D2.1

BIOEAST HUB Handbook

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AUTHORS	Inazio Martínez de Arano Andrea Arancibia
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Contributors

NAME	ORGANISATION
Inazio Martínez de Arano	EFI
Andrea Arancibia	EFI
Nora Szarka	DBFZ
Mihaela Mihailova	AA
Balazs Imre	BME
Aleksejs Nipers	LBTU
Dario Gazić	EIHP
Steliana RODINO	ICEADR
Katrin Kepp	EMÜ
Lili Veesaar	EMÜ
George Sakellaris	CR HUB
Marco Segovia Bifarini	CC
Jana Hrenova	MARD SK
Rasa Pakeltienė	VMU

Peer Reviews

NAME	ORGANISATION
Mariana Fernandez	SIE
Marie Kubankova	CR HUB
Korinna Varga	ÖMKi

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Abbreviations

AKIS	Agriculture Knowledge and Innovation Systems
CAP	Common Agricultural Policy
CD&E	Communication, Dissemination and Exploitation
CET	Communication Expert Team
EIP-AGRI	European Innovation Partnership – Agricultural Productivity and Sustainability
NCP	National Contact Point
NMG	National Mirror Group
MS	Member State
OECD	Organisation for Economic Co-operation and Development
OIC	Open Innovation Challenge
PESTLE	Political, Economic, Sociological, Technological, Legal and Environmental
R&D	Research and development
RIS3	Regional Research and Innovation Strategies for Smart Specialisation
SCAR	Standing Committee on Agricultural Research
SOAR	Strengths, Opportunities, Aspirations, and Results
SRIA	Strategic Research and Innovation Agenda
SWG	Strategic Working Groups
SWOT	Strengths, Weaknesses, Opportunities and Threats
TWG	Thematic Working Group

Introduction to the project

BOOST4BIOEAST *is a Coordination and Support Action funded by the European Commission developed to support the BIOEAST Initiative with the aim of empowering national stakeholders in the Central Eastern European and Baltic countries for the development of national bioeconomy action plans and to build long-lasting structures and spaces of dialogue for national and macro-regional cooperation. The project will enrich knowledge on the bioeconomy and stimulate related research and innovation across the macro-region.*

1 About this handbook

BOOST4BIOEAST aims to connect bioeconomy stakeholders with policymakers through national expert communities to strengthen their engagement in bioeconomy policy, research and innovation. To that aim, it will develop national bioeconomy action plans and set up long-lasting structures for cooperation and networking at national and macro-regional levels. To achieve this, the project creates and animates **national BIOEAST HUBs** (later referred to as HUBs), **understood as national networks to gather stakeholders and support their engagement in bioeconomy and with the decision-making process.**

This document sets out the process and procedures for the establishment and the operation of the HUBs and therefore will act as a guiding manual for all actors involved in these processes. After setting out an overview and the rationale behind the HUBs, the handbook presents the main features of the HUBs, from their definition and scope to the stakeholder categories and their broad functioning (chapter 3).

The following chapters then make up the core part of the handbook. Chapter 4 describes the key factors in establishing successful HUBs in a step-by-step process, based on experience from existing initiatives, relevant literature and European projects. Crucial to the success of the HUBs is a well thought stakeholder engagement process, which must carefully manage expectations since the outset (chapter 5).

Chapter 6 outlines procedures for effectively managing and coordinating the HUBs after their establishment taking into account HUB governance, functioning rules, practical aspects such as data management, internal reporting, dissemination and communication requirements. In this respect, the role of the HUB Coordination Body is crucial, and its main responsibilities are described. Additionally, The Playbook (Appendix 3) provides a compilation of proposed activities and methodological approaches, that can be implemented as part of the HUB functioning.

This handbook is intended to provide guidance and inspiration for the HUBs. It is not a rigid recipe. While it is important to ensure a degree of consistency across countries, the necessary flexibility must be retained to consider the specific characteristics of each national bioeconomy ecosystem.

2 Methodology

This handbook was developed based on the experiences and lessons learned from past projects, literature reviews, and an iterative process with BOOST4BIOEAST partners and HUB members to ensure that the guidelines align with the project's and HUBs' strategic objectives.

The structure and general approach of this document are inspired by the iNet Manual (Martinez de Arano *et al.* 2018) developed in the HORIZON 2020 Incredible project (https://www.incredibleforest.net/) complemented with literature from different sources such as past projects, different manuals, scientific literature, all listed in the References chapter.

