D2.3 Matrix of innovation opportunities

Project: Boosting innovation agencies for bioeconomy value chains

Acronym: BIO-Boost

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List of abbreviations

Abbreviation	Full name
PC	Project Coordinator
PC	European Commission
KAM	Key Account Management
UNI	Fundacja Unimos (UNIMOS Foundation)
LIC	Viesoji Istaiga Lietuvos Inovaciju Centras (Lithuanian Innovation Center)
FBCD	Food Bio Cluster Denmark
ITC	Inovacijsko Tehnoloski Grozd Murska Sobota
ONT	Asociación Clúster Granada Plaza Tecnológica y Biotecnológica - onTech Innovation
B4C	Bioeconomy for Change
PIC Network	Plant InterCluster Network
NCBR	Narodowe Centrum Badań i Rozwoju (National Centre for Research Development)
CLIC	CLIC Innovation OY
DIH	Digital Innovation Hub
EDIH	European Digital Innovation Hub
COSME	COSME
H2020	Horizon 2020
WP	Work Package
HE	Horizon Europe
RIA	Research and Innovation Action
RTO	Research and Technology Organization
SME	Small and Medium Enterprise
EU	European Union

Executive Summary

The BIO-Boost project aims to boost innovation agencies for bioeconomy value chains. This goal will be achieved by interconnecting European innovation ecosystems and increasing the latent potential of the participating innovation agencies, to learn from leading innovator regions, and to cement this knowledge and experience in the organizations. The project focuses also on building and expanding networks, expanding the cooperation and enlarging the participation of more diverse innovation stakeholders and territories to existing successful initiatives in the field of bioeconomy.

The present report *D2.3 Matrix of innovation opportunities* has been prepared within the **WP2 Challenges** that aims to boost interconnections between and across innovation ecosystems working together to address specific bioeconomy challenges faced by industry, and to build cooperations between innovation ecosystem actors. The report will provide an evaluations of the identified challenges, solutions and insights from the challenge events, and include possible consortia / funding opportunities for follow up and inspiration.

1 Background

1.1 Project Concept

Funded under the call HORIZON-EIE-2022-CONNECT-01-01, the BIO-Boost project is an ambitious, multidisciplinary and collaborative European initiative dedicated to enhancing innovation agencies for bioeconomy value chains. BIO-Boost runs from February 2023 to January 2025 and will work along the entire agriculture, bioresources and food value chains (known as bioeconomy) - a key European focus, vital for future prosperity and sustainability.

Project activities will benefit society in terms of green, digital and social transition, while ensuring economic development across Europe, narrowing the digital and bioeconomy divides. BIO-Boost involves activities such as peer-to-peer learning, study visits, and staff exchanges, to strengthen ties within the partnership and with the wider regional innovation ecosystems. These ties will be further solidified through hackathons (160 organizations involved), direct SME support on innovation management (24 crossborder KAM cases), and assistance to SMEs that are looking for financing for innovation projects. Over 450 SMEs will be connected to the project, which will also cooperate with 20 other innovation ecosystems.

1.1.2 Project objectives

The overall objectives of the BIO-Boost project are to increase the latent potential of the participating innovation agencies, to learn from leading innovator regions, and to cement this knowledge and experience in the organizations, building and expanding networks, expanding the cooperation and enlarging the participation of more diverse innovation stakeholders and territories to existing successful initiatives in the bioeconomy, including agri-food, forestry, bio-based chemicals, materials and products, and bioenergy.

1.1.3 Project partners

BIO-Boost project is implemented by a multidisciplinary partnership of eight partners from seven European countries. Together, BIO-Boost partners represent over 1835 European innovation actors, including SMEs, start-ups, RTO, public bodies and other ecosystem stakeholders that will be engaged in the BIO-Boost activities.

- **Food & Bio Cluster Denmark (Denmark)** - national cluster organization within food and bioresources in Denmark, with more than 400 members including startups, SMEs, established companies, knowledge institutions, municipalities, regional authorities, investors, and other public institutions;
- **UNIMOS (Poland)** – network organization and coordinator of AgroBioCluster that represents a boutique, purpose-driven constellation of trusted partners that works both physically and digitally to speed up the development of innovations, international expansion, and interconnections across and along Europe and Latin America.
- **Lithuanian Innovation Centre (LIC)** – organization that consolidates the interests of business, science, politics and society and for more than 25 years has been providing innovation support services to businesses, research and study institutions, Lithuanian business associations, and business support organizations, promoting the development and marketing of new products and integrating the potential of Lithuanian innovation support entities into international value chains.
- **ITC - Innovation Technology Cluster (Slovenia)** - regional technology transfer intermediary, innovation centre, and business support cluster, with interdisciplinary experts having strong international references, a network of institutions, and extensive experience in conducting EU-funded projects and other projects focused on rural development;
- **onTech Innovation (Spain)** – cluster and Digital Innovation Hub gathering almost 800 members and focused on innovation, training, employment, and entrepreneurship in the fields of technology and biotechnology in Spain and the EU;
- **Bioeconomy For Change (France)** - the reference network for the bioeconomy in France, Europe and internationally. It counts with a team of 35 specialists that serve more than 500 members, from upstream agricultural activities through to the commercialisation of finished products;
- **The National Centre for Research and Development (NCBIR -Poland)** - a Polish Centre that works as an executive agency that supports and develops innovative technological and social solutions, creating an ecosystem of knowledge about, and information on, innovation from 2010;

