di Torvergata di Roma, partecipando a diversi progetti internazionali nell'ambito di Horizon 2020 e della flagship sul Graphene. Dal 2019 Consulente per l'innovazione in PNO. Esperta per Horizon Results Booster della CE

# CHI SIAMO

## PNO CONSULTANTS

Ogni innovazione inizia con una buona idea e tanta passione. Questi sono tratti che riconosciamo, perché abbiamo iniziato allo stesso modo. Dalle nostre radici di start-up, siamo cresciuti fino a diventare **leader del mercato europeo nei servizi di finanziamento e innovazione con uffici in 7 paesi europei**. La nostra azienda è collegata a una rete globale di partner: multinazionali, start-up, RTO e università, nonché organizzazioni di settore e pubbliche. Da questa rete unica, lavoriamo per promuovere le connessioni e stimolare, realizzare e finanziare l'innovazione in un panorama sempre più veloce e complesso, cambiando il mondo in meglio.



## KEY FACTS



30+

Years of activity



7

Countries



6000+

Funding applications filed  
per year



4000+

Research clients  
and partners



€ 1 Bn

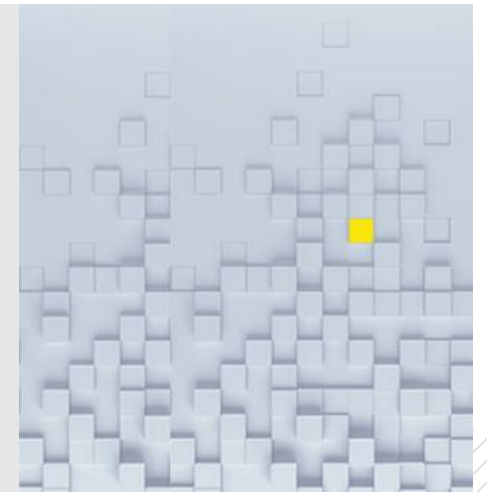
Total annual  
funding won

# IL NOSTRO FOCUS & COMPETENZE

Il Gruppo PNO è specializzato in consulenza R&S, proposte di finanziamento e gestione dell'innovazione, fornendo servizi di supporto ad organizzazioni private e pubbliche nel perseguimento di contributi e incentivi per i loro investimenti e progetti di innovazione. PNO è un gruppo europeo composto da un pool di oltre **400 professionisti** tra cui scienziati, ingegneri, consulenti, presenza a Bruxelles per «policy advise», nonché esperti finanziari e legali, con una consolidata esperienza in proposte e processi di finanziamento. PNO supporta oltre **4.000 clienti e partner in tutta Europa**, sviluppando **ogni anno oltre 175 consorzi europei e proposte di finanziamento CE**, nonché **6.000 domande di sovvenzione nazionali / regionali**, promuovendo o gestendo la loro implementazione di successo in molti domini tecnologici. Fondata nel 1985, PNO è una società ad alta intensità di conoscenza. La nostra crescita è spiegata da una combinazione unica di servizi, basata su una profonda conoscenza delle regole, delle strategie di finanziamento degli investimenti e dell'innovazione, conoscenze aggiornate, vaste reti di stakeholder e oltre 30 anni di esperienza pratica con oltre **500 programmi di finanziamento** nella maggior parte dei paesi dell'UE. PNO ha anche una propria boutique di Corporate Finance.

## COMPETENZE

- R&D Advisory & Project Development
- Definizione e scrittura di proposte di finanziamento con success rate superiori
- Consulenza inclusive di strumenti IT
- Management & Coordinazione di progetti
- Ottimizzazione di Processo e massimizzazione del RoI della ricerca
- Supporto basato su una conoscenza interna delle politiche di finanziamento
- Corporate Finance



# TRACK RECORD

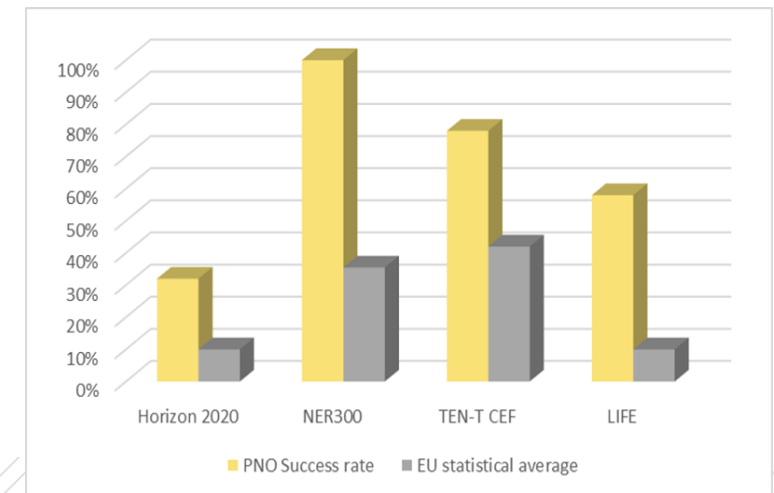
## COMPETENZA EUROPEA SENZA PARI

- 34+ anni di esperienza nei finanziamenti pubblici
- oltre 175 richieste di finanziamento dell'UE all'anno
- Un tasso di successo significativamente superiore alla media UE (vedi tabella)
- Partecipazione a circa 99 progetti finanziati dalla CE come leader o partner del consorzio.
- Più dipendenti PNO agiscono regolarmente come valutatori per i programmi di finanziamento della CE
- PNO è stato incaricato dalla Commissione Europea di analizzare e valutare il potenziale di valorizzazione economica dei progetti finanziati dalla CE.

\*\*\* NER300 è il predecessore dell'Innovation Fund per i grandi progetti Cleantech della CE

\*\*\* Il Success rate per l' EIC Accelerator /SME-Instrument è ca. 20%

\*\*\* Il Success Rate a livello di bandi nazionali è ca. 80%



# ALCUNI TRA I NOSTRI CLIENTI





# TESTIMONIANZE DI GRANDI CLIENTI EUROPEI



"PNO consultants support has been fundamental in shaping and co-developing our successful CEF Energy application for the Antwerp Liquid CO2 export terminal studies proposal. The Antwerp@C consortium, composed of Port of Antwerp, Air Liquide, Fluxys, Total, BASF, Borealis, ExxonMobil and INEOS is currently investigating the technical and economic feasibility of building CO2 infrastructure in the port of Antwerp. With the project the partners aim to keep CO2 out of the atmosphere and as such to make a significant contribution towards the climate objectives, thanks to applications for capturing and utilizing or storing CO2, all within a relatively short time span and at reasonable costs. As part of this, the achievement of the EU funding for the CEF application is an important milestone towards our ambitions to reduce the CO2 emissions within the port (18.65 million tons of greenhouse gas emissions in 2017) potentially by half between now and 2030."

"With their constant high-level advice, hands-on approach and professional support in all aspects related to the application management and submission, PNO Consultants helped us to prepare a top-quality application that was very well received by the CEF evaluators, resulting very high in the final ranking."

Hanna Van Kraaij

Funding Desk Manager, Port of Antwerp  
Lead WG Funding, Antwerp@C

"PNO Consultants have been instrumental in shaping and co-developing our CEF proposal. By bringing in their experience and insights from previous projects, we have jointly managed to prepare a proposal that has not only been successful in the CEF tender but that will also help us, and our consortium partners, to achieve our goals in this specific area of alternative fuels for road transport."

Henk de Jong

Project Leader CONNECT2LNG, Unilever

"Sustainable chemistry begins by assuring our own footprint is light, but it only reaches its full potential when it delivers solutions to the problems faced by society. The Life grant meant an extra incentive to carry out the project. Moreover, this European grant confirms our position as leader in the European market"

David Kepler

DOW's Chief Sustainability Officer

"PNO consultants have adequate experience and up to date and relevant knowledge related to Horizon 2020 and the way to optimize success of grant applications. They also understand the policy context and SINTEF's strategy and innovation objectives. This has resulted in a highly satisfactory collaboration between SINTEF and PNO."

Stian Nygaard

Vice President EU Research and Innovation at SINTEF

# **A systematic approach to strongly increase the success rates in R&D projects**



## NUMEROUS PROGRAMMES OFFERS VERY ATTRACTIVE FUNDING OPPORTUNITIES

- A new range of challenging funding programmes are being launched running from 2021 to 2027.
- Offering **50% to 100% funding for all kinds of RD&I projects** from all type of organisations,
- The programmes boosts large **budgets exceeding several hundreds of billion €**, which will be used to fund:



### Science & Technology:

Fuel EU's scientific and technological excellence and the strengthen the European Research Area.



### Society:

Tackle policy priorities, including green and digital transitions and Sustainable Development Goals, including large scale CAPEX investments



### Economy:

Boost Europe's innovation uptake, competitiveness and jobs

## BUT THE FUNDING LANDSCAPE IS EXTREMELY COMPETITIVE

A mid term evaluation showed an average success rate of e.g. 11.94% for grant applications of the recent Horizon 2020 programme for RD&I.

→ Only organisations targeting funding programmes with a proven systematic approach will be structurally successful.

# OUR APPROACH FOR FUNDING SUCCESS



## A SYSTEMATIC APPROACH FOR STRONGLY IMPROVED RESULTS

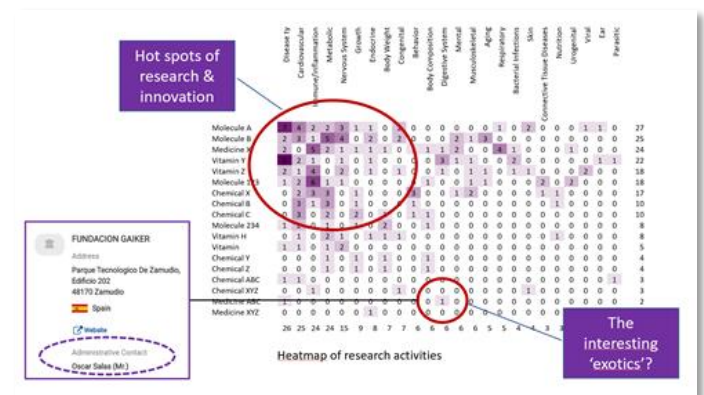
PNO offers a unique and proven approach that structurally increases your chances to participate in successful Funding programmes.

Our approach builds on **30+ years of hands-on funding experience**, proprietary **big-data driven innovation intelligence tools** and a **vast network of top innovators**. We use these assets to systematically optimize all factors key to success, resulting in projects with a proven win-rate 3 to 4 times above the market average. We do this by:

- Analyzing your business ambitions, technology interests and R&D projects and making an initial match with the most value adding call-for-proposals.
- Performing a technology trend and state-of-the art analysis, plus an assessment of relevant previously funded projects and call related policy objectives to optimize your projects' scoping and positioning. This combined with the execution of an innovation ecosystem mapping to identify, engage and commit the strongest possible consortium partners and/or to identify and join relevant consortia in build us stage.
- Link to "top innovators" projects in build up stage to improve chances of success and connect to relevant innovations unknown by client prior PNO support
- Making a final project/call selection and prepare, draft and submit one or more high quality funding applications with an optimized chance of a grant award decision.



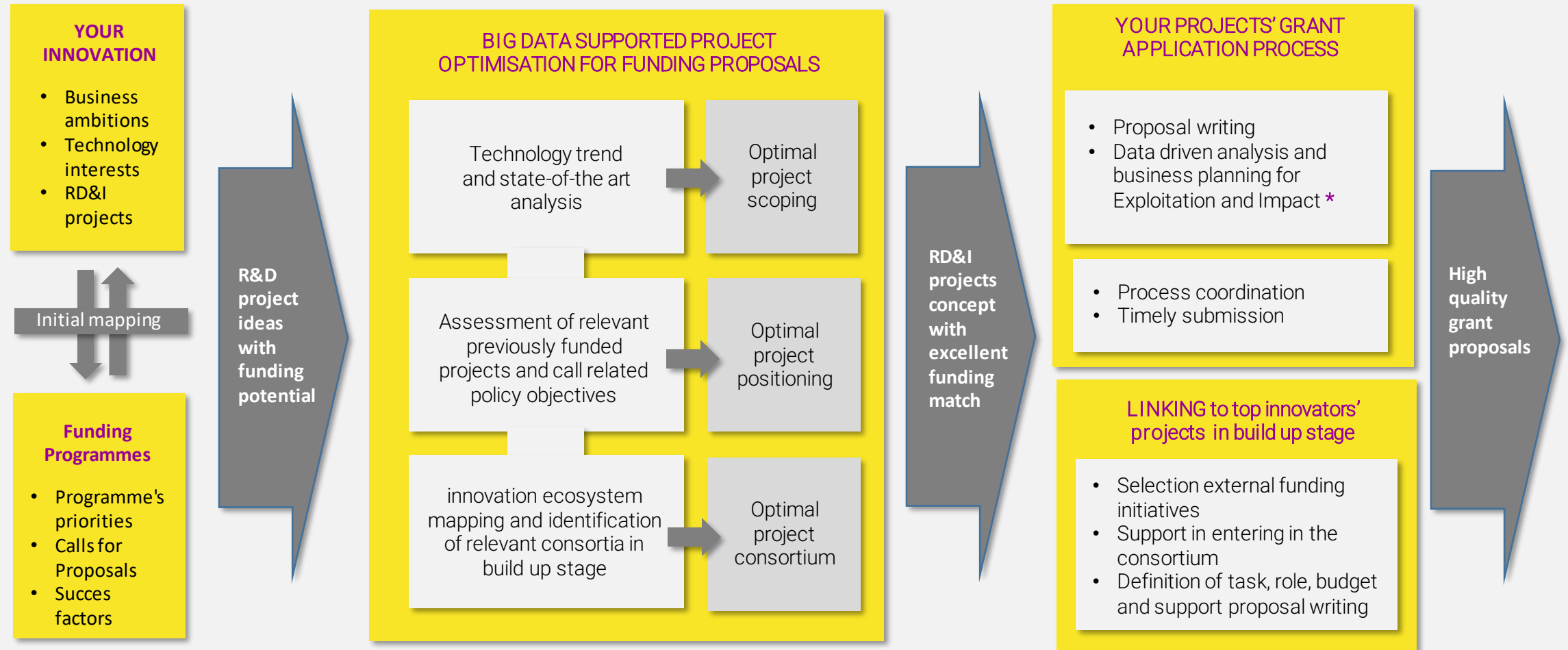
Data driven partner identification



Big data powered technology trend analysis

# OUR APPROACH FOR SUCCESSFUL FUNDING PROPOSALS

## OUR INTEGRATED SYSTEMATIC APPROACH FOR STRONGLY IMPROVED FUNDING SUCCESS RATES





**Leveraging networks and data-driven innovation:** Who is doing what in the European innovation eco-system?

# ► Leverage networks: Build a Collaboration Ecosystem

## Learn from others.

There's a tremendous amount of knowledge out there, supported by reference material and case studies. Build yourself a network to understand who has done it before, learn from their mistakes, and – if possible – work collaboratively and share ideas.

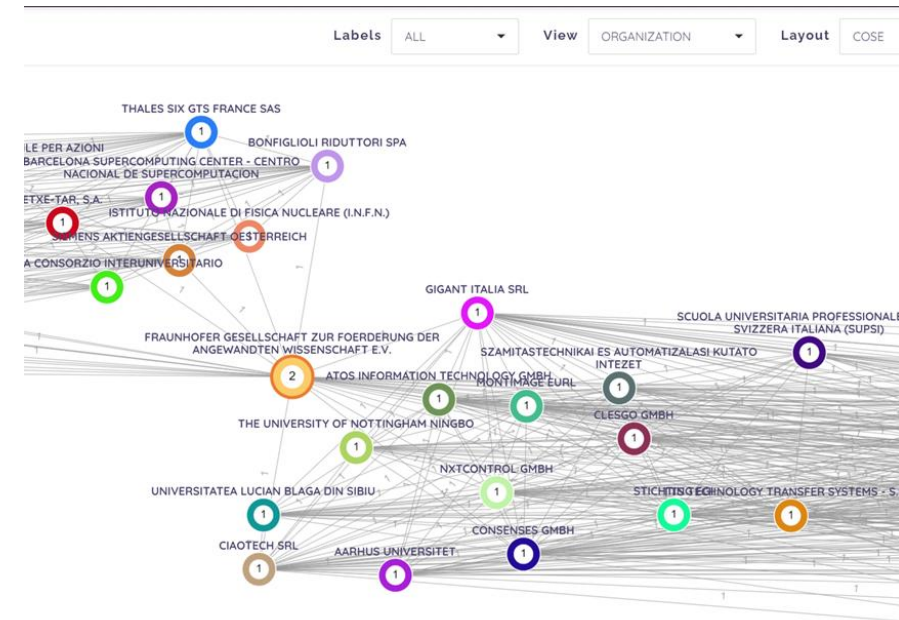
## Innovate through strategic partnerships.

You don't need to possess all the skills, and you can focus on your core competencies instead of trying to learn everything from scratch. Benefits are generated for all the businesses involved. It's almost as if you are operating as an ecosystem, an environment that is beneficial for everyone.

## Select the right partners.

An innovative technology partner can help bring the agility your business needs, it can help prove the value of something quicker, can suggest alternative ways of working, can support new funding models and can even help share risk. All these factors are swiftly becoming business-critical.

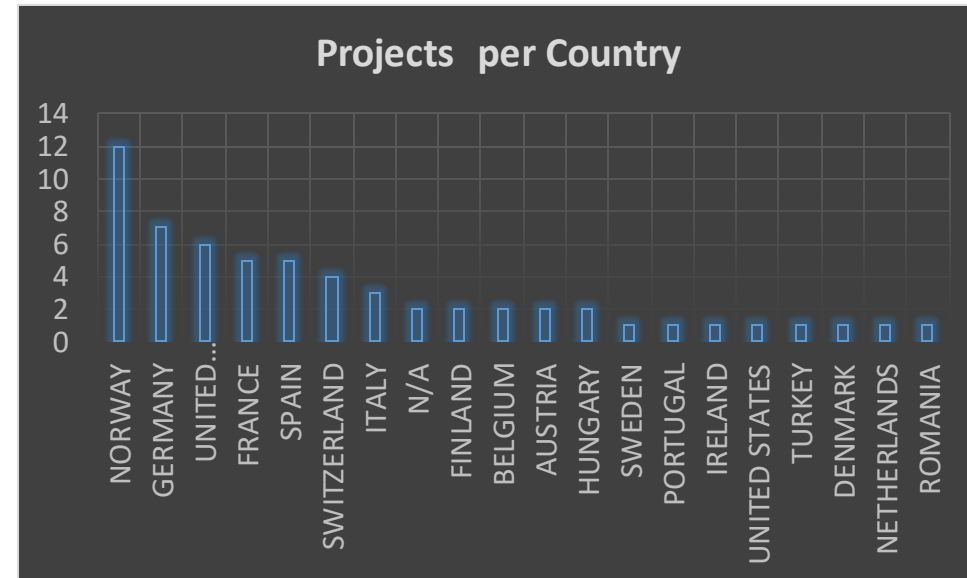
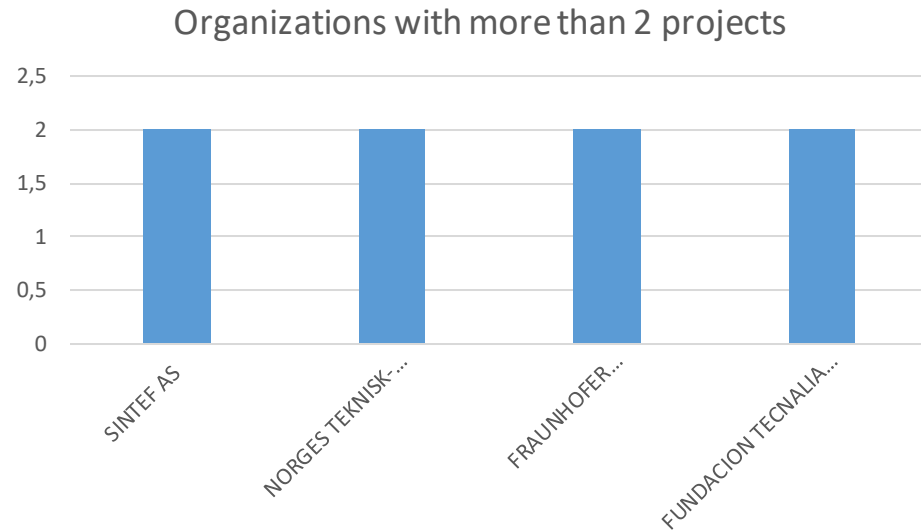
Map your innovation eco-system:  
example on Digital Twins



***“Up to 30% of all expenditure in R&D is wasted on redeveloping existing inventions”***

## ► Digital innovation in machinery – Digital Twins

There are **> 89 projects on manufacturing and digital twins**. Norway is the most active country, with SINTEF one of the most active research centers:



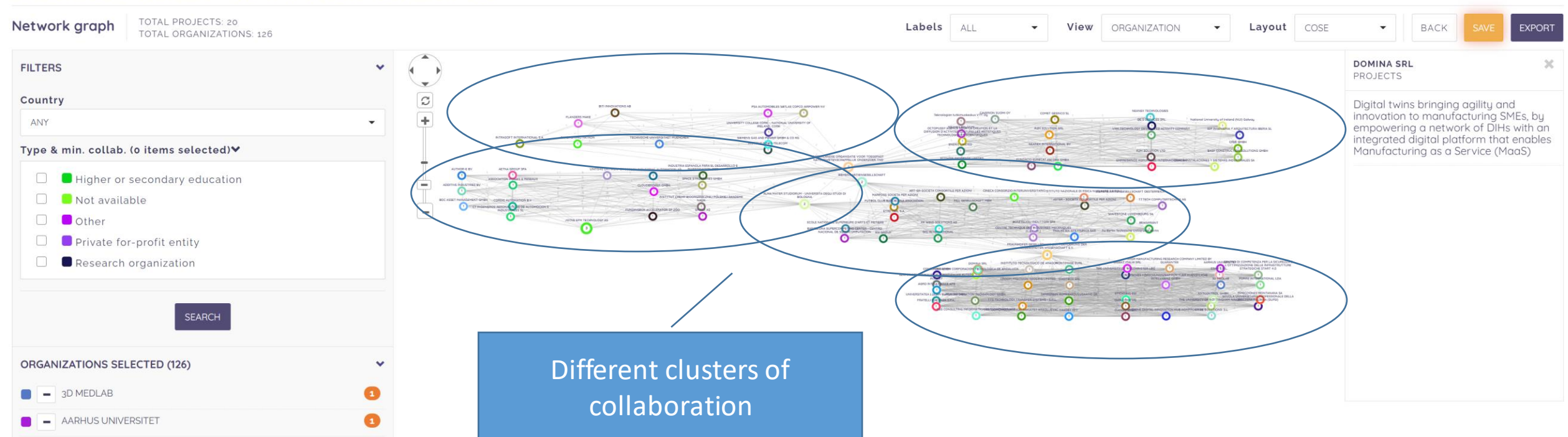
**Example of interesting project: Umbra Reality Capture (Finland):** Entire world will be modelled as a three-dimensional digital twin. First step is to 3D scan the world into digital model through laser scanning and photographic 3D reconstruction. In this project we research methods for turning the scanned data into an efficient cloud-based 3D model and database. Machine learning methods are researched for improving the quality of the scanned data.



# ► Digital Twins & Manufacturing

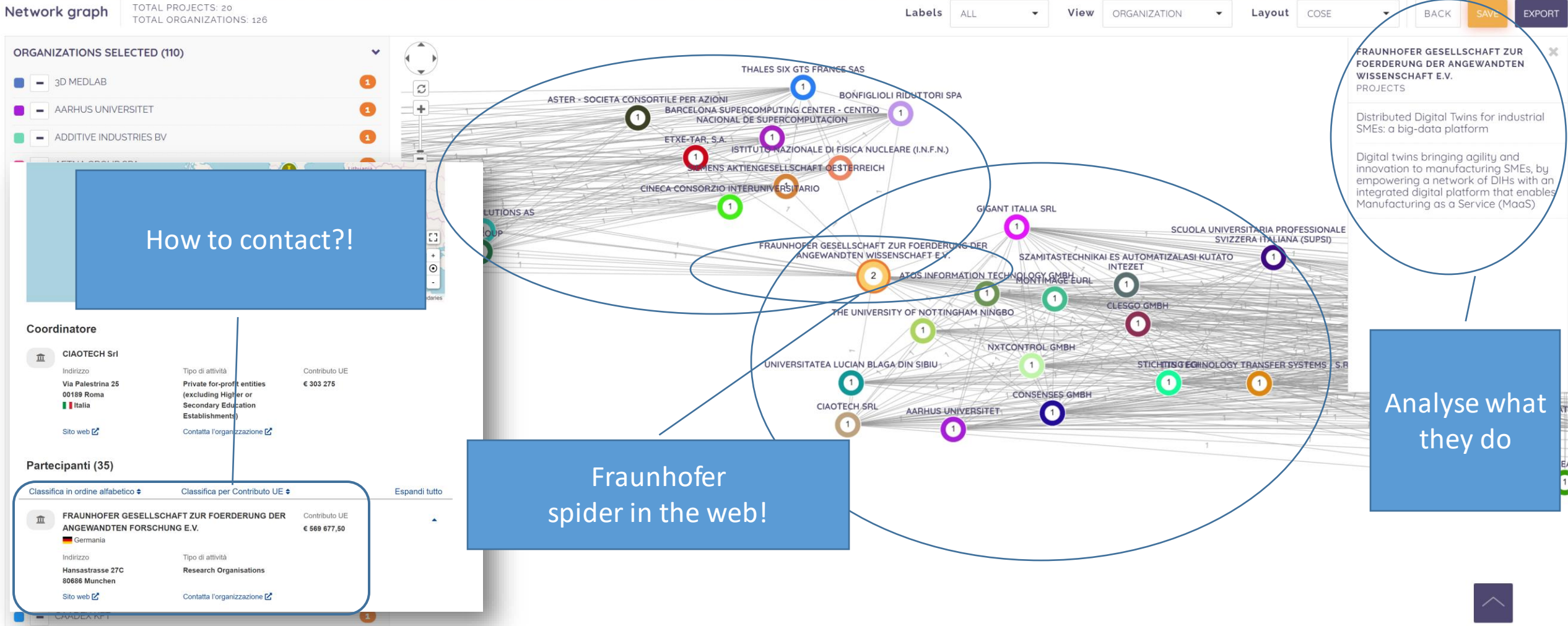
**Digital Twins/Digital Process Development/Plant Engineering:** Developing digital twins for digital engineering and plant operation management in an integrated way along the whole life cycle of a plant, covering product and process development, plant engineering, procurement, plant construction, commissioning, later operation, as well as plant flexibility, extensions and reuse for next generation and new products;

## DIGITAL TWINS AND MANUFACTURING





# ► Digital Twins & Manufacturing



# ► Digital Twins & Manufacturing

**Much more inspiration: 89 projects with 126 unique European organisations**

**Multiple topics to investigate further e.g.**

- Design theories and methods
- Artificial intelligence
- Cryptography
- Instruments, sensors and detectors
- Optical technologies for production
- etc

The screenshot displays the wheesbee platform interface. At the top, there's a navigation bar with icons for ROOMS, DOCUMENTS, MY FAVOURITES, and MY QUERY. Below this is a dark header with various icons representing different project categories. The main content area shows search results for the query "digital twin" and manufacturing. On the left, there's a sidebar with filters for FUNDING COUNTRY and SUBJECTS. The FUNDING COUNTRY list includes Europe (27), United Kingdom (20), Norway (15), United States (11), Germany (8), Belgium (4), Finland (4), Switzerland (1), and The Netherlands (1). The SUBJECTS list includes Services for the 21st Century (3), Manufacturing (3), Design theories and methods (2), Manufacturing processes (2), Other mechanical and manufacturing engineering (2), methods and technologies (2), Artificial intelligence not elsewhere classified (1), Complete system electric vehicle (with focus on vehicle electronics and energy management, vehicle concepts and manufacturing processes) (1), Computer theory (1), Control systems (1), Cryptography (1), and Economics (1). The main search results area shows two project entries: "Change2Twin - Create and Harvest Offerings to support Manufacturing SMEs to become Digital Twin Champions" and "High Volume Composites Manufacturing Cell with Digital Twinning Capability". Both projects are listed with their start dates, funding countries, and status. A red dashed circle highlights the "Change2Twin" project entry.

