BIO-Boost

Replication guide for multiplication

Project: Boosting innovation agencies for bioeconomy value chains

Acronym: BIO-Boost

Funded by
the European Union

Document Information

Grant Agreement Number	101096150	**Acronym**		BIO-Boost
Full Title	Boosting innovation agencies for bioeconomy value chains			
Start Date	1st February 2023	**Duration**		24 months
Project URL	https://bio-boost.eu/			
Deliverable	D4.3: BIO-Boost Replication Guide (M24)			
Work Package	WP4 Dissemination, Communication and Exploitation			
Date of Delivery	**Contractual**	31.01.2025	**Actual**	31.01.2025
Nature	Guide	**Dissemination Level**		Public
Lead Beneficiary	The National Centre for Research and Development - NCBR			
Responsible Author	Maciej Zdanowicz			
Contributions from	All partners			

Document History

Version	Issue Date	Stage	Description	Contributor
D1.0	30.01.2025	Draft	Final draft prepared for review	NCBR
D1.1	31.01.2025	Draft	Final draft prepared for review	NCBR
D1.2	31.01.2025	Draft	Input received from partners	UNIMOS
D1.3	31.01.2025	Draft	Input received from partners	ITC
F1.0	31.01.2025	Final	Integration of input	NCBR, FBCD

Disclaimer

Contents

Executive Summary

It outlines the replication processes and methodologies defined and implemented under the BIO-Boost international initiative. It provides detailed insights into the procedures, strategies, and considerations necessary for replicating the project's objectives, ensuring the successful implementation of bio-based innovations across various sectors.

This guide details essential frameworks required to scale and replicate BIOBoost's methodologies, emphasising best practices and lessons learned from its implementation. The document presents an analytical and pragmatic approach towards integrating bio-based advancements within existing industrial and research structures, facilitating knowledge transfer and broader adoption of sustainable technologies focusing on services addressed to SMEs and start-ups. It appoints the steps for effective replication, highlighting key challenges and mitigation strategies.

Furthermore, the guide underlines the importance of collaboration between stakeholders, including governmental agencies, research institutions, and industry partners, to enhance the efficacy of bio-based solutions on regional, national and international levels. It outlines the regulatory considerations, financial mechanisms, and technological adaptations required to ensure easy adoption of the replication process in different environments.

In addition, the document presents a comprehensive and universal case study and pilot services, demonstrating the successful application of BIOBoost principles in various contexts. These examples provide valuable insights into the practical aspects of replication, showcasing the tangible benefits and potential impacts of adopting such approaches. The guide's emphasis on sustainability and innovation reflects the pan-European strategy of boosting innovations for bioeconomy value chains. It fulfils the project's main objective of increasing the latent potential of the participating innovation agencies, learning from leading innovator regions, cementing this knowledge and experience in the organisations, 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.

This replication guide is a crucial resource for policymakers, researchers, and industry leaders seeking to implement bio-based solutions effectively. Offering a structured and evidence-based methodology ensures that the principles of BIOBoost can be successfully adapted and scaled, contributing to the advancement of sustainable industrial practices on a broader scale.

1. Context

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

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

The BIO-Boost consortium, implemented by a multidisciplinary partnership, comprises eight partners from seven European countries. Together, they represent over 1835 European innovation actors, including SMEs, start-ups, RTOs, public bodies, and other ecosystem stakeholders, who will be engaged in the BIO-Boost activities.

- **Food & Bio Cluster Denmark (Denmark)** – BIO-Boost leader, national cluster organisation 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 organisation 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 with Latin America.
- **Lithuanian Innovation Centre (LIC)** consolidates the interests of business, science, politics, and society. For more than 25 years, it has been providing innovation support services to businesses, research and study institutions, Lithuanian business associations, and business support organisations. It promotes the development and marketing of new products and integrates 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 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) – a** non-profit company based on a public-private partnership model. CLIC aims to build new services, innovations, and research projects to address systemic sustainability challenges through co-creation processes and tools.

In order to reach established objectives, the BIO-Boost consortium implemented a set of interrelated activities that included, among others, study visits, staff exchanges, hackathon events, and cross-border initiatives that were held in Denmark, Spain, Lithuania, Finland, France, Poland, and Slovenia. The learnings from interconnected activities have led partners to the joint conclusions emphasised in the Joint Strategy and New Services Design and Implementation (DOP) created to design and implement new support services, tools, and resources to facilitate and expand assistance for innovation stakeholders, cross-sector collaboration, and support for start-ups and small and medium-sized enterprises (SMEs).

As a follow-up to the proposed DOP operational roadmap project, the consortium has provided the practical replication guide to create a long-term impact after the project. The replication guide provides guidelines and tools, including the DOP, to assist other innovation ecosystems/organisations in employing the BIO-Boost results to support SMEs and share the knowledge produced and lessons learned.

Propose a set of seven key joint conclusions:

1. **Importance of cross-sector synergies**: Collaboration between sectors such as agriculture, biotechnology, energy, and digital technologies is essential for achieving sustainable development in the bioeconomy.
2. **International cooperation**: The exchange of experiences and best practices among EU countries is vital for reducing the innovation gap and enhancing the innovation capacities of member states.
3. **Support for start-ups and SMEs**: Start-ups and SMES need increased financial and organisational support to introduce innovations and effectively participate in international projects.
4. **Digital transformation**: Digital technologies such as artificial intelligence, the Internet of Things (IoT), blockchain, and robotics play an increasingly important role in the bioeconomy and are crucial for its future development.
5. **Education and skills development**: Investing in education and skills development in new technologies and innovations is necessary to prepare younger generations for the challenges of the bioeconomy.
6. **Management of innovation ecosystems**: Effective management of innovation ecosystems, including establishing and coordinating advisory boards in collaboration with larger companies, is critical for the success of innovative projects.
7. **Sustainable development and circular economy**: Promoting sustainable practices and principles of the circular economy is essential for achieving sustainable economic growth and environmental protection.