  CLIC Innovation (Finland) - non-profit company based on a public-private partnership model. CLIC is aimed at building new services, innovations, and research projects to address systemic sustainability challenges through co-creation processes and tools.

Figure 1: BIO-Boost project partners

The consortium has a strong project portfolio, as well as access to large and important networks, which will facilitate the planned activities, including recruitment of innovation ecosystem partners, and SMEs.

Six of the partners are active clusters, engaged in the European Cluster Collaboration Platform (ECCP) which gives the opportunity to directly contact other clusters via the platform (including social clusters), and via specific cluster focused events. Two partners - FBCD and LIC- are also strongly anchored in the Enterprise Europe Network, which is the European Commission's official SME network supporting business and innovation, with 600+ organizations representing 60+ countries, including all EU, and neighbouring regions and EU accession countries. Three partners - CLIC, B4C and FBCD - are full members of the Bio-based Industries Consortium (240 industry members - 38 large companies, 44 SMEs, 19 regional clusters that represents an additional 140 SMEs) and 165 associate members, including RTO, universities, European associations and organizations, Technology Platforms (ETPs), public institutions, regional organizations and private banks), which gives access to a huge range of cross-border expertise within the bioeconomy, and multiplication opportunities across the entire European region. Additionally, three partners (ONT, LIC and ITC) have status of Digital Innovation Hubs and EDIH with both geographical and sectoral coverage.

1.2 Introduction to the matrix of innovation opportunities

The matrix of innovation opportunities encapsulates the results of the challenge events from WP2 Challenges. Challenge events focused on boosting interconnections between and across European innovation ecosystems by working together to address specific bioeconomy challenges faced by industry. A full description of the challenge events' objectives and process is presented in D2.2.

The matrix presented in this report demonstrates the challenges identified during **T2.2 Challenges and opportunities gathering in innovation ecosystems**, combined with the project ideas from **T4.3 Research and innovation funding webinars and workshops** from within the regional innovation ecosystems. This will be cross-checked against project ideas and solutions resulting from **T2.3 Organisation and implementation of hackathons** and funding opportunities from T4.3, providing a matrix of possible consortia / funding opportunities for follow up and inspiration. The matrix will form part of the feedback to policymakers in **T4.5 Exchange channel with authorities, policy makers**.

2 Compiled innovation matrix from the challenge events

For the BIO-Boost project, the goal was to arrange at least **eight hackathons**, each hosted by a BIO-Boost partner and attracting at least 160 organizations to be involved in challenge events. The format and dynamics of each hackathon were aligned to each of the innovation ecosystem and challenges identified. In total, **235 participants** took part in 8 challenge events organized by the BIO-Boost

partners and held across Europe. The results of the hackathons were compiled into a Matrix of Innovation Opportunities, which consists of the challenges from the challenge providers matched with the innovative solutions from SMEs. The Matrix includes further insights into how these matches could be continued by applying to various identified funding sources. The BIO-Boost partners played a critical role in counselling and guiding the SMEs throughout the hackathon processes by introducing them to current industry challenges, potential collaboration partners and funding opportunities. An overview of the results from the hackathons is presented in Matrix of Innovation Opportunities below.

BIO-Boost Matrix of Innovation Opportunities

Partner	Country	Challenge Provider and/or Specialization	Challenge Description	Challenge Category (e.g technical, financial, operational)	Solution Provider and/or Specialization	Solution Description	Outcome (Status / Impact)	Funding Opportunity (if identified)
CLIC	Finland	CLIC Bioeconomy Stakeholders	Open topic based on CLIC Innovation Bioeconomy SRIA	All	Aalto University	Streamlined Modernization of Bio-based industry To achieve twin transition (Digital, Environmental)	Project concept has been evaluated and collaboration assessment is in progress	1) Business Finland co-innovation projects 2) Techmakers Brazil 3) Eureka Clusters (CELTIC Next, ITEA)
CLIC	Finland	CLIC Bioeconomy Industry Partners	Enabling biodiverse and circular bioeconomy via value-creation	Technical, operational	Lappeenranta-Lahti University of Technology / High-performance Biocomposites with Enhanced Functionalities	Hemp and cellulose fiber reinforced biocomposite with enhanced ductility, moisture resistance functionalities, fire-retardant property and recyclability suitable for lightweight automotive parts	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding
CLIC	Finland	CLIC Circular Economy Industry Partners	Increasing circularity of large-scale industrial side streams	Technical, operational	Aalto University	Forest-based valorized side-streams for carbon negative cementitious materials	Project concept has been evaluated and collaboration assessment is in progress	1) Business Finland 2) Interreg Baltic Sea EU Funding 3) Finnish Academy 4) ERC Funding