**FUNDING COUNTRY**

- Europe 27
- United Kingdom 20
- Norway 15
- United States 11
- Germany 8
- Belgium 4
- Finland 4
- Switzerland 1
- The Netherlands 1

**SUBJECTS**

- Services for the 21st Century 3
- Manufacturing 3
- Design theories and methods 2
- Manufacturing processes 2
- Other mechanical and manufacturing engineering 2
- methods and technologies 2
- Artificial intelligence not elsewhere classified 1
- Complete system electric vehicle (with focus on vehicle electronics and energy management, vehicle concepts and manufacturing processes) 1
- Computer theory 1
- Control systems 1
- Cryptography 1
- Economics 1

**COORDINATORS**

- JSTNE EPM TECHNOLOGY AS 1
- TEXAS RESEARCH INSTITUTE, AUSTIN, INC. 1
- SINTEF AS 2
- NORGES TEKNISK-NATURVITENSKAPELIGE 2

**Search Results:**

Search query: "digital twin" and manufacturing

Page 1 on 5  
Total Matches: 89

**Change2Twin - Create and Harvest Offerings to support Manufacturing SMEs to become Digital Twin Champions**

Start date: 01-06-2020 | Funding country: Europe | Active | Saved in 1 room

The main ambition of Change2Twin is to ensure that 100% of manufacturing companies in Europe have access to 100% of technologies needed to deploy a digital twin. Change2Twin will adopt the best in Europe have access to 100% of technologies needed to deploy a digital twin. Specifically, we will focus on three sub-objectives: - Developing and providing a truly end-to-end service to the manufacturing companies - A Pan-European marketplace populated with the state-of-the-art service providers that create coverage for end-to-end Digital Twinning solutions - A growing network of DITs that have adopted

**High Volume Composites Manufacturing Cell with Digital Twinning Capability**

Start date: 01-09-2019 | Funding country: United Kingdom | Active | Saved in 1 room

Composites Manufacturing Cell with Digital Twinning Capability (HV-COMMAND). The cell features four components and is configured to facilitate research into each stage of the composite compression of the manufacturing process - a digital twin capturing the effect of material and process variabilities during forming. This will facilitate future process developments, permitting high-risk feasibility studies

GKN and McLaren. This High-Volume Composites Manufacturing Cell with Digital Twinning Capability (HV-COMMAND) will contribute to the development of a range of composites manufacturing disciplines

**Change2Twin - Digital twins bringing agility and innovation to manufacturing SMEs, by empowering a network of DITs with an integrated digital platform that enables Manufacturing as a Service (MaaS)**

Start date: 01-07-2020 | Funding country: Europe | Active | Saved in 1 room

of extending the CloudFacturing solution with an augmented digital twin concept called "Digital Product Brain" (DPB) and a smart business model called "Manufacturing as a Service" (MaaS). By having access to AI Technology, leverage edge-, cloud- and HPC-based modelling, simulation, optimisation, analytics, and machine learning tools and augment the concept of digital twin with a memorizing capacity that records according to individual conditions. The availability of industrial product capacity will facilitate the implementation of MaaS, which will allow manufacturing SMEs to access advanced manufacturing facilities

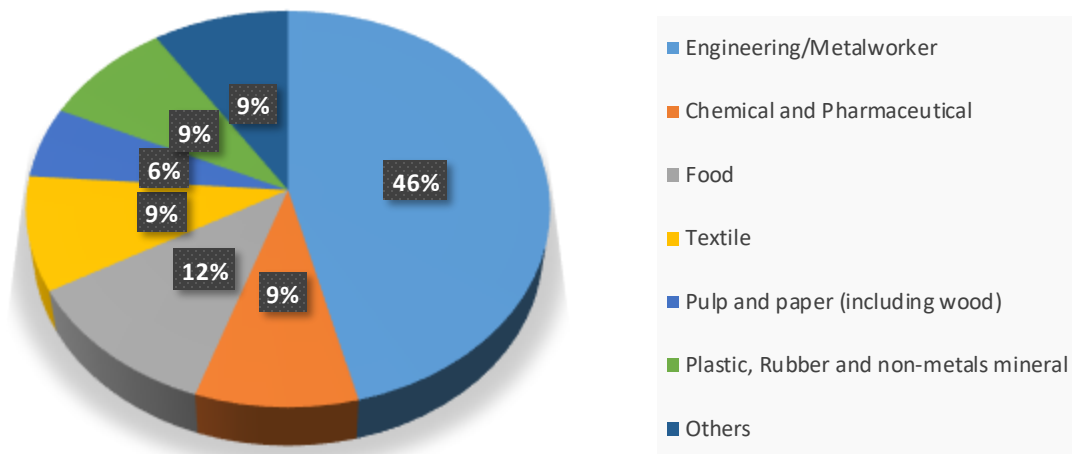
# The EU metalworking industry

Present and future of the metalworking sectors



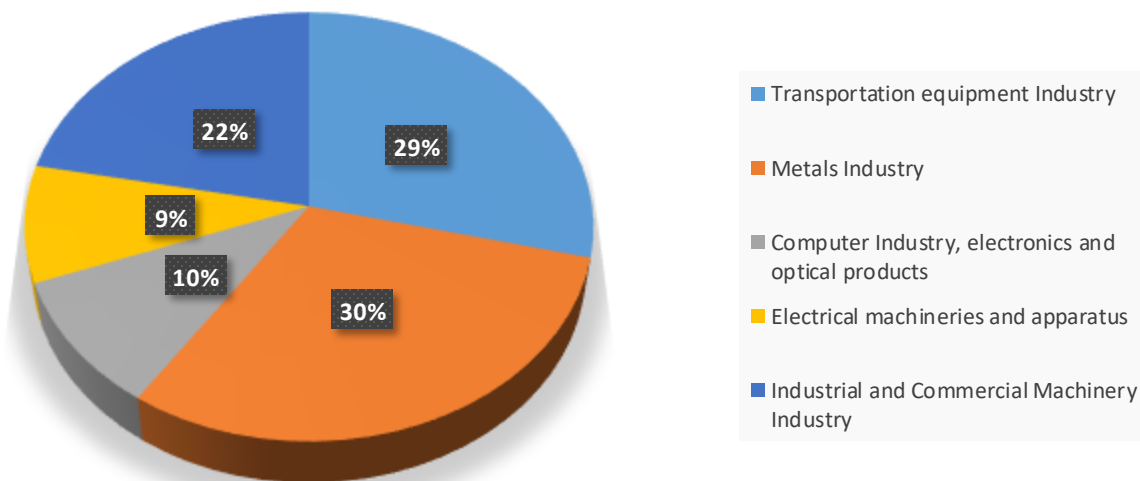
# ► The metalworking sectors in the manufacturing industry

## ADDED value of the Metalworking sectors in the manufacturing industry (2019)



The Metalworking Industry represent the 46% of added value with respect to the totality of the Manufacturing Industry Sectors

## EU-28 Sectoral composition of the Metalworking Industry (2020)



### The Metalworking Industry main sectors:

- Transportation equipment Industry
- Metals Industry (Ferrous materials and Steel)
- Computer Industry, electronics and optical products
- Electrical machineries and apparatus
- Industrial and Commercial Machinery Industry

# ► European strategies for the metalworking sectors

## A New Industrial Strategy for Europe

European industry is a global leader in many sectors representing 20% of the total value added of the EU and providing jobs for 35 million people in the EU.

To uphold Europe's industrial leadership, a new Industrial Strategy will help deliver on **three key priorities**: maintaining European industry's **global competitiveness** and a level playing field, at home and globally, making Europe **climate-neutral by 2050** and **shaping Europe's digital future**.

European manufacturing industry is currently going through an exceptional transformation process that is driven by:





# ► How Europe's manufacturing industry will overcome today's challenges?

Through ambitious **European partnership** in manufacturing and process industries between public and private actors to reinforce cooperation.

Under [Horizon Europe](#), the funding programme that will success Horizon 2020, new co-programmed partnerships as [Made in Europe](#), [Clean Steel](#) and [Processes4Planet](#) – **Transforming the European Process Industry for a sustainable society** are proposed in the area of manufacturing and energy intensive process industries to contribute to Commission priorities a [Europe fit for the digital age](#) and the [European Green Deal](#) with the ambition to develop breakthrough technologies, to achieve fully circular production and net-zero greenhouse gas emissions.



**Factories of the Future**  
Public Private Partnership



**Processes4Planet**

2014



2020

2027

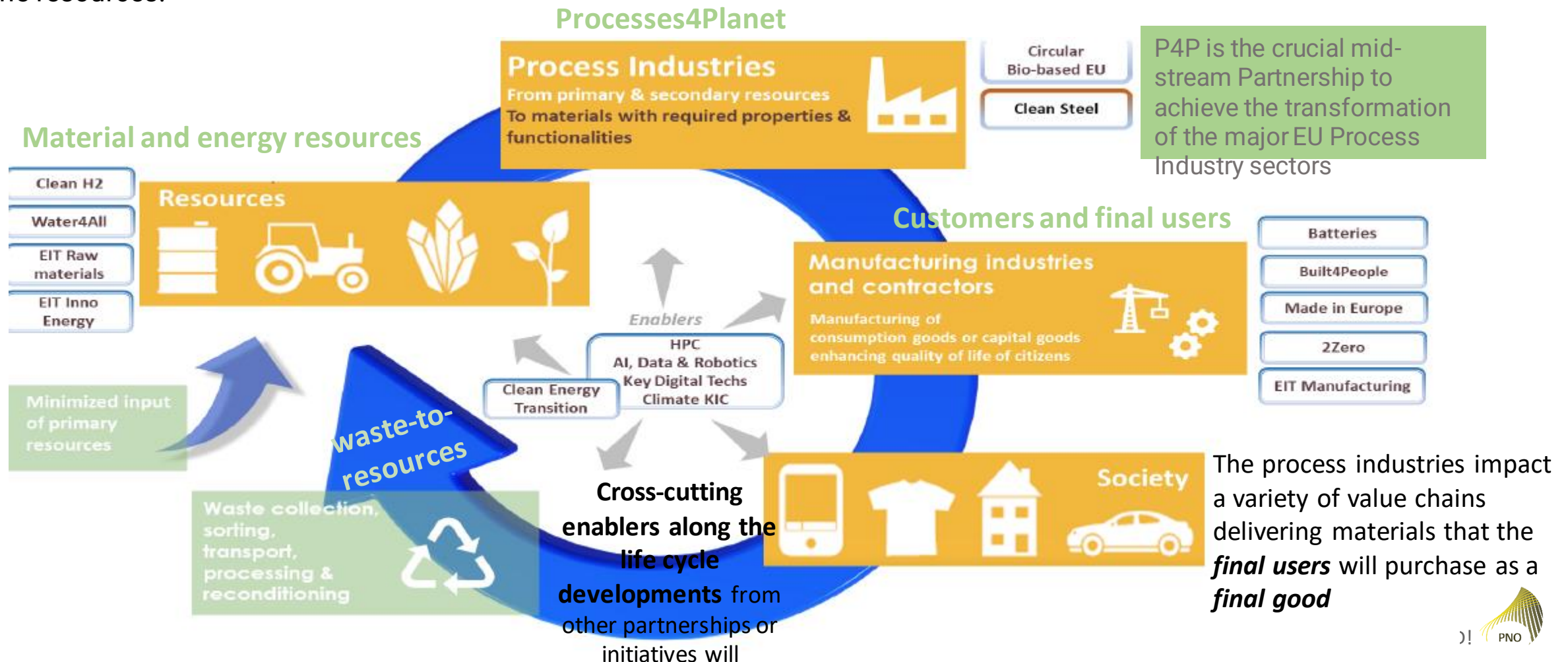
2050

INNOVATION. GRANTED!



# ► **Processes4Planet** in the Circular Value Chain of Partnerships & Initiatives

**Processes4Planet** will establish effective collaboration processes with relevant European Partnerships candidates for HEurope as well as with other relevant initiative to exploit opportunities and maximisation of impact through an optimal use of the resources.

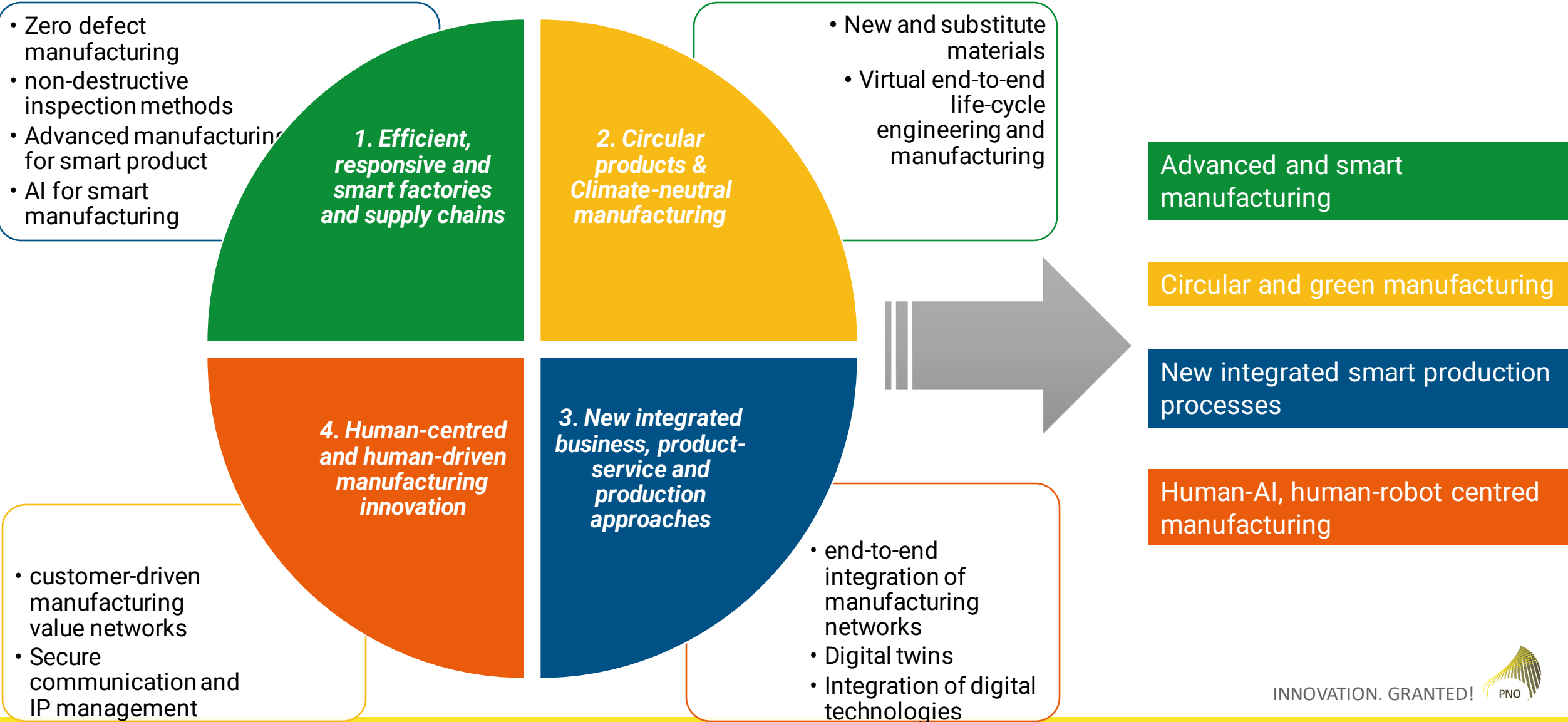




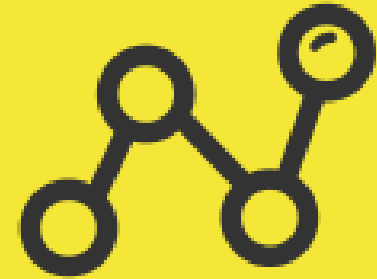
# ► Processes4Planet main innovation areas

Electrification	<b>Electrification of Thermal Processes:</b> <ul style="list-style-type: none"> <li>Heat pumps</li> <li>Electricity-based heating technologies</li> </ul>	Energy and resource efficiency	Next-gen catalysis Breakthrough efficiency improvement
	<b>Electrically driven processes</b> <ul style="list-style-type: none"> <li>Electrochemical conversion</li> <li>Electrically driven separation</li> </ul>	Circularity of materials	Innovative materials of the process industries Inherent recyclability of materials Upgrading secondary resources Wastewater valorisation
H2 integration	<b>Hydrogen integration:</b> <ul style="list-style-type: none"> <li>Alternative hydrogen production route</li> <li>Using hydrogen in industrial processes <ul style="list-style-type: none"> <li>Hydrogen storage</li> </ul> </li> </ul>	Industrial-Urban symbiosis	Demonstration of Industrial-Urban Symbiosis
CCU-CO/CO2	<b>CO2 capture for utilisation:</b> <ul style="list-style-type: none"> <li>Flexible CO2 capture and purification technologies</li> </ul>	Circular regions	European Community of Practice Development of Hubs for Circularity
	<b>CO2 utilisation in minerals</b> <ul style="list-style-type: none"> <li>CO2 utilisation in concrete production</li> <li>CO2 and CO mineralisation to produce building materials</li> </ul>	Digitalisation	Digital materials design Digital process development and engineering Digital plant operation Intelligent material and equipment monitoring Autonomous integrated supply chain management Digitalisation of industrial-urban symbiosis
	<b>CO2 &amp; CO utilisation in chemicals and fuels</b> Artificial photosynthesis, Catalytic conversion of CO2 to chemicals/fuels, Utilisation of CO2 and CO as a building block in polymers, Utilisation of CO to chemicals or fuels		Integration of non-technological aspects in calls Human resources, skills, and labour market
		Non-technological aspects	

# ► *Made in Europe Partnership* objectives and main Research and Innovation actions







# Innovation Trends in the EU metalworking industry



# ► Metalworking sector: trends in EU Funded projects

The main innovation trends and the most investigated topics in R&D of the main sectors of the metalworking industry (*transport, metal, electronics and machineries*) are highlighted in the **heatmap**

Made in Europe Innovation Areas & Topics		Metalworking Sectors			
Innovation Areas	Topics	Transport Industry 	Metal Industry 	Electronics Industry 	Machinery Industry 
Advanced and Smart Manufacturing	Zero Defect Manufacturing	15	2	3	4
	Non Destructive Inspection Methods	10	3	3	0
	AI Based Smart Manufacturing	7	1	3	1
	Advanced Manufacturing for Smart Products	15	12	9	1
Circular and Green Manufacturing	New/Substitute Materials and Circular Economy	3	8	3	1
	New Production Processes and Emissions Reduction	4	22	1	1
	Integration of Renewable Energies	0	1	0	0
New Integrated Smart Production Process	Integration of Manufacturing Networks	1	1	2	1
	Digital Twin	5	2	2	1
	Integration of Digital Technologies	8	2	1	2
Human-AI, Human-Robot Centered Manufacturing	Human-Machine Interaction & Collaboration	19	3	1	3

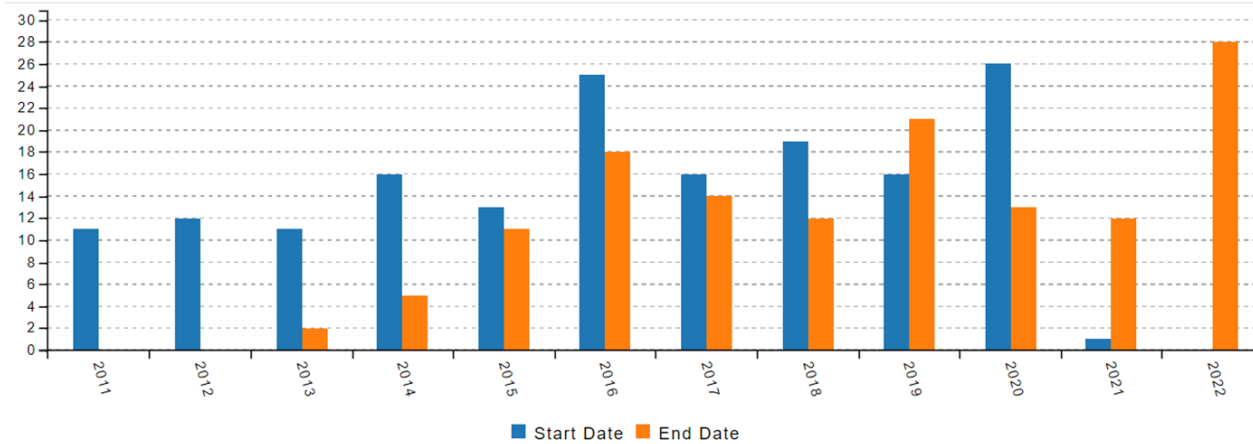
The transport and metal sectors see highest participation in R&D&I projects.

1) the topics related to the innovation area "Advanced and Smart Manufacturing" and "Human-Robot Centered Manufacturing" prevail in the transport industry.

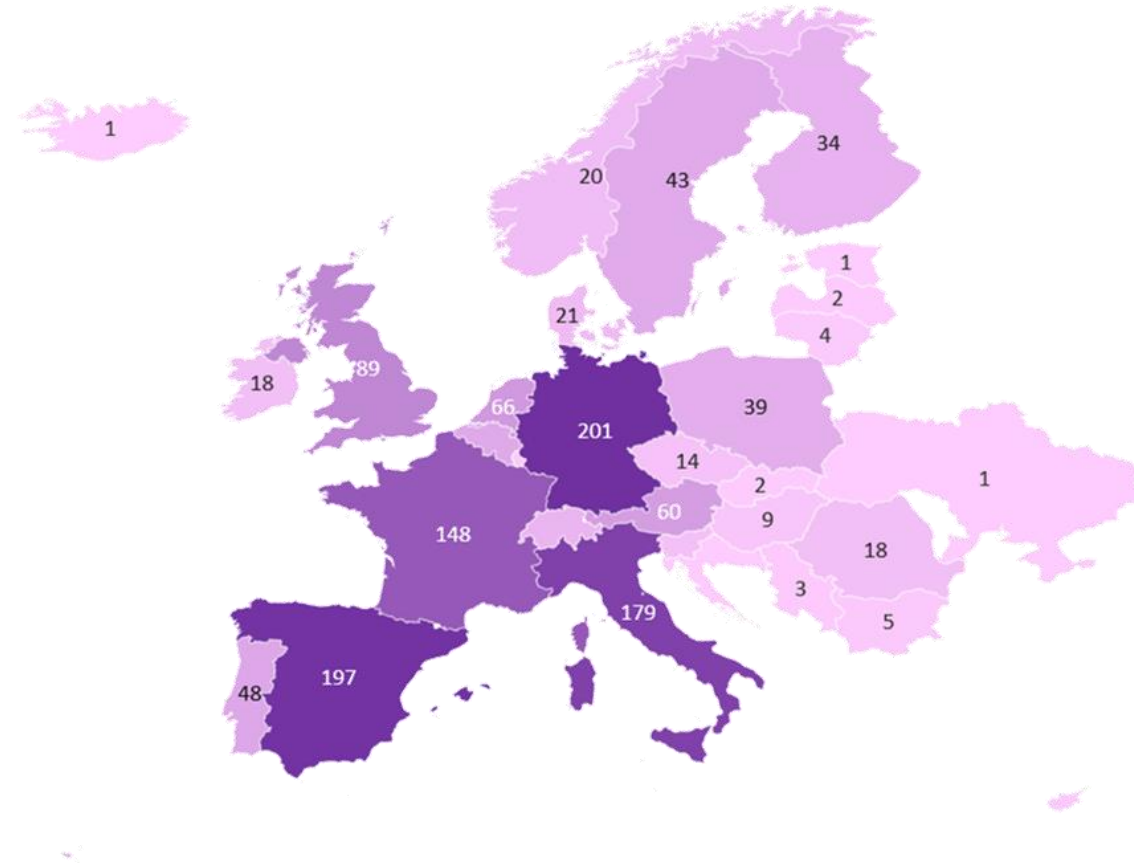
2) the topics related to the innovation area "Circular and Green Manufacturing" prevail for the metal industry.

# ► Metalworking sector: trends in EU Funded projects

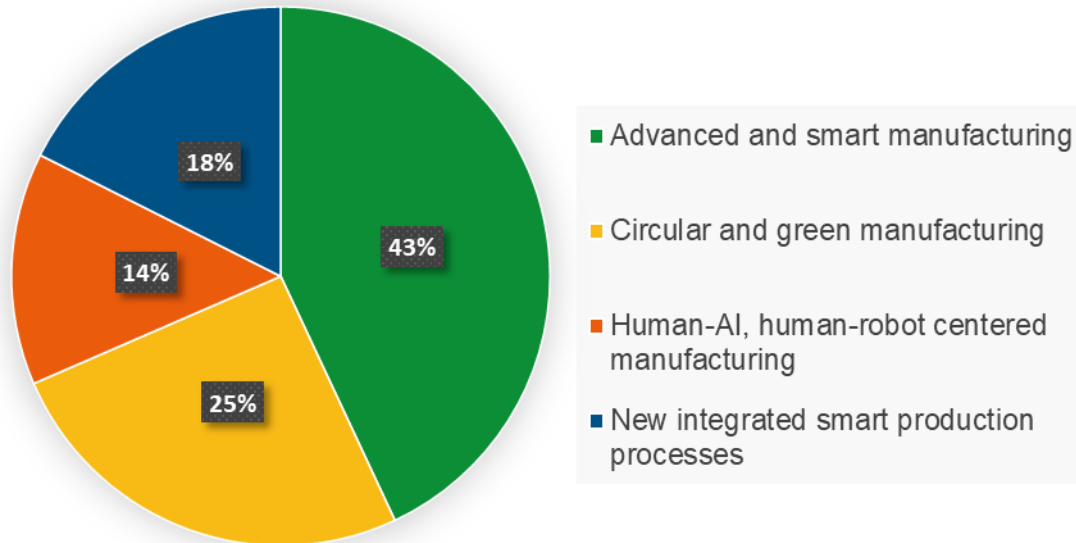
NUMBER OF EU SELECTED PROJECTS BELONGING TO THE METALWORKING SECTORS: 166



TOP PARTICIPANT COUNTRIES  
(number of participants to projects)