These conclusions reflect the shared priorities and challenges discussed during the project's activities and indicate directions for future actions to strengthen the innovative aspect of the bioeconomy. This will help build a resilient, inclusive, and competitive European bioeconomy ecosystem that supports sustainable economic growth, cooperation on shared priorities, and exchanging knowledge and experiences to help the European community address current challenges together.

2. Introduction

The Replication Guide provides a structured framework that outlines the steps, processes, and best practices for replicating successful models, projects, or services across different regions, contexts, or audiences in communication, dissemination, and exploitation activities aiming to provide a framework for organisations to follow to:

- effectively replicate the message;
- ensure it is accurately transmitted and received by multiple recipients;
- achieve similar outcomes in their efforts.

It was created to enable regional, cross-regional, and Pan-European knowledge transfer, ecosystem development, and digital transformation while facilitating stakeholder engagement.

The proposed Replication Guide is closely aligned with the overall objectives of the project, such as:

- 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 organisations while building and expanding networks, expanding the cooperation, and enlarging the participation of more diverse innovation stakeholders and territories in existing successful initiatives in the bioeconomy, including agri-food, forestry, bio-based chemicals, materials and products, and bioenergy.

It also includes considering defined challenges such as regional disparities in innovation capacity and skill gaps, limited access to financing for SMEs, policy and infrastructure barriers, and the need for sustainable development in the bioeconomy.

As a result, the Replication Guide serves as a tool for:

- enhancing cooperation and collaboration among innovation agencies, SMEs, policymakers, and other stakeholders;
- supporting digital transformation by promoting open-source solutions and knowledge-sharing;
- strengthening bioeconomy value chains, including agriculture, forestry, bio-based chemicals, materials, and energy sectors;
- facilitating peer-to-peer learning, capacity building, and technology transfer;
- facilitating the structured replication of successful innovation models;
- expand regional cooperation and innovation networks;
- aligning innovation strategies with regional and international policies, including the European Green Deal and Smart Specialization Strategies (RIS3).

This unified guide integrates the methodologies indicated in the project proposal and other replication guides focusing on bioeconomy innovation, digital transformation, and SME capacity building. By applying best practices, the solutions developed in the Replication Guide are targeted to support innovation agencies, SMEs, policymakers, and other stakeholders in scaling their initiatives effectively.

3. Replication Methodologies

The BIO-Boost Replication Guide has been created as a structured framework that serves as a blueprint for scaling successful initiatives to foster multilevel development, ensuring innovation ecosystems can expand their impact efficiently.

Hence, the **Replication methodology** provides a structured approach to implementing successful models, processes, or technologies in new regions or sectors. It ensures that an initiative's core principles are maintained while allowing for adaptations to different local conditions, regions, countries' policies, and economic environments.

The methodology is designed to:

- **Reduce Innovation Risks**: By leveraging proven models, stakeholders can minimise uncertainties in new implementations.
- **Enhance Knowledge Transfer**: Facilitating the exchange of expertise between experienced and emerging regions.
- **Support Sustainable Growth**: Ensuring the replication process aligns with environmental, economic, and social sustainability principles.
- **Foster Cross-Sector Collaboration**: Encouraging partnerships between industries, academia, government institutions, and SMEs to create a holistic innovation ecosystem.

It is essential to mention that the replication is not a one-size-fits-all approach. It involves multiple steps that can vary depending on the sector, stakeholders, and specific project needs. The methodology generally includes:

- **Assessment Phase**: Identifying key success factors from the original model, including technological components, operational strategies, and stakeholder engagement processes.
- **Adaptation Phase**: Customise the model to align with regional regulatory frameworks, market conditions, and local innovation capacities.
- **Implementation Phase**: Establishing partnerships, securing funding, and deploying the model while ensuring continuous feedback loops.
- **Monitoring and Optimization**: Evaluating performance against predefined KPIs and making necessary improvements for long-term sustainability.

3.1 Open Innovation Ecosystem Playbook (OIEP)

The BIO-Boost project has been inspired by the Open Innovation Ecosystem Playbook (OIEP) used by one of the project partners, CLIC Innovation. The OIEP is a structured methodology that guides and manages open innovation processes within different ecosystems. It provides a roadmap for facilitating collaboration among diverse stakeholders, including businesses, research institutions, and policymakers, ensuring innovation thrives through shared knowledge, resources, and expertise.

OIEP methodology is designed for managing open innovation and is divided into three phases:

- **Explore**: This phase defines the ecosystem's vision, mission, and foundational strategies. Stakeholders assess existing capabilities, identify innovation gaps, and align on a collective vision for development.
- **Build**: This phase involves expanding participation by initiating ecosystem portfolio projects. It includes forming partnerships, securing funding, and implementing co-creation methodologies to drive innovation.

- **Grow**: The final phase involves preparing for commercialisation and broader market integration. This consists in scaling successful pilot initiatives, refining business models, and ensuring long-term sustainability.

OIEP supports organisations by offering tools, templates, and best practices that enable structured ecosystem management. It also emphasises adaptability, recognising that innovation ecosystems must continuously evolve in response to new challenges and opportunities through strategic development, engaging stakeholders at each phase.

3.2 Disruptive Innovation Ecosystem (DIE) Model

In addition to the OIEP model, BIO-Boost partners connected it with the Disruptive Innovation Ecosystem (DIE) Model to ensure the support for interconnecting the European innovation ecosystem flexibly and adaptively that fosters innovation by enabling dynamic collaboration between businesses, research institutions, and policymakers. DIE focuses on breaking traditional innovation silos and creating interconnected ecosystems where disruptive ideas can thrive. Being a dynamic framework for innovation, it emphasises:

Core Principles of the DIE Model:

- **Stakeholder Interdependence**: Recognizing the role of multiple actors, including startups, corporations, academia, and government bodies, in shaping innovation outcomes.
- **Market-Driven Adaptation**: Aligning replication efforts with evolving market demands, technological advancements, and industry trends.
- **Policy and Funding Alignment**: Ensure favourable regulatory frameworks and sustainable funding sources support innovation initiatives.
- **Agility and Flexibility**: Promoting an iterative development approach for continuous improvement and scalability.
- **Technology-Enabled Collaboration**: Utilizing digital tools, open data, and knowledge-sharing platforms to enhance connectivity between ecosystem actors.