CLIC	Finland	CLIC Circular Economy Industry Partners	Increasing circularity of large-scale industrial side streams	Technical, operational	Natural Resources Institute Finland (Luke)	Recovery of nutrients in biorefineries by membranes - Effective nutrient separation from organic side-streams with the use of less energy as the alternative processes	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding
CLIC	Finland	CLIC Circular Economy Industry Partners	Increasing circularity of large-scale industrial side streams	Technical, operational	Åbo Akademi	Green Liquor Dregs Leaching and Thermal Treatment - For better understanding of potential for element recovery and dregs use	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding
CLIC	Finland	CLIC Circular Economy Industry Partners	Increasing circularity of large-scale industrial side streams	Technical, operational	Tampere University	Co-production of high value-added bio-energy, chemicals and materials from biowaste: Combining Hydrothermal Carbonization (HTC) and Chemical Looping Gasification (CLG)	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding
CLIC	Finland	CLIC Circular Economy Industry Partners	Recovery and recycling of critical raw materials	Technical, operational	Aalto University	Maximizing the capabilities & techno-economical feasibility of EV battery industry in light of the Recover, Recycle, Repair, Repurpose model with intelligent automation and AI	Project concept has been evaluated and collaboration assessment is in progress	1) Business Finland co-innovation projects 2) Techmakers Brazil 3) Eureka Clusters (CELTIC Next, ITEA)
CLIC	Finland	CLIC Circular Economy Industry Partners	Recovery and recycling of critical raw materials	Technical, operational	University of Helsinki	Novel technique that treats waste, extracts Phosphorus and Nitrogen and produces mineral fertilizer from sewage sludge, biogas sludge and incinerated ash	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding

CLIC	Finland	CLIC Circular Economy Industry Partners	Open topic based on CLIC Innovation Circular Economy SRIA	All	University of Eastern Finland	Finland-Lagos Recycling Culture Research & Development Project: Unveiling a PLATFORM for International Collaborative RI&D for Circular Economy (CE).	Project concept has been evaluated and collaboration assessment is in progress	Business Finland and Horizon EU Funding
UNIMOS	Poland	Łukasiewicz Institute - Lodz	Geotextiles made from waste feathers containing keratin	Business/Operational	Unimos as facilitator of cross-sectoral and cross-industry collaboration	Design a path for the development and application of keratin-based geotextile, including the identification of barriers affecting the launch of feather-based geotextile from the perspective of customers (B2B or consumer), the design of a value proposition and a plan to mitigate these risks for both categories of customers, as well as the identification of other opportunities for product development.	Searching for potential applications and market update in progress within the UNLOCK project	EU cascade funding opportunities, Horizon EU Funding
UNIMOS	Poland	SANSEVERA LLC	Foods that promote the development of the gut microbiome	Business/Operational	Unimos/Sansevera	Design of a pathway for the development and marketing of a food additive.	Search for funding opportunities in progress	Own financial resources + EU projects, including cascade funds
UNIMOS	Poland	UNIMOS industry, network and public authorities	Developing innovative approaches for collaboration among policymakers and creating novel methods for intersectoral collaboration"	Operational	International Development Norway, Fundacja Platforma Przemysłu Przyszłości, Klaster Gospodarki	The expected results involve creating innovative models of collaboration between different sectors, including public administration, businesses, NGOs, enterprises, and science. The aim is to develop Mazovia	Project concept has been evaluated and BIO-Boost hackathon in May 2024 was part of the process. New dates and venues for further	CBE JU (new forms of collaboration), Horizon Europe (Expanding Industry-

					Odpadowej i Recyklingu, Izba Przemysłowo-Handlowa Ziemi Radomskiej (IPHZR), UNIMOS, Noble Brand and BCC	region and promote a circular economy (GOZ) by establishing new spaces for cooperation. Additionally, the focus is on enhancing multi-level and inter-regional strategic planning and operational implementation in the field of bioeconomy development and RIS3 of the Mazowieckie Voivodeship.	collaborations to be established	Academia collaborations)
NCBR	Poland	Design thinking / agile cross-sectoral techniques	Water resources are shrinking drastically. Closed water circulation and its reuse in production processes in the food processing industry is complicated due to water quality in circulation. The problem of excessive water consumption and running out of resources needs to be sufficiently addressed and publicized	Technical, social	Collaborations between industries/entities using water resources and (smart) water management providers	The ideas generated by the team included digitalization and monitoring of water usage, cross-chain water management value chains, educational programs, social learning, and open innovations.	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Digital Europe, Cascade funds and Horizon Europe calls, CBE JU
NCBR	Poland	Design thinking / agile cross-sectoral techniques	The identified problem is related to dwindling water resources. The issue affects agriculture, industry, and households.	Technical, social	Collaborations between industries/entities using water resources and (smart) water management providers	The team's proposals for solutions involved comprehensive measures: the introduction of water footprint measurement, rainwater recovery (with an incentive system), water splits in new buildings, and training and education activities for construction and industry. The solution developed by the team is a subsidy program	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Digital Europe, Cascade funds and Horizon Europe calls, CBE JU