The co-creation methodology of this handbook included an internal questionnaire for HUB Coordinators. The questionnaire contained 20 questions (Appendix 1) designed to capture among others, the foreseen objectives of the HUBs, their definitions, the types of stakeholders to be involved and the types of activities planned. It was completed by 10 HUB Coordinators from Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia in April 2024.

The results from the questionnaire were compiled, analysed, and discussed with WP2 partners and in an online workshop with HUB Coordinators, which included 18 participants on May 13, 2024. During the workshop, key results such as the prioritized objectives, activities, and stakeholders were discussed and validated along with the structure of the handbook's content.

3 Introduction to the HUBs and their role in BOOST4BIOEAST

In response to the need for sustainable development in Central and Eastern European and Baltic countries, the BIOEAST Initiative[1] (www.bioeast.eu) emerged in 2015, prioritizing research, innovation, and transnational cooperation. BIOEAST seeks to foster sustainable bioeconomies in the macro-region by addressing challenges like climate change and societal and economic issues through a macro-regional perspective. However, internal disparities in research and innovation capacities pose a challenge, bringing the necessity to enhance EU-wide cooperation.

To bridge existing gaps between policies and markets in Western and BIOEAST countries, there's a need for deeper stakeholder engagement and the development of action plans for innovative solutions. The BOOST4BIOEAST project aims to tackle this challenge by facilitating stakeholder connections, knowledge transfer and upskilling. The BIOEAST Initiative considers the BIOEAST HUBs as national networks to gather stakeholders and support their

[1] The Central and Eastern European Initiative for Knowledge-based Agriculture, Forestry and Aquaculture in the Bioeconomy. BIOEAST in short, provides a common research and innovation strategic framework for the development of sustainable bioeconomies for Central and Eastern European countries. The current members of the open initiative are Czech Republic, Hungary, Poland and Slovakia, Bulgaria, Croatia, Latvia, Lithuania, Estonia, Romania and Slovenia.

engagement in bioeconomy and with the decision-making process. Through their establishment at the national level, the project aims to connect governmental bodies with market actors to ensure the development and deployment of national bioeconomy action plans.

These HUBs will serve as platforms for capacity building and stakeholder mobilization, enabling effective contributions to policy and strategy development at national, macro-regional and EU levels. The HUBs encompass all value chains associated with the bioeconomy and are encouraged to develop thematic groups based on priority sub-sectors in the country.

BIOEAST HUBs will be established in 11 countries. At the moment, 4 HUBs have been already established. BIOEAST HUBs located in Czechia (coordinated by CR HUB) and Poland (coordinated by the Polish Ministry of Agriculture) were established with the support of the respective national BIOEAST NCPs before the start of the project. The Croatian and Slovenian HUBs have kick-started in June 2024 in a joint effort with the CEE2ACT project.

BIOEAST HUBs and their link with BIOEAST structures

- ***Thematic Working Groups (TWGs):*** The BIOEAST TWGs are established to support the work of the BIOEAST Governing Board at macro-regional level (comprised of representatives of ministries and research organizations) in specific strategic areas, and to enhance science-policy cooperation. Currently, there are seven TWGs: (i) Agroecology & Sustainable Yields, (ii) Bioenergy & New Value-Added Materials, (iv) Food Systems, (v) Forestry Value Chain, (vi) Freshwater-based Economy (vi) Advanced Biobased Materials and (vii) Bioeconomy Education (BE EDU). The TWGs were instrumental in developing the BIOEAST Strategic Research and Innovation Agenda (SRIA) (BIOEAST 2023) in 2023 and other macro-regional strategic documents. TWGs will lead the SRIA update process in frame of the BOOST4BIOEAST project, and be the communication link between TWG representatives, HUB Coordination Body, and the national HUB members.

- ***National Mirror Groups (NMGs)*** aim to reflect the TWGs at national level. Each Member State (MS) will integrate the NMGs in their HUBs that are related to their countries´ needs. NMGs will be integrated into national BIOEAST HUBs with the aim to have at least four NMGs per HUB to strengthen the connection between national and macro-regional levels and represent national bioeconomy priorities (through experts) based on TWG topics.

- ***BIOEAST National Contact Points (NCPs):*** NCPs work under the mandate of their sending country and are nominated directly by a political representative of their ministry. NCPs are the main national contact points in all BIOEAST-related matters. NCPs coordinate the inter-ministerial groups supported by the HUBs.

