Deliverable D9.4

Report on clustering activities with EC initiatives

Dissemination level: Public
Date: 26/05/2025

The project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 952941.

Document control sheet

Project	BIOMAC – European Sustainable Biobased Nanomaterials Community
Call identifier	H2020-NMBP-TO-IND-2020-twostage
Grant Agreement N°	952941
Coordinator	Aristotelio Panepistimio Thessalonikis - AUTH
Work package N°	9
Work package title	Dissemination Communication and Clustering
Work package leader	EUBIA
Document title	Report on clustering activities with EC initiatives
Lead Beneficiary	EUBIA
Dissemination level	Public
Authors	Giulio Poggiaroni
Contributors	AUTH
Reviewer(s)	
Issue date	

DOCUMENT HISTORY

Date	Version (n.)	Summary of changes
20/05/2025	1	First version
26/05/2025	2	final version

Contents

Executive Summary

This report documents the collaborative and promotional activities undertaken by the BIOMAC project and its Open Innovation Testbed (OITB) services to strengthen the innovation ecosystem and reach potential users. These activities, covering the period up to M54 of the project, primarily focused on:

- Clustering with Other Horizon 2020-funded OITBs

BIOMAC has collaborated closely with BIOMAT, BIONANOPOLYS, and INN PRESSME. Joint initiatives included a webinar on Open Calls in March 2023 and participation in significant events such as the "Workshop on the Future of Open Innovation Testbeds" in Lund in June 2023, and an event at EUBCE 2024. These meetings facilitated discussions on common issues in OITB implementation, such as funding for SMEs, Intellectual Property (IP) management, standardization, and regulatory challenges. They also explored strategies to strengthen the ecosystem and ensure its long-term sustainability. The European Commission provided recommendations, emphasizing the importance of offering comprehensive services (technological, business model, financial), focusing on SMEs through Open Calls, and establishing a Single-Entry Point (SEP) with a funding strategy.

- National Stakeholder Events

To increase local visibility, workshops were organized in Italy (May 2024, Milan), Greece (May 2024, Athens), and Austria (November 2024, Graz, in collaboration with Bionanopolys). These events, held in local languages, involved various national companies and stakeholders, presenting BIOMAC's OITB services and addressing practical questions about access, costs, IP, and funding opportunities.

- Participation in Various Events and Digital Promotion

BIOMAC partners promoted the project and OITB services at conferences (e.g., EUBCE, Polymers), trade fairs, and specific meetings, as well as through digital promotion. The audience was diverse, including R&D professionals, academics, industry (SMEs and large enterprises), the innovation community, and researchers from other EU projects. Interest focused on the OITB concept,

access to services (even individual ones), pilot lines (particularly PL4 for nanolignin), cross-cutting services (IP, business model, LCA, toxicology, decision support tool), sectoral applications (agriculture, packaging, cosmetics), and Open Calls.

- Contribution to Standardization

BIOMAC is actively promoting a CEN Workshop Agreement (CWA) to standardize a process for the ultrasonic-assisted production of lignin nanoparticles. The goal is to draft a pre-standard that ensures reproducibility and scalability, representing an important legacy of the project.

- Outcomes and Concerns

The interactions generated by these activities led to concrete follow-ups, including new contacts, scientific collaborations, interest in Open Calls, submission of samples for testing, and specific discussions on service access and financial support. Company concerns regarding IP protection and regulatory fragmentation emerged as recurring themes.

1. Clustering activities with other OITBs

In the span of the overall BIOMAC's activities, we established a close relationship with three other OITB, funded in the same Call/topic of Horizon 2020. These were BIOMAT, BIONANOPOLYS and INN PRESSME. The previous deliverable detailed the activities developed in collaboration with such projects until M20. From that point onwards, contacts have been strengthened and partners have attended the respective online and physical events. In terms of new joint initiatives, in March 2023, BIOMAC promoted the organization of a joint webinar where the four projects presented their respective Open Calls, which were active at the time. The second other joint initiative was the event at EUBCE 2024, which is described in the next section.