						with an automatic generator and a short time limit for processing to promote pro-ecological water management.		
NCBR	Poland	Design thinking / agile cross-sectoral techniques	Only 1% of clothing is currently recycled.	Technical	Collaborations between providers of digital solutions and textiles producers	In order to raise awareness and reduce environmental impact, the group has proposed the following solutions: introducing a clothing passport, producing fast-moving items like socks from biodegradable materials, improving the quality of materials to make them more biodegradable and durable through the greater use of plant raw materials and residues, producing more versatile and non-fashionable clothes with better repairability, and setting limits for manufacturers and consumers.	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Digital Europe, Cascade funds and Horizon Europe calls, CBE JU
NCBR	Poland	Design thinking / agile cross-sectoral techniques	The issue at hand is the disposal of water waste produced by the textile industry. This industry produces large volumes of contaminated water, including dyed water from the clothes dyeing process.	Technical	Digital providers in collaboration with textile industries	Exploring the option of using this water in its current state, or after minimal treatment, in industrial processes where water colour is not critical, such as for cooling machinery or rinsing before cleaning. One potential solution is to create a marketplace for water exchange, allowing nearby industries to purchase	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Future Euroclusters open calls for cascade funding, Horizon Europe calls, CBE JU calls

						this water at a lower cost for specific processes.		
NCBR	Poland	Design thinking / agile cross-sectoral techniques	The team identified the problem of reduced soft fruit production due to large temperature variations in April and May, including warm days and nighttime frosts, as well as the fruits' short shelf life.	Technical	Daily Fresh / other strawberry and other soft fruits producers. Potentially companies working in urban farming field	Several potential solutions, includes: implementing inexpensive vertical farms under a roof, using heating umbrellas, genetically modification of the fruits to increase their weather resistance, and employing AI technology for weather predictions, temperature control in greenhouses, and predicting the optimal time for harvesting.	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Future Euroclusters open calls for cascade funding, Horizon Europe calls, CBE JU calls
NCBR	Poland	Design thinking / agile cross-sectoral techniques	The manual harvesting of apples involves high staff turnover, negatively impacting work quality due to inexperienced workers. Additionally, the orchard sector lacks modern technologies and investment. Manual labour is also affecting profitability.	Operational/ technical	Equipment and machinery producers in collaboration with AI providers	Improving worker quality through training and providing social security to reduce turnover, educating farmers, and connecting them with researchers to develop surveillance and harvesting technology. The final proposed solution is to create an automated harvester drone using AI technology to reduce costs and harvest the fruit at the optimal time.	Project concept has been evaluated and further national or cross-border collaborations are being explored, together with potential funding sources	Horizon Europe calls, EU regional and national funds
NCBR	Poland	Design thinking / agile cross-sectoral techniques	The group's idea was to use apple residue to produce a new material that imitates leather for use in luxury products such as furniture and electric cars.	Technical/business	Potential concept for startups and entrepreneurs	A plan for developing the solution, which includes identifying possible funding sources, conducting market research, acquiring ambassadors, and partnering with others to scale the technology.	Conclusions from the work have been included in the Innovation Support Programme implemented within the EU-project SCALE-UP	Future Euroclusters and Horizon Europe open calls for cascade funding, Horizon

								Europe calls, CBE JU calls
ITC	Slovenia	Hotel Vivat	Food Circularity for HORECA: Develop innovative solutions to optimize food waste reduction and circularity in food production processes. Explore strategies for processing side streams and by-products into valuable food products or ingredients.	Operational/ business	Mensana, Zelena točka, ITC, Agency SIV	To tackle the "Food Circularity for HORECA" challenge at Hotel Vivat using design thinking, start by empathizing with stakeholders to understand their perspectives on food waste and circularity. Define the core problem, focusing on reducing waste and enhancing sustainable practices. Ideate solutions like on-site composting, dynamic menus based on inventory, and partnerships with local farms. Prototype these ideas by launching pilot programs, such as a composting initiative or a guest incentive for eco-friendly actions. Test these solutions on a small scale, gather feedback, and refine to ensure they meet business goals and improve operational sustainability. This enhances both efficiency and the hotel's reputation for environmental stewardship.	Project concept has been evaluated and collaboration assessment is in progress	Horizon Europe Cluster 6, Cascade funding (ie. FOODITY, DRG4FOOD)
ITC	Slovenia	Green Point	AI and Advanced Digital Tools for Enhanced Food Safety and Efficiency: Explore the integration of AI, blockchain, and IoT technologies to revolutionize food	Operational/ technical	NCBR, ZT	For Green Point's challenge on using AI and digital tools like blockchain for enhancing food safety and traceability in short food supply chains, employ a strategic approach that integrates technology	Project concept has been evaluated and collaboration assessment is in progress	Horizon Europe Cluster 6 and Cluster 4, Cascade funding (ie. FOODITY, DRG4FOOD)