- ***HUB Coordination Body:*** The HUB Coordination Body is comprised of 11 HUB Coordinators and aims to manage the creation and improvement of the HUBs, ensure exchange and learning between HUBs and reflect on the progress of the national HUB activities. The Coordination Body will be responsible to maintain a continuous flow of information exchange between the BIOEAST Board, Secretary through the project coordination, WP3-7 and the HUB Coordinators.

HUBs' roles in the BOOST4BIOEAST project:

BIOEAST HUBs are national platforms where shared visions are built and stakeholders are mobilised to effectively contribute to policy and strategy development. Three main mandates of the HUBs in the framework of the BOOS4BIOEAST project will contribute to this objective:

- ***SRIA:*** HUBs will contribute to the TWGs' specific strategic areas with national priorities in updating the BIOEAST SRIA from 2024. The BIOEAST SRIA aims at mobilizing public and private resources to address the most relevant macro-regional knowledge gaps and identify the most pressing research needs, priorities and the most promising innovation opportunities. The SRIA must be created and updated in a multi-actor set-up, through permanent consultation and interaction. The HUBs can play a pivotal role in this, through the animation of participatory workshops and consultations at national level. This process is supported by activating the different thematic NMG*s* active in each HUB and supported by critical input provided to and by the macro-regional TWGs.

- ***Bioeconomy action plans:*** HUBs will be engaged in the development of national bioeconomy action plans. In line with the BIOEAST national bioeconomy concept papers (https://bioeast.eu/national-bioeconomy-concept-papers-published/), and with the diagnosis and priorities identified by the SRIA, these action plans will concert actions that will be implemented by different stakeholders, including ministerial levels. The HUBs will steer the process and will enrich its outcomes through:
    - identifying and elaborating on nationally important bioeconomy measures and actions,
    - providing assessment of results achieved,
    - mobilizing stakeholders through participatory methods,
    - establishing links with inter-ministerial groups to ensure policy coherence.

- ***Inter-ministerial groups:*** Inter-ministerial groups within the BIOEAST Initiative are collaborative assemblies that aim at fostering cooperation between various national ministries to promote bioeconomy strategies and implement related measures. These groups are crucial stakeholders for BIOEAST HUBs acting as a bridge between policymakers and national experts to develop and implement bioeconomy-related

policies and strategic documents, such as SRIA and bioeconomy action plans. The NCPs lead the coordination efforts, supported by the HUBs, which provide communication and organizational assistance (Guidelines for the establishment of inter-ministerial groups in Appendix 2).