DISTRIBUTION of the identified projects PER TOPIC

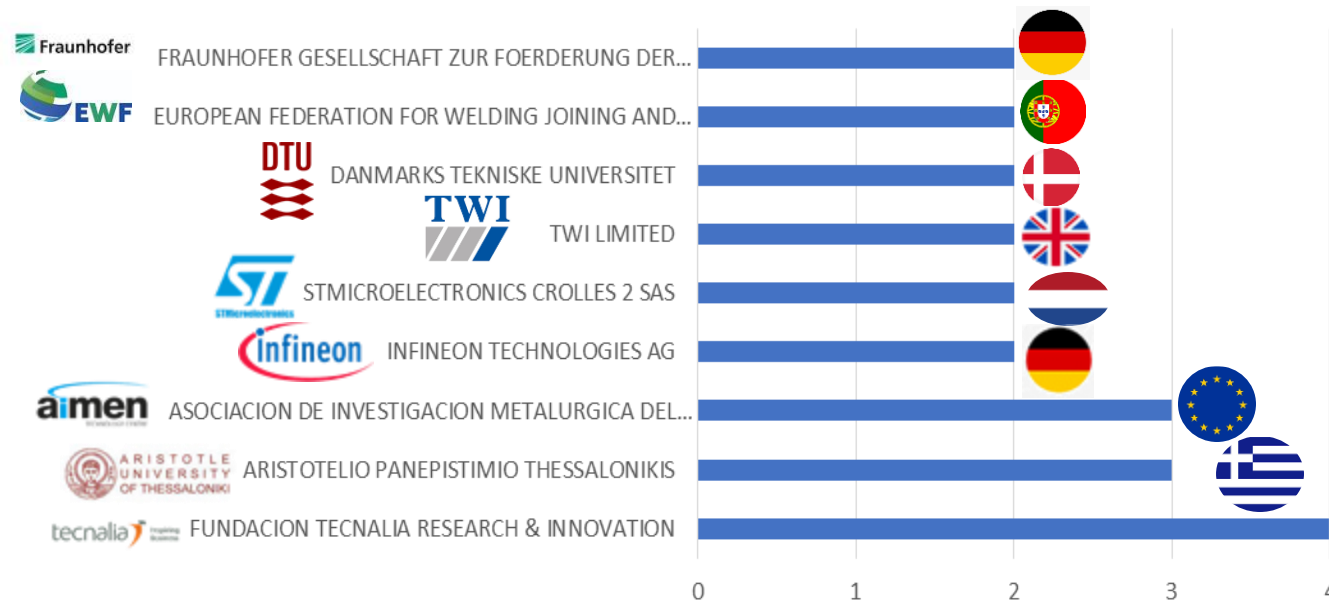


# ► Metalworking sector: trends in EU Funded projects

## Advanced and smart manufacturing

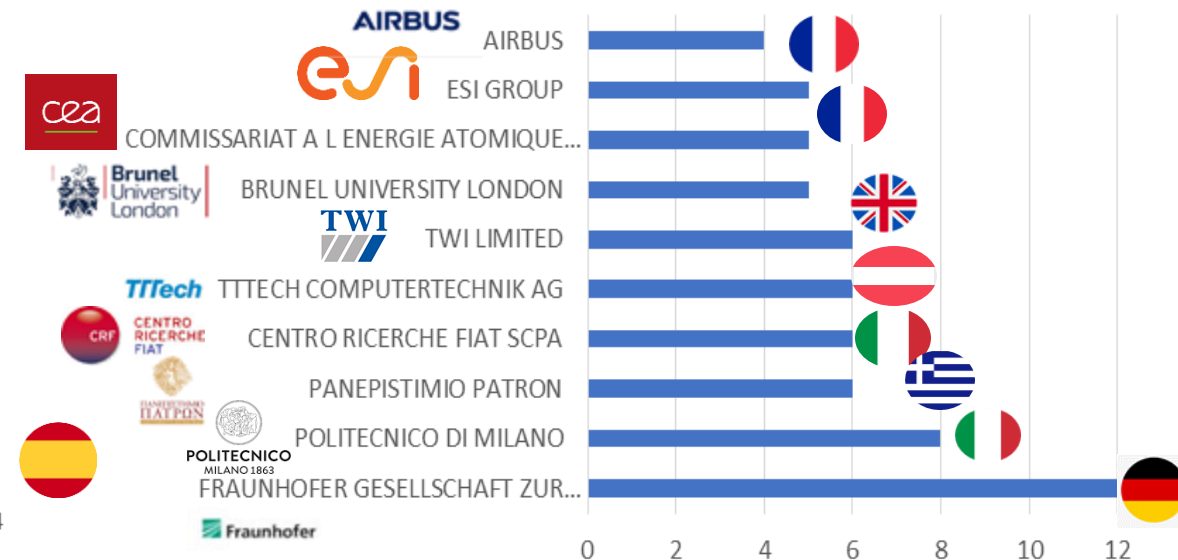
*Efficient, responsive and smart factories and supply chains: technologies and methods for zero-defect and zero-downtime high-precision manufacturing, including predictive quality and non-destructive inspection methods.*

### COORDINATORS



### PARTICIPANTS

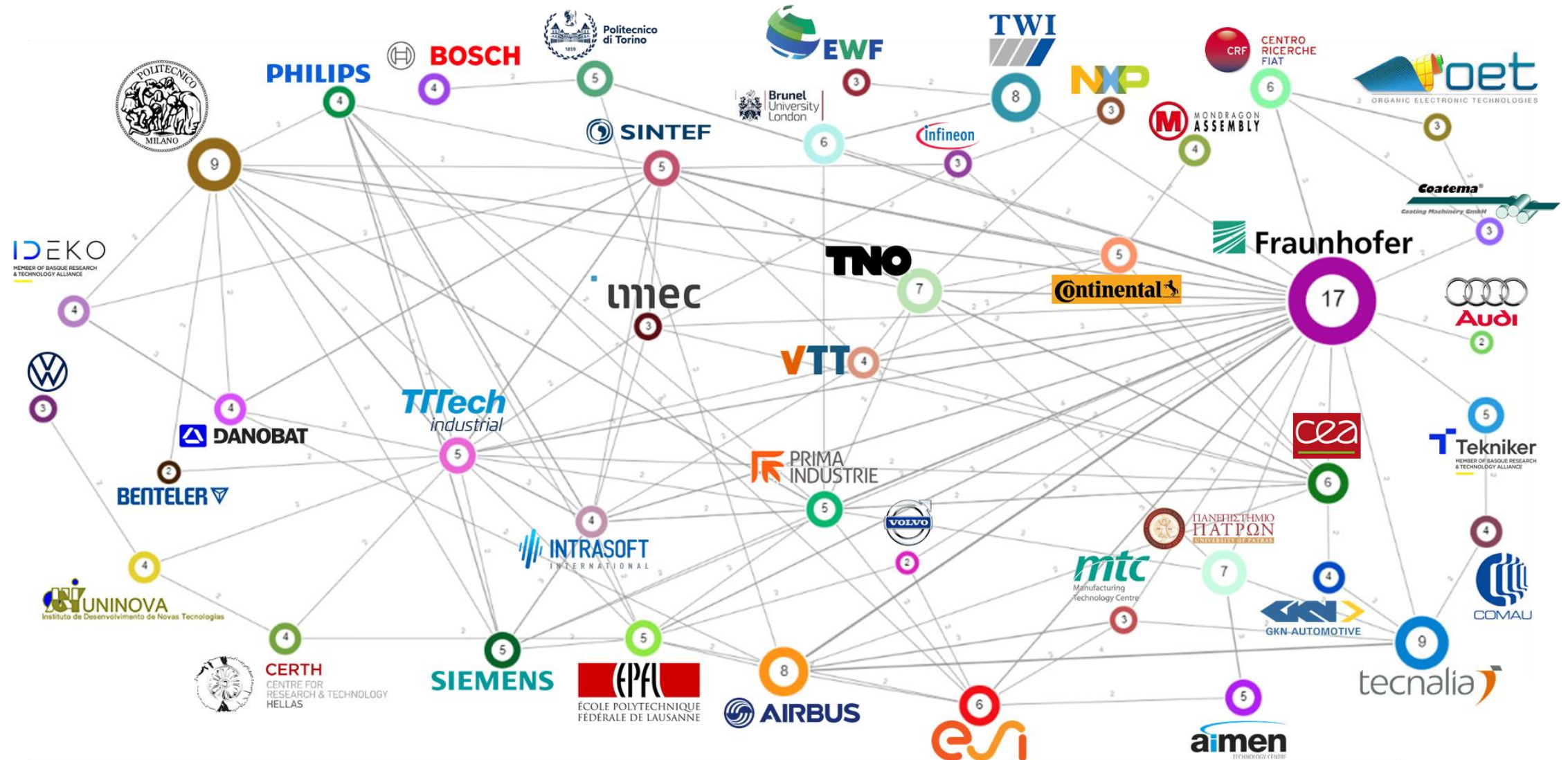
#### TOP5 RTOs and INDUSTRIES





# ► Metalworking sector: trends in EU Funded projects

Advanced and smart manufacturing



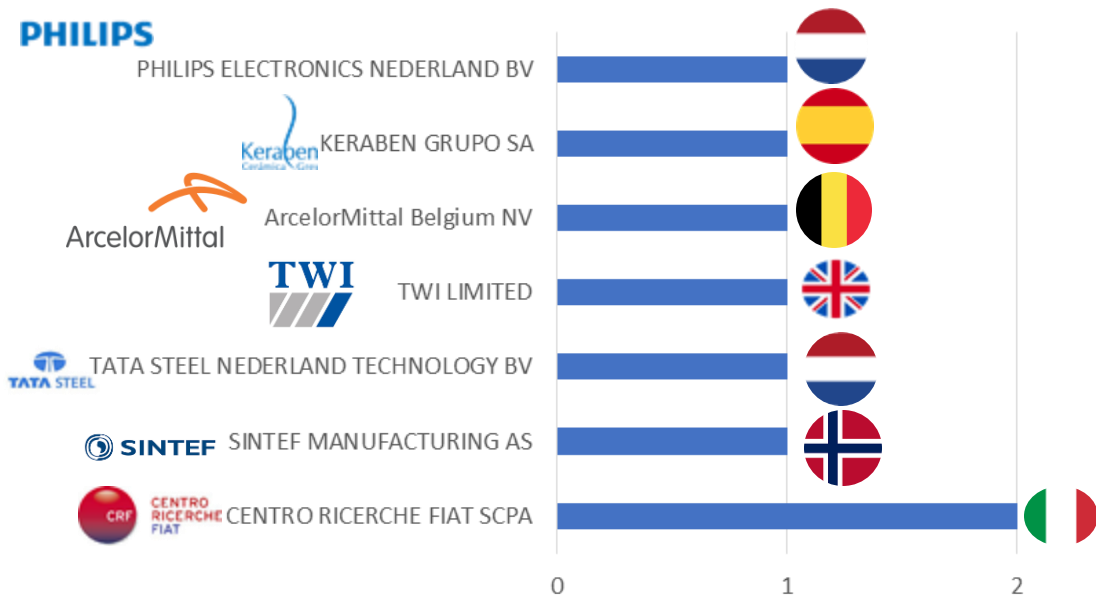


# ► Metalworking sector: trends in EU Funded projects

## Circular and green manufacturing

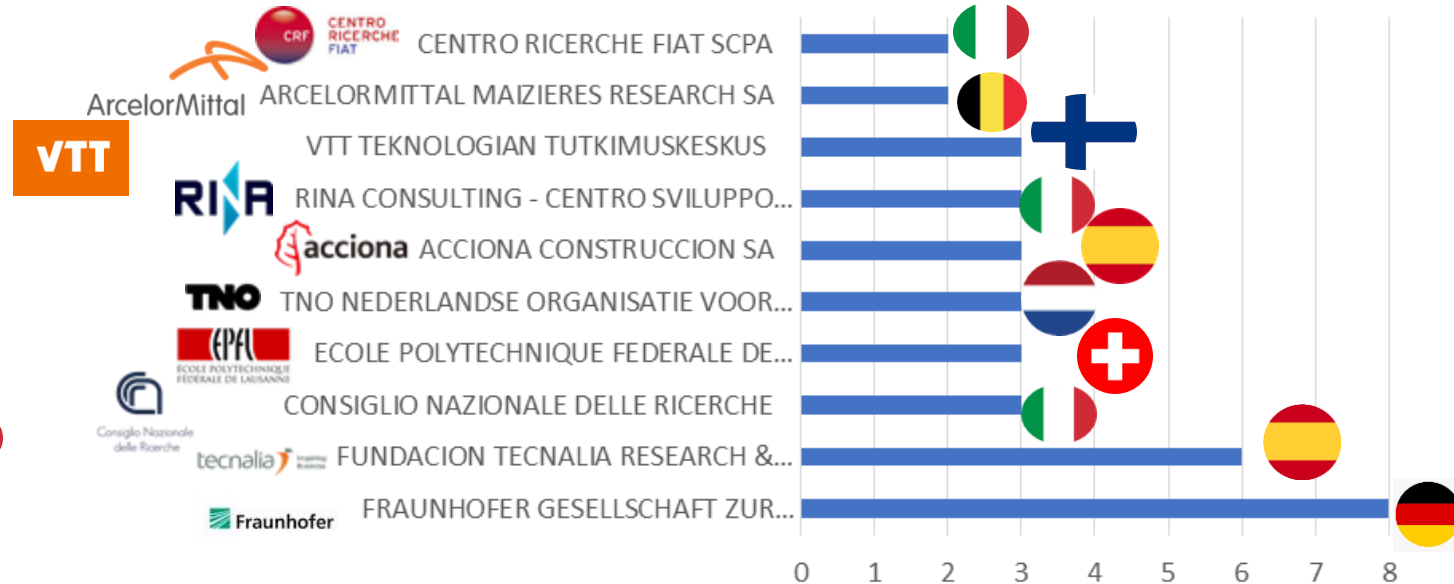
*Circular products & Climate-neutral manufacturing:* advanced materials and production processes employing digital technologies and manufacturing technologies to achieve a considerable reduction of the ecological impact and CO2-emissions.

### COORDINATORS



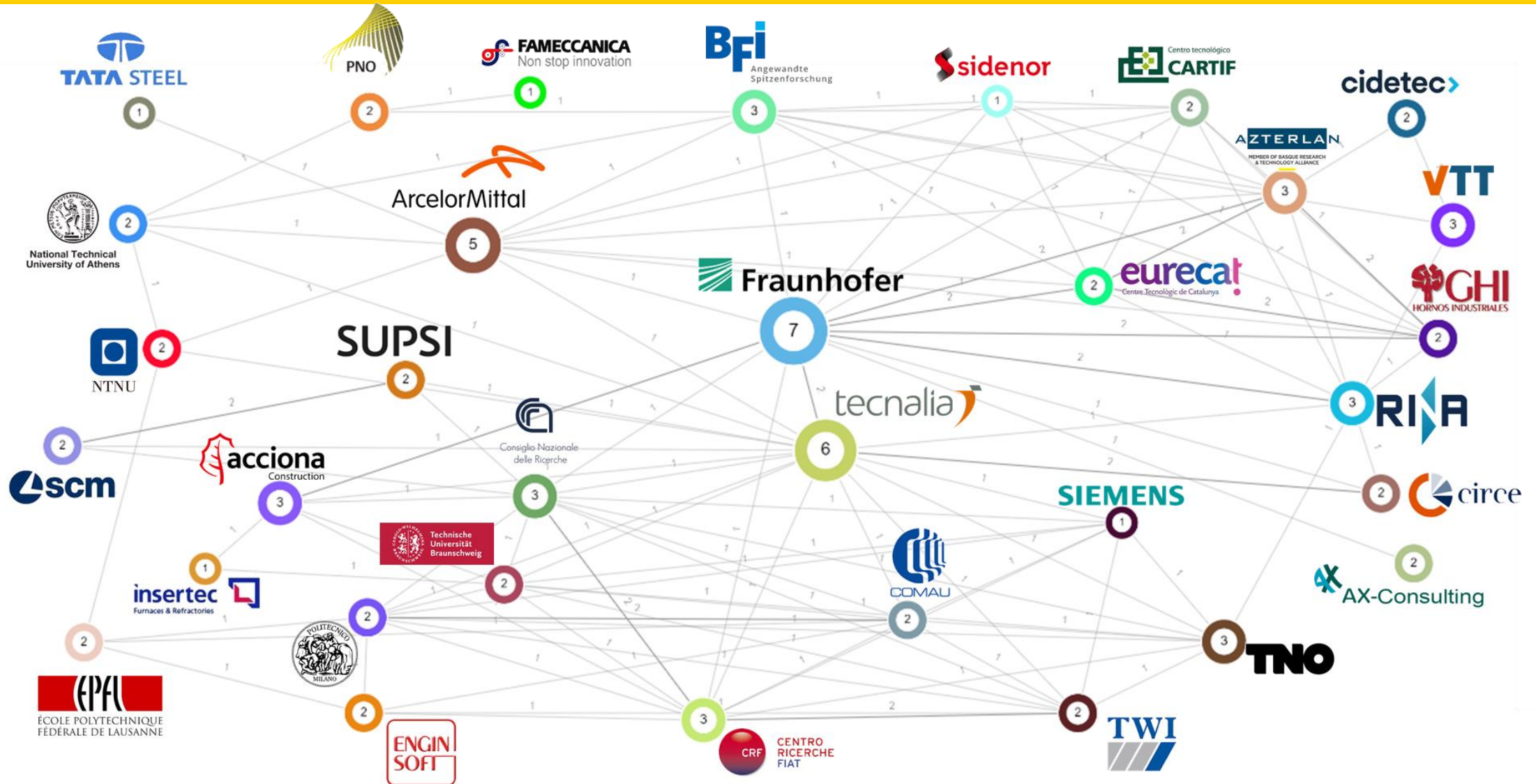
### PARTICIPANTS

#### TOP5 RTOs and INDUSTRIES



# ► Metalworking sector: trends in EU Funded projects

## Circular and green manufacturing

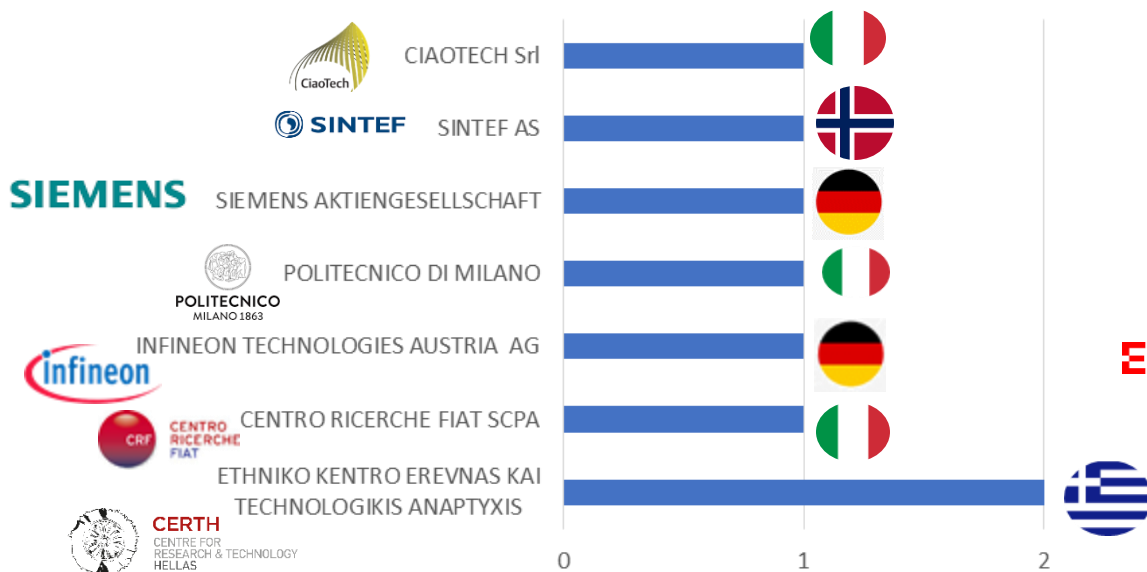


# ► Metalworking sector: trends in EU Funded projects

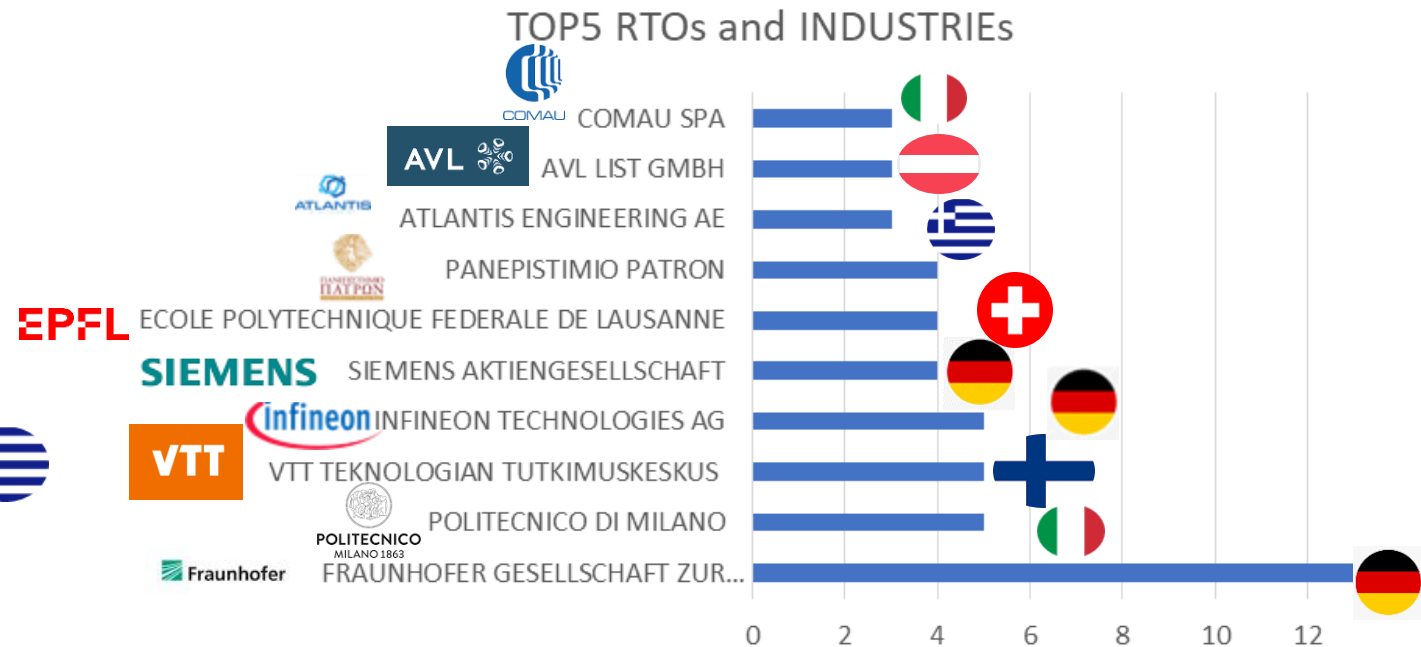
## New integrated smart production processes

*New integrated business, product-service and production approaches: new technologies and methods for collaborative product-service engineering and manufacturing for customer-driven value networks. dynamic and sustainable value networks by the continuous and secure integration of digital technologies (AI, digital twins, machine learning)*

### COORDINATORS



### PARTICIPANTS

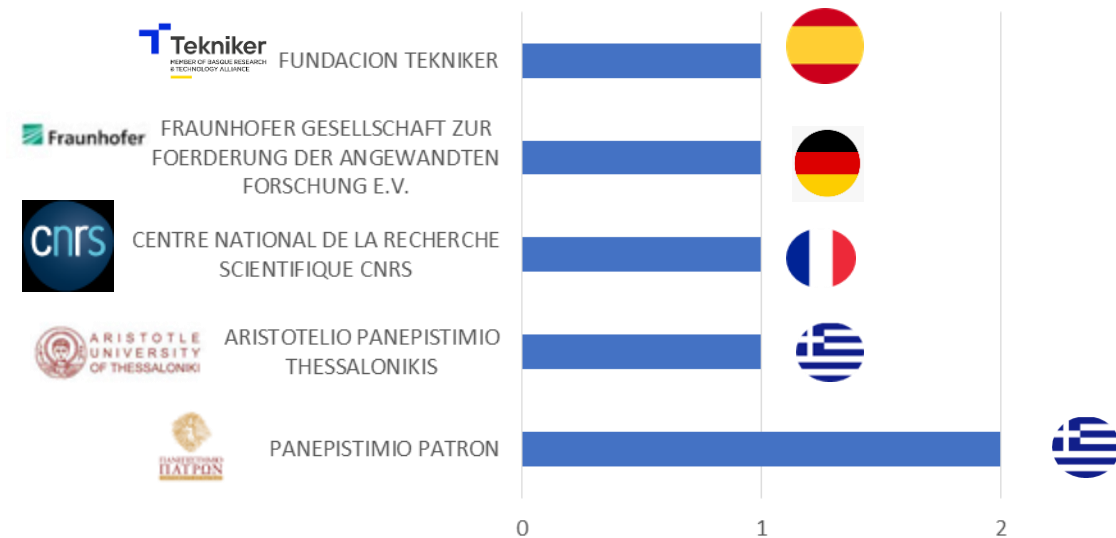


# ► Metalworking sector: trends in EU Funded projects

## Human-AI, human-robot centered manufacturing

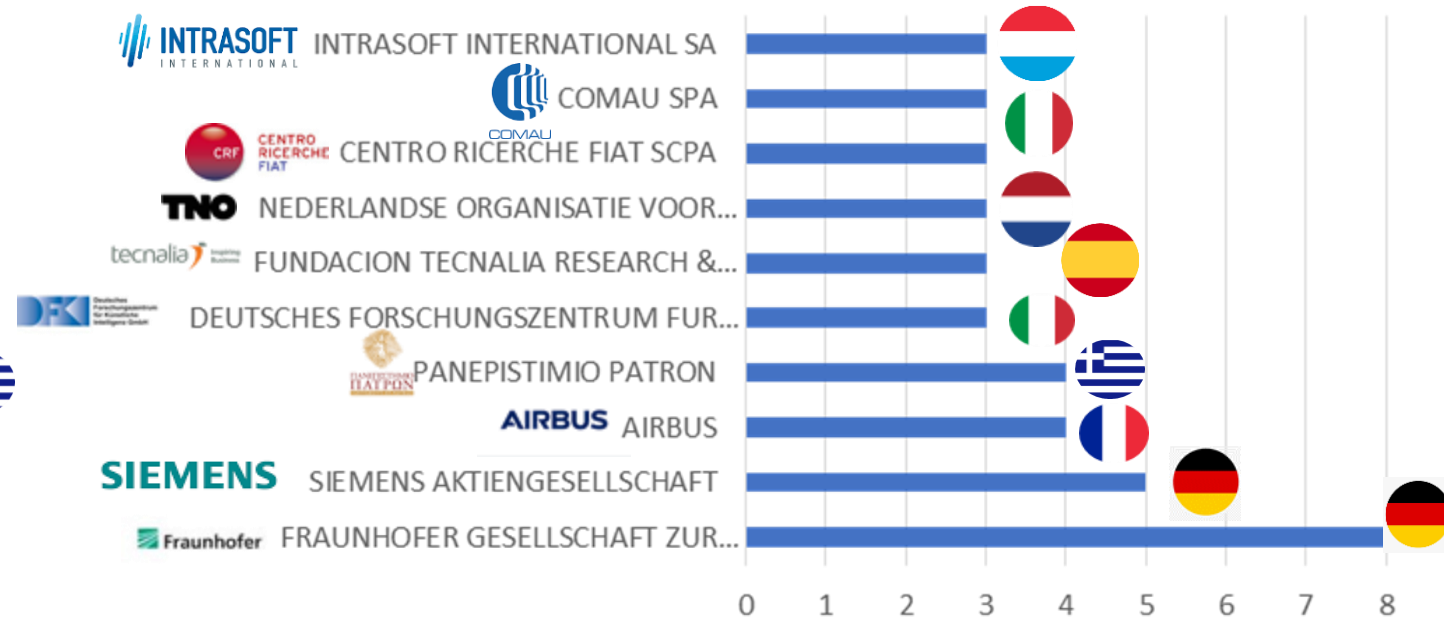
*Human-centred and human-driven manufacturing innovation:* new approaches in the intelligent manufacturing processes. Human knowledge and skills complemented with Artificial Intelligence solutions, human-AI or human-robot interactions.

### COORDINATORS

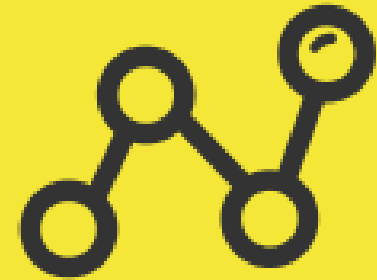


### PARTICIPANTS

#### TOP5 RTOs and INDUSTRIES



# Funded projects as USE-CASE in the metalworking industry main sectors



# CASE STUDY 1:

## LIFE ALL-IN



- Call: LIFE
- Programme: Environment and Resource Efficiency
- Project start date: 01-09-2020
- Project end date: 29-02-2024
- Coordinator: FAMECCANICA (Italy)
- Project funding: € 1,694,014

LIFE ALL-IN - Integration of the substrate and AHP production process reducing raw materials and steps along the supply chain



LIFE ALL-IN aims to launch an innovative eco-friendly **integrated process** that, for the first time, combines, on the same machine, the **AHPs production process** with processes for the on-line manufacturing of raw materials usually manufactured offline as well as raw materials transformation processes. The technology led to the **design of a one-of-a-kind production line that combines the non-woven conversion and post-processing phases together with the final diaper assembly**, allowing significant **materials saving and CO2 emissions decrease** as well as notable **costs reduction**.

### OBJECTIVES

The project will showcase a new production line at industrial scale that combines in a single step the non-woven conversion and post-processing phase, together with the final diaper assembly.

The Market introduction, compared to standard AHPs production process, would potentially lead to:

1. A decrease of the raw materials amount used in AHPs manufacturing, keeping the same or better functionality, efficacy and overall performances with up to **23% of raw material savings per year**
2. A reduction of the number of the steps along the raw materials supply chain, thus saving the total energy needed for the process to be operated, the materials used for reels and components packaging and the CO2 related to materials transportation. **10% of CO2 emissions reduction** each year in Europe, and an **annual cost reduction of 10%**.