Implementation of the DIE Model is composed of the following Phases:

- Phase 1: **Ideation and Co-Creation** – Engaging stakeholders through workshops, hackathons, and innovation challenges to generate disruptive ideas.
- Phase 2**: Prototyping and Testing** – Developing and piloting new solutions in controlled environments to assess feasibility and impact.
- Phase 3: **Scaling and Commercialization** – Expanding successful prototypes into broader markets through strategic partnerships and funding mechanisms.

Leveraging the DIE model with cross-sector expertise strengthens innovation ecosystems and cultivates an environment where transformative solutions emerge, driving long-term economic growth and technological advancement.

3.3 Open Source Replication Model (OSRM)

The Open Source Replication Model (OSRM) is a structured framework designed to facilitate the replication of innovative solutions using open-source principles. It enables knowledge transfer, ecosystem collaboration, and cost-effective scalability for SMEs, innovation agencies, and policymakers.

Core Features of OSRM:

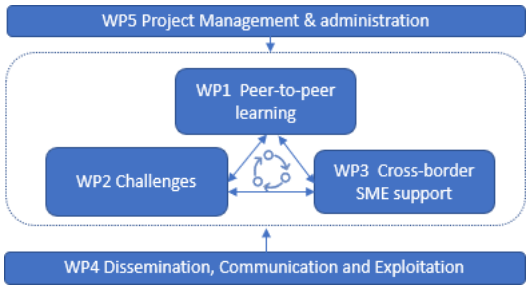
- **Open Data Utilization**: Promotes publicly accessible data to enhance innovation and transparency.
- **Interoperable Digital Tools**: Encourages the adoption of shared digital platforms that can be modified and adapted across different ecosystems - shared digital tools to facilitate replication.
- **Community-Driven Knowledge Exchange**: This strategy establishes a collaborative environment where stakeholders share insights, best practices, and technological advancements, encouraging community-driven knowledge exchange and cost-effective scalability.
- **Scalability & Cost-Efficiency**: This approach reduces development costs by leveraging existing open-source solutions instead of building new frameworks from scratch. It also ensures interoperability between different innovation ecosystems.
- **Regulatory & Policy Alignment**: Ensures that open-source methodologies comply with local and international regulatory frameworks for digital transformation.

The SCORE Replication Guide, BIOBoost Replication Model, and MPowerBIO open innovation frameworks inspire the proposed OSRM model. These frameworks emphasise open-source solutions for innovations and public service improvements within replication initiatives. By using these frameworks, stakeholders can drive digital innovation, strengthen bioeconomy ecosystems, and promote sustainable knowledge exchange.

4. Implementation Phases

The BIO-Boost project has been ideated as a dynamic, interconnected, and versatile framework to support the development of SMEs, innovation agencies/clusters and their innovation ecosystem actors, as well as regions in the field of bioeconomy innovations.

Based on the knowledge produced and lessons learned in the BIOBoost project, we share core implementation phases implemented as a case study. Thus, it is an example of the developed practices needed to structure the replication process successfully.



4.1 Peer-to-Peer Learning Phase

The peer-to-peer learning phase was the first project work package from a series of interconnected and related work packages and tasks included in the work plan to achieve the expected quality and efficiency of the implementation. P2P WP1 was focused on boosting durable interconnections between project partners as ecosystem facilitators by organising P2P learning and staff exchanges at the pan-European level, broadening the cooperation between partners, and opening up to include the participation of other regional innovation ecosystem actors. This phase emphasises knowledge exchange and capacity building through:

- Study Visits: Direct engagement with leading innovation regions.
- Staff Exchanges: Cross-border placements to enhance skill transfer.
- Digital Collaboration: Using open-source methodologies for knowledge sharing.

The expected outcome was to improve best-practices exchange and strengthen innovation networks with the following deliverables:

4.1.1 D1.1 Report on Innovation Ecosystems

The D1.1 Report on Innovation Ecosystems is an early stage of the BIO-Boost project. The project's key objective was to strengthen and expand innovation agencies working in bioeconomy value chains by fostering peer-to-peer learning, collaboration, and knowledge exchange among eight key innovation agencies, including research institutions, clusters, and digital innovation hubs specialising in **bioeconomy, ICT, and Industry 4.0 technologies** from seven EU countries.

The Report was elaborated collectively and provides a **comprehensive overview of the current state, challenges, and opportunities for bioeconomy innovation across seven EU countries** (Denmark, Finland, France, Lithuania, Poland, Slovenia, and Spain):

Key Networks & Stakeholders: Each partner identifies relevant networks, agencies, and programs in their regional innovation ecosystems. Examples include Danish food clusters, French bioeconomy consortia, Lithuanian digital hubs, and various Polish, Slovenian, Finnish, and Spanish institutions supporting bio-based industries.

Current State of Innovation Ecosystems: The Report outlines common challenges SMEs face, such as limited funding, regulatory barriers, a shortage of skilled labour, and a lack of market opportunities. It highlights best practices (e.g., matchmaking events, incubators, and accelerator programs). It shows how public and private funding (e.g., Cascade Funding Calls[1], EIC Accelerator[2], ERA-NETs, COSME, and national grants) spur collaboration and adoption of bio-based innovations. The Report also catalogues mistakes to avoid, including inadequate support services, heavy bureaucracy, and poor long-term sustainability planning.

SWOT Analysis: Each partner conducts a concise Strengths, Weaknesses, Opportunities, and Threats review for their bioeconomy ecosystem. Common strengths include robust R&D support and innovation-friendly policies; weaknesses stem from inconsistent coordination, knowledge gaps, and administrative complexity. Opportunities lie in cross-border collaborations, EU funding for

[1] https://webgate.ec.europa.eu/funding-tenders-opportunities/pages/viewpage.action?pageId=25559615
[2] https://eic.ec.europa.eu/eic-funding-opportunities/eic-accelerator/eic-accelerator-challenges-2025_en

sustainability, and growing consumer demand for bio-based products, while threats include economic uncertainties, global competition, and slow digital adoption.