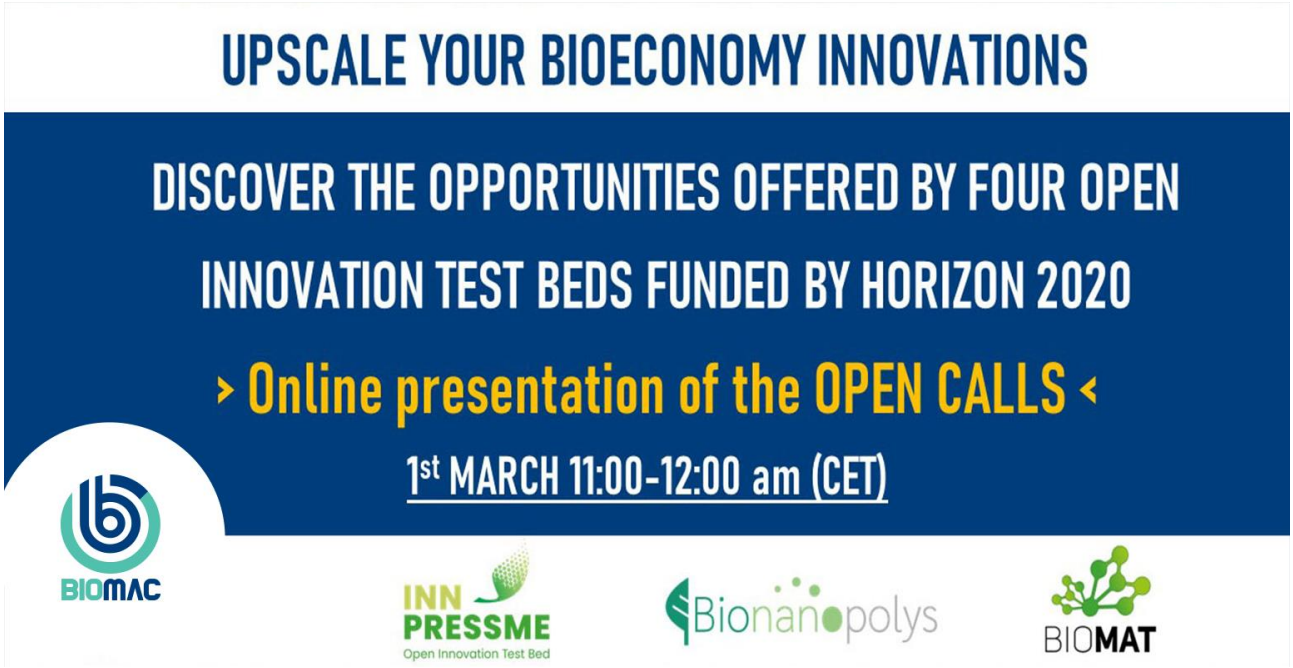

Figure 1 The joint webinar of March 2023

1.2 OITB workshop in Lund, 2023

On June 14, 2023 the "Workshop on the Future of Open Innovation Testbeds! was held at Lund University, as a satellite event of EuroNanoForum 2023 (ENF2023). It was jointly organized by the Convert2Green, FlexFunction2Sustain, and SAFE-N-MEDTECH projects in close collaboration with the European Commission (EC). The workshop's objective was to discuss crucial issues arising during the implementation of OITB projects and explore future actions to strengthen the community and ensure the long-term viability of the OITB ecosystem.

Participants included members from various OITBs, representatives from the European Commission, and speakers from different projects and organizations.

Presenters included:

- António Ferrández Garcia (EC/DG Research and Innovation representative)
- Professor Magda Krokida(Convert2Green project coordinator)
- Sandrine Lebigre (IPC, who illustrated the OASIS SEP)
- Professor Maria Taxiarchou** (NTUA, who described the LIGHCOCE SEP)
- Lorenzo Pastrana (INL, who outlined ESNA for FlexFunction2Sustain)
- Xavier Borras (AC2T, who presented the i-TRIBOMAT SEP)
- Andrea Haiek (CIDETEC, who presented go.Med/TBMED OITB)
- John Fahlteich (KETMarket, Convert2Green SEP, who presented the OITB ecosystem landscape)
- Christian May (Fraunhofer FEP, FlexFunction2Sustain coordinator, who provided insights on open calls)
- Ulla Forsström (VTT, INN-PRESSME project coordinator, who emphasized the importance of process data)
- Fernando Utrilla (UNE, who represented several OITBs discussing standardization)
- Robert Harrison (SONNENBERG HARRISON, Valorisation and IP Manager at FlexFunction2Sustain, who discussed IP management)
- Tommaso Zerbi (STAM SRL, participant in seven OITBs, who addressed EC expectations and SME reach).