			production, quality control, and supply chain management. Leverage AI-powered predictive analytics to optimize resource allocation and accurately predict demand utilizing IoT sensors. Implement blockchain to ensure traceability and transparency throughout the supply chain, promoting food safety and authenticity. Develop real-time monitoring systems capable of detecting contaminants and ensuring product integrity. This challenge aims to create a seamless, efficient, and trustworthy food supply system that meets the growing demand for safe and sustainable food production.			into each stage of the process. Begin by implementing IoT devices to monitor real-time conditions such as temperature and humidity throughout the supply chain, ensuring food safety. Utilize AI algorithms to analyze the data for anomaly detection and predictive maintenance, preventing potential safety hazards. Integrate blockchain technology to create a transparent and immutable record of the food's journey from farm to table, allowing for easy traceability and swift responses to any safety concerns. This system not only enhances consumer trust but also improves operational efficiency and compliance with safety regulations. Through the synergistic use of AI and blockchain, Green Point can revolutionize safety and traceability in food supply chains.		
ITC	Slovenia	Farm cooperative	Alternatives to Nurture and Delight 10 billion People with introduction of Sustainable proteins as Novel Food Product Concepts: Address the global challenge of	Technical/business	Algen, ITC, FBCD	For the "Algae Production as Sustainable Proteins" challenge aimed at a farm cooperative, focus on the integration of algae as a sustainable food source. Start by researching various strains	Project concept has been evaluated and collaboration assessment is in progress	Horizon Europe Cluster 6, Cascade funding (Open Agri, Farmtopia)

			sustainably feeding a growing population by designing food solutions that leverage innovative ingredients and production methods. Focus on developing scalable and nutritious food products by exploring alternative protein sources such as new plant proteins, cultured meat, and insect proteins. Innovate by conceptualizing and prototyping new food products that align with evolving consumer preferences and health trends, experimenting with unique ingredients, flavors, and textures. This challenge encourages the creation of disruptive food concepts that are both environmentally sustainable and appealing to modern consumers.			of algae to identify those best suited for local environmental conditions and high protein yield. Implement pilot projects to cultivate algae sustainably, using minimal land, water, and resources. Develop new products or ingredients incorporating algae as a primary protein source, which can be introduced to local markets or through partnerships with food manufacturers. Educate cooperative members and the broader community on the nutritional benefits and environmental advantages of algae-based proteins. By positioning algae as a viable alternative protein, the cooperative can tap into the growing demand for sustainable food solutions, reduce its carbon footprint, and diversify income streams.		
ITC	Slovenia	Žipo Lenart	CPG 'Brands of the Future' to Close the Consumer Gap with support of Technologies Across the Value Chain: Reimagine consumer packaged goods (CPG) brands by integrating advanced technologies such as IoT, robotics, and AI across the entire value chain	Technical/business	Termodron, UNIMOS, ITC	For the "Novel Brands in Precision Farming" challenge focused on Termodron, the goal is to marry innovative, sustainable farming methods with consumer packaged goods (CPG) branding while fostering farmers' trust in technology. Start by demonstrating the benefits of	Project concept has been evaluated and collaboration assessment is in progress	Horizon Europe Cluster 6 and Cluster 4, Cascade funding (CHAMELEON, ICAERUS)

			to enhance production efficiency, reduce waste, and optimize processes. Develop brand strategies that emphasize sustainability, transparency, and personalized consumer experiences, ensuring that CPG brands resonate with informed consumers. This challenge seeks innovative solutions that close the gap between products and consumer values, leveraging technology to create brands that are not only efficient and technologically advanced but also aligned with consumer expectations for sustainability and authenticity.			precision farming — such as increased efficiency, yield, and sustainability — through pilot programs that utilize technologies like drones, satellite imagery, and AI analytics. Collaborate with farmers to design these programs, ensuring their needs and concerns are addressed, which helps build trust in high-tech solutions. Develop CPG brands that highlight these sustainable practices, emphasizing transparency and the origin of ingredients, which are monitored and optimized through precision methods. Market the products under a brand that communicates the story of innovation and sustainability from farm to shelf. By positioning Termodron at the intersection of cutting-edge technology and authentic storytelling, you can inspire both farmers and consumers to embrace and support high-tech, eco-friendly agricultural solutions.		
ONT	Spain	ONTECH INNOVATION INDUSTRY PARTNER A	Design of an AI system for a theatre to recommend plays to regular customers and make easier for the	technical	Admitted solution 1: Instituto Tecnológio de Granada (Technological	Admitted solution 1: Creation of an application whose value is based on the collection of information on users' cultural interests, as well as their	Project concept has been evaluated and collaboration assessment is in progress	