As a result, the following key takeaways were highlighted:

- **Collaboration & Shared Learning**: All partners underline the importance of harnessing best practices and scaling innovative solutions.
- **Financing & Policy Alignment**: Access to national/EU funding is critical but requires more streamlined processes and better SME awareness.
- **Capacity Building & Skills**: Closing skills gaps and boosting knowledge exchange around new technologies are essential to strengthen bio-based value chains.
- **Future Steps**: This report's insights guided peer-to-peer learning activities, developed joint strategies, and helped design new services to bolster Europe's bioeconomy.

The findings guided future BIO-Boost activities, including joint workshops, strategy development, and innovation policy recommendations. The deliverable has been included on the project website and in the repository.

4.1.2 D1.2 Design option paper

The Design Options Paper (DOP) presents a framework for a **joint strategy and new service designs** to address systemic challenges in the bioeconomy sector.

Key Challenges Identified:

- **Regional disparities**: Uneven innovation capacity across EU regions.
- **Capacity and skills gaps**: Difficulty adopting advanced technologies (AI, IoT, blockchain).
- **Financial constraints**: Limited funding for early-stage bioeconomy initiatives.
- **Policy and infrastructure barriers**: Fragmented regulations and inadequate infrastructure.

Joint Strategy and New Services – the strategy revolves around peer learning, capacity building, and cross-border SME support through initiatives like:

- Study visits & staff exchanges to share best practices;
- Hackathons & challenge events for problem-solving in bioeconomy innovation;
- Cross-border Key Account Management (KAM) services for SMEs;

and the new service proposals:

- **Big challenge events** – scale-up and technology transfer;
- **Innovation tools** - joint acceleration and incubation activities or cross-border boot camps;
- **Activating participation in international grants** - more intense support for transnational cooperation and expanding services;
- **Green and digital transformation support** - to enable SMEs to adopt advanced technologies such as AI, IoT, and blockchain for process optimisation;
- **Networking and collaboration platforms** - expand international connections through ECCP and EEN;
- **Entrepreneurial Discovery Process** (EDP).

The implementation plan focused on the proposed four pillars:

- Governance & coordination: Clear roles and monitoring mechanisms.
- Integration with EU frameworks: Aligning with Horizon Europe, the Green Deal.
- Stakeholder engagement: Connecting policymakers, SMEs, and research entities.
- Training & Dissemination: Promoting awareness through events and guidelines.

Policy recommendations were emphasised to collect a summary of recommendations for policymakers that correspond to the challenges, opportunities, and knowledge gathered in the DOP and the essential documents regarding the bioeconomy community:

- **Strengthening regional cooperation** through international cross-border cooperation;
- **Financial incentives to support SMEs and startups**;
- **Enhance training and resources**;
- **Harmonising regulations** to create a unified EU bioeconomy framework;
- **Boost strategic investments**;
- **Promote inclusive growth**.

The DOP aims to reduce innovation disparities, strengthen bioeconomy value chains, and enhance the competitiveness of EU bioeconomy sectors. The project highlights the importance of cross-sector collaboration, digital transformation, and sustainability, ultimately contributing to a resilient, circular bioeconomy. Hence, the DOP provided a strategic roadmap to guide EU innovation agencies in implementing effective support structures for the bioeconomy, ensuring long-term growth and sustainability in the sector. For more details, visit https://bio-boost.eu.

4.2 Challenges - Triple Helix cooperation phase

In the second phase, under work package 2 (WP2) Challenges/hackathons, project partners implemented Triple Helix Cooperation, which was focused on boosting interconnections between and across innovation ecosystems working together to address specific bioeconomy challenges faced by the industry. This work package moves from networking toward actual cooperation between innovation ecosystem actors.

- Challenge Events & Hackathons to stimulate innovation;
- Cross-industry collaboration to leverage expertise;
- Stakeholders Engagement.

The Expected Outcomes were to deliver concrete innovation solutions and strengthen regional innovation ecosystems.

4.2.1 D2.1 Stakeholder map

The stakeholder map is a strategic tool developed to identify, categorise, and engage key actors across the BIO-Boost regional, national, and European bioeconomy innovation ecosystem. It ensures strategic collaboration among innovation agencies, SMEs, research institutions, policymakers, SME investors, and digital hubs to facilitate knowledge exchange, improve access to funding, and drive sustainable bio-based solutions. The stakeholder map also helps bridge regional innovation gaps, promotes cross-border cooperation by mapping networks, projects, and initiatives relevant to bioeconomy innovation, and aligns diverse interests towards enhancing SME growth, technology adoption, and financing opportunities within the European bioeconomy sector.

The stakeholder mapping was conducted through the provided methodology:

- **Data collection** from BIO-Boost partners via Excel-based templates.
- **Visual representation** of stakeholder interlinkages using the Miro platform.
- **Collaborative sessions** to validate and refine stakeholder relationships.

The impact and future use of the stakeholder map assume it will evolve throughout the project as more stakeholders and synergies are identified. The map will also enhance knowledge exchange,

funding opportunities, and strategic partnerships. Moreover, it will support the organisation of hackathons and innovation challenges, fostering SME participation in bioeconomy solutions.

By strengthening collaboration across innovation ecosystems, BIO-Boost aims to narrow the digital and bioeconomy divide, boost SME competitiveness, and accelerate the transition to a sustainable, bio-based economy in Europe. The deliverable has been included on the project website and in the repository.

4.2.2 D2.2 Report and evaluation of the impact of challenges

This report evaluated the impact of challenge events (hackathons) on addressing industry challenges in the bioeconomy. The assessment covered participant expectations, feedback, event outcomes, and recommendations for improvement.

Key Findings:

- **Challenge Events**: Eight hackathons were held across Europe, involving 235 participants from more than 160 organisations. These events facilitated cross-border collaboration, knowledge sharing, and the development of at least 34 bio-based solutions.
- **Participant Expectations**: Most attendees aimed to enhance networking, explore funding opportunities, gain industry insights, and develop innovative solutions.
- **Feedback & Impact**:
  - **Networking & Collaboration**: The most valued aspect of facilitating cross-sectoral connections.
  - **Knowledge Sharing & Learning**: Provided insights into sustainable bioeconomy solutions.
  - **Innovation & Idea Generation**: Helped refine new concepts for product development.
  - **Skills Development**: Improved pitching and presentation abilities.