After a discussion developing over three main sessions, its main outcomes and conclusions can be summarized in the following 8 sections.

Recommendations from the EC:

a) OITBs should offer technological, business model, and financial consulting expertise.
b) They should focus on SMEs as primary clients and target them via Open Calls.
c) Improve client proximity with assistance from internal marketing departments, translator networks, Enterprise Europe Network (EEN), M.ERA-NET, national certification bodies, and National Contact Points.
d) Promote the Code of Practice on intellectual asset management for efficient IP licensing.
e) Allocate a portion of funds to IP protection and exploitation.
f) Include investment consulting for SMEs.
g) Establish a Single-Entry Point (SEP) within the first year of the project, including a funding strategy and a permanent location.

h) Identify unique client characteristics and needs throughout the entire lifecycle and prioritize services accordingly.

Recommendations for the OITB Network:

a) Inform members about regulatory and standard developments and cooperate with technical committees to promote new or revised standards.
b) Group together and jointly develop an OITB label.

Recommendations for Member States:

a) Consider opportunities to support the financial sustainability of OITBs after EU funding ends, for example, through state aid rule exemptions or funds like the European Regional Development Fund.

Experiences with SEP Legal Models:

a) There is no single ideal model for the SEP's legal structure; each consortium must identify the most suitable one. Models explored included collaborative agreements, spin-offs (like LIGHCOCE), associations (like ESNA for FlexFunction2Sustain), and profit-oriented entities with external shareholders (like i-TRIBOMAT).
b) Regional SEPs are seen as a way to be closer to clients and access national funding. A potential disadvantage of the associative model could be the inability to contract with its own associates.

Value of SEPs:

a) For clients, the value lies in sharing knowledge and experience, efficiently guiding them to appropriate service providers. A single contract provides access to a combination of services from different providers. The SEP offers quality control through initial assessments. It also reduces costs and time in the development cycle. Consulting is a crucial service, as developers may overestimate their level of advancement. Being a trusted provider is important for the venture capitalist market.

b) For service providers, the SEP offers a favourable framework for joint development activities, increased visibility, and the possibility of expanding service offerings to their existing client networks.

Collaboration between OITBs:

a) Creating a general OITB organization could facilitate users in finding service providers. The ability to translate client needs into detailed service specifications is crucial.

b) Funding is the main obstacle for SME access to OITBs. OITBs should help SMEs access funding sources, including public funds. Innovative funding models are being explored that link third-party investments (with equity acquisition) to the purchase of services from the OITB network, offering technical quality assurance.

c) Opportunities for joint activities include cross-promotion of services, a central information hub, resource sharing (SEP, templates), joint marketing, and engagement of external networks.

d) It is important to collect process data for lifecycle assessment and modeling. Transnational barriers, such as those related to national laws on material reuse, need to be addressed.

Challenges (Standardization and IP):

a) Standardization is an essential service to provide to SME users. OITBs must identify who will provide this service and are encouraged to collaborate with the technical committees of standardization bodies. Standardization brings clarity, enhances the value of services, and fosters innovation. It also aids in quality control and compatibility among different providers. It's important to distinguish between OITBs' internal operational procedures and international standards.

b) For IP management, most OITBs start with pre-existing IP and focus on scaling up rather than creating entirely new concepts. Often, researchers prioritize publication over patenting. SMEs frequently lack clarity on freedom to operate and the patent landscape and should utilize the IP services offered by OITBs, which increases trust.

c) A future challenge is the potential presence of patents from extra-European sources that could hinder collaborative commercialization. Costs related to IP protection increase towards the end of projects and require careful consideration and support from the EC.

SME Outreach:

a) Implementing an innovation ecosystem model involves a significant administrative burden. An appropriate governance structure with representatives from each OITB could mitigate risks.

b) The shift from independent operation to an ecosystem approach requires digital marketing tools, in-depth analysis of existing offerings, gap analysis, and cross-market analysis.

Figure 2 BIOMAC partners during the EuroNano Forum 2023

1.3 Clustering event at EUBCE 2024

On the 25th of June 2024 BIOMAC partners EUBIA and ETA organized a parallel event in the context of the 32nd European Biomass Conference and Exhibition. The event saw the collaboration of the other OITBs INN PRESSME, BIOMAT, and BIONANOPOLYS, as part of the ongoing clustering activities.