			marketing team to target advertising campaigns		Institute of Granada) Admitted solution 2: Computing Sciences, Univ. of Granada	interests of a theatre-like nature. Design of an AI system for a theatre to recommend plays to regular customers and make easier for the marketing team to target advertising campaigns The application sends personalised information according to their interests		
						Admitted solution 2: Creation of a predictive model that stores information on users' purchases for the subsequent offering of works that are of interest to them. The model includes a system for reviewing works by the user, whose evaluations are compiled to create a kind of familiarity in order to obtain customer loyalty. An analysis of colour palette taste and composition of the promotional material according to the customer's interests is included.		
ONT	Spain	ONTECH INNOVATION INDUSTRY PARTNER B	Pruning residues that farmers produce in the fertile lowlands of Granada are burnt annually in the months of September and October. Produced fumes contribute to the problem of pollution in the valley,	technical	I.E.S Albayzin	Reuse of pruning waste from agricultural work to create a substance that serves as a basis for the production of furniture for regular use.	Project concept has been evaluated and collaboration assessment is in progress	Horizon Europe, Regional Andalusian funds

			affecting the city and its metropolitan area. A solution is sought based on the reuse of the material and the creation of a new value chain.					
ONT	Spain	ONTECH INNOVATION INDUSTRY PARTNER C	Create predictive and generative AI models in technology Water Biosense that anticipate critical events, automatically configure device parameters and improve data interpretation. The challenge is divided into two areas: - Predictive AI for prevention and adjustment of the device before problems arise. - Generative AI for data interpretation and simulation of future scenarios.	technical	IES Zaidín Vergeles	Predictive AI model based on official data published in the INE. (National Statistics Institute). Once the appropriate model for the data has been selected, an API (application programming interface) for generative AI must be implemented. The platform will display an interactive map where the user identifies waters around his area in a simple way, receiving an indication of potential problems and suggestions to avoid or solve them.	Project concept has been evaluated and collaboration assessment is in progress	National Funds (CDTI), Cascade funding
ONT	Spain	ONTECH INNOVATION INDUSTRY PARTNER D	Design of an AI for land of low agricultural value in different locations for reforestation in which the application proposes the location of the trees, according to the orography, rainfall, local flora as well as the quality and composition of the soil.	technical	I.E.S Albayzin	A system using a terminal (drone type) that can map the terrain and collect thermal information from the ground. The information is analysed to determine soil fertility, ease of irrigation, altitude and hours of sunshine. The system presents a planting proposal based on the information received.	Project concept has been evaluated and collaboration assessment is in progress	National Funds (CDTI), Cascade funding. Erasmus+, Andalusian Regional Funds

FBCD	Denmark	Connecting Grounds	Help getting a clearer idea about our market and who are competitors are. What strategy do you suggest we develop to reach out to potential customers?	Business/Operational	Danish Technical University and Aarhus University	Go to market strategy, aim at B2B. Targeted market analysis. Suggestions for collaborating business partners and new products.	Project concept has been evaluated and collaboration assessment is in progress	FBCD: Closing Loops
FBCD	Denmark	Good Sodas	Challenges with limitations on health claims. How do we ensure the best possible starting point for consumers to navigate between conventional soft drinks and Good Sodas®? Challenges regarding fermentation - we ferment with lactic acid bacteria and use a base of various fruit concentrates. How can we potentially give us a better starting point to get funding for this, activate programmes, knowledge institutions or alternatively motivate the right resources to become part of our R&D?	Business and technical	Danish Technical University and Erhvervs Akademi Aarhus	Strengthening communication, e.g. by usign influencers. Make sure to use the rigth claims (non-alcoholic, reduced sugar, organic etc.) The challenge with producing organic soda without sugar and no additives will be taken up at DTU lab.	Project concept has been evaluated and collaboration assessment is in progress	FBCD: Biossolutions Zealand. Horizon EU funding
FBCD	Denmark	Algiecel	Finding innovative ways to integrate algae into food and develop effective marketing strategies. Creative marketing strategies. How can we best emphasise the benefits of algae in food to attract consumers?	Business and technical	Danish Technical University and Aarhus University	Innovative and practical suggestions for integrating algae into foods and effective marketing strategies. Concrete ideas for foods such as snacks, smoothies, sauces, baked goods or ready meals where algae can improve nutritional value and optimise taste and texture.	Project concept has been evaluated and collaboration assessment is in progress	FBCD: Biossolutions Zealand. Horizon EU funding