Challenges & Recommendations:

- **Pre-Event Preparation**: A summary of pitches and structured event materials can improve Engagement.
- **Interaction & Communication**: More in-person events, structured discussions, and industry partner feedback sessions are recommended.
- **Event Structure**: To enhance participation outcomes, hackathons should align with industry-specific needs, foster deeper discussions, and include expert-led lectures.

The challenge events have successfully promoted bioeconomy innovations, strengthened inter-organisational collaboration, and supported SMEs in identifying sustainable business opportunities. High participant satisfaction (95.7%) indicates the program's effectiveness, with recommendations set to enhance future Engagement and impact. For more information, visit: https://bio-boost.eu/.

4.2.3 D2.3 Matrix of Innovation Opportunities

The D2.3 Matrix of Innovation Opportunities report presents a structured matrix of challenges, solutions, and funding opportunities identified during BIO-Boost challenge events. These events aimed to stimulate collaboration among industry players, innovation agencies, and policymakers to overcome key bioeconomy challenges.

Key Findings

- **Bioeconomy Challenges and Solutions**: The Challenges of circular economy, digital transformation, AI applications, resource efficiency, and food innovation were identified.

- **Innovation Matrix Insights**: Key focus areas include waste valorisation, advanced manufacturing, AI-driven resource management, and sustainable food production.; Solutions include circular bioeconomy models, smart water management, digital food traceability, and biobased alternatives to PFAS coatings.; Several solutions are under evaluation for cross-sectoral and cross-border collaborations.
- **Funding & Implementation**: Several projects are being considered for EU Horizon Europe, Interreg, and regional/national funding. Collaboration assessment and feasibility studies are in progress to transition projects from ideation to market implementation.

Policy Recommendations:

- Strengthening **interconnections between clusters, innovation agencies, and EU projects** to support long-term sustainability.
- Supporting **structured cross-industry** and **cross-border collaborations**.
- Enhancing the **role of innovation agencies in fostering bioeconomy partnerships**.
- Promoting **inter-project knowledge sharing** to accelerate innovation adoption in the EU bioeconomy.

Matrix of Innovation Opportunities provided successfully mapped bioeconomy innovation opportunities, forming a strong foundation for future collaboration, funding, and implementation. The innovation matrix serves as a blueprint for EU policymakers, industry leaders, and researchers to build on existing solutions and drive sustainable bioeconomy development across Europe. For more information, visit: https://bio-boost.eu/

4.3 Cross-border SME support

The third phase was implemented under the WP3 Cross-border Key Account Management work package to boost new client services, using skills gained or improved during WP1 and cross-border KAM methodology while testing and validating new concepts such as time banking. It builds and develops the capacity of the participating innovation agencies to help their SMEs and start-ups accelerate their innovation process. Lessons learned during the peer-to-peer learning would be implemented in hackathons and SME advisory, allowing the opportunity to learn methods from other partners in practice. The Expected Outcomes were to enhance SME access to funding and expertise and improve regional cooperation.

4.3.1 D3.1 Selection criteria for SME recruitment to the programme

The SMEs Selection Criteria Report ensures that BIO-Boost identifies and supports high-potential SMEs in the bioeconomy sector. It helps bridge regional innovation gaps, providing targeted funding access, mentorship, and innovation services to SMEs facing finance, technology, and sustainability barriers. The Report ensures efficient resource allocation, prioritising businesses that align with EU Green Deal goals, fostering cross-border collaboration, and driving sustainable economic growth. Ultimately, it maximises BIO-Boost's impact by selecting SMEs that scale, innovate, and contribute to a circular bioeconomy.

Deliverable D3.1 **defines the selection criteria for recruiting SMEs** into the BIO-Boost program. The goal is to identify and support high-potential SMEs with innovative bio-based solutions, fostering growth, internationalisation, and sustainability. Key Selection Criteria:

- Sectorial Focus;
- SMEs must operate in bioeconomy-related sectors;
- Solution Orientation;
- Regional Fit;

- Capability and Commitment;
- SMEs must have a strong team, financial stability, and a commitment to innovation;
- Innovation and Growth Potential;
- Alignment with BIO-Boost Services.

SME Selection Process:

- **Open Call & Direct Invitations**: SMEs apply via the BIO-Boost website or are identified through partner networks.
- **Evaluation Based on Criteria**: Applications are reviewed using a structured questionnaire assessing business potential and project alignment.
- **Final Selection**: A project committee selects SMEs through a transparent and merit-based assessment.

BIO-Boost's structured selection ensures that high-impact SMEs receive targeted support to drive innovation, sustainability, and international collaboration in the bioeconomy sector.
The deliverable has been included on the project website and in the repository.

4.3.2 D3.2 Report and evaluation of impact from cross-border KAM

This report evaluates the impact of cross-border Key Account Management (KAM) support offered within the BIO-Boost framework. The cross-border KAM service aims to enhance SME innovation potential, market access, and networking opportunities evaluated by the following factors:

- SME Engagement;
- Impact of KAM Support;
- Timebanking Concept;
- Consortium Feedback.

BIO-Boost partners highlighted the importance of trust, industry-specific support, and tailored advisory services. The cross-border collaboration allowed SMEs to expand their market reach and gain industry insights.

Policy Recommendations:

- Institutionalize KAM services within regional and national SME support programs.
- Expand cross-border collaboration through time banking to ensure equitable expertise distribution.
- Continue funding webinars, sector-specific activities, and targeted support for innovation-driven SMEs.
- Strengthen engagement with Enterprise Europe Network (EEN), Digital Innovation Hubs (DIH), and European Clusters.

The cross-border KAM service in BIO-Boost effectively supported SMEs in scaling their innovations, finding funding, and establishing international partnerships. The initiative's success suggests that structured, cross-border advisory services should be integrated into EU-wide innovation strategies to accelerate bioeconomy sectors' green and digital transitions.
For more information, visit: https://bio-boost.eu/.