During the talk, the representatives from the four projects presented their respective achievements that occurred in the last 3 and a half years, then they thoroughly described the services that the four Open Innovation Test Beds will offer from 2025.
The projects/OITB were represented by:

- Zoi Terzopoulou from the Aristotle University of Thessaloniki (BIOMAC)
- Juan Sobreira Seoane from ITG – National Technology Center (BIOMAT)
- Paulina Kivinen from VTT (INN PRESSME)
- Carmen Sanchez from ITENE (BIONANOPOLYS)

Finally, the four projects listened to a guest intervention from Niccolò Giacomuzzi Moore, Executive Director of CBE-JU, who talked about the achievements of this European program and the possible synergies that can be implemented between the four OITBs and the projects/companies financed by CBE-JU.
In this occasion, the audience and the project representatives exchanged views and concerns with Mr Giacomuzzi, and the takeaways from the discussion are listed below:

- The projects funded by CBE-JU are very much aligned with the topics covered by the OITBs, in addition, their maturity level might be boosted by accessing the services and pilot lines offered by the OITBs, An effort aimed at connecting these two worlds must be made.
- CBE-JU calls for funding that can fund the costs that an SME would face in accessing the OITB services. This opens an additional opportunity for companies with financial constraints.
- During the past months, some of the OITBs have presented their services in other events before SMEs and other potential clients. A recurring theme has been that of IPR protection. Companies are rightly worried about the preservation of their intellectual property or know-how while dealing with large entities like the OITBs. Therefore, a great deal of attention must be given to tailored Non-Disclosure Agreements that can dissipate all the concerns coming from potential clients.
- Accessing single services, like regulatory or market analysis is very important for SMEs developing bio-based products. Those instances should be highly taken into consideration.

- Based on some experiences evidenced by the speakers, bio-based products are still pricy and perceived strangely by banks. There is a certain degree of optimism for this situation to change, however more efforts are required, especially by the side of brand-owners. If a fashion/trend then meets lower prices, the market uptake is granted.
- The various interventions highlighted that the regulatory framework is still quite fragmented, and this is perceived as a barrier. Thus, the regulatory analysis services offered by the OITBs are essential to help SMEs in their upscale processes.
- The uptake of bio-based products is not "pushed" by legislation (with some exception); however, the European Commission will soon perform an assessment on the status of the bio-based materials and products, there will be a public consultation and all the OITBs partners are encouraged to submit their inputs.

Figure 3 Zoi Terzopoulou at the event

Figure 4 Niccolò Giacomuzzi Moore at the event

2. National stakeholder events

With the objective of increasing the outreach of the BIOMAC OITB services, project partners, on the initiative of WP8 and WP9 leaders, agreed in early 2024 to organize a series of events taking place in different countries and held in the local language. This initiative led to three events, described in the following sections.

2.1 Italian stakeholder event

On the 23rd of May 2024, the Italian partners of BIOMAC, organized an event in Milan, to showcase the achievements and the future services of the OITB. This activity is part of BIOMAC efforts to promote the OITB to the national stakeholders in different European countries. The event was held in Italian and saw the participation of representatives from the companies listed below.

Figure 5 Patrizio Salice from Novamont engaging with the audience

SAES: a company specialized in the production of different kind of materials for sectors like semiconductors, medical applications, food packaging and aerospace.

NSB Project: an Innovation broker with a large portfolio of clients in northern Italy, looking for opportunities to scale up the business of its clients.

Graftonica: a company dealing with Materials science and polymer composites which offers services like characterization analysis and materials development.

Cluster SPRING: the Italian bioeconomy cluster, an association of companies active in the field of the bioeconomy. The Cluster is always active in searching opportunities for its member and they also promoted the BIOMAC event through its channels.

Pietro Fiorentini: a company providing services for the gas market, such as monitoring systems and digitalization processes.

TPV Compound: a company producing compounds made with Polyvinyl chloride

Corapack: a company producing packaging films, mostly for food applications

Stardust Secured: the Italian branch of US company that specializes in the research, development, and scaled manufacturing of innovative technology for supply chain traceability, document security, and brand protection.

Following the presentations given by the BIOMAC partners, a session of Q&A followed, the main points are summarised below.