B4C	France	B4C innovation managers according to industrial needs	Biobased alternatives to PFAS coatings	Business and technical	No solution emerged from the hackathon			
B4C	France	Bernard Magrez Wine	Innovative solutions for the sustainability of the wine industry, from plot to bottle	Business and technical	Beebox by Oenoco	Development of a traceability tool to optimize the management of transport crates. This project aims to reduce the environmental impact and improve the operational efficiency of crates carrying reusable glass bottles.		
B4C	France	Cristal Union	Solutions for field crop farmers to reconcile production, income, environment and climate	Business and technical	My Easy Farm (MyEasyAI project)	The MyEasyAI project aims to solve the problem of fragmentation and complexity of agricultural data by developing an intelligent decision-support platform integrating artificial intelligence (AI) technologies for the optimization of agroecological practices in field crops. This platform integrates multi-source data (satellites, agricultural equipment, meteorological, pedological and agronomic data) to analyze the complex interactions of agroecosystems. Specific algorithms, adapted to local particularities, provide personalized	Project concept has been evaluated and collaboration with agri-food industries (including Cristal Union) are being explored, together with potential funding sources	Regional and national funds, LIFE 2025

						recommendations on subjects such as intermediate crop management, fertilization optimization and disease prevention.		
B4C	France	Cristal Union	Solutions for field crop farmers to reconcile production, income, environment and climate :		Agreego (Seed'n Go Project)	Seed'n Go: Improve the effectiveness of seeding by drones with the Development of software capable of automatically generating flight criteria (height, width and speed of passage, spreader disc rotation speed and hopper opening) based on the specific characteristics (weight, density, shape, etc.) of each seed species.	Project concept has been evaluated will be tested. Internal development by the start-up in process	

Table 11: Overview of the challenge events within the BIO-Boost project.

3 Analysis and insights from the innovation matrix

3.1 Analysis of challenges identified from the clusters

3.1.1 Circular economy and circularity of resources

A substantial portion of the challenges identified during the BIO-Boost challenge events focus on enhancing resource circularity, recycling, and waste reduction, particularly in sectors such as industrial side streams, water, food, and textiles. This underscores the increasing focus on shifting industries toward a circular (bio)economy model. Water resource management is another recurrent theme, linking environmental sustainability with production challenges in textiles, food, and agriculture. Specific challenges include shrinking water resources and closed water circulation in the food processing industry, as well as water waste disposal in the textile industry, including issues with dyed water. Predictive AI models for water management and scenario simulation were also highlighted as potential topics for the challenge events.

3.1.2 AI and advanced technology

Multiple identified challenges called for leveraging advanced digital technologies to address inefficiencies and sustainability issues, indicating a shift toward data-driven solutions. For instance, challenges included the potential use of AI, IoT, and blockchain to improve food safety, supply chain transparency, and efficiency. Additionally, new strategies to bridge the consumer gap using IoT, AI, and robotics were needed.

3.1.3. Cross-sectoral opportunities and future proofing

Innovation in food and agriculture was also a significant industry need, with sustainable proteins, food waste valorization, and microbiome-enhancing products taking center stage. These topics included the development of plant-based proteins, cultured meat, and insect proteins. Agriculture-related challenges further highlight the growing impact of climate change on production (e.g., temperature variability affecting soft fruits). Additionally, breakthroughs in material science, such as biobased PFAS coatings, textile recycling, and leather alternatives were called for.

3.1.4. Stakeholder engagement needs

A need for collaboration was a recurring industry challenge, particularly between policymakers, industry leaders, and researchers. The challenges also highlighted a gap in intersectoral communication and action. Issues like health claims for new products or fermentation highlight regulatory and technical knowledge gaps. New strategies to integrate stakeholders into R&D initiatives were seen as essential.

3.2 Outcomes from the innovation matrix from the clusters

The challenge events held during the BIO-Boost project resulted in matching a total of 34 bio-based solutions to the identified industry challenges. These solutions demonstrate various approaches to advancing the bioeconomy, integrating circular principles, innovative technologies, and collaboration

to create sustainable, market-ready solutions. A full analysis of the BIO-Boost challenge events and their impact on the participants is described within *D2.2 Evaluation of impact from challenges*.

The next steps from the challenge events regarding the innovations are in various stages. While evaluation has been completed for most of the pitches, collaboration for a possible project is still under assessment. Some innovations have advanced beyond initial evaluations and are actively seeking national or cross-border collaborations and funding. Some innovations have had direct impact to existing projects, such as results from one pitching session being directly integrated into the EU-project SCALE-UP.

To enhance the transition of the innovation matrix from evaluation to actionable implementation, several key areas require attention. First, addressing bottlenecks in collaboration assessments is essential. Understanding why the follow up discussions for many of the collaborations are prolonged, and making the partnership facilitation or collaboration frameworks more proactive could increase the chance of future implementation. Second, highlighting success cases, such as SME innovation contributing to ongoing EU-projects like SCALE-UP and UNLOCK, can serve as an example to enhance other bioeconomy initiatives. Third, implementation should be streamlined by providing further mentorship for the pitchers, ensuring a clearer understanding of each project's unique status and next steps on identifying potential partners or funding opportunities. By tackling these areas, the matrix of innovations can achieve greater momentum in impactful implementation.