4.4 Dissemination and communication plan

The objective of the dissemination and communication phase was to maximise the impact of BIOBoost and its results by providing targeted information to multiple audiences, including SMEs, start-ups and support organisations in innovation ecosystems across Europe. The BIO-Boost project partners took advantage of the strong existing networks within the consortium, which had broad geographical coverage. The phase implemented under WP4 ensures the involvement of many innovation advisors, geographically spread EU-wide, including in areas not directly covered by the partnership and by supporting better dissemination of project results emphasised in the Plan for Dissemination, Exploitation and Communication.

4.4.1 D4.1: Plan for Dissemination, Exploitation and Communication (PDEC)

The D4.1 Plan outlined the communication, dissemination, and exploitation (CDE) strategy to ensure maximum outreach and impact. Its key objectives include:

- Raising awareness about the BIO-Boost project and its results.
- Engaging SMEs, start-ups, and innovation agencies in bioeconomy sectors.
- Strengthening networks through regional events, workshops, and hackathons.
- Encouraging knowledge-sharing and best practices across Europe.

The strategy integrates **digital and physical channels** for effective outreach:

- **Website & Social Media**: A dedicated project website (bio-boost.eu) with an active LinkedIn, Twitter, and Facebook presence.
- **Publications**: Articles in professional journals and local/regional media.
- **Events**: Webinars, regional innovation events, hackathons, and final conferences.
- **Promotional Material**: Brochures, posters, roll-ups, and branding templates.

An essential part of the plan was to identify target audiences where BIO-Boost engages both **direct** and **indirect stakeholders**:

- Direct: SMEs, start-ups, innovation agencies, research institutions.
- Indirect: Policymakers, investors, European Enterprise Network (EEN), and the general public.

Dissemination and Exploitation included:

- Phased approach: Initial awareness-building (M1-M3), targeted stakeholder engagement (M3-M6), and impact maximisation through regional events (M6-M24).
- Key Exploitable Results (KERs) include a Replication Guide, training for SMEs (including Funding webinars and workshops), and cross-border knowledge-sharing.
- Monitoring & Impact Assessment: A CDE Toolbox tracks progress, ensuring strategic alignment and goal achievement.

The dissemination and communication plan foresaw expected outcomes with a specified number of engaged SMEs, strengthened innovation ecosystem actions, and facilitated cross-border collaborations. By leveraging diverse communication tools, the project ensures that bioeconomy stakeholders have the knowledge, resources, and networks to drive sustainable innovation across Europe. For more details, visit https://bio-boost.eu/.

4.5 Management Plan

The management and administration of WP ensured the correct allocation and coordination of resources to reach the project objectives within the contractual requirements and time frames. It described the processes and responsibilities for the successful execution of the project, which included implementing effective internal communication with the EU to track the project's progress and objectives, organising all meetings, preparing technical and financial reporting, and controlling the quality of deliverables.

4.5.1 D5.1: Project Management Handbook

The BIO-Boost Project Management Handbook is a crucial guide for ensuring the smooth execution of the BIO-Boost project, which aims to strengthen innovation agencies in bioeconomy value chains. It provides a structured framework for governance, communication, reporting, and risk management, ensuring compliance with EU funding regulations. The handbook standardises roles, responsibilities, and deliverables, streamlines internal and external coordination, and outlines strategies for financial oversight, stakeholder engagement, and contingency planning. It is essential for maintaining efficiency and accountability and achieving project objectives.

The implemented Management Structure included and followed a structured project **governance model**:

- Steering Committee (SC): Comprising representatives from each partner, responsible for strategic decision-making.
- Project Management Team (PMT): Oversees daily operations, financials, and project compliance.
- Work Package Leaders (WPL) & Task Leaders (TL): Responsible for specific project tasks and deliverables.

Two approaches were taken into account for the project **coordination and communication**, including:

- Internal Communication: Managed via emails, meetings, and collaborative platforms like Microsoft Teams.
- External Communication: The Project Coordinator (PC) is the official liaison with the European Commission, while partners engage stakeholders such as industry players and policymakers.

The project adopted a standard **reporting model** and scheduled for mid-term and final evaluation. **Deliverables** include technical reports, financial statements, and impact assessments, ensuring compliance with EISMEA and EC guidelines.

To fulfil the dissemination and visibility principles, the project-related communication included EU funding acknowledgements, ensuring data protection compliance, and contributing to public engagement via reports, social media, and workshops.

Risk Management was mitigated with the following predefined key risk examples:

- Lack of engagement from stakeholders (mitigated via recruitment campaigns).
- Poor SME participation (addressed through targeted outreach).
- Partner underperformance (managed through the Consortium Agreement and periodic reviews).
- External disruptions (e.g., global crises) (contingency plans include virtual adaptations).

The Project Management Handbook provided essential guidelines for governance, communication, deliverable tracking, and risk management. It ensured smooth project execution, compliance with funding requirements, and effective dissemination of results to maximise BIO-Boost's impact on the bioeconomy sector. For more details, visit: https://bio-boost.eu.

4.5.2 D5.2: Data management and ethics plan

The Data Management Plan (DMP) outlined the methodology for handling, storing, and sharing data collected/generated during the project, ensuring compliance with ethical and legal standards, particularly the FAIR (Findable, Accessible, Interoperable, and Reusable) principles.

- Data Collection and Sources
- FAIR Data Principles
- Data Security and Access
- Ethical and Legal Compliance
- Project Sustainability and Updates

The BIO-Boost DMP ensures structured, ethical, and secure data management. Following the FAIR principles, the project maximises data accessibility and collaboration while adhering to legal and security requirements.