-A first question was posed regarding how BIOMAC managed IP with such a big consortium and how the analysis has been carried out. BIOMAC partners explained that the IPR research was carried out through patent databases on selected technological domains identified within the project. The results (which will be available at the end of the project, unless prior more general publications are published as scientific papers) allow partners to know the FTO and also potential collaborations. Moreover, it is pointed out that the IPR management within the project is ruled by the Consortium Agreement.

-An attendee was seriously interested in accessing the OITB services and asked for the possibility of receiving an indicative price offer before the end of the year. This is because he is applying with his company for regional funding and might add a budget for the OITB fees. We have agreed to stay in touch and continue the discussion with the SEP.

-An attendee made a specific question regarding the LCA methodologies used in the OITB. BIOMAC partners explained that the LCA methodologies are the established ones and that they are also connected with the LCC, that is they are also useful to estimate the total costs at the production scale, beyond the lab and with an industrial perspective.

-An attendee asked if it's possible to access just some complementary services, avoiding the Supreme Hub. BIOMAC partners answered positively.

-A few attendees asked about the application procedure, especially referring to the administrative burden. BIOMAC partners answered that the application is relatively simple and does not mirror any other application that can be required by public authorities. We have explained that some aspects are still to be defined but for the time being the reference document is the Open Call handbook.

2.2 Greek stakeholder event

The Greek Stakeholders Workshop was held as a satellite event during the final day of the Polymers Conference in Athens, Greece, on May 31, in the Greek War Museum. The workshop was organized by BIOMAC partners EXELISIS, RDC Informatics, and the Aristotle University of Thessaloniki and attracted significant attention.

The purpose of the event was to raise awareness of BIOMAC's capabilities to potential Greek stakeholders who may be interested in the OITB services. The workshop began with an introduction to the BIOMAC OITB, showcasing its pilot lines, transversal services, and test cases.

The focus then shifted to the potential of exploiting synergies between various funding instruments available in Greece that could offer the necessary funding for potential clients of the OITB to access its services, with particular emphasis on the "Research – Innovate" program [1]. Technology transfer opportunities were also explored aiming to encourage collaboration and enhance stakeholder engagement with BIOMAC's infrastructure.

The event was concluded with some guest speakers who shared their successful R&I stories where they effectively utilized such funding sources to drive real impact for their organizations. Their experiences were a perfect opportunity to reflect the value of combining multiple funding instruments showing that interested clients could potentially combine Greek funding mechanisms to access the OITB.

RDC had also created a specific website [2] for the event, including the agenda and the speakers. Some photos from the workshop are added below.

Figure 6 moments of the Greek stakeholder event

2.3 German stakeholder event

The German Stakeholder Event of BIOMAC took place on November 12th, 2024, in Graz, Austria, as a satellite event of the European Summit of Industrial Biotechnology (ESIB). ESIB, one of the key events in the field, gathers over 500 international participants each year. With its 2024 focus on "sustainable bioproduction" in bioeconomy and biopharma, the summit offered a great opportunity for BIOMAC to connect with a wide audience.

The event was synergically organized with the H2020-funded project Bionanopolys:
The event highlighted the role of Open Innovation Test Beds (OITBs) in advancing the bioeconomy and showcased BIOMAC's unique tools and services, including its decision-support system and pilot plant capabilities, tailored to industrial and SME needs.

The highlights of the Q&A session were the following:

1. Access to BIOMAC Services: Attendees inquired about tailored service options. BIOMAC confirmed the flexibility to access specific services without requiring full engagement with the Supreme Hub but only involving the SEP.
2. Nature of the SEP: the advantages of different SEP entities were asked and discussed, highlighting the importance of the involvement of the SEP as the legal representative of the OITB.
3. Pricing: Stakeholders expressed interest in receiving cost estimates demonstrating the practical value of BIOMAC services, that are currently under definition internally.
4. Availability of Decision-Support tool: the availability of the decision-support tool, developed within BIOMAC by AXIA, for companies was asked. The presenters confirmed the interest of the company to make it available for the market.

Figure 7 Post-event picture card

Conclusion

This joint workshop underscored the value of collaboration between BIOMAC and Bionanopolys, enabling both projects to exchange ideas and strategies while addressing common challenges in sustainable material development. By engaging with diverse

stakeholders, BIOMAC strengthened its role as a pivotal resource in the bioeconomy and showcased its commitment to advancing innovation in bio-based nanomaterials.