# CASE STUDY 1:

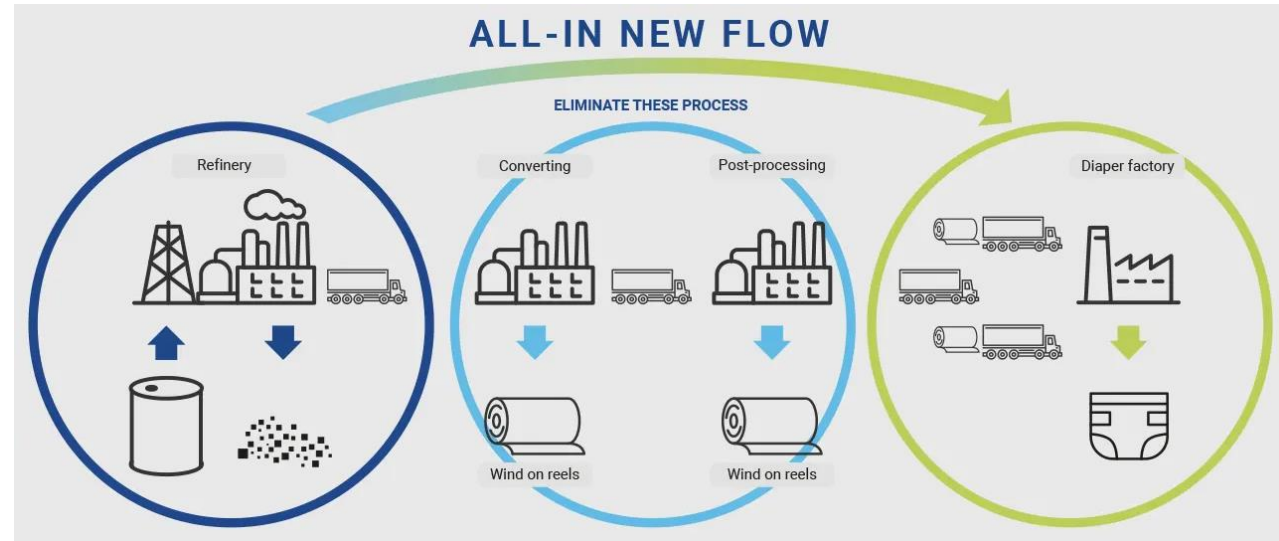
## LIFE ALL-IN



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LIFE ALL-IN - Integration of the substrate and AHP production process reducing raw materials and steps along the supply chain

LIFE ALL-IN



### EXPECTED RESULTS

- Engineering and design of an AHP machine to combine raw materials processing with the final integration of four diaper manufacturing sub-processes: **1) elastic extrusion, 2) web transformation, 3) fluff-free ADL, 4) frontal Tape creation**;
- Construction of a prototype of the new online integrated technology;
- **Achievement of TRL 8 in all the four sub-processes**;
- Start of commercialisation and sale of a full-scope installation
- Saving of up to 546 ton of raw materials during the prototype testing;
- Decrease of 604 tons of CO2 emission due to the reduction of steps

# CASE STUDY 2:

## DESTINY

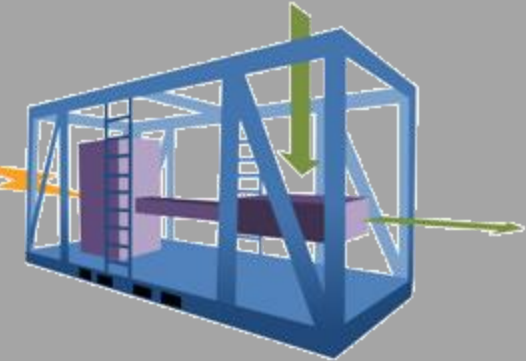


- **Call:** H2020-NMBP-SPIRE-2018
- **Funding scheme:** CS2-IA, Innovation action
- **Project start date:** 01-10-2018
- **Project end date:** 31-03-2022
- **Coordinator:** KERABEN GRUPO SA (Spain)
- **Project funding:** € 7 058 006,25

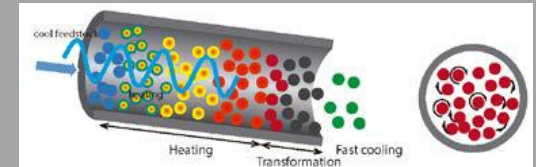
**DESTINY** - Development of an Efficient Microwave System for Material Transformation in energy Intensive processes for an improved Yield



The DESTINY project aspires to introduce a “first-of-a-kind” high temperature microwave heating processing granular solid feedstock system at industrial level offering a variety of vital benefits to energy intensive sectors: *reduced energy consumption, lower lifetime operating costs and enhanced sustainability profile.*



DESTINY solution is new **Microwave Kiln Cell** in a **container-size mobile microwave-powered plant** targeted to a production rate of 20kg/h for **three energy-intensive sectors** working on solid materials, namely **cement, steel** and **ceramic**, covering more than 53% of production in the European SPIRE sector.



# CASE STUDY 2:

## DESTINY



- Call: H2020-NMBP-SPIRE-2018
- Funding scheme: CS2-IA, Innovation action
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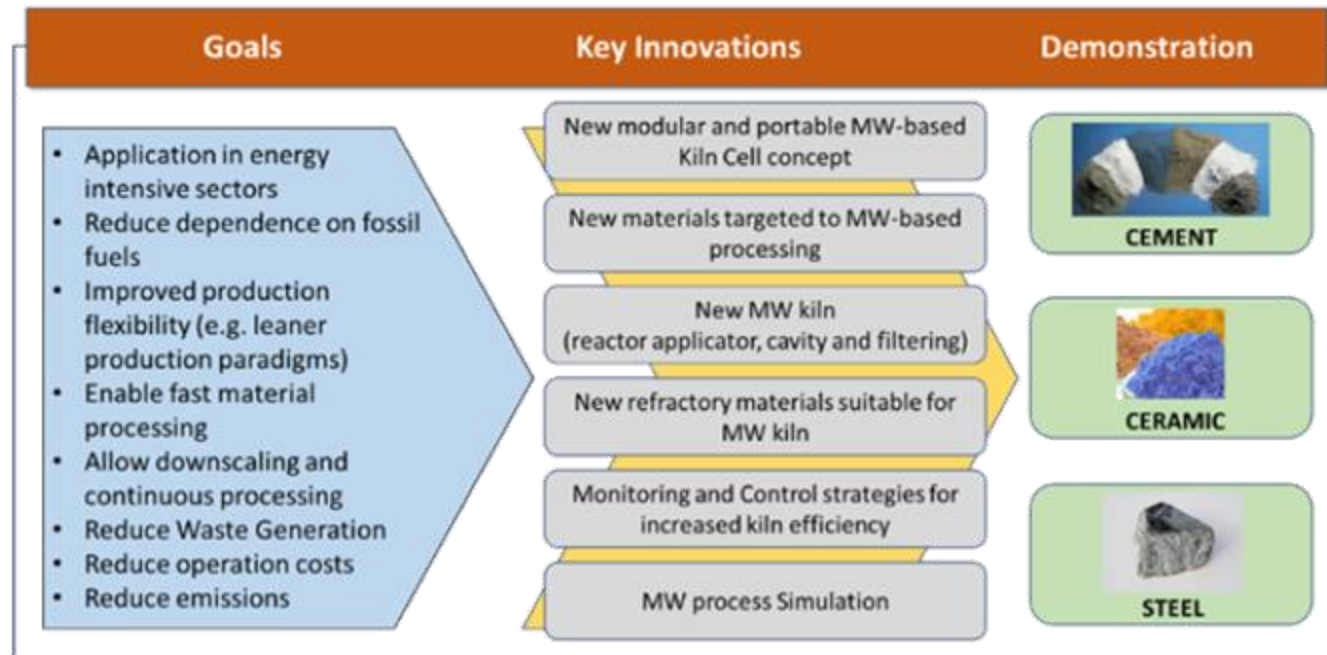
DESTINY - Development of an Efficient Microwave System for Material Transformation in energy Intensive processes for an improved Yield



### OBJECTIVES

DESTINY will give the cement, steel and ceramic industries a competing solution to standard heating processes, able to:

- Cut by 30% the required energy for production
- a -30% to +30% energy input within RES fluctuations timeframes, without significant losses in specific energy efficiency,
- Improvement in energy efficiency of 30% and in resource efficiency of 30%,
- decreasing the CO2 emissions in more than 40% in steel sector and more than 90% in ceramic pigments and calcined clay,
- Decrease OPEX and CAPEX by 15%





# CASE STUDY 2:

## DESTINY



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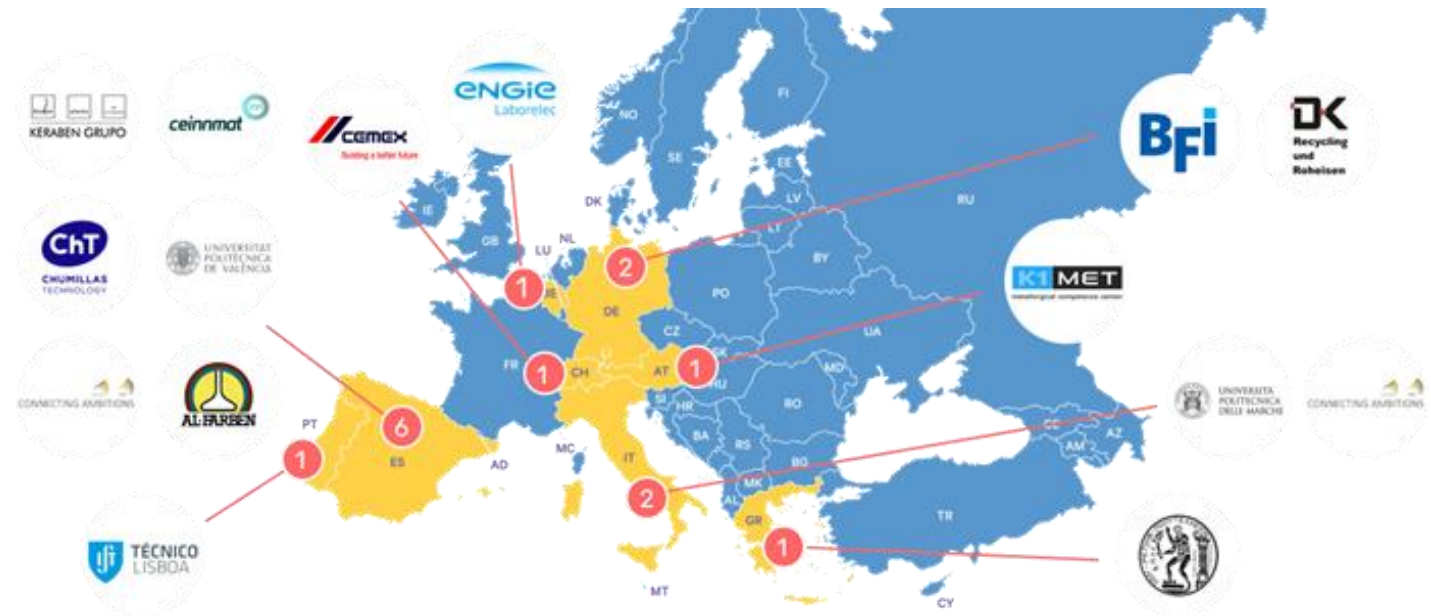
DESTINY - Development of an Efficient Microwave System for Material Transformation in energy Intensive processes for an improved Yield



### RESULTS ACHIEVED SO FAR

During the first 18 months of activities, the main developments focuses on three aspects: the **new microwave-based technology**, the **selected products and raw materials**, as well as the **new processing of DESTINY**.

In the upcoming months, priority will be given to the incorporation of the advances in *process monitoring and control*, *microwave kiln configuration*, *efficient integration of microwave process with conveying system* to improve the quality of the product, particularly at upscaled level.



# CASE STUDY 3:

## LIFE GREEN-FACTORY



- Call: LIFE
- Programme: Environment and Resource Efficiency
- Project start date: 01-09-2020
- Project end date: 28-02-2024
- Coordinator: LOSMA S.p.A (Italy)
- Project funding: € 665,586.00

LIFE GREEN FACTORY - PMs concentration reduction in metal factories through the use of an energy-saving electronic detective system



Iron and steel production generates inside and outside the factories significant Particulate Matter  $PM_{1-10\mu}$  and *Volatile Organic Compounds* (VOCs), dangerous to the human health and the environment, for the population living nearby metal factories and workers.



On factory floors, air quality is affected by the emissions of the industrial machinery and of the chemical compounds involved in the process.



The Green Factory project aims at employing an '**hybrid technological mix** (new, with IP potential) of **PCO** [Photo Catalytic Oxidation] and **UVC** [Ultra Violet Categories] to reduce PM concentrations in metal factories through a cost-effective and energy-saving **electronic detection system**.



### OBJECTIVES

**Improvement of air quality:** on factory floors and recycle of chemically and bacteriologically clean air after sanitation.

**Constant monitoring:** of system efficiency plus feedback control to maintain correct parameters through IOT system.

**Predictive maintenance:** to ensure constant performance and improvement of environmental conditions.

### ENVIRONMENTAL IMPACT

- ❖ PM 1,0 - 2,5 - 10: reduction of 99%
- ❖ VOCs: reduction from 30% to 90%
- ❖ Odorous gasses: reduction of 65%
- ❖ Energy consumption: reduction of 30%

## CASE STUDY 3:

### LIFE GREEN-FACTORY



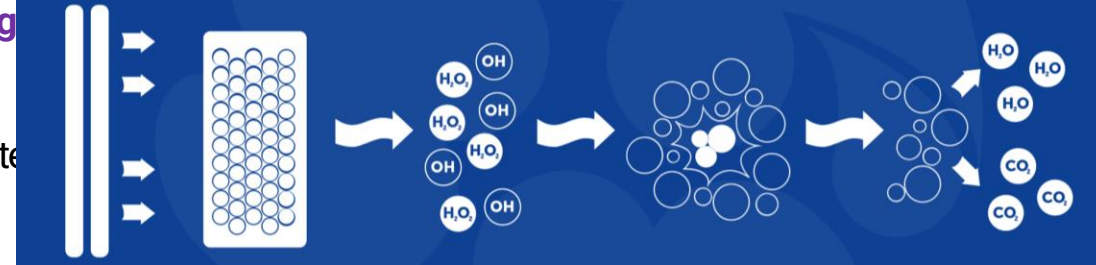
- Call: LIFE
- Programme: Environment and Resource Efficiency
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- Coordinator: LOSMA S.p.A (Italy)
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LIFE GREEN FACTORY - PMs concentration reduction in metal factories through the use of an energy-saving electronic detective system



#### THE SOLUTION

**Green Factory Air Mapping System:** array of Wi-Fi sensors for PM that automatically communicate with a gateway that sets and updates the optimal ventilation conditions.



The system filters all the indoor air and recirculates only clean air in the working areas, reducing the quantity of inhaled pollutants by 3.2 mg/day per worker on average.

#### EXPECTED RESULTS

- **CO2 in air by 3%** (50 kg/day) through the use of a *CO2 absorber*;
- **PM2.5 and PM10** concentration to **below 0.6 mg/m3** (-75%) through *dedicated filters*
- *UV and TIOX system for reduction of NO2* concentration by **20%** and irritant / corrosive /toxic substances (formaldehyde) by 30%
- **bacterial load** by **99.90%** through the use of *ionizing and UV systems*;
- **mutagenic/carcinogenic substances** (polycyclic aromatic hydrocarbons) by **25-30%** by *activated carbon*;
- **waste** (filter cartridge) by **5%** through a more precise *management of the filtration systems*;
- **energy consumption** by **50%** through the use of *inverter for the control of ventilation fans*.



## CASE STUDY 4: AI-CUBE

- Funding scheme: H2020-CSA
- Project start date: 01-09-2020
- Project end date: 31-08-2022
- Coordinator: CIAOTECH Srl (Italy)
- Budget: 597,806.00 €

AI-CUBE-Artificial Intelligence and Big Data CSA for Process Industry Users, Business Development and Exploitation



AI-CUBE aims to enhance the understanding of **digital technologies related to artificial intelligence (AI) and big data (BD) applied in process industries** for all the eight SPIRE industrial sectors: cement, ceramics, chemicals, engineering, minerals and ores, non-ferrous metals, steel, water.

AI-CUBE will define a roadmap that will serve as guidance for researchers, managers, and operators, and include specific recommendations for all involved industrial sectors and organizations' functions and processes.

### OBJECTIVES AND ACTIVITIES

The overall objective of AI-CUBE project is to contribute harnessing and optimizing the potential of AI and BD in the European process industry.

- Draw a **multi-dimensional AI and BD map of available good practices**, within the processes across the 8 SPIRE industry sectors
- Build on identified good practices to develop future **AI and BD business cases and define a roadmap of the RD&I actions needed in each SPIRE sector**
- Detect the **white spots of AI and BD solutions that can be covered** adapting good practices from other process industries, outlining an adaptation roadmap
- **Define the data requirements, skills and RD&I requirements for future AI and BD business cases** to emerge within the different process industry sectors

# CASE STUDY 4:

## AI-CUBE

AI-CUBE-Artificial Intelligence and Big Data CSA for Process Industry  
Users, Business Development and Exploitation



### AI-CUBE CONCEPT

The overall project approach is based on the development of a **3-dimensional conceptual matrix** based on:

- 1) AI and BG technologies
- 2) Application areas (activities and industrial processes)
- 3) SPIRE sectors



- Funding scheme: H2020-CSA
- Project start date: 01-09-2020
- Project end date: 31-08-2022
- Coordinator: CIAOTECH Srl (Italy)
- Budget: 597,806.00 €



**8 AI and BD roadmaps**, indicating a **route map and practical recommendations on AI and BD business cases**, transferability of good practices from other industries, data, skills and RD&I requirements, in line with the A.SPIRE 2050 vision. Industrial stakeholders and associations will validate the consolidated roadmap ensuring solution feasibility and benefits for the European industrial community.



## CASE STUDY 5: A4-BLUE

- Funding scheme: H2020-FOF-2016
- Project start date: 01-10-2016
- Project end date: 30-09-2019
- Coordinator: FUNDACION TEKNIKER (Spain)
- Budget: € 4 179 062,50

A4BLUE- Adaptive Automation in Assembly For BLUE collar workers satisfaction in Evolvable context



Sectors such as **aerospace, automotive, wind power or capital goods** are characterized by *complex products and small-scale production* that require *high flexibility*, as well as *increasing pressure to raise productivity rates* and manual intensive activities. Furthermore, manufacturing systems need to deal with an ever-changing environment due to changes caused by human, production related variability, market's demands, technology advancements or demographic trends.

**A4BLUE** proposes the *development and evaluation of a new generation of sustainable, adaptive workplaces dealing with evolving requirements of manufacturing processes* the introduction of automation mechanisms that are suitable for flexible and efficient task execution in interaction with human workers and by optimizing human variability through personalized and context aware assistance capabilities as well as advanced human-machine interfaces.



# CASE STUDY 5:

## A4-BLUE

- Funding scheme: H2020-FOF-2016
- Project start date: 01-10-2016
- Project end date: 30-09-2019
- Coordinator: FUNDACION TEKNIKER (Spain)
- Budget: € 4 179 062,50

A4BLUE- Adaptive Automation in Assembly For BLUE collar workers satisfaction in Evolvable context



### OBJECTIVES AND ACTIVITIES

- (1) providing an *open, secure, configurable, scalable and interoperable adaptation management and assistance system* that allows integration of hardware and software components to adjust the behavior of workplace parts according to changes: **A4BLUE adaptive framework**
- (2) providing a set of safe, easy to use, intuitive and personalized and context aware **multimodal human-automation interaction mechanisms**
- (3) providing **methods and tools to determine the optimal degree of automation of the new assembly processes** to maximize long term worker satisfaction and overall performance.

A4BLUE involved four validation scenarios: two industrial ones representing the aeronautic sector (AIRBUS and CESA) and two laboratories (RWTH: electric car, and IK4-TEKNIKER: assembly).

### RESULTS

#### **A4BLUE Adaptive Framework**

including different modules from Semantic virtual asset representation to Methods and tools for the definition of the optimal level of automation.

#### **Automation mechanisms**

Deburring robot and Automated tool trolley for tool provision

**know-how** or approaches to identify  
**socio economic assessment indicators**

# CASE STUDY 6:

## Z-FACTOR



- Call: H2020-FOF-2016
- Funding scheme: IA – Innovation action
- Project start date: 2016-10-01
- Project end date: 2020-03-31
- Coordinator: CENTRE FOR RESEARCH AND TECHNOLOGY-HELLAS (Greece)
- Project funding: € 4,206,252.00

Z- FACTOR: Zero-defect manufacturing strategies towards on-line production management for European factories



Nowadays, the efficiency and sustainability of the manufacturing processes of high-tech products depend on the introduction of Advance Manufacturing Technologies in the production processes. *The project address the need for zero-defect manufacturing, a business opportunity or innovative, high-ROI (Return on Investment) solutions to ensure, better quality and higher productivity in the European manufacturing industries.*



### OBJECTIVES

The z-fact0r solution comprises five modules that are to be used in multistage production systems with the following targets:

1. The early detection of the defect (Z-Detect)
2. The prediction of defect generation (Z-Predict)
3. The prevention of defect generation by recalibrating the production line (multistage), as well as defect propagation in later stages of the production (Z-Prevent)
4. The reworking of the product, using additive and subtractive manufacturing techniques (Z-Repair) and
5. The management of the aforementioned strategies through event modelling, KPI (key performance indicators) monitoring and real time decision support(Z-manage)

### Fields of science

additive manufacturing, subtracting manufacturing, laser physics, software, remanufacturing, production economics, machine learning, smart sensors, employment

# CASE STUDY 6:

## Z-FACTOR



- Call: H2020-FOF-2016
- Funding scheme: IA – Innovation action
- Project start date: 2016-10-01
- Project end date: 2020-03-31
- Coordinator: CENTRE FOR RESEARCH AND TECHNOLOGY-HELLAS (Greece)
- Project funding: € 4,206,252.00

Z- FACTOR: Zero-defect manufacturing strategies towards on-line production management for European factories



### MAIN ACHIEVED RESULTS

1. a **laser scanning portable solution** was developed for **rapid defect detection**, based on processing algorithm for machine/process defect detection
2. An **intelligent robotic deburring cell** for repairing defected parts was developed, and a Knowledge based Decision support system for managing all the defect and action events generated by the system
3. definition of a **sensors' network** for each end-user and its integration under of a common middleware environment **that communicates with all technical modules**
4. **Z-PREDICT Machine Learning Tool** to register events and find the relationship
5. **Incremental Strategy** and integration of the various software application into a complex distributed software system.



**CERTH**  
CENTRE FOR  
RESEARCH & TECHNOLOGY  
HELLAS



**CETRI**  
Center for Technology Research & Innovation





# The EU textile industry



# ► The future of the EU textile industry



THE EUROPE  
INDUSTRIAL  
STRATEGY

#EUIndustrialStrategy



The European  
Green Deal

#EUGreenDeal



Circular Economy  
Action Plan

The European  
Green Deal



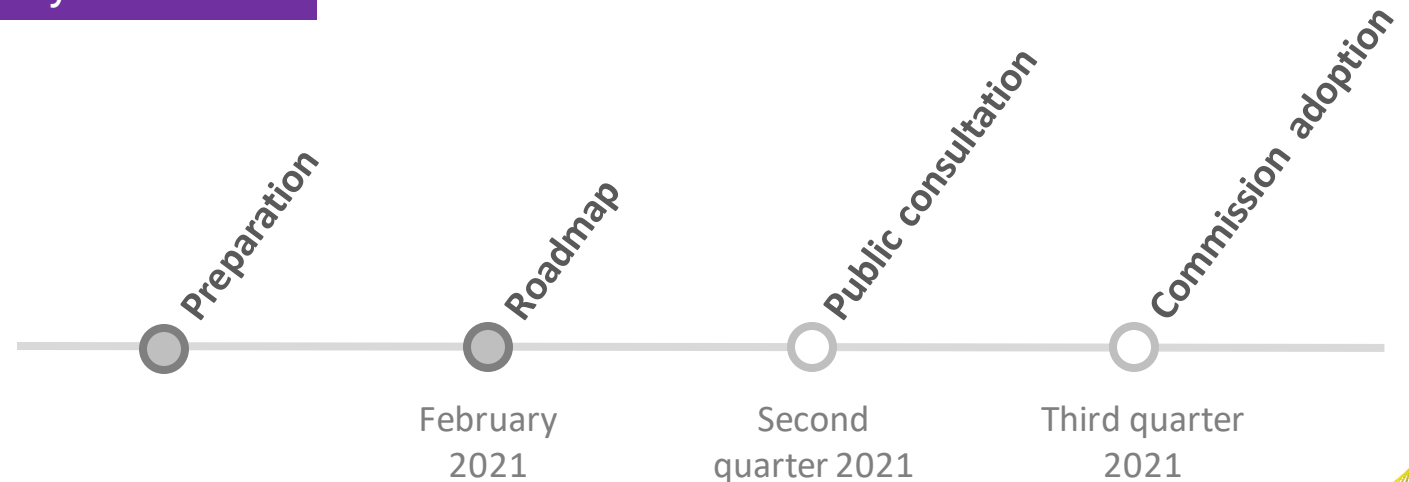
12 RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



Textile as a priority sector to pave the way towards a carbon neutral, circular economy

## EU strategy for sustainable textiles

This strategy will help the **EU shift to a climate-neutral, circular economy** where products are designed to be more durable, reusable, repairable, recyclable and energy-efficient.



INNOVATION. GRANTED!



# ► Toward sustainability in the EU textile sector



# ► Strategic Innovation Themes and Research Priorities in textile industry

## Innovation Theme 1 - *Smart, high-performance materials*

### Research priority:

- High-performance fibres and textile materials for technical applications (including bio-based fibres and materials)
- Novel 1, 2 or 3-dimensional fibre based structures for technical applications
- Multifunctional textile surfaces and related processing technologies
- E-textiles for smart structures, functional interiors or smart wearable systems

## Innovation Theme 2 - *Advanced digitised manufacturing, value chains and business models*

### Research priority:

- New manufacturing technologies for efficient realisation of complex textile and composite structures
- Digitisation and flexibilisation of production processes and factories
- Virtual modelling/design of fibre- and textile-based materials/products
- Digitisation of the full textile-fashion value chain
- New digitally-enabled business models

## Innovation Theme 3 - *Circular Economy and Resource Efficiency*

### Research priority:

- Novel flexible process technologies to save water, energy and chemicals
- High-tech textile recycling for circular economy concepts
- Sustainable substitutes for hazardous or restricted textile processing chemicals or bio-chemistry based textile processing
- Bio-refinery concepts using European biomass or waste for textile fibres
- Greater use of EU-origin natural fibres

## Innovation Theme 4 - *High-value added solutions for attractive growth markets*

### Research priority:

- Functional and smart textile solutions for health, sports and personal protection
- Textile solutions to resource and protect a growing global population
- Textile solutions for safe, energy-efficient buildings and smart interiors
- Textile solutions for light-weight, clean and safe transport systems
- Personalised fashion and functional wear products

# ► Funding opportunities for the textile industry to address these themes



## HEU Pillar II – Global Challenges & European Industrial Competitiveness

### Cluster 4 - Digital, Industry & Space

- Climate neutral, circular and digitised production
- Increased autonomy in key strategic value chains for resilient industry
- Digital and emerging technologies for competitiveness and fit for the green deal

### Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture & Environment

- Circular economy and bioeconomy sectors

## HEU Pillar III – Innovative Europe

### EIC Accelerator

The EIC Accelerator supports high-risk, high-potential **SMEs** and innovators to help them develop and bring onto the market new innovative products, services and business models that could drive economic growth.



## LIFE programme

The LIFE programme is the EU's funding instrument for the environment and climate action. The two relevant sub-programme are:

- Circular economy and quality of life sub-programme
- Climate Change Mitigation and Adaptation sub-programme

## CBE - Circular Bio-based Europe Joint Undertaking

The Circular Bio-based Europe Joint Undertaking (CBE JU) is a new **public-private partnership** and will be the successor of the previous Bio-based Industry (BBI JU).

CBE JU aims at further develop and expand the sustainable sourcing and **conversion of biomass into bio-based products via multiscale biorefineries across sectors** and regions in Europe.