This Ethics Plan ensured the BIO-Boost project adheres to ethical, legal, and regulatory frameworks and aligns with EU research integrity standards. The plan established data protection, privacy, stakeholder engagement, and ethical compliance guidelines in all project activities with the following concluded ethics:

- Ethical Management
- Data Privacy and Confidentiality
- Compliance with Ethical Standards

The BIO-Boost Ethics Plan established a structured framework to ensure ethical compliance throughout the project's lifecycle. Regular monitoring, evaluation, and stakeholder engagement are emphasised to maintain moral integrity. The project fosters accountability, transparency, and responsible research practices in the bioeconomy sector by adhering to EU ethical guidelines and data protection laws. For more details, visit https://bio-boost.eu.

4.6 Knowledge produced

Importance of Regional Ecosystems in Bioeconomy:
Innovation ecosystems across different EU regions (leaders, moderate innovators, and widening countries) are critical for fostering collaboration and addressing regional disparities in bioeconomy innovation.

Cross-border Collaboration Frameworks:
The BIO-Boost project highlights the significance of Key Account Management (KAM) services in strengthening SME support across borders and fostering international cooperation.

Role of Digital Tools in Bioeconomy:
Integrating advanced digital technologies (IoT, AI, blockchain) has been crucial in modernising bio-based industries and improving supply chain transparency.

Customised SME Support Models:
Tailored innovation support services are needed to effectively address bioeconomy SMEs' unique needs.

Lessons from Widening Countries:
Challenges such as limited infrastructure, financial constraints, and governance issues in widening countries underscore the need for targeted capacity-building initiatives.

Alignment with the Green Deal and Bioeconomy Strategy and Research Policy:
Taken actions must be adapted directly to the EU Bioeconomy Strategy and Green Deal objectives, emphasising sustainability, circularity, green and digital transformation. Moreover, to achieve practical bioeconomy governance, research outputs need to be aligned with policy frameworks to create coherent strategies for sustainability.

Shared Learning through Peer-to-peer Initiatives:
Study visits and workshops enable knowledge transfer among innovation agencies, strengthening regional ecosystem capacities.

4.7 Lessons learned

The following knowledge has been produced based on the lessons mentioned above, feedback gathered, and experiences from implementing the BIO-Boost project.

Tailored approached:
National bioeconomy systems have various strengths that require tailored approaches to address the regional bioeconomy ecosystems' unique strengths and weaknesses.

Collaboration and Capacity Building is crucial:
Collaboration of all stakeholders, including public, private, and citizens, is essential for impactful bioeconomy innovation.
Strengthening the capabilities of innovation agencies would directly impact the effectiveness of the delivered bioeconomy support services.

To foster innovations, focus on SME training and skills development offers are needed:
SMEs require targeted support to overcome barriers in funding, green and digital transformation, or cross-border collaboration.
Practical problem-solving events like hackathons effectively engage diverse stakeholders and might provide innovative solutions for bioeconomy challenges.

Technology drives innovation and support in achieving digital and green transformation:
Adopting advanced technologies like AI and IoT can significantly enhance operational efficiency in bio-based sectors. Integrating digital tools with green initiatives might drive the modernisation of bio-based industries.

Addressing Financial Gaps:
Financial constraints remain a significant barrier for SMEs, especially in less-developed regions. Targeted funding mechanisms are needed.

Sustainability is fundamental:
Projects must prioritise environmental, economic, and social sustainability to align with the European Green Deal.

Identification of success indicators:
Using identified, tailored and specialised metrics for impact assessment ensures the long-term success of bioeconomy initiatives.

Importance of peer learning:
Structured learning opportunities among agencies catalyse improvements in bioeconomy innovation strategies.

Resilience through diversity:
Involving diverse regions and stakeholders in bioeconomy initiatives builds resilience against systemic challenges.

Policy coherence will enhance impact:
Aligning European initiatives and national policies with EU-wide strategies ensures consistency and amplifies the impact of bioeconomy projects.

5. Replication Toolkit

To facilitate successful replication based on the collected knowledge, the following Replication tools and resources were identified:

- **Open Innovation Ecosystem Playbook**: A step-by-step guide on ecosystem development.
- Model for organising immersive **study visits and staff exchanges** in innovation ecosystems to promote knowledge transfer and peer learning in bioeconomy development.
- **Hackathon models**: eight innovative challenge (hackathons) event formats to strengthen linkages among European Innovation Ecosystems and interconnect businesses, academia, clusters, public institutions, and NGOs
- **KAM services**: a novel support system for SMEs based on a time-banking concept fosters efficient and tailored advisory services
  - **Cross**-regional funding webinars focused on financing opportunities for small and medium enterprises.
  - **Development of interproject collaborations** by leveraging synergies with other EU-funded projects and initiatives.
- **Training Modules**: Online and in-person sessions covering core methodologies.
- **Case Study Repository**: Showcasing real-world bioeconomy successes.
- **Open-Source Repository**: This repository can be an open and easily accessible space where all stakeholders can access the gathered existing and dedicated bioeconomy replication guides, digital tools, templates, and best practices.
- **Policy Recommendation Papers**: Guidelines for integrating bioeconomy strategies at regional and national levels.
- **Communication Strategy Guide**: Ensuring stakeholder engagement and visibility.
  - Delivery of **three funding webinars**

6. Monitoring and Evaluation

Monitoring and evaluation are essential components of the replication process. They ensure that key objectives are met, resources are efficiently utilised, and continuous improvements are made. Monitoring and evaluation provide stakeholders with actionable insights that enhance the replication process by systematically tracking progress, assessing impact, and identifying areas for optimisation.

To effectively follow the state of the art in implementing the monitoring and evaluation methodologies, it is necessary to establish Key Performance Indicators (KPIs), which are critical for measuring the success of replication efforts. They provide a quantitative and qualitative framework to evaluate effectiveness, enabling stakeholders to:

- **Ensure Accountability**: Clearly defined KPIs allow stakeholders to track responsibilities and measure their contributions.
- **Measure Progress**: Regular monitoring of KPIs ensures that milestones are achieved as planned and that projects remain on schedule.
- **Facilitate Decision-Making**: Data-driven insights help make informed decisions to refine strategies and improve outcomes.
- **Enhance Resource Allocation**: Identifying prosperous areas and bottlenecks allows for better distribution of funding, personnel, and infrastructure.
- **Demonstrate Impact**: Establishing concrete evidence of success strengthens stakeholder confidence and fosters continued investment in replication initiatives.