3. Event highlights report

This chapter summarizes the experience of project partners in promoting the OITB services among the target audience during physical events around Europe. The description presents four main sections: 1) Types of events 2) Type of audience engaged, 3) Type of interest shown, 4) Follow-ups and interactions.

3.1 Types of Events and Promotional Venues

The BIOMAC project partners have promoted the project and OITB services through a variety of communication and dissemination activities. These activities included participating in various settings, promoting the work done within BIOMAC and the services offered by the OITB:

- Conferences: Partners presented BIOMAC and its services at national and international conferences. Specific examples include, ICGC Green Chemistry Conference 2022, BioProScale Symposium 2024, Polymers 2024, the first BIOMAC Polymers 2024 congress, EUBCE 2023, 2024, and 2025, and Milan Polymer Days 2023. Presentations were essentially of two types, oral or via posters.
- Fairs and Trade Events: Promotion also took place at trade fairs dedicated to specific sectors, such as the Plastics & Rubber 2025 fair, recognized as the main meeting point for the plastics and rubber industries in the Iberian Peninsula, and fairs dedicated to additive manufacturing technologies. The partner EVERSIA participated in the European Bioplastics Fair Side Event.
- Meetings and Stakeholder Events: Specific events with stakeholders were organized or attended, such as a regional event on the circular economy organized by UNISMART – UNIPD.
- Digital Promotion: Activities also included promotion through platforms like LinkedIn and sending emails to contacts.
- National Stakeholder Events: National workshops were organized in Greece, Germany, and Italy. These included the "Greek stakeholder engagement event" satellite workshop during Polymers 2024, the "German Stakeholder Event" satellite workshop during the European Summit of Industrial Biotechnology (ESIB), and the Italian workshop in Milan. (Feedback on these events is reported in Chapter 2).

3.2 Type of Audience Engaged

BIOMAC partners interacted with a diverse audience during their promotional activities:

- R&D Professionals and Technicians: R&D managers, engineers, and partnership officers.
- Research and Academic Community: Composed of scientists, academics, researchers, and experts in life cycle sustainability assessment and toxicology, as well as researchers from other communities. For instance, the audience at Milan Polymer Days was predominantly academic.
- Industry and Companies: Professionals from the plastics and rubber sector, industrial companies interested in biomaterials and sustainable solutions, high-tech companies, partners of polymer manufacturing companies, industry representatives and SMEs, end-user companies, technology companies, business professionals, SMEs and large enterprises (potential OITB clients), manufacturing companies, and consulting firms.
- Broader Innovation Community: Including entrepreneurs, investors, policymakers, and industry professionals from various sectors.
- Students: An audience with whom interaction occurred (see section 3.4)
- Researchers from other EU-funded Projects and/or OITBs:

3.3 Type of Interest Shown

The interest shown in BIOMAC was varied and focused on different aspects of the project and OITB services. You can find below a summary of the topics of interest that emerged during the interactions.

- OITB Concept: Some audiences were unfamiliar with the OITB concept and requested explanations. General interest in OITB services was shown at various events.
- Access to OITB Services:
    - Practical questions were asked about how SMEs can access OITB services, where to find information, how much they cost, and who to contact to join.
    - There was interest in accessing specific services even without full involvement with the Supreme Hub.
    - The unique opportunity to access open innovation test beds for free and to take a bionanomaterial project from lab to industrial prototype was highlighted.
    - Companies were interested in exploring potential synergies with relevant pilot lines for their activities.
- Pilot Lines (PL):