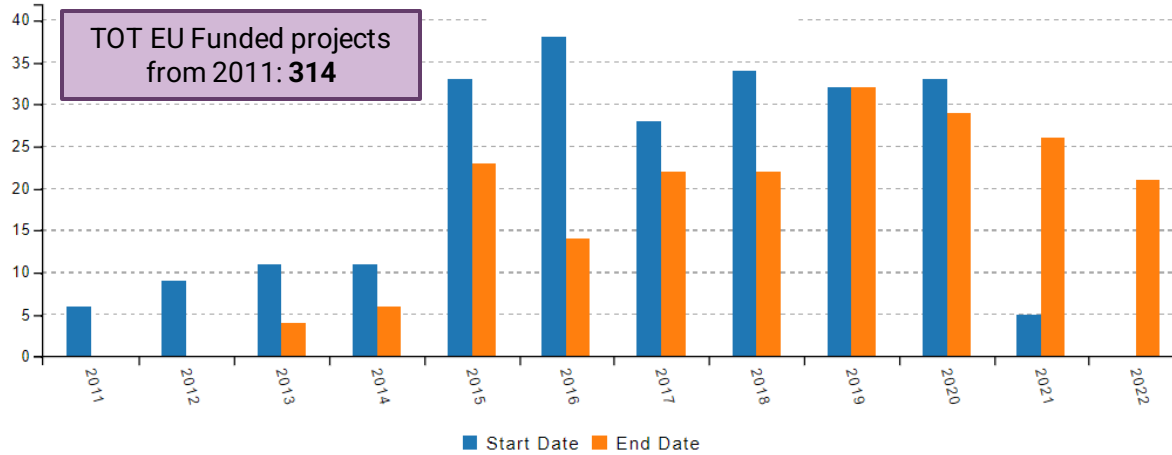
# Innovation Trends in the textile sector



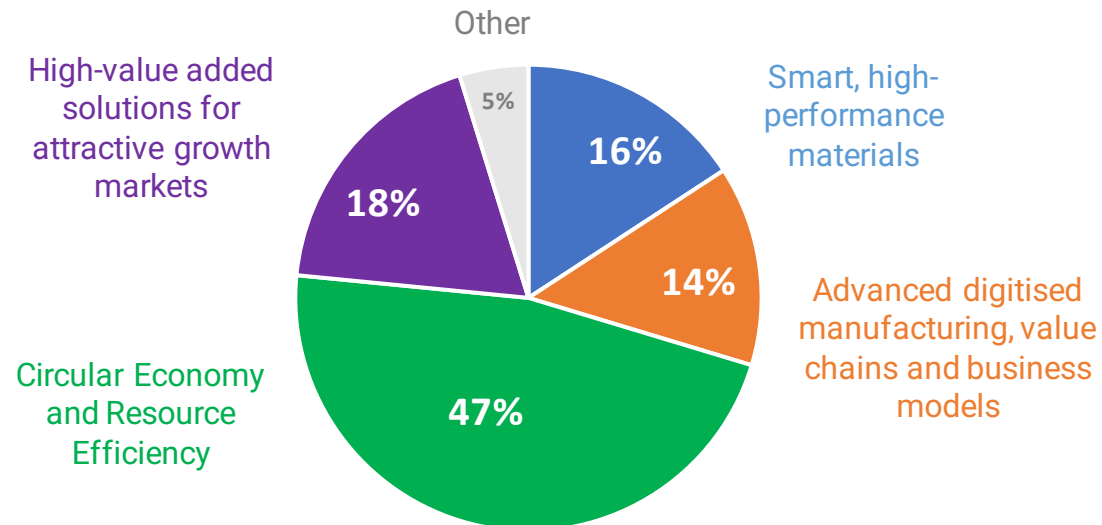


# ► Textile sector: trends in EU Funded projects

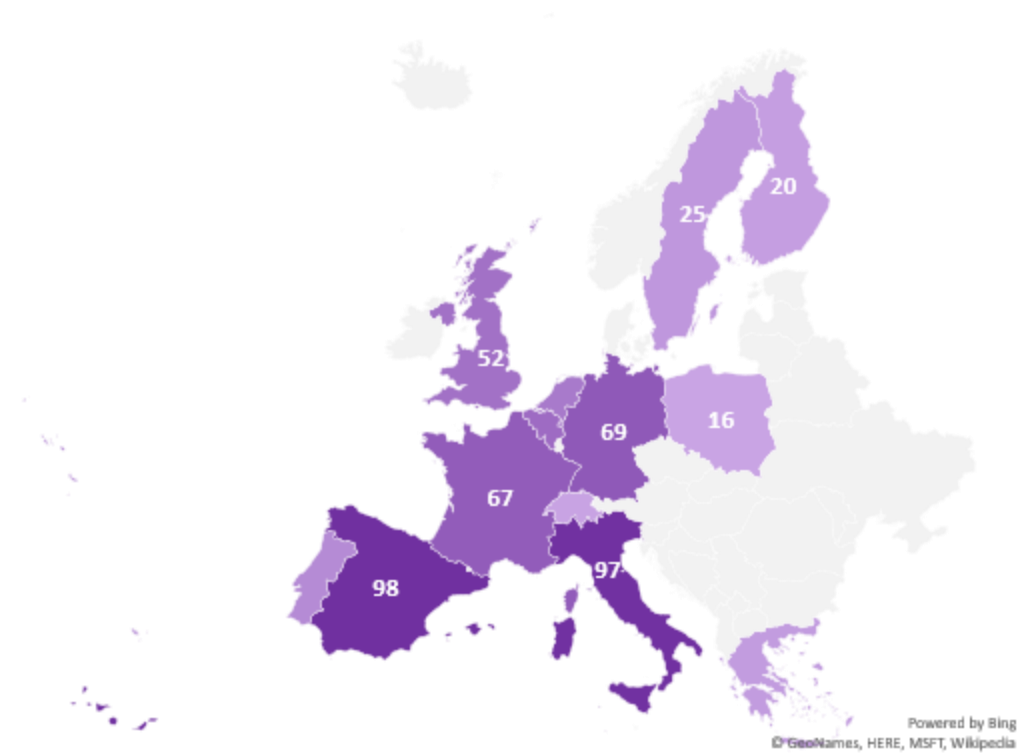
NUMBER OF EU PROJECTS IN THE TEXTILE SECTOR



DISTRIBUTION PER TOPIC



TOP PARTICIPANT COUNTRIES

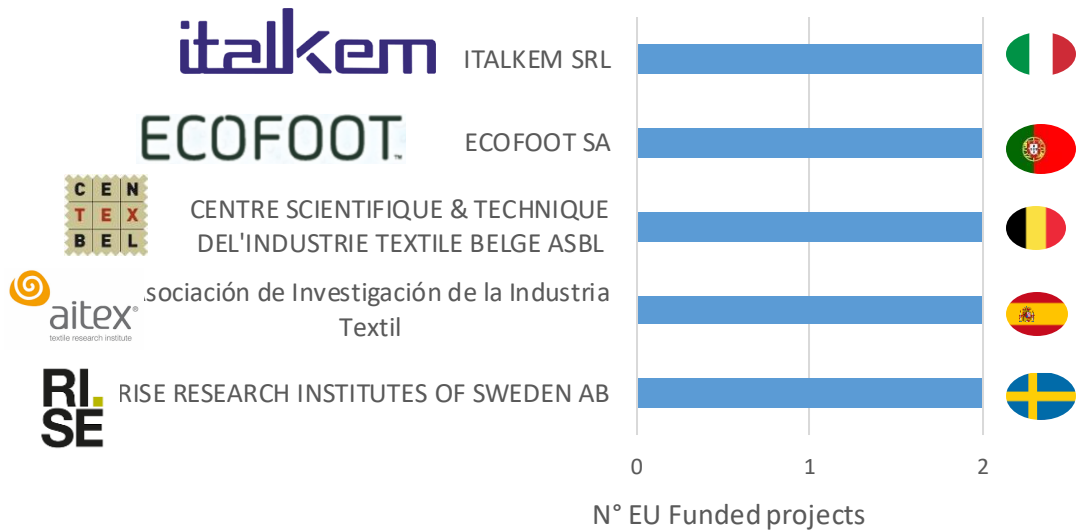


# ► Textile sector: trends in EU Funded projects

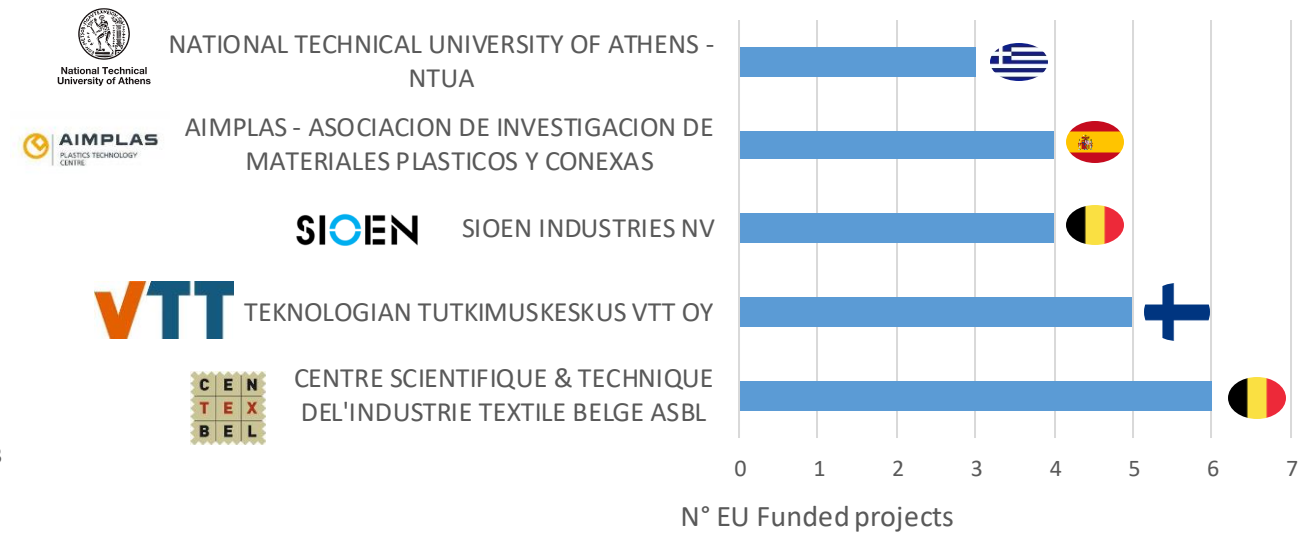
## CIRCULAR ECONOMY AND RESOURCE EFFICIENCY

Top organisations involved in the EU project (circular economy and resource efficiency sector)

### COORDINATORS



### PARTICIPANTS



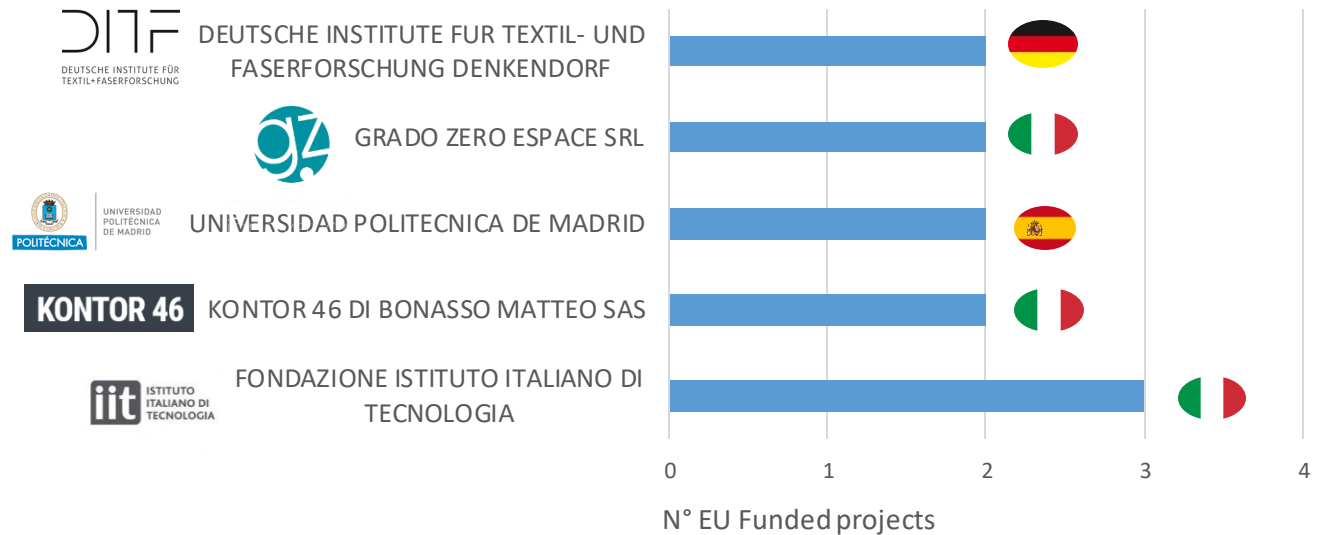
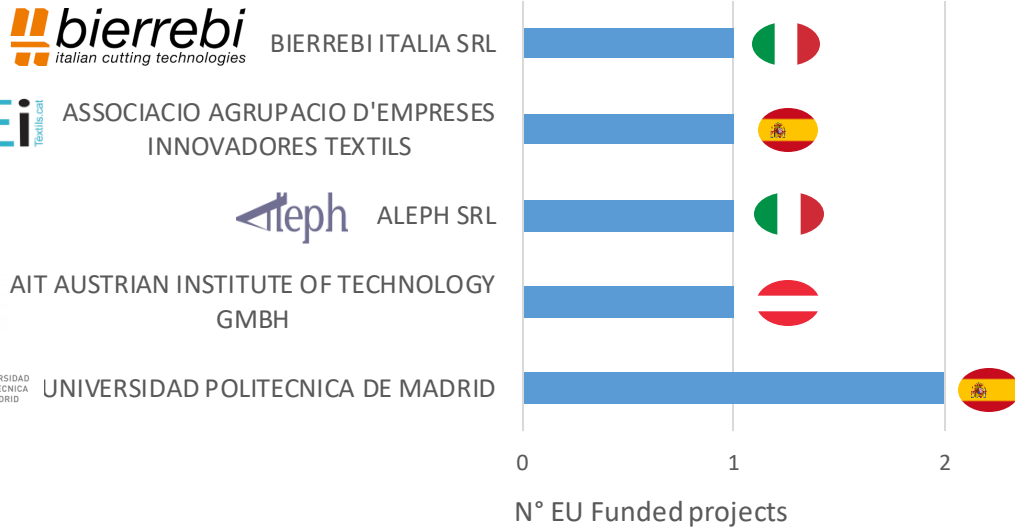
# ► Textile sector: trends in EU Funded projects

## ADVANCED DIGITISED MANUFACTURING, VALUE CHAINS AND BUSINESS MODELS

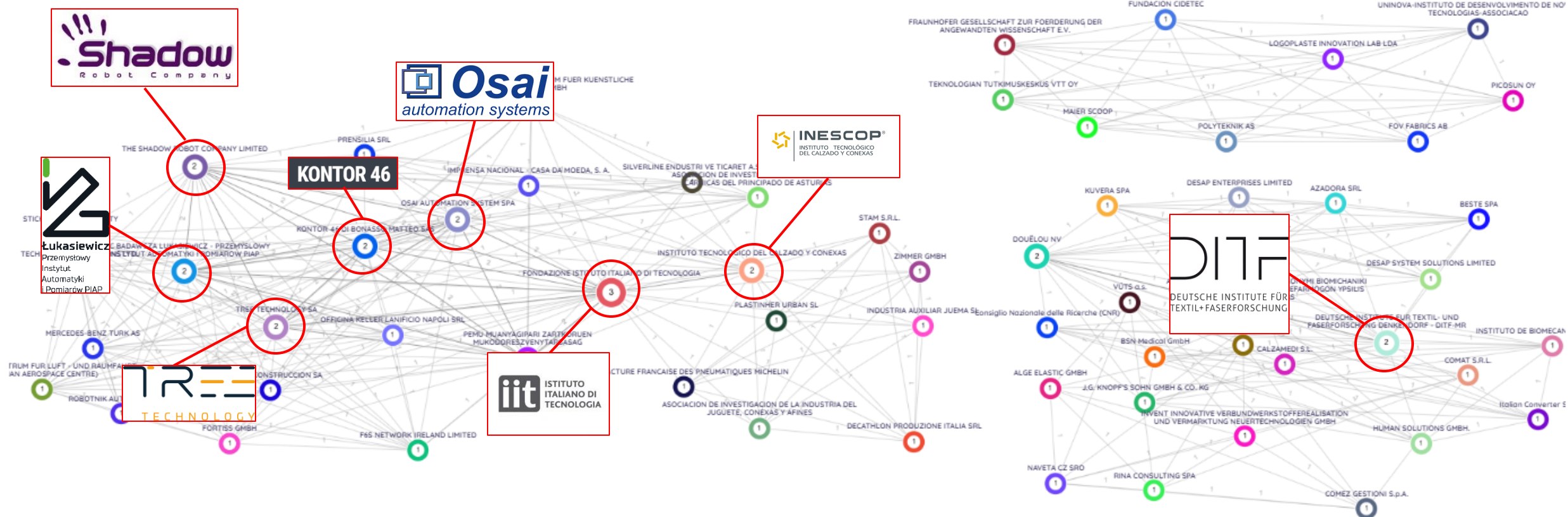
Top organisations involved in the EU project (Advanced digitised manufacturing, value chains and business models)

### COORDINATORS

### PARTICIPANTS



## ADVANCED DIGITISED MANUFACTURING, VALUE CHAINS AND BUSINESS MODELS

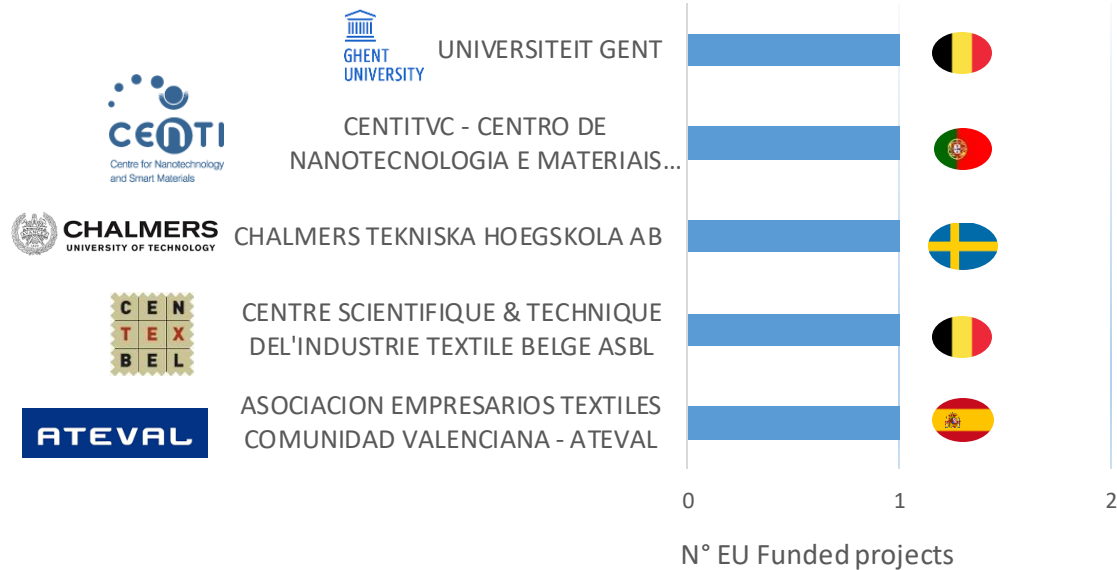


# ► Textile sector: trends in EU Funded projects

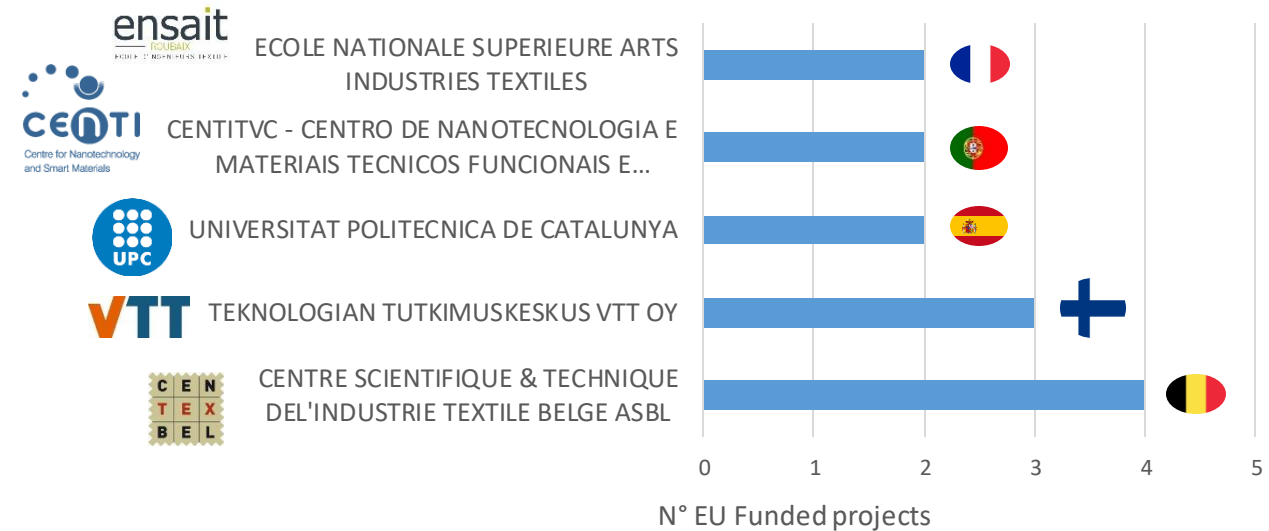
## SMART, HIGH-PERFORMANCE MATERIALS

Top organisations involved in the EU project (Smart, high-performance materials)

### COORDINATORS



### PARTICIPANTS

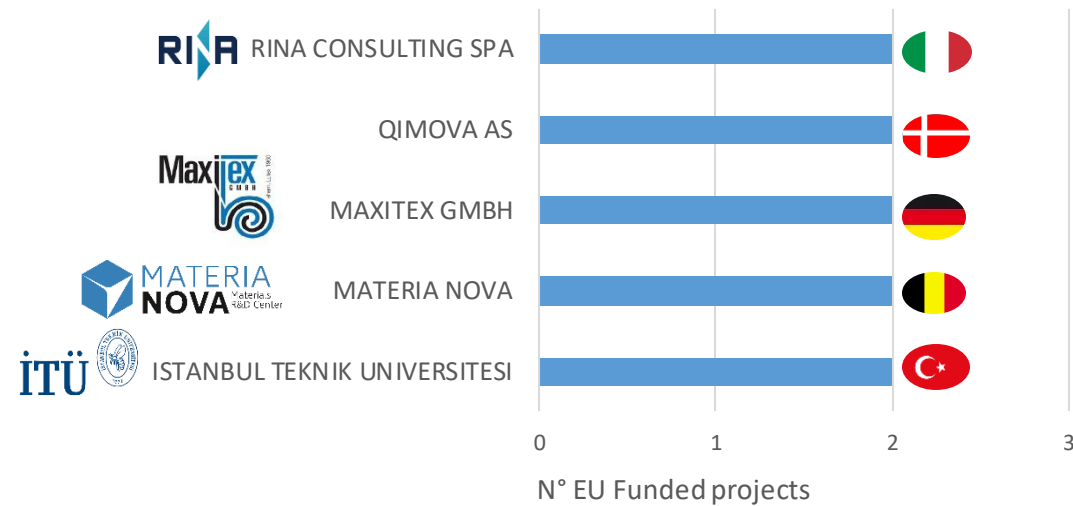


# ► Textile sector: trends in EU Funded projects

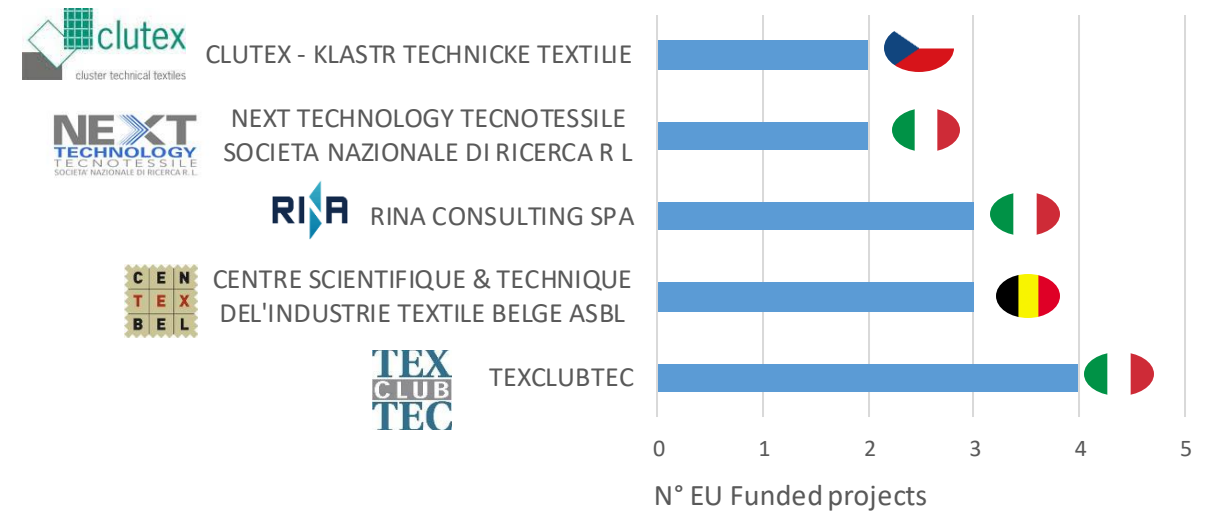
## HIGH-VALUE ADDED SOLUTIONS FOR ATTRACTIVE GROWTH MARKETS

Top organisations involved in the EU project (High-value added solutions for attractive growth markets)

### COORDINATORS



### PARTICIPANTS





# Funded projects as use-case in the textile industry



# CASE STUDY 1: GLAUKOS

The EU-funded Glaukos project aims to **develop innovative and environmentally sustainable textile fibres** and coatings – with a particular focus on fishing gear and clothing – that offer the required performance but avoid the current environmental persistence.

The complete life cycle of these textiles will be redesigned: their sustainability performance (i.e. biodegradability and bio-recyclability) will be enhanced significantly, while their technical performance will be matched to end-user requirements.

**This will help the textile industry to migrate to a circular approach**, reducing its carbon and plastic footprint. It will redesign the lifecycle of the textiles, enhancing their biodegradability and bio-recyclability while minimising microplastic leakage into the environment.

- Call: H2020-BBI-JTI-2019
- Funding scheme: BBI-RIA - Bio-based Industries Research and Innovation action
- Project start date: 1 June 2020
- Project end date: 31 May 2024
- Coordinator: BIO BASE EUROPE PILOT PLANT VZW (Belgium)
- Total budget: € 4 570 355



## OBJECTIVES

- **Increase the bio-based content** of polyester and polyamide textile products
- Mitigate microplastic pollution by **increasing the biodegradation rate of materials** compared to conventional (micro) plastics.
- Ensure the improved biodegradation rate does not undermine technical performance and durability, to **ensure the effective and long-term use of textile products**.
- **Boost the bio-recycling potential of the GLAUKOS polymer textile products** by developing a recycling biocatalyst.

# CASE STUDY 1: GLAUKOS

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## GLAUKOS - Circular solutions for the textile industry



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**This will help the textile industry to migrate to a circular approach**, reducing its carbon and plastic footprint. It will redesign the lifecycle of the textiles, enhancing their biodegradability and bio-recyclability while minimising microplastic leakage into the environment.

### EXPECTED OUTCOMES

Glaukos **will develop eco-designed finishing gear and clothing**, and scale-up their production process, all the way from renewable feedstock to textile prototype and ending with two end-of-life (EOL) solutions: **biodegradation and bio-recycling**.



Belgium



Belgium



Belgium



Belgium



Denmark



Germany



Germany



Italy



Netherlands



Netherlands



Slovakia

# CASE STUDY 2:

## LIFE

## TEXTILEATHER

- Funding scheme: LIFE Programme
- Project start date: 02-JUN-2014
- Project end date: 31-MAY-2017
- Coordinator: ATEVAL - Asociación de Empresarios Textiles de la Comunidad Valenciana (Spain)
- Budget: € 942,842.00

LIFE TEXTILEATHER - Functional textiles and leathers by innovative MLSE process



LIFE TEXTILEATHER project focuses on the **implementation of Multiple Laser Surface Technology (MLSE®) – originally developed in the field of metal industry - for the treatment of textiles and leathers in order to provide them with functional properties.**

The proposed MLSE technology is a dry, continuous process able to significantly reduce the environmental impact of textile and leather finishing operations, especially in case of water- proofing, fire-retardant and antibacterial properties.