In the BIOBoost project, the following KPIs were used to evaluate the effectiveness:

- **Stakeholder Engagement**: The number of stakeholders participating in study visits and collaboration activities.
- **SME Participation**: Over 160 SMEs actively participate in challenge events and capacity-building programs.
- **Cross-Border Support**: A number of SMEs have received tailored advisory services for cross-border innovation.
- **Innovation Support**: A number of innovative projects benefit from replication methodologies.

Continuous evaluation ensures these KPIs align with project goals, facilitating adaptive learning and sustainable replication strategies. Periodic assessments and stakeholder feedback loops refine the methodology, driving long-term impact and scalability.

The following is a set of other sample Key Performance Indicators (KPIs) that might be developed for the project to measure the success of replication efforts:

- Stakeholder Engagement: The stakeholders responded to the surveys.
- SME Participation: A number of SMEs participated in the events.
- Cross-Border Support: a number of international consortia created by SMEs receiving advisory services.
- Innovation Support: innovative projects launched.
- **Digital Adoption**: several digital tools/services were explored.

7. Sustainability and Scale-Up Strategy

To ensure long-term impact, the following strategies are recommended:

- Integration into Regional Policies: Aligning with Smart Specialisation Strategies (RIS3).
- Leveraging Existing Networks: Expanding partnerships with Enterprise Europe Network and digital innovation hubs.
- Continuous Learning: Encouraging ongoing staff training and peer-learning initiatives.
- Open Data and Digital Collaboration: Enhancing knowledge-sharing through shared digital tools.
- Enhanced Visibility: Adapted Communication and Design Manual similar to the proposed example from EEA and Norway Grants 2014-2021

8. Conclusions

The presented BIO-Boost Replication Guide is a comprehensive roadmap with a scalable and customisable framework for boosting innovation ecosystems in the bioeconomy to scale successful innovation models across different regions. The guide ensures sustainable impact in EU-wide bioeconomy value chains by leveraging methodologies, structured implementation phases, and lessons learned. This document summarises the methods implemented and tested within the BIOBoost project, the steps taken, and the tools used to provide an integrated programme dedicated to SMEs. The international uptake of the projects of different partners and countries represented in the projects, from strong innovators to emerging innovators, delivered cross-border support of their local clusters with recommendations to the stakeholders of expanding regional innovation capabilities, international collaboration, driving digital transformation, and promoting sustainability in the bioeconomy sector. Overall, the provided guide is a tool dedicated to all stakeholders actively participating in the cross-border bioeconomy industry, such as innovation agencies, SMEs, and bioeconomy clusters (and beyond). The presented practical and easy-to-adopt guidelines based on the project case study allow customisation and replication of similar activities at regional, national or international levels. The replication guide aims to support stakeholders in becoming self-sufficient in training SMEs to prepare better and secure innovations, increase their performance and improve access to funding. The overall feedback brings key conclusions helping in the replication:

- Cross-sector collaboration is essential for sustainable bioeconomy innovation;
- Simplifications – as for the application process and reporting;
- Stronger focus on innovations and results than bureaucracy;
- Peer learning initiatives effectively strengthen ecosystem capacities - training practical examples are needed;
- Assure that all stakeholders are heard and understood;
- Cross-border services to boost collaboration in European innovation ecosystems;
- Digital transformation (AI, IoT, blockchain) accelerates bio-based industry modernisation;
- Targeted SME support with adequate management services improves financial (private and public) and technological access, enhancing the performance of the SMEs;
- Every replication process needs individual and tailored approaches in its adoption;
- Replication is a broader concept of reusing different aspects and components;
- Services helping to identify similarities are needed;
- Collaboration and co-creation in facilitating replication reduce costs and simplify the process;
- Policy alignment with EU strategies enhances the success of bioeconomy innovation.

The project was built on the six pillars defined in the proposal and evaluated during the project implementation, which are the basis of the proposed replication process:

- Specific needs (what are the specific needs that triggered this project?),
- Expected results (what do you expect to generate by the end of the project?)
- Dissemination, exploitation, and communication measures (what dissemination, exploitation and communication measures will you apply to the results?)
- Target groups (who will use or further adopt the project's results? Who will benefit from the project's results?).
- Outcomes (what change do you expect to see after successful dissemination and exploitation of project results to the target group(s)?
- Impacts (what are the expected broader scientific, economic, and societal effects of the project contributing to the expected impacts outlined in the respective destination in the work programme?)

These are the steps we recommend replicators take to begin implementing our guidelines.

Bibliography

1. Project proposal - *Boosting innovation agencies for bioeconomy value chains* (BioBoost);
2. BioBoost Deliverable 1.1 *Report on innovation ecosystems*;
3. BioBoost Deliverable 1.2 *Design Options Paper: Joint Strategy and New Services Design and Implementation*;
4. BioBoost Deliverable 2.1 *Stakeholder map*;
5. BioBoost Deliverable 2.2 *Report & evaluation of impact from challenges*;
6. BioBoost Deliverable 2.3 *Matrix of innovation opportunities*;
7. BioBoost Deliverable 3.1 *Selection criteria for SME recruitment to the programme*;
8. BioBoost Deliverable 3.2 *Report & evaluation of impact from cross-border KAM;*
9. BioBoost Deliverable 4.1 *Plan for Dissemination, Exploitation and Communication* (PDEC);
10. BioBoost Deliverable 5.1 *Project management handbook*;
11. BioBoost Deliverable 5.2 *Data management and ethics plan*;
12. BioBoost - Guidelines and rules of the time-banking platform;
13. The Open Innovation Ecosystem Playbook (OIEP);
14. Replication Guidelines Open source solutions for Public Service Delivery - Evdoxia Kouraki, Johanneberg Science Park; Camilla Sandberg, Sebastiaan van Herk, Bax & Company;
15. D 6.6 MPowerBIO Replication Guide and Toolkit - Food & Bio Cluster Denmark (FBCD);
16. Communication and Design Manual EEA and Norway Grants 2014-2021.

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End of document

Funded by
the European Union