  - Generic interest in the technologies underlying the pilot lines.
  - Specific questions about PL9.
  - Interest and questions about PL15's capabilities in terms of geometry, process costs, and usable materials.
  - Interest and questions about PL4 (Cnano), focused on the final product specifications (nanolignin), its potential applications in multiple sectors, and requests for evidence of its functionalization.
- Materials and Results: across several interaction, specific questions were asked about the results obtained with the different materials tested in BIOMAC.
- Specific Services:
  - Interest shown in services related to Intellectual Property (IP) protection and Freedom to Operate (FTO).
  - Interest in business model services.
  - Questions about the availability of the decision support tool developed by AXIA.
  - Interest focused on the methodologies and value chain processes used for life cycle sustainability and in-vitro toxicology assessments within the project.
- Sectoral Applications:
  - In the case of NVMT, considerable interest was shown for TeC2 'Agricultural Applications,' with questions on how BIOMAC solutions could be integrated into industrial and research activities, the potential of different intermediates for biomaterial development for agricultural applications, compatibility with existing processes, and advantages in terms of sustainability and performance.
  - One company showed interest in finding replicable processes in the packaging and cosmetics sectors.
  - A start-up showed interest in finding nanoadditives to improve sustainable bioplastics.
  - A US-based company explored opportunities to synergistically integrate their nano-inorganic markers with nanoadditives developed in BIOMAC.
- External Test Cases and Open Calls: Interest in submitting proposals for external test cases and general interest in open calls.
- Future of the Project: Interest in the future of the BIOMAC project results.

3.4 Follow-up of Interactions

- Interactions during presentations at national and international conferences such as EUBCE 2022, ICGC Green Chemistry Conference 2022, BioProScale Symposium 2024, and Polymers 2024 led to the establishment of new international contacts, student exchanges, and new scientific collaborations.
- Interactions with the broader innovation community, the general public, and the research community generated interest in the project's open calls, highlighting the unique opportunity to access open innovation test beds for free and to bring bionanomaterial projects from lab to industrial prototype. This interest is a form of follow-up aimed at deeper engagement.
- Interactions related to promotion, including those related to 'Agricultural Applications,' allowed for establishing contacts with different types of stakeholders (by NOVAMONT) and initiating discussions related to BIOMAC activities. Specifically, the following cases are reported:
    - Interaction with a leading innovation technology company that was seeking replicable processes in the packaging and cosmetics sectors.
    - Interaction with an innovative start-up interested in finding nanoadditives to improve sustainable bioplastics.
    - Interaction with a US-based company exploring opportunities to synergistically integrate their nano-inorganic markers with nanoadditives developed in BIOMAC.

In the case of CNANO, there were significant interactions related to Pilot Line 4 (PL4):

- Many companies and universities showed interest in nanolignin. These entities initially contacted the partners via email, which led to meetings and the sending of several samples for testing in their specific applications.
- Several tests were also carried out to functionalize nanolignin to better adapt it to these applications. These activities expanded knowledge about nanolignin beyond the project's scope.
- Participation in the European Bioplastics Fair Side Event led to email correspondences.
- Interactions during the Polymers 2024 conference and the Greek stakeholder event led to several outcomes:
    - Some interactions resulted in the submission of a project proposal during the open call process.

- There were exploratory meetings and discussions involving BIOMAC partners and interested stakeholders.
- In particular, in cases where a stakeholder expressed interest in specific BIOMAC services (e.g., a Pilot Line), they were directed to the relevant partner as well as the Project Coordinator for more information.

Drawing a wrap up of the above sections, while some interactions did not lead to immediate or direct follow-up, several dissemination and communication activities generated new contacts, scientific collaborations, concrete interest in OITB services (including participation in open calls), and specific discussions/tests with external entities, particularly evident in cases related to nanolignin and TeCs for agricultural applications, as well as in cases managed through the project's main events and the direct approach to specific companies.

4. BIOMAC participation in the CEN workshop

CNANO and European Bioplastics and the Spanish Standardization Body (UNE) have put forward a proposal for a CEN Workshop (CWA) aimed at implementing an innovative process to produce lignin nanoparticles using an ultrasound-assisted method, invented by CNANO. Workshops meeting started in the second half of 2024 with the official launch of the CWA in February 2025.

These meetings are reserved for representatives of CEN, ISO, and the EU-28 standardisation
bodies, as well as their experts who are members of the technical committee. On average, each
meeting counts a participation of 60-70 people (online and in person).

The formalization of this process in a CWA will ensure that the procedure is reproducible, scalable, and can be applied across different laboratory and pilot settings. The goal of the CEN Workshop is to draft a pre-standard, the CWA, on this process.

The initiative aims to strengthen the efforts of standardization and ensure that the knowledge gained from BIOMAC can be widely adopted. The activities of this workshop will provide an exciting collaborative opportunity for experts already working on ultrasound-assisted production of lignin nanoparticles. Success in this endeavour will be a relevant legacy of the BIOMAC project.