**Environmental impacts:** Reduction of greenhouse gas emissions, chemicals and water consumption, as well as energy consumption (normally associated to the traditional finishing treatments)

### OBJECTIVES

- Demonstrate, **on a semi-industrial scale**, the technical, environmental and financial feasibility of the MLSE technology for the treatment of textiles and leather.

### TECHNICAL ACTIVITIES

- Selection of parameters to be optimised for textiles treatment.
- Adaptation of MLSE process for textiles and leather treatment in the demonstration plant.
- Characterisation of functional textiles and leather.
- Validation of the technology. Goods prototypes manufacturing.



# CASE STUDY 2:

## LIFE

## TEXTILEATHER

- Funding scheme: LIFE Programme
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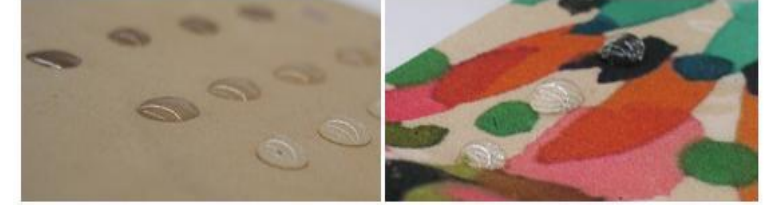
LIFE TEXTILEATHER - Functional textiles and leathers by innovative MLSE process



### RESULTS



Improved fire resistance



Strain resistance (hydrocarbon resistance Grade 7)



Textile prototypes obtained with the MLSE process

**ATEVAL**

Association of Textile  
Entrepreneurs of the Valencian  
Community

**ATHENEA**

Spanish textile industry



Spanish Cluster of  
footwear industries



Italian tannery

**INESCOP**  
INSTITUTO TECNOLÓGICO  
DEL CALZADO Y CONEXAS

Technological Institute for  
footwear and related industries

## CASE STUDY 3: PROTECT (I)

- Call: H2020-NMBP-PILOTS-2016
- Funding scheme: IA - Innovation action
- Project start date: 1 January 2017
- Project end date: 30 June 2021
- Coordinator: UNIVERSITAT POLITECNICA DE CATALUNYA (Spain)
- Budget: € 9 441 862,50

PROTECT - Pre-commercial lines for production of surface nanostructured antimicrobial and anti-biofilm textiles, medical devices and water treatment membranes



**Summary:** PROTECT aims to introduce to the market **One step antimicrobial finish processes for polymeric materials** used in different applications including **specialty textiles for public areas and hospitals**. Compared to main existing manufacturing routes, the proposed one-step coating technologies are simple, fast, and reproducible. PROTECT will upgrade the nanocoating One step process platform comprising: **two roll to roll (R2R) pilots (sonochemical and spray coating) for functional textiles production**.

### OBJECTIVES

- Establishment of **pre-commercial nanoparticle (NPs) coating lines** for production of a large spectrum of 2D and 3D antimicrobial products
- Advanced low-cost, sustainable and safe coating processes and products
- Novel highly efficient antimicrobial and anti-biofilm NPs
- *In situ* monitoring and control of NPs coating processes and products
- Shelf-life monitoring of the antimicrobial and anti-biofilm performance of the products
- New **functional products** with improved performance, such as **antimicrobial textiles**

### WORK PLAN

- Production and assembly of the pre-commercial nano-coating lines and production of NPs
- *In situ* process monitoring
- Environmental and human safety assessment of the new coating process and products
- In situ monitoring and control of NPs coating processes and products
- End product manufacturing in an industrial relevant environment and characterization



## CASE STUDY 3: PROTECT (II)

**PROTECT** - Pre-commercial lines for production of surface nanostructured antimicrobial and anti-biofilm textiles, medical devices and water treatment membranes



### OUTCOMES

**Innovation developed:** Novel antimicrobial textiles

**Market Maturity of the Innovation:** 'Tech Ready', i.e. innovation that is progressing on technology development process (e.g. pilots, prototypes, demonstration)

**Go to Market needs:**

Prepare for Market entry

Secure capital

Scale-up market opportunities

### Key innovators



Maroco LDA (PT,  
Large industry)



Tessitura Pertile srl  
(IT, SME)



Klopman  
International Srl  
(IT, Large industry)

- **Call:** H2020-NMBP-PILOTS-2016
- **Funding scheme:** IA - Innovation action
- **Project start date:** 1 January 2017
- **Project end date:** 31 December 2020
- **Coordinator:** UNIVERSITAT POLITECNICA DE CATALUNYA (Spain)
- **Budget:** € 9 441 862,50



R2R sonochemical fabric coating machine for hospital textiles at Klopman

## CASE STUDY 4: SMARTEX (I)

- **Call:** H2020-EIC-SMEInst-2018-2020-3
- **Funding scheme:** SME-2b - SME Instrument (grant only and blended finance)
- **Project start date:** 1 February 2020
- **Project end date:** 31 January 2022
- **Coordinator:** SMARTEX UNIPessoal LDA (Portugal)
- **Budget:** € 1 464 375

SMARTEX - Detection of defective textile production

SMARTEX.AI

The textile manufacturing process has several sources of defects, but more than 80 % of those originate from the knitting stage. Detecting these defects early in the production chain is difficult. **The EU-funded SMARTEX project has developed a solution to help reduce defective production levels from 5 % to near zero.** Its online software as a service (SaaS) is based on computer vision, machine learning and artificial intelligence and aims to become the main solution for the automation of the inspection processes in the textile industry. The technology has already performed successfully in real short-term environmental tests.

### STARTING MATURITY OF THE INNOVATION

SMARTEX devices are in a **prototype stage (TRL 6)**, since real short-time environment tests have been successfully performed and the market-fit is also validated by multiple LOIs and prices agreed with potential clients, including Decathlon group, PVH (Calvin Klein, Tommy Hilfiger, etc.), Kering (Gucci, YSL), in different continents.

### ACTIVITIES

- Engineering & Product Development activities (including hardware development in real textile industries)
- Preparation of pilots and production lines

### RESULTS REACHED SO FAR

Since October 2020, the Smartex pilots developed and manufactured under the project created:

- financial benefit of over 27 000€ (by saving raw material)
- Saving of 600 000 Liters of water by avoiding the defective fabrics to proceed after the knitting stage
- 48 500 kWh of energy and 12 000 Kg of CO2 savings



# The EU agri-food sector



# ► Megatrends affecting the agri-food sector

- 10 billion people in 2050
- Growing income per capita and increasing urbanisation

## Demographic and income trends



- Growing income per capita and increasing urbanisation generate higher and different food consumption per capita

## Consumption patterns and emerging trends



- Technological innovation could increase yields by 30%, enhance technological efficiency, create new business models

## Technological changes



- Agriculture itself is responsible for high GHG emissions
- Higher rates of undernutrition due to availabilities of fewer calories per capita

## Climate change



- One third of world's food is being lost or wasted
- Food losses or wasted are estimated to be 1.3 billion tonnes per year

## Food waste



- Natural resources for agriculture will become even more scarce by 2050
- About 70% of all water usage is meant for agriculture

## Competition for natural resources



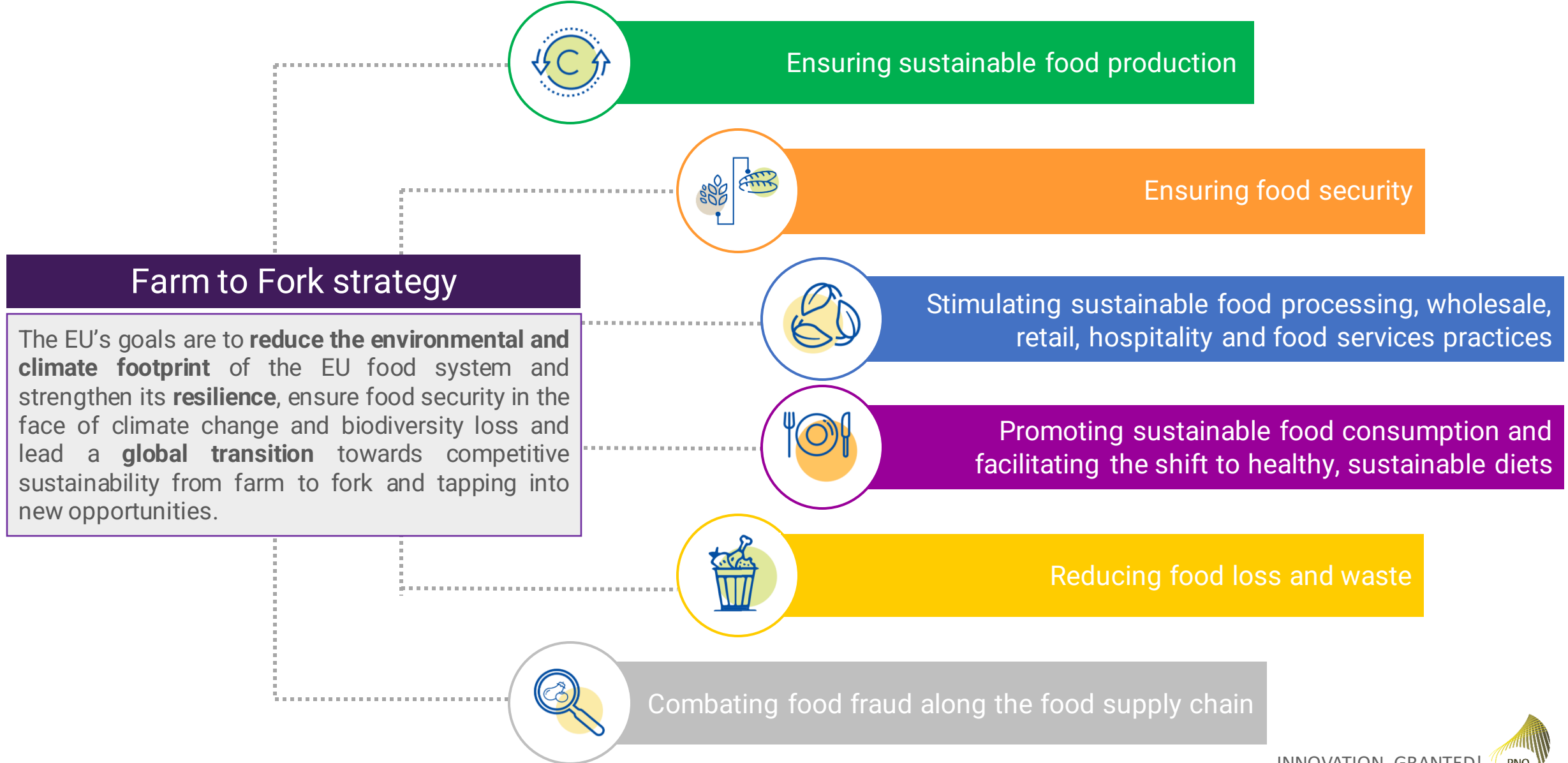


# ► Main policies and directives related to the agro-food sector



EU aims to create a sustainable food system that safeguards food security and protects people and the natural world

# ► Toward sustainability in the agri-food sector





# ► Innovation areas in the agro-food sector

## *Innovation in the production process*

- **Digital agriculture:** digital, communication and improved decision-making tools through ICT and sensor-based technologies
- **Novel cultivars:** novel cultivars with increased productivity and reduced reliance on inputs)
- **Climate control:** new detection tools for climate change issues, e.g. smart irrigation system, improved and new warning system, innovative diagnostic systems
- **Chemicals free:** minimising chemical residues, increasing the use of pest control and novel alternative fertilisers
- **Vertical farming and greenhouses:** optimization of plant growth and soilless farming techniques increased crop yield lowering land requirement
- **Alternative proteins:** solutions replacing conventional animal proteins

## *Innovation in processing*

- **Minimally processed products:** non thermal product preservation, e.g. high hydrostatic pressures, pulsed electric field, ozonation, ultrasonic
- **Products control:** technologies used for the detection of contaminated and defective fresh products, and chemical and biological contamination on food products and processing surfaces
- **Smart food processing:** use of Advanced Manufacturing technologies, IoT, sensors, robotics and other technological solutions in food processing activities (including product control)
- **Reduction of food losses and waste:** technologies used to minimise the food losses during the post-harvesting and processing steps

## *Innovation in the distribution and packaging*

- **Packaging solutions:** active, intelligent and smart packaging to extend the shelf life of products and improve environmental impacts
- **High-tech traceability:** full traceability throughout the food sector
- **Integration:** increased integration of the food sector by a systematic organization and involvement of operational groups and computing algorithms

## *Innovation in the consumption*

- **Sustainability:** new consumer trends, e.g. short supply chain and organic products
- **Tailored consumer products:** innovative processed products tailored to consumers' segments, such as vegan, vegetarian, overweight, diabetics, etc
- **Alternative proteins:** consumption of plant-based food and alternative proteins
- **New flavours:** consumption of new ingredient and food with different flavours

# ► Funding opportunities for the agro-food industry to address these themes

**Horizon Europe**

THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021–2027)



## HEU Pillar II – Global Challenges & European Industrial Competitiveness

### Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture & Environment

- Fair, healthy and environment-friendly food systems from primary production to consumption (FARM-TO-FORK)
- Circular economy and bioeconomy sectors

## HEU Pillar III – Innovative Europe

### EIC Accelerator

The EIC Accelerator supports high-risk, high-potential **SMEs** and innovators to help them develop and bring onto the market new innovative products, services and business models that could drive economic growth.



## LIFE programme

The LIFE programme is the EU's funding instrument for the environment and climate action. The two relevant sub-programme are:

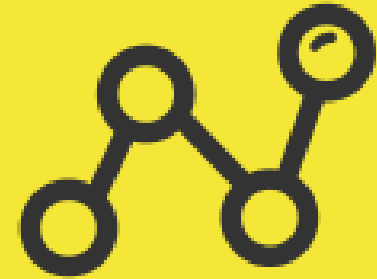
- Circular economy and quality of life sub-programme
- Climate Change Mitigation and Adaptation sub-programme

## CBE - Circular Bio-based Europe Joint Undertaking

The Circular Bio-based Europe Joint Undertaking (CBE JU) is a new **public-private partnership** and will be the successor of the previous Bio-based Industry (BBI JU).

CBE JU aims at further develop and expand the sustainable sourcing and **conversion of biomass into bio-based products via multiscale biorefineries across sectors** and regions in Europe.

# Innovation Trends in the agri-food sector

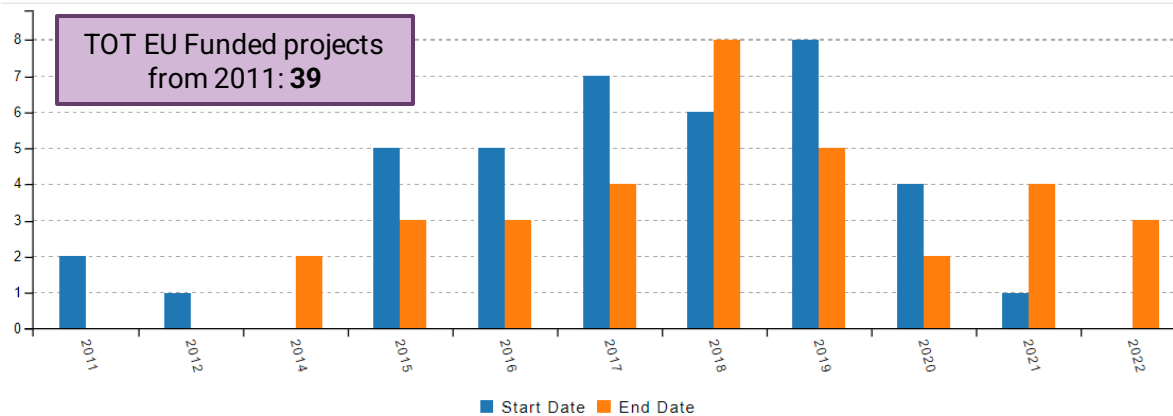


# ► Agro-food sector: trends in EU Funded projects

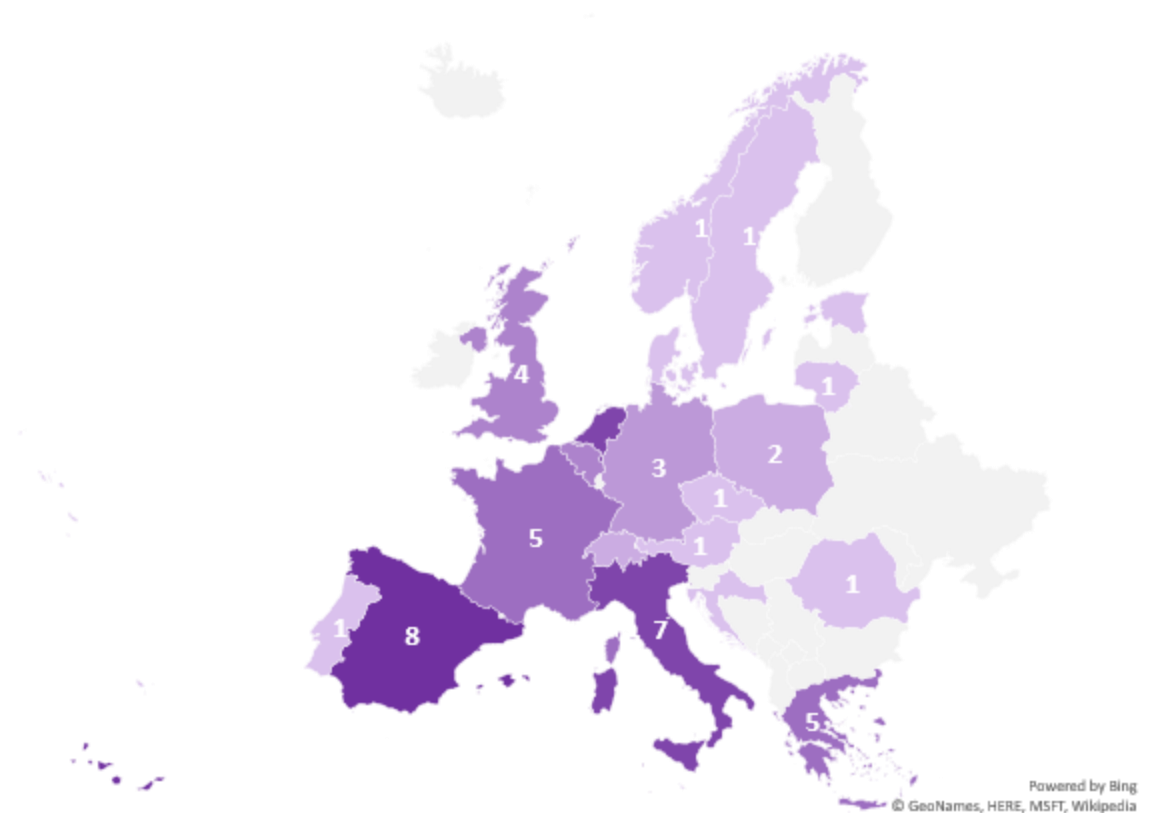
## INNOVATION IN THE PRODUCTION PROCESS – VERICAL FARMING AND GREENHOUSES



NUMBER OF EU PROJECTS ON VERTICAL FARM AND GREENHOUSES



TOP PARTICIPANT COUNTRIES



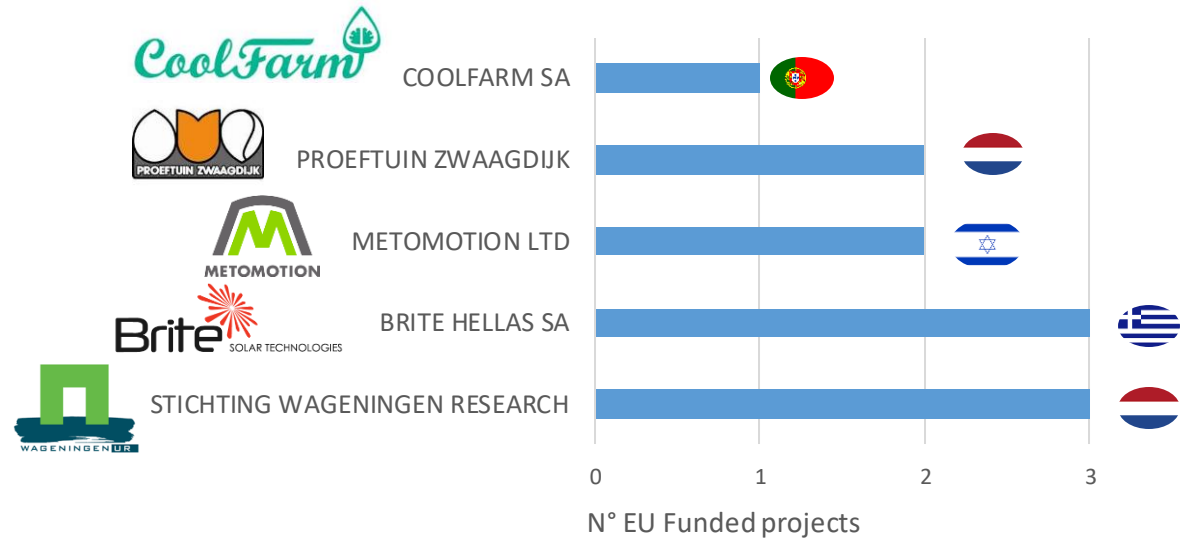
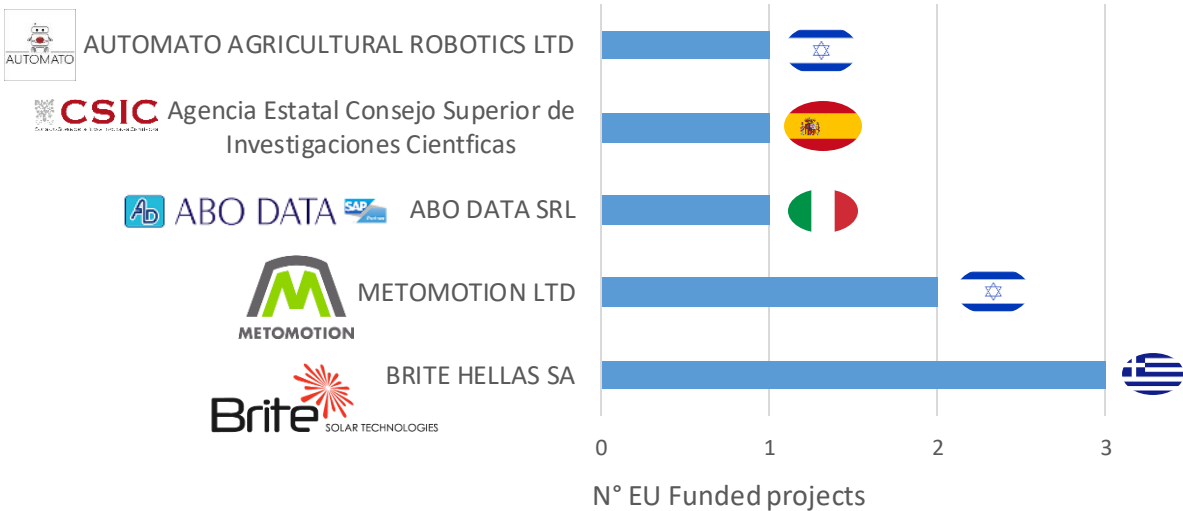
# ► Agro-food sector: trends in EU Funded projects

## INNOVATION IN THE PRODUCTION PROCESS – VERICAL FARMING AND GREENHOUSES

Top organisations involved in the EU project (Vertical farming and greenhouses)

### COORDINATORS

### PARTICIPANTS

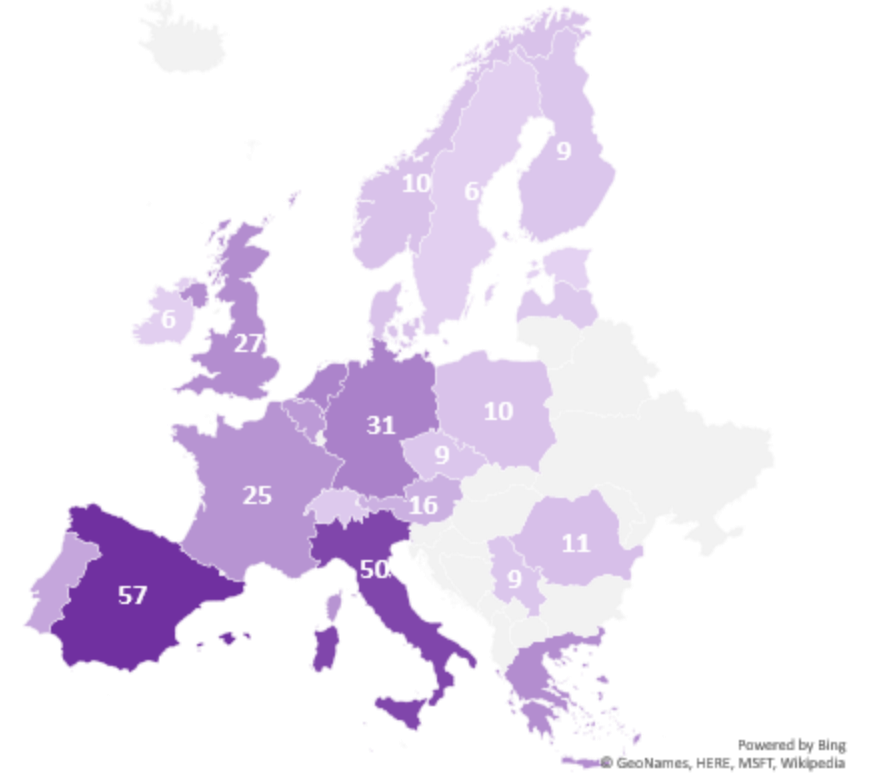


# ► Agro-food sector: trends in EU Funded projects

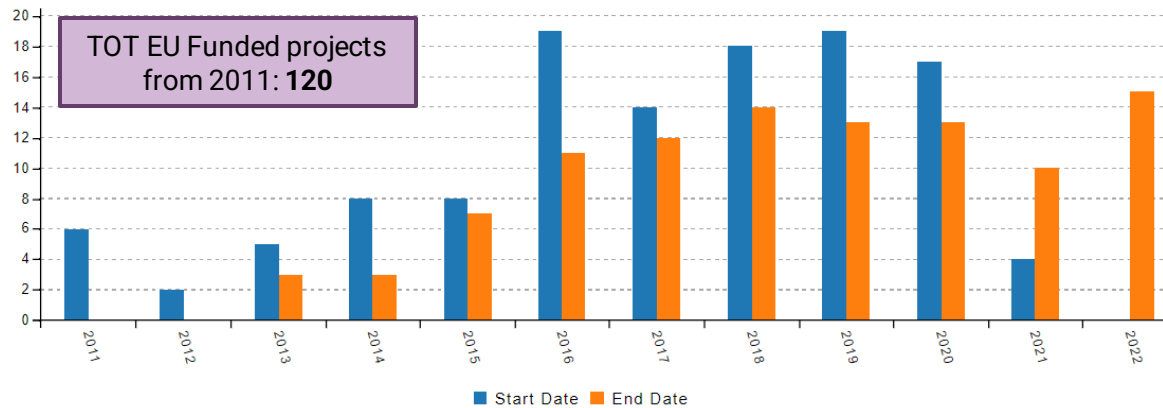
## INNOVATION IN THE PRODUCTION PROCESS – DIGITALISATION, AUTOMATION AND BIG DATA