4 Conclusion

The BIO-Boost challenge event results suggest that a significant number of bioeconomy innovations can be produced across various sectors over the period of two years. Through focused hackathons with varying themes and formats, 34 bio-based solutions were matched to industry challenges, showcasing solutions of circular bioeconomy principles and cutting-edge technologies. The project's impact is evident in the formation of potential new partnerships, identified funding calls and the direct integration of innovative pitches into existing EU projects like SCALE-UP.

Going forward, it is crucial to address collaboration bottlenecks, facilitate proactive partnerships, and streamline mentorship programs to enhance the transition from evaluation to implementation. The next steps involve a concerted effort to refine collaboration frameworks, provide targeted support to innovators, and secure cross-border partnerships and funding opportunities. These actions would maximize the potential of the innovation matrix to drive progress in the EU bioeconomy.

5 Recommendations for policy makers

The findings and experiences underscore the critical need for a holistic and interconnected approach to bolstering the bioeconomy. Experiences and lessons learned during the implementation of the BIO-Boost project showed that structured framework with engaging, flexible and agile tools to implement a set of interconnected activities at regional and cross-regional level promote multiple and actionable pathways to enhance collaboration, innovation, and resource efficiency between European innovation ecosystems and their actors. Wise interconnections between industry, academia, networks and projects identified during the collective stakeholders mapping were translated into different collaboration activities implemented at different levels and in different sectors, while considering different regional environment, strengths, assets, needs and interests.

The approach used in the BIO-Boost project aligns with RIS3 strategies addressing both traditional agri-food and hi-tech industries. Innovation agencies that drive BIO-Boost project served as orchestrators of dynamic ecosystems that can drive shaping and implementation of Regional Innovation Strategies (RIS3) and support interregional collaborations. Lessons learned and tools used during the implementation of BIO-Boost project can be leveraged to orchestrate multilevel collaboration across different industries, sectors, regions, and countries, while innovation agencies may act as the nexus, driving force and architects of collaborative efforts to boost:

- cross-industry cooperation between various industries, including traditional (like agri-food) and high-tech (digital and deep-tech);
- cross-cluster cooperation between clusters from different regions and countries, interlinking other clusters and innovation ecosystems;
- cross-border cooperation between other innovation actors from other EU regions and countries;
- cross-sectoral collaboration between private, public, academic and non-governmental actors at the regional (RIS3) and interregional (S3) levels.

Having this in mind, strengthening the role of innovation agencies and clusters is essential, as these agencies are vital players in creating, animating and interconnecting ecosystems supporting bioeconomy initiatives that involve small and medium enterprises. It is needed to keep enhancing their capabilities and empowering them to broaden their involvement in implementing Regional Innovation Strategies (RIS3), interregional collaborations (such as S3) and cultivate collaborations that extend across different industries and geographic areas. The continued support offered to support the development and excellence of innovation agencies and clusters may accelerate the growth of small and medium enterprises and offer suitable conditions to unlock the latent potential and co-discover business, innovation and cooperation opportunities for academia, industry and other innovation ecosystem actors.

Encouraging multiple and structured cooperation with space for experiments, study visits, peer-learning and capacity building is essential, thereby integrating expertise and innovative solutions from multiple sectors and regions. Further boosting of cross-border partnerships may contribute to developing resilient value chains and stimulating innovation throughout the bioeconomy.

In addition, innovation agencies - engaged in many EU-projects - may act as drivers of EU-project cross-fertilization, boosting inter-project and inter-cluster cooperation both regionally and interregional. In BIO-Boost, several interconnections between EU projects identified in the stakeholders mapping related to the economy, digitalization, short food supply chains, and bio-based innovations have been established. As example, during BIO-Boost challenge events, cases, challenges, solutions and approaches from different ongoing and/or closed EU-projects have been used in shaping new methodologies, co-ideating and co-creating new solutions or adapting approaches to specific environments or target groups. This way, meaningful interconnections between EU-projects were created and seized, including projects such as SCALE-UP (bioeconomy rural development), SUAVE (urban agriculture), UNLOCK (unlocking feather-based bioeconomy), D2XCEL (scaling up digital and deep tech startups and scaleups), among others. This type of interrelation has been instrumental in the success of the BIO-Boost project in interconnecting innovation ecosystems by adding value, connecting value chain actors across Europe and fostering a collaborative environment that promotes knowledge-sharing, and enhanced relationships between partners.

This way, programs and projects incentivizing interproject and cross-industry collaboration incorporating cutting-edge technologies, such as artificial intelligence (AI) and the Internet of Things (IoT) into bioeconomy initiatives should be collectively designed and implemented.

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