### TOP PARTICIPANT COUNTRIES



### NUMBER OF EU PROJECTS ON DIGITALISATION, AUTOMATION AND BIG DATA FOR PRODUCTION



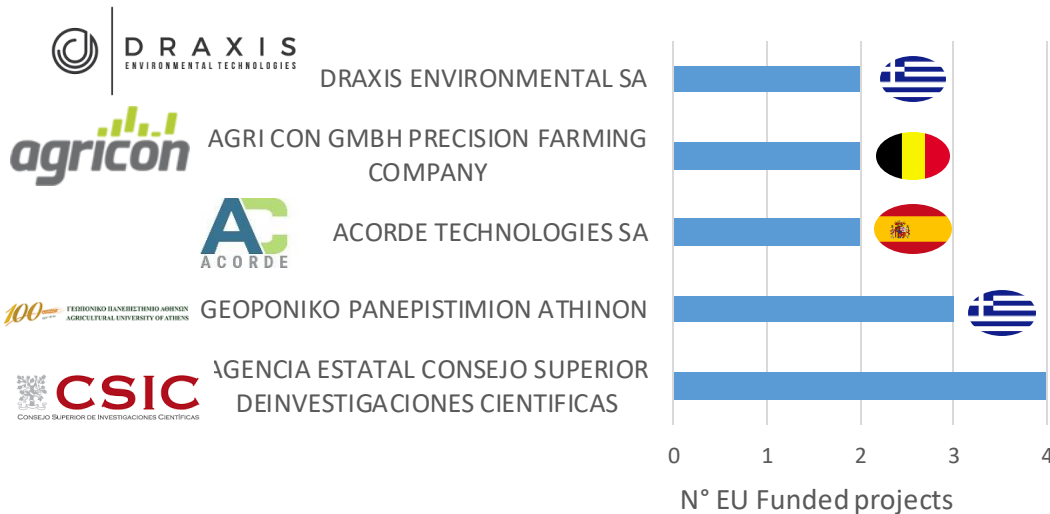


# ► Agro-food sector: trends in EU Funded projects

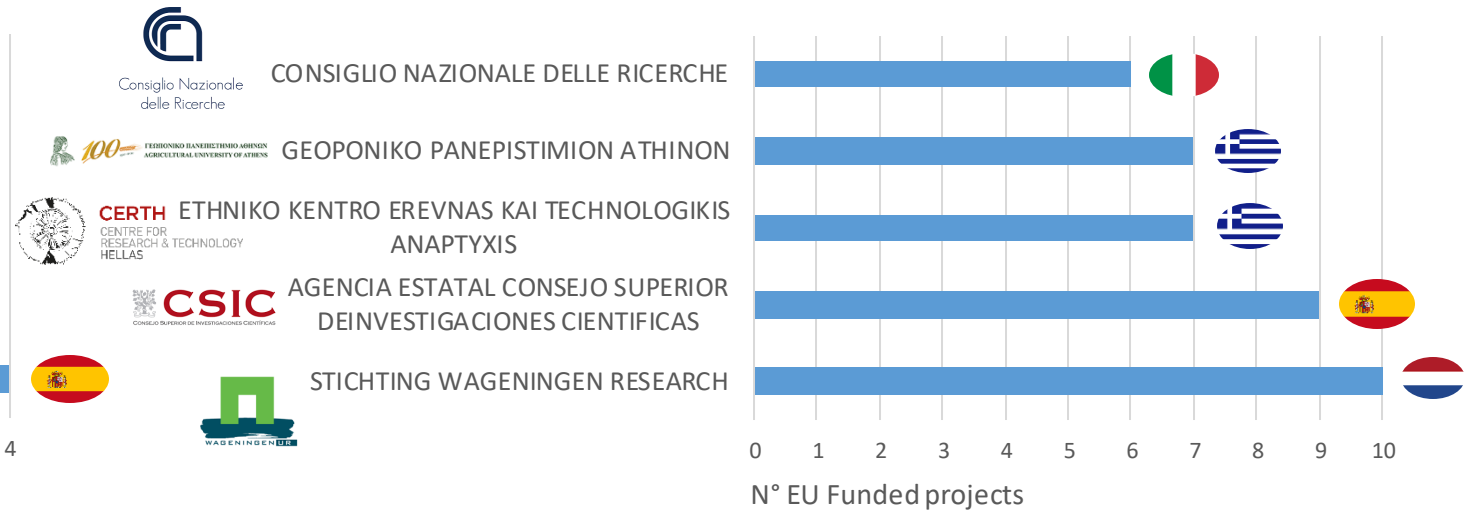
## INNOVATION IN THE PRODUCTION PROCESS – DIGITALISATION, AUTOMATION AND BIG DATA

Top organisations involved in the EU project (Digitalisation, automation and big data in production process)

### COORDINATORS



### PARTICIPANTS



# ► Agro-food sector: trends in EU Funded projects

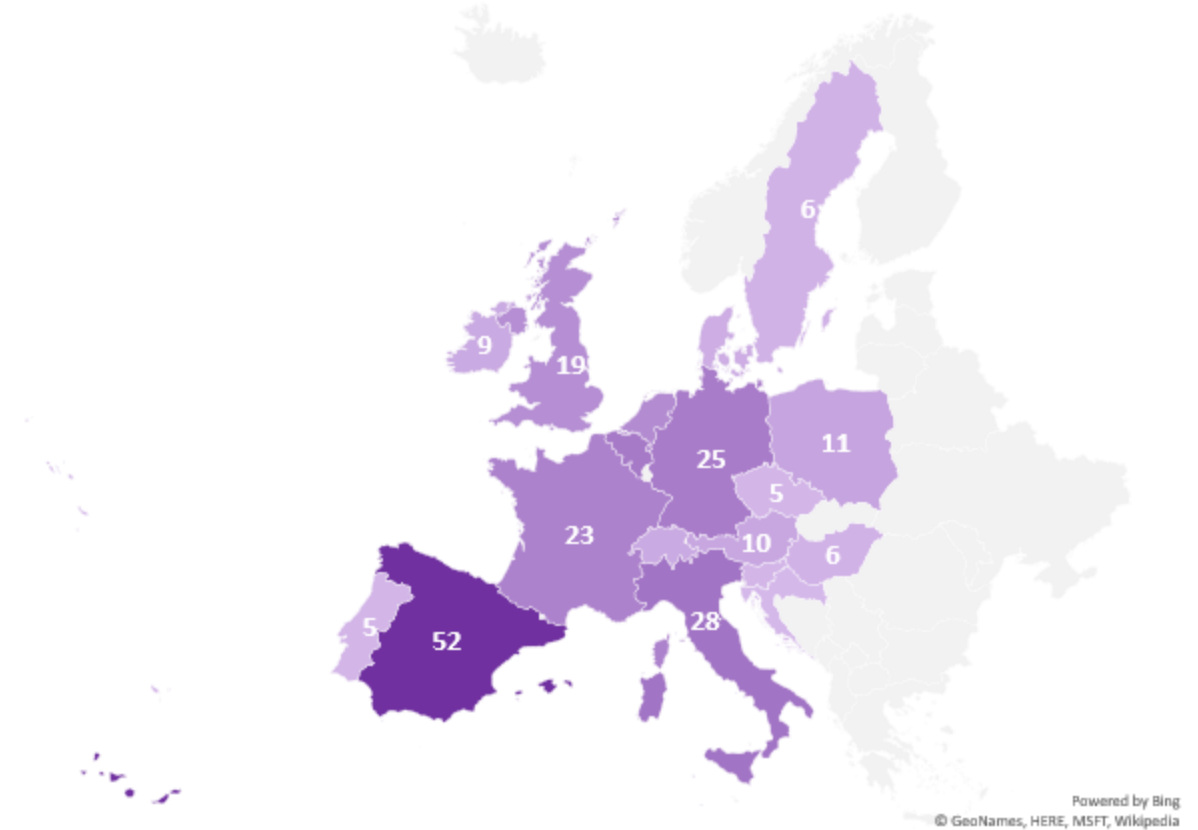
## INNOVATION IN THE PRODUCTION PROCESS – BIOFERTILISERS AND BIOPESTICIDES



NUMBER OF EU PROJECTS ON BIOFERTILISERS AND BIOPESTICIDES



TOP PARTICIPANT COUNTRIES



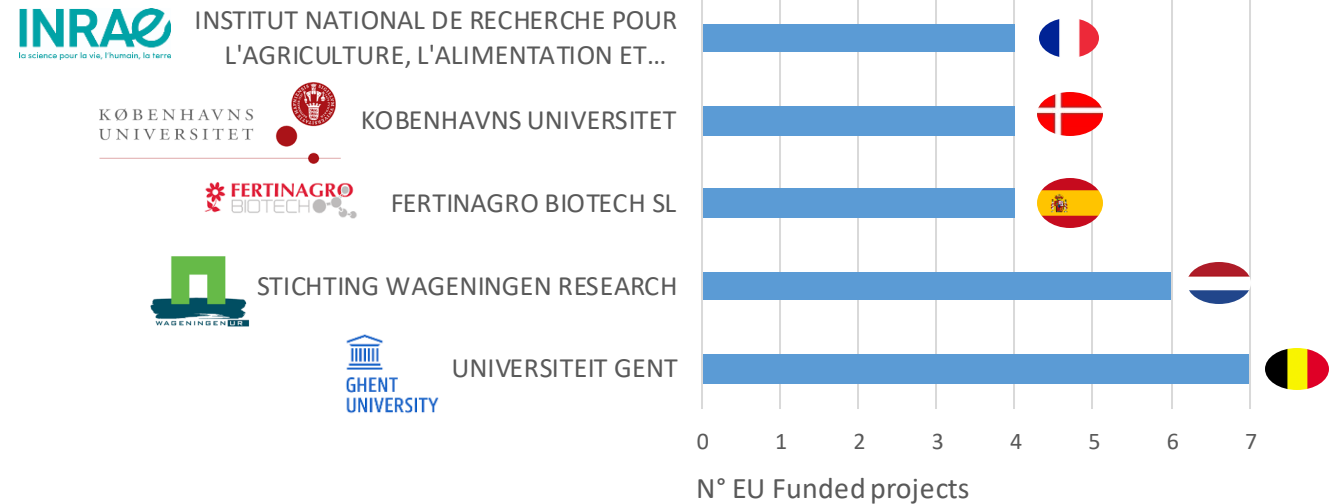
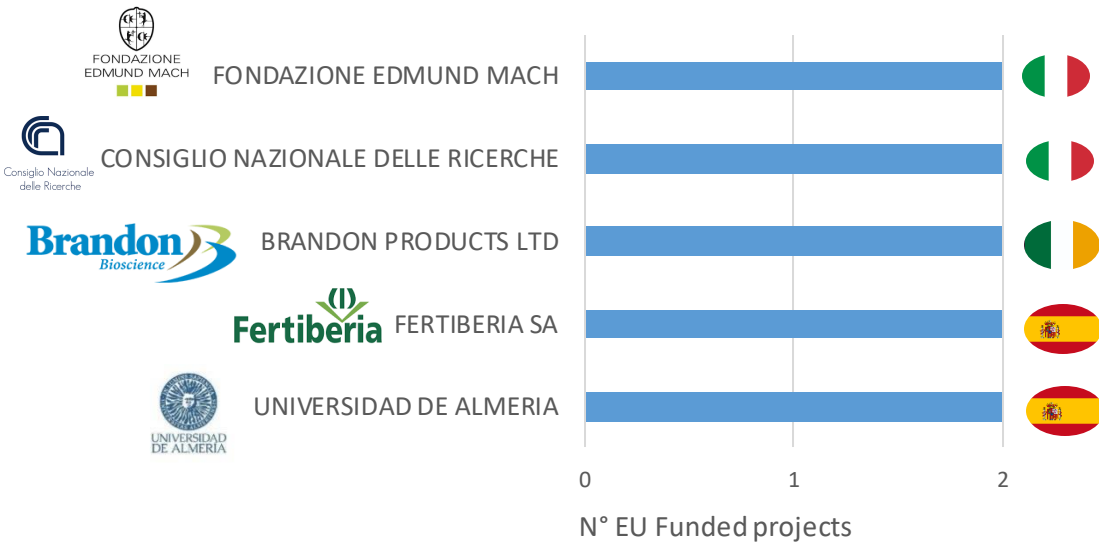
# ► Agro-food sector: trends in EU Funded projects

## INNOVATION IN THE PRODUCTION PROCESS – BIOFERTILISERS AND BIOPESTICIDES

Top organisations involved in the EU project (Biofertilisers and biopesticides)

### COORDINATORS

### PARTICIPANTS

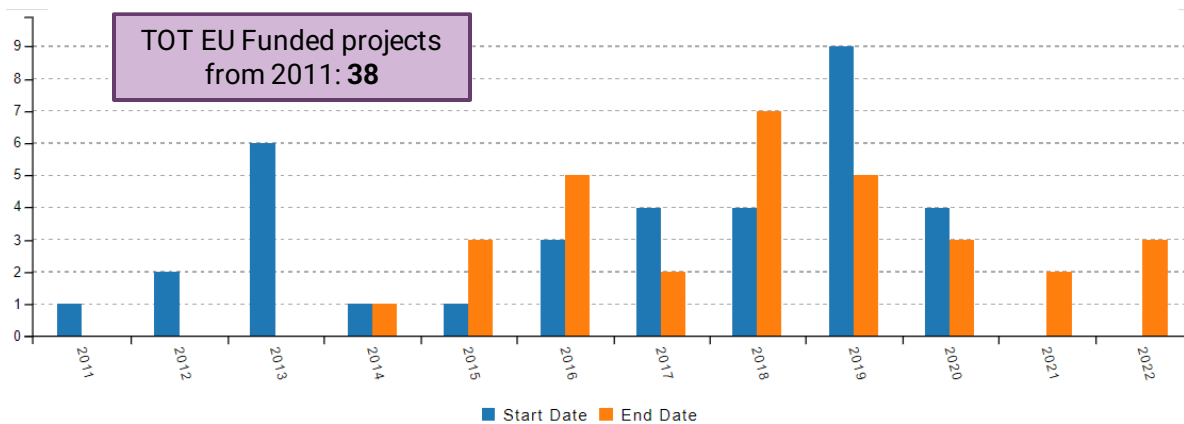


# ► Agro-food sector: trends in EU Funded projects

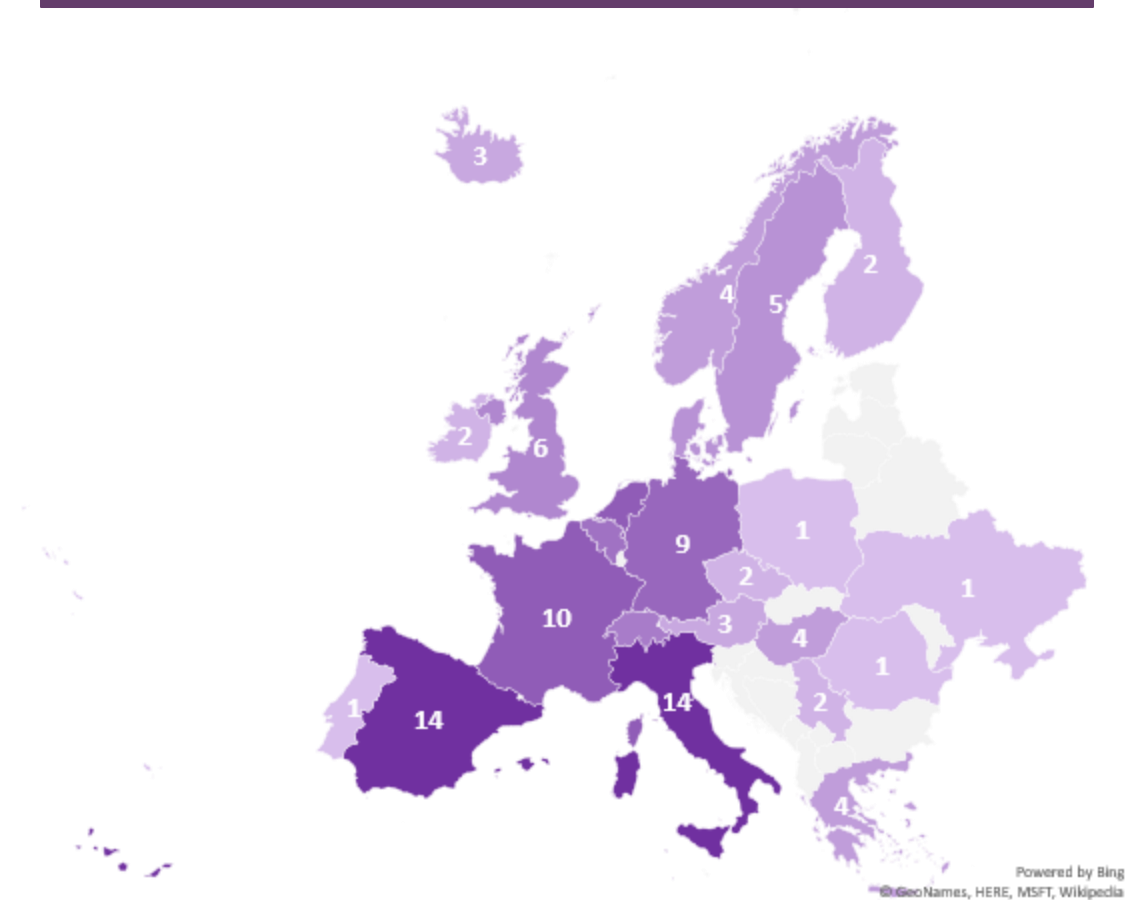
## INNOVATION IN THE FOOD PROCESSING – SMART FOOD PROCESSING



NUMBER OF EU PROJECTS ON SMART FOOD PROCESSING



TOP PARTICIPANT COUNTRIES

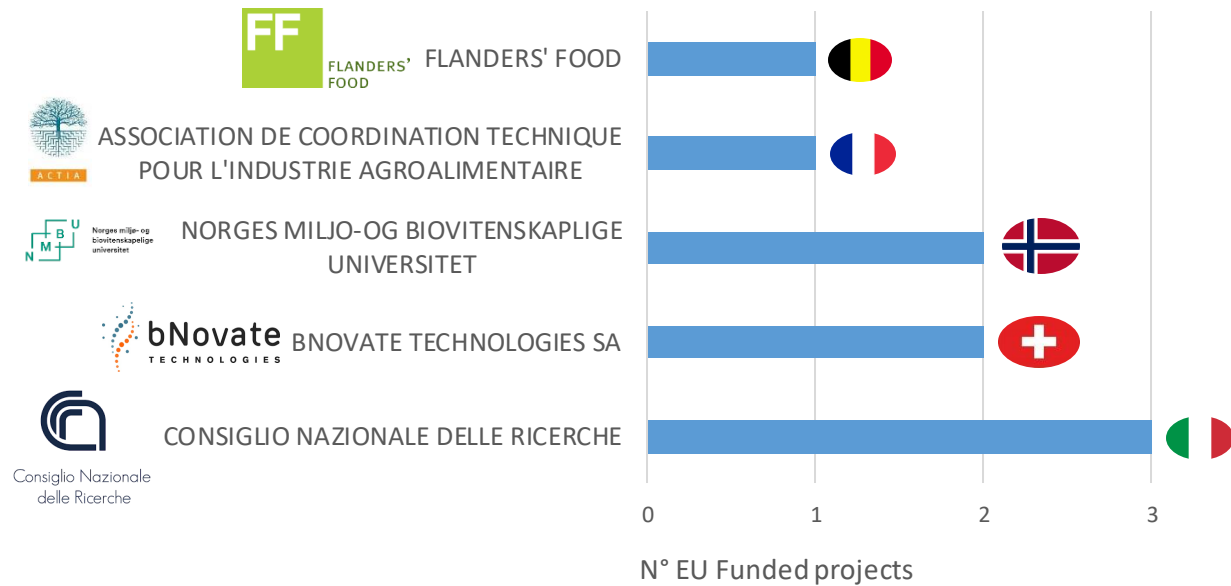


# ► Agro-food sector: trends in EU Funded projects

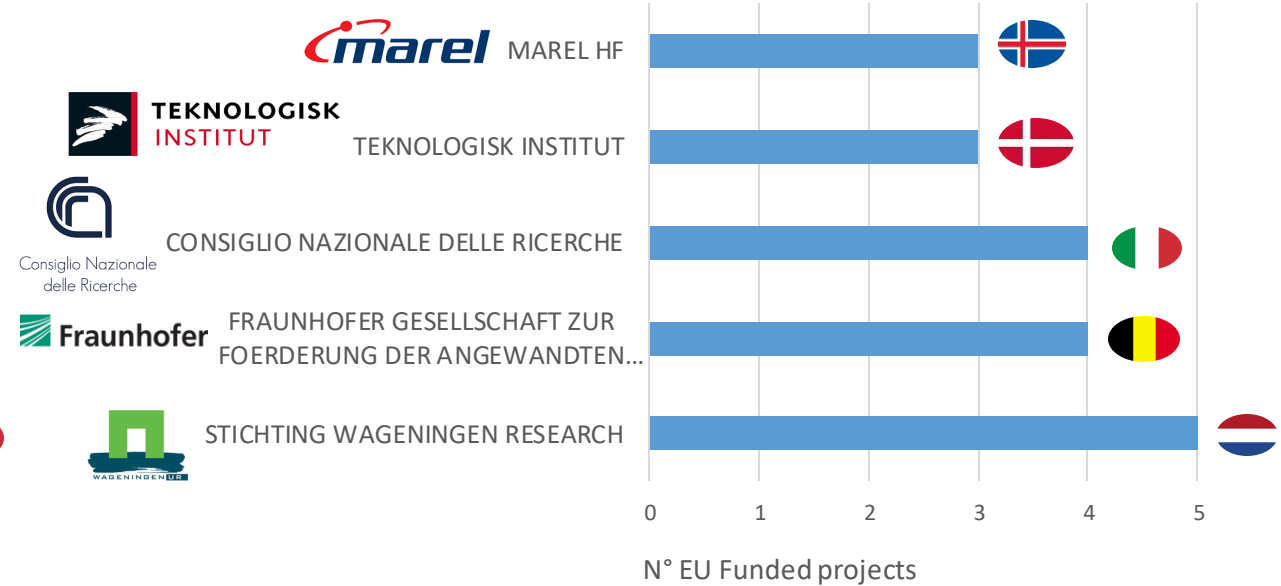
## INNOVATION IN THE FOOD PROCESSING – SMART FOOD PROCESSING

Top organisations involved in the EU project (Smart Food Processing)

### COORDINATORS



### PARTICIPANTS

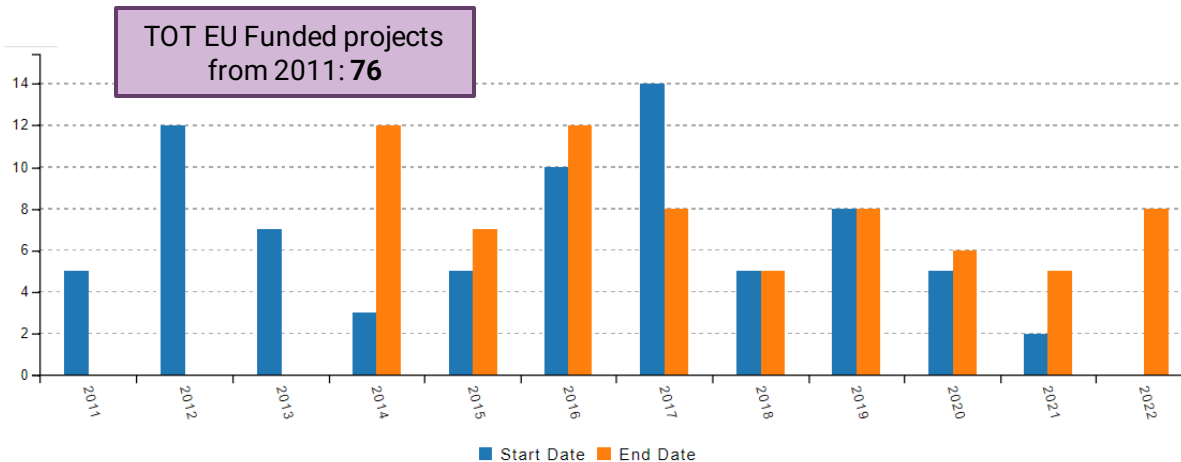


# ► Agro-food sector: trends in EU Funded projects

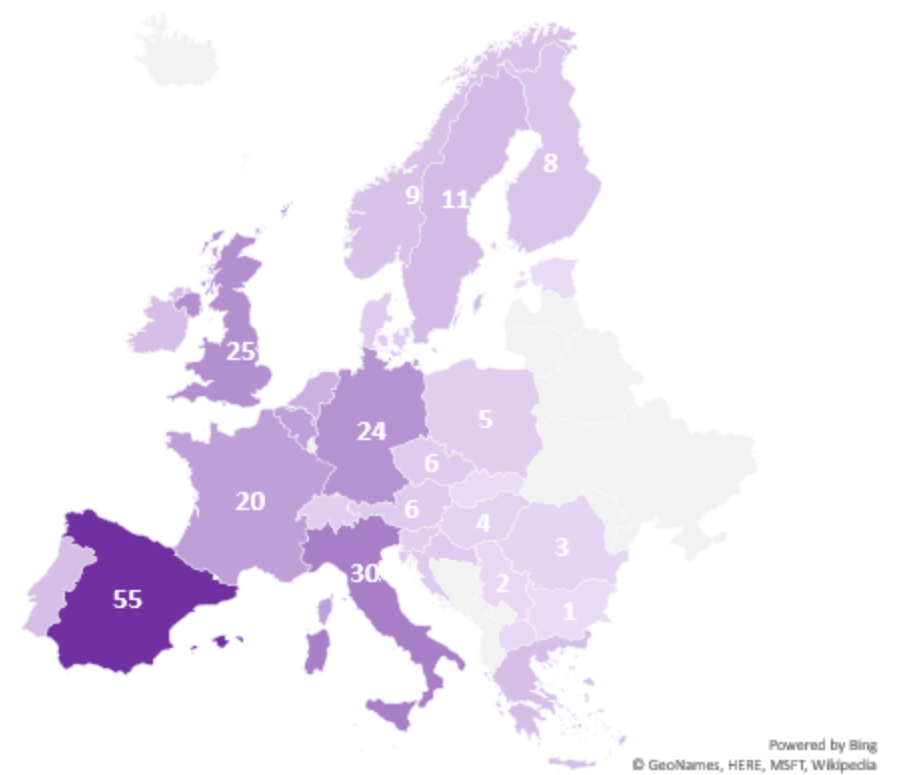
## INNOVATION IN THE DISTRIBUTION – FOOD PACKAGING



### NUMBER OF EU PROJECTS ON FOOD PACKAGING



### TOP PARTICIPANT COUNTRIES



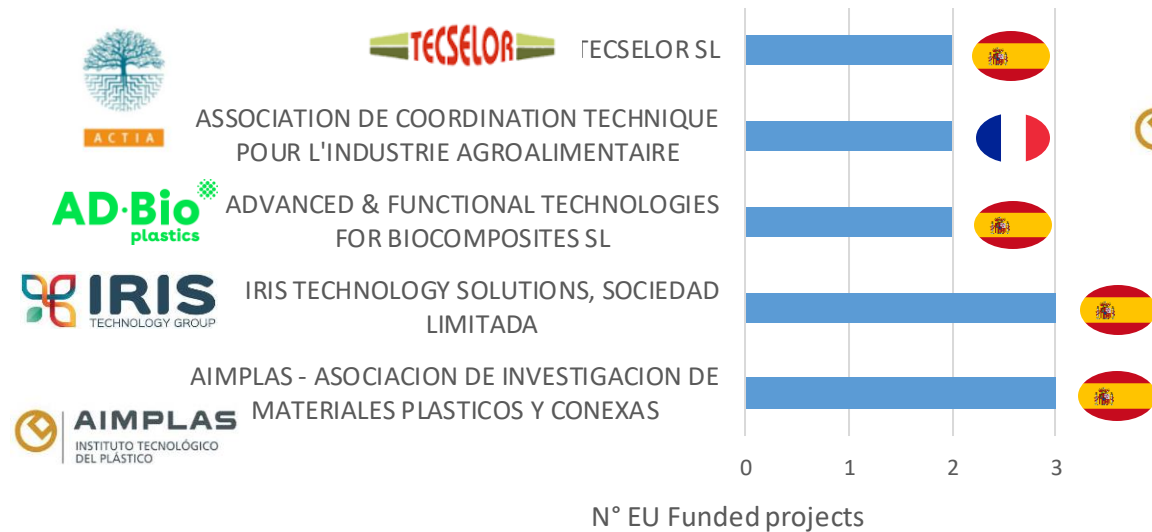


# ► Agro-food sector: trends in EU Funded projects

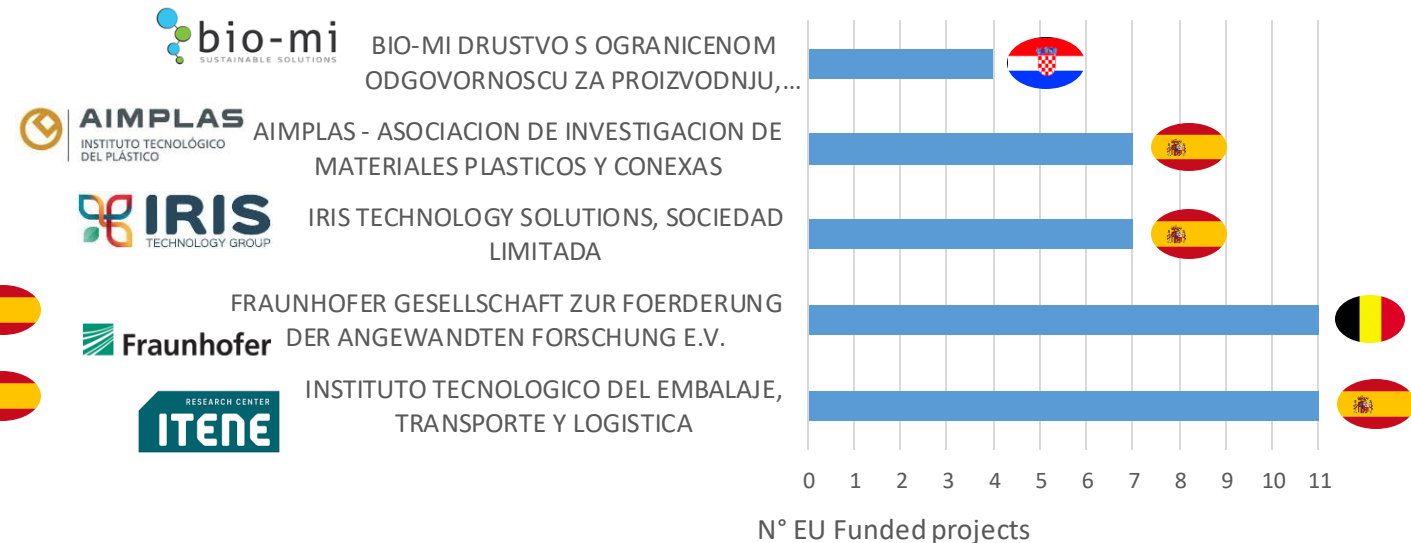
## INNOVATION IN THE DISTRIBUTION – FOOD PACKAGING

Top organisations involved in the EU project (Food packaging)

### COORDINATORS



### PARTICIPANTS

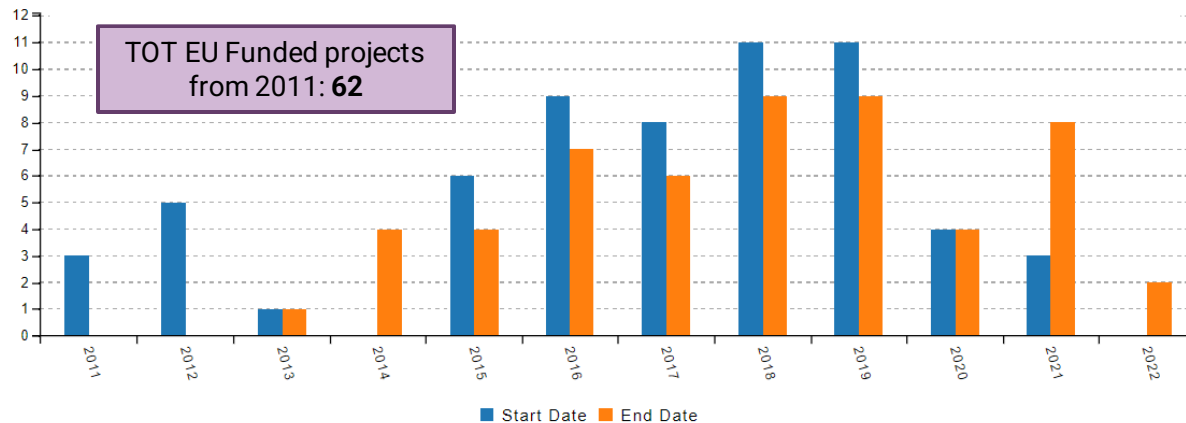


# ► Agro-food sector: trends in EU Funded projects

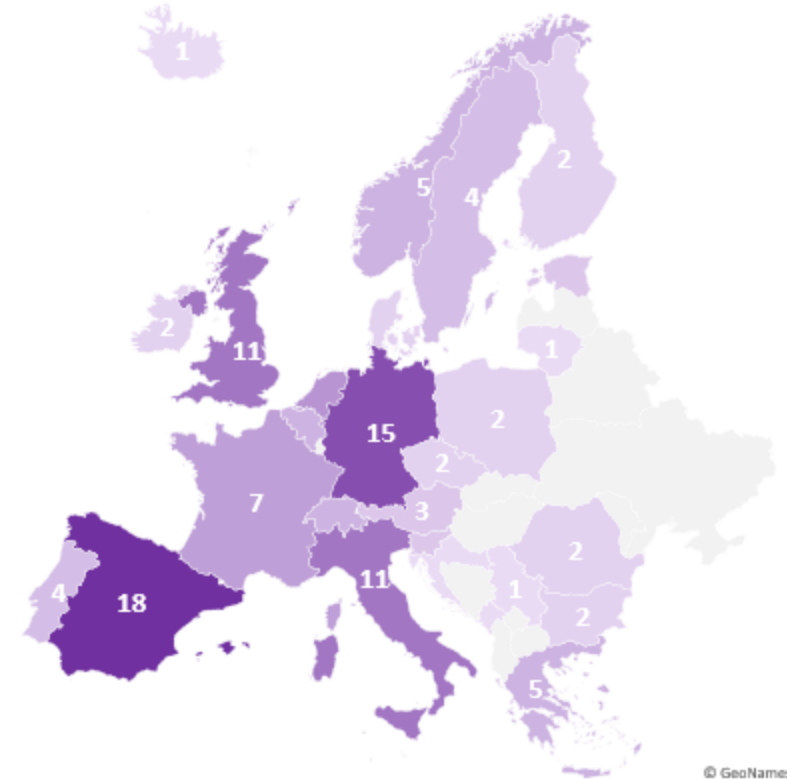
## INNOVATION IN THE DISTRIBUTION – TRACEABILITY AND SAFETY



### NUMBER OF EU PROJECTS ON FOOD TRACEABILITY AND SAFETY



### TOP PARTICIPANT COUNTRIES



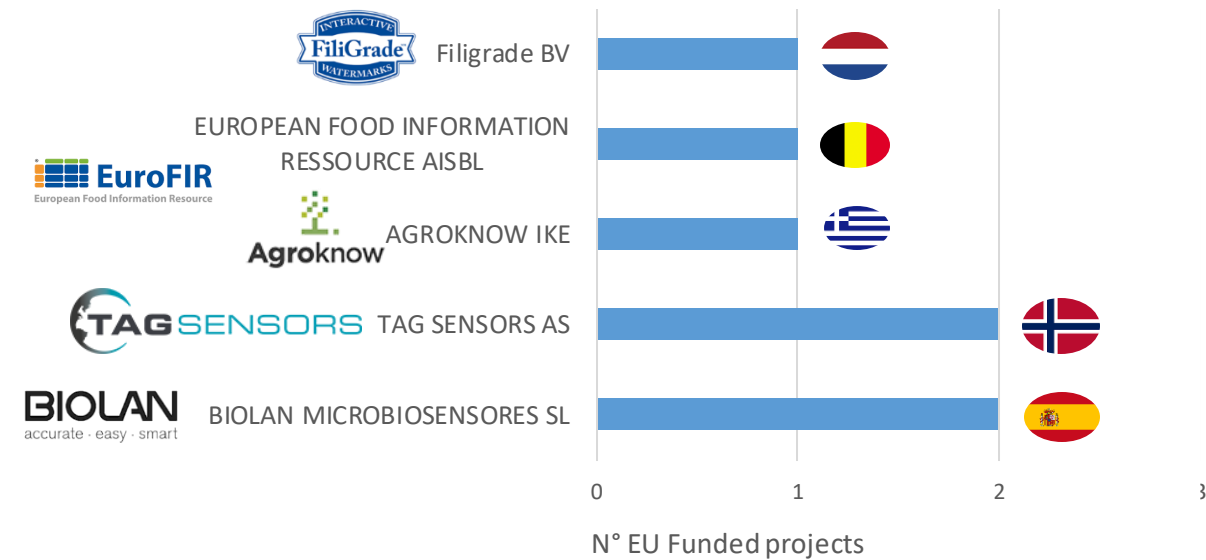
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# ► Agro-food sector: trends in EU Funded projects

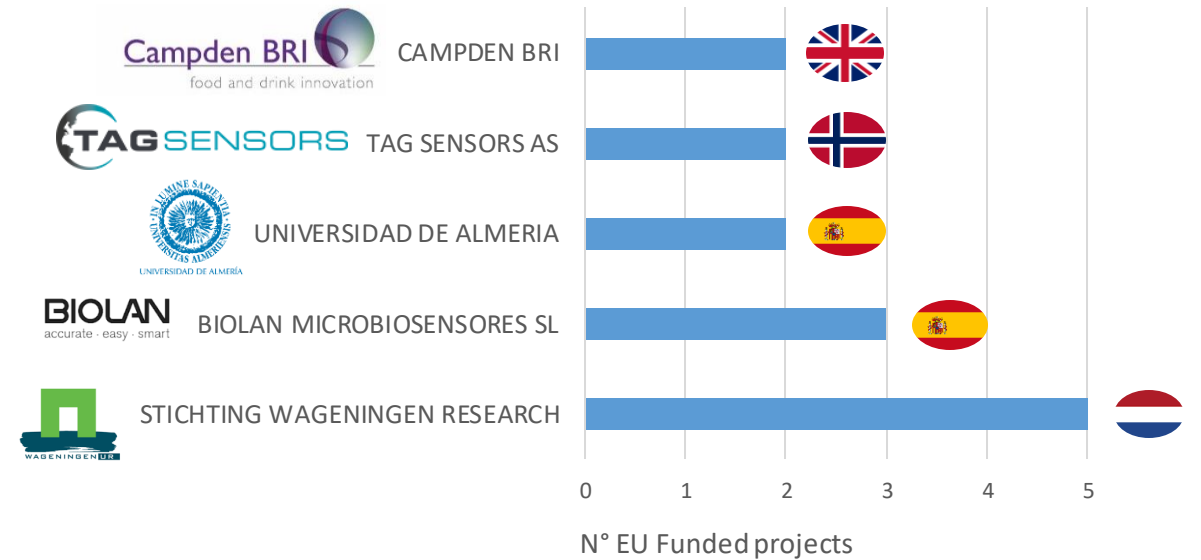
## INNOVATION IN THE DISTRIBUTION – TRACEABILITY AND SAFETY

Top organisations involved in the EU project (Food traceability and safety)

### COORDINATORS



### PARTICIPANTS

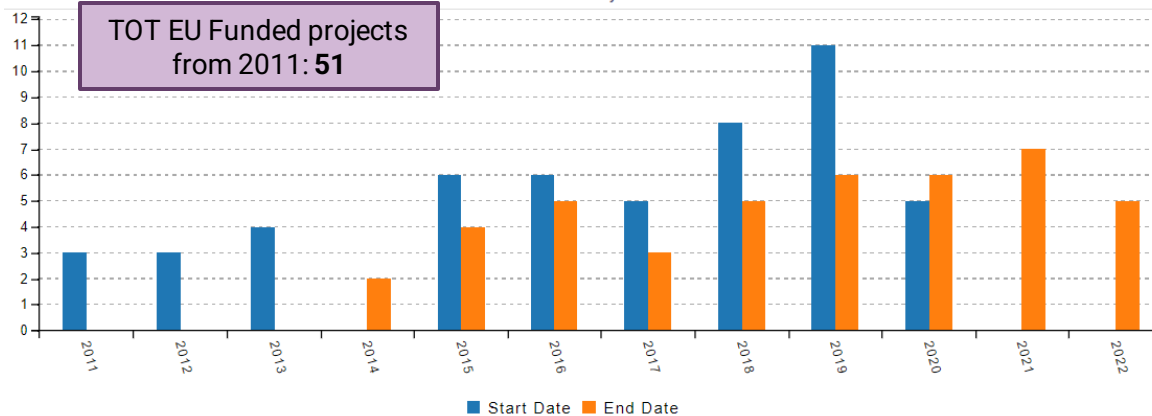


# ► Agro-food sector: trends in EU Funded projects

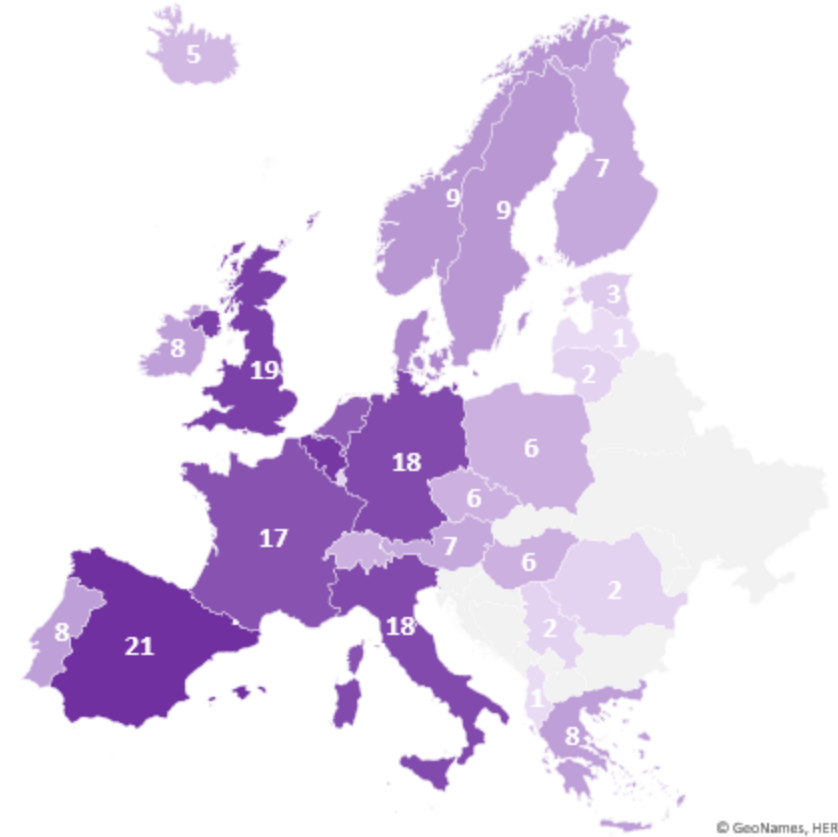
## INOVATION IN CONSUMPTION – SUSTAINABLE AND HEALTHY DIETS



NUMBER OF EU PROJECTS ON SUSTAINABLE AND HEALTHY DIETS



TOP PARTICIPANT COUNTRIES



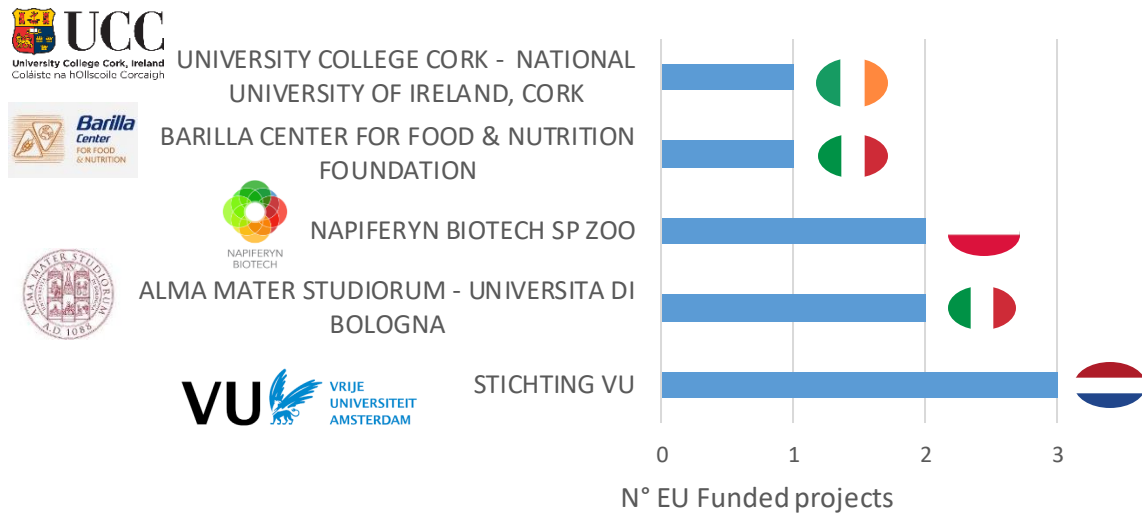
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# ► Agro-food sector: trends in EU Funded projects

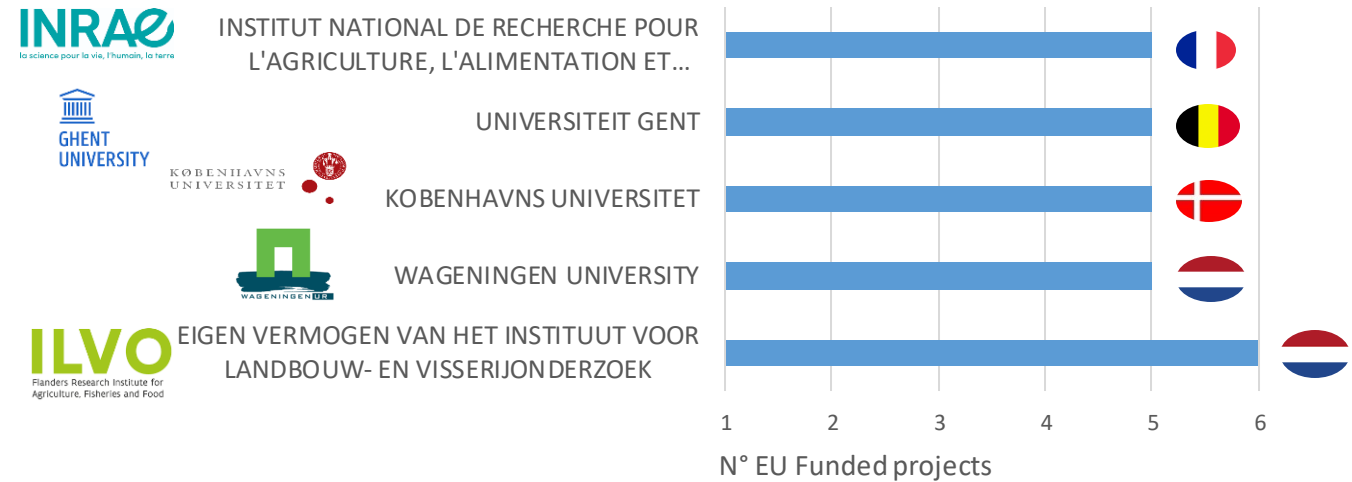
## INOVATION IN CONSUMPTION – SUSTAINABLE AND HEALTHY DIETS

Top organisations involved in the EU project (Sustainable and healthy diets)

### COORDINATORS



### PARTICIPANTS



# Funded projects as use-case in the agri-food sector





# CASE STUDY 1:

## BIOBESTicide

- Call: H2020-BBI-JTI-2019
- Funding scheme: BBI-IA-DEMO - Bio-based Industries Innovation action - Demonstration
- Project start date: 1 May 2020
- Project end date: 30 April 2023
- Coordinator: GREENCELL (France)
- Budget: € 4 402 772,50

BIOBESTicide - BIO-Based pESTicides production for sustainable agriculture management plan



The BIOBESTicide project is developing an effective and cost-efficient **biopesticide** to fight the **Grapevine trunk diseases (GTDs)**, one of the major causes of worldwide vineyards destruction.

The protection system is based on the oomycete *Pythium oligandrum* strain that, applied at optimal time and concentration, colonises the roots of vines and stimulates natural plant defences against GTDs.

The BIOBESTicide project will validate the efficiency of the formulated product on vineyards of different geographical areas. The fungus will be cultivated on beet pulp and beet molasses, a by-product of sugar production. **A demonstration will be based on an innovative bio-based value chain starting from the valorisation of sustainable biomasses.**

### STARTING MATURITY

- Grencell, the project coordinator, has developed, **at laboratory level (TRL 4)**, an effective method to biocontrol the GTDs.
- Protection rate: between 40% - 60%



### ACTIVITIES

- Building a **DEMO plant** producing 10T of high-quality oomycete-based biopesticide product per year to be used in viticulture (**TRL 7**).
- Designing the **optimal product formulation** to optimise the efficiency of the product
- Testing **the products in controlled environments and practice conditions**
- To comply with the European regulation on Plant Protection Product (PPP) and to submit an approval dossier in order to **obtain an authorisation for marketing** the product
- **Engaging specific categories of stakeholders** such as farmers, companies involved in harvesting, storage and transportation of biomass, vinery companies, policy makers, researchers and society

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France



Italy



Spain



France



France



Italy



Poland



France



France



Germany

## CASE STUDY 2:

### Planet Farms LIFE

PLANET FARMS LIFE - Innovative air treatment, hydroponic irrigation and automated systems for the first industrial



PLANET FARMS LIFE aims to demonstrate to the agricultural sector that a significant reduction in the consumption of natural resources is possible by implementing industrial indoor vertical farm systems.

PLANET FARMS LIFE will test, for the first time in the EU, **an industrial vertical farm for the production of vegetables and aromatic herbs** with a net growing area of 10 000 m<sup>2</sup>.

This will comprise innovative air treatment, hydroponic irrigation and automated cultivation systems.

- Funding scheme: LIFE Programme
- Project start date: 1 September 2020
- Project end date: 28 February 2023
- Coordinator: Planet Farms Italia Società Agricola S.r.l. (Italy)
- Budget: € 3,256,063 €

#### EXPECTED RESULTS

- A vertical farm composed of an automated system for production from sowing to packing, a hydroponic irrigation system, and an air treatment system.
- From the economic point of view, the industrialisation of the vertical farm is expected to generate a turnover of € 8,377,000 within the project, and € 28,681,000 within 3 years after the project end.

#### ENVIRONMENTAL ISSUES ADDRESSED

- Resource Efficiency
- Water saving



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Planet  
Farms

Planet Farms Italia  
Società Agricola S.r.l.  
(Italy)



255  
Handling  
Engineering &  
Controls

255 Handling  
engineering &  
controls S.R.L.(Italy)



Signify Netherlands  
B.V.(Netherlands)



Sirti S.p.A. (Italy)





# CASE STUDY 3:

## SmartAgriHubs

- **Call:** H2020-RUR-2018-1 - ICT Innovation for agriculture – Digital Innovation Hubs for Agriculture
- **Funding scheme:** IA - Innovation action
- **Project start date:** 1 November 2018
- **Project end date:** 31 October 2022
- **Coordinator:** STICHTING WAGENINGEN RESEARCH (Netherlands)
- **Budget:** € 22 423 146

**SmartAgriHubs** - Connecting the dots to unleash the innovator potential for digital transformation of the European agri-food sector



SmartAgriHubs is dedicated to **accelerate the digital transformation of the European agri-food sector**. It will consolidate, activate and extend the current ecosystem by building a network of Digital Innovation Hubs (DIHs) that will boost the uptake of digital solutions by the farming sector.

The heart of the project is formed by **28 flagship innovation experiments** demonstrating digital innovations in agriculture.

### DIGITAL INNOVATION EXPERIMENTS IN AGRICULTURE – SOME EXAMPLE OF THE FLAGSHIPS

#### ANIMAL PRODUCTION



Implementing an ammonia emissions and climate monitoring tool in animal shelters to improve animal welfare and overall sustainability

#### ARABLE



Gathering data on crop status by using deep-learning analyses of hyperspectral imaging to improve spray operations.

#### AQUACULTURE



Using ICT and IoT technologies to deliver precision fish farming which controls water quality and executes operational routines in order to bolster sustainable aquaculture

#### VEGETABLES



Drones, satellites and IoT devices to figure out the right harvesting time and discover weed patches, enhancing the production of organic open field vegetables

#### FRUIT



Developing an application which provides decision-making support for routine operations based on sensors attached to machinery for viticulture

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### WORK PLAN

- WP1 – Ecosystem building
- WP2 – Open call and funding
- WP3 – Monitoring & Evaluation of the Innovation Experiments
- WP4 – Competences Centres
- WP5 – Project Management

### OPEN CALL

SmartAgriHubs offers funding for Digital Innovation Hubs to develop, set-up, offer, provide, test and validate their services for Digital Transformation and Innovation. This shall help you to become:

- A regional partner for innovation in the agri-food domain
- Support preparation & realisation of Innovation Experiments for free, and/or
- Node of a European Innovation Network

### Typical Innovation Services offered by DIHs:



#### Ecosystem

- Community building
- Strategy development
- Ecosystem learning
- Project development
- Lobbying



#### Technology

- Technical support on scale-up
- Provision of technology infrastructure
- Testing and validation
- Strategic RDI
- Contract research



#### Business

- Incubator/accelerator support
- Access to finance
- Skills and education



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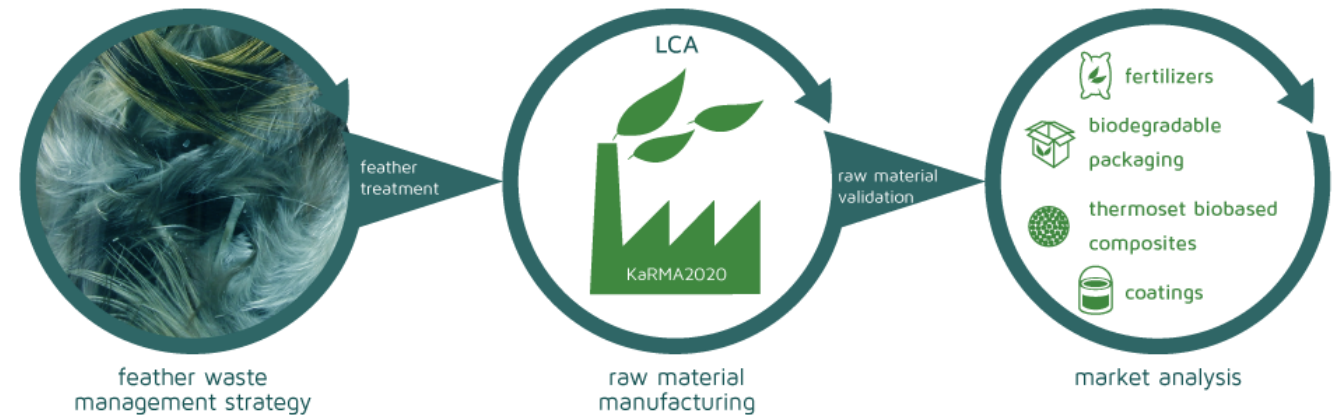


## CASE STUDY 4: KaRMA2020

- Call: H2020-SPIRE-2016
- Funding scheme: IA - Innovation action
- Project start date: 1 January 2017
- Project end date: 31 December 2019
- Coordinator: FUNDACION CIDETEC (Spain)
- Budget: € 6 679 744,39

In Europe, the majority of the poultry feather waste is disposed in landfills, incinerated, or a minor part converted into low nutritional value animal food, becoming a problematic for the future.

The KaRMA2020 Project aims to the industrial manufacture and the **exploitation of such underutilized feather waste from food processing industry** for the production of valuable raw material that will be employed to develop products for cross-sectorial applications, including **bio-based fertilizers and biodegradable packaging**.



### OBJECTIVES AND ACTIVITIES

- The main objective of KaRMA2020 project is to develop new biobased products for high impact sectors from poultry feather waste. This main objective will be reached through the following steps:
  - Improving feather waste pre-treatment and conditioning processes
  - Optimizing the isolation of keratin and other feather-based raw materials
  - Validation of the feather-based raw materials for bio-based end products
- TRL reached at the end of the project: TRL 6-7

## CASE STUDY 4: KaRMA2020

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- Coordinator: FUNDACION CIDETEC (Spain)
- Budget: € 6 679 744,39



Bioplastic tray realised in KaRMA2020



Fertiliser with keratin-based coating prepared at lab scale in KaRMA2020

# CONTACT

## PNO CONTACT PERSONS

For follow-up or further information you can contact:

### Marco Molica Colella

*Team Manager and Senior Innovation Consultant*

**Email:** m.molicacolella@ciaotech.com

**T:** +39 06 33 268 972 - Rome

**M:** +39 328 2972490

Via Napoleone Colajanni 4, 00191, Rome, Italy

### Patrizia Circelli

*Senior Innovation Management Consultant & PNO cross board sector team leader bioeconomy and agri-food*

**Email:** p.circelli@ciaotech.com

**T:** +39 02 30 918 325 - Milan

**M:** +39 3398735610

Via G. Pacini 11, 20131, Milan, Italy

### Ron Weerdmeester

*Team Manager & Head of Strategic Innovation Services*

**Email:** ron.weerdmeester@pnoconsultants.com

**T:** +39 0633268972

**M:** +39 3495135491