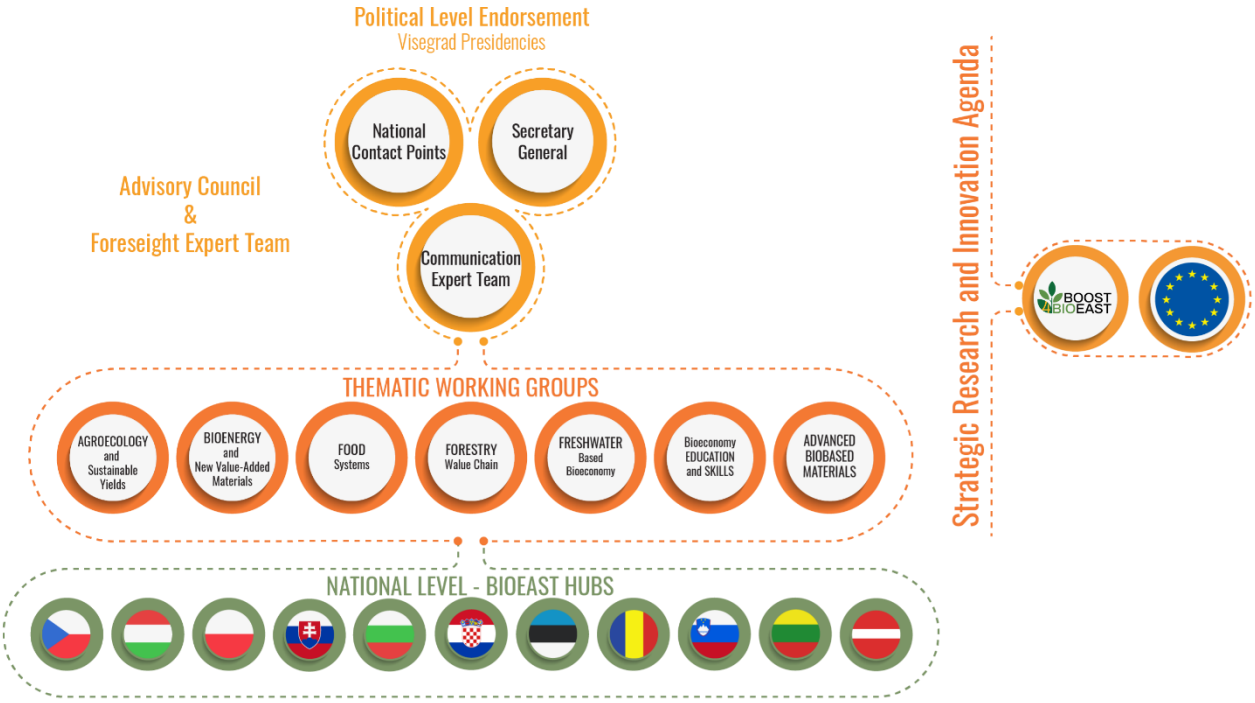


Figure 1. BIOEAST HUBs in the BIOEAST structure. (Source: BIOEAST Initiative)

Structure of the HUBs

HUBs will establish their HUB Management Teams, consisting of:

- ***HUB Coordinator:*** HUB Coordinators are representatives of the coordinating organizations (see Table 1). The HUB Coordinator serves as the main contact point and the official administrator of the HUB and oversees the kick-off, the management and the improvement of the HUB.

- ***Representatives of supportive organizations:*** HUB Coordinators are assisted by representatives from supporting organizations (See Table 1) that help in the management of the HUBs.

- ***Communication Expert Teams (CET)***: Each HUB appoints its CET (comprised of communication specialists) which will interact with WP8 partners to define the most HUB-appropriate activities related to communication and dissemination and they act as

liaisons between their national community and the project.

Table 1. HUB Coordinators and supporting organizations

Country	Coordinating organisations	Supporting organisations
Bulgaria	Agricultural Academy (AA)	
Croatia	Energetski institut hrvoje pozar (EIHP)	Hrvatska poljoprivredna komora (HPK)
Czechia	BIOEAST HUB CR, Z. U (CR HUB)	Ceska Zemedelska Univerzita V Praze (CZU)
Estonia	Eesti Maaulikool (EMÜ)	
Hungary	Budapesti Műszaki es Gazdaságtudományi Egyetem (BME)	Természettudományi Kutatóközpont (TTK), AKI Agrárközgazdasági Intézet Nonprofit Kft (AKI)
Latvia	Latvijas Biozinatnu un Tehnologiju Universitate (LBTU)	
Lithuania	Vytauto Didziojo Universitetas (VMU)	Lietuvos Respublikos Zemes Ukio Ministerija (ZUM)
Poland	Ministerstwo Rolnictwa i Rozwoju Wsi (MARD PL)	Instytut Ekonomiki Rolnictwa I Gospodarki Zywnosciowej-Panstwowy Instytut Badawczy (IERIGZ-PIB)
Romania	Institutul De Cercetare Pentru Economia Agriculturii Si Dezvoltare Rurala Bucuresti (ICEADR)	Institutul National De Cercertare Dezvoltare Pentru Stiinte Biologice Ra (INCDSB)
Slovakia	Ministerstvo Podohospodarstva A Rozvoja Vidieka Slovenskej Republiky (MARD SK)	Narodne Pol'nohospodarske a Potravinarske Centrum (NPPC), Narodne Lesnicke Centrum (NLC)
Slovenia	Circular Change, Institut Za Krozno Gospodarstvo (CC)	Ministry of Agriculture, Forestry and Food (MKGP)

In order to address bioeconomy stakeholders' expectations, and to ensure successful establishment of the HUBs, it is important to define their composition and scope. The following sections will deal with this matter, investigating the What, Where, When, Who and How of HUBs.

3.1 WHAT: The nature and role of the HUBs

The bioeconomy requires government buy-in, supporting regulatory framework, cross-sectoral collaboration and a well-functioning innovation ecosystem made of all Quadruple Helix[2] actors.

[2] The Quadruple Helix involves representatives from all members of society; public authorities, industry, academia and citizens.

The specific thematic focus of a HUB will influence the type of stakeholders to be engaged, the types of activities to be developed, the set of skills and resources the HUB requires, and of course, the approach to the HUB's governance and its communication strategy.

Although HUBs can have characteristics of different collaborative structures (Table 2), they can be generally understood as a platform that functions as a focal point for stakeholders to exchange knowledge, access information, and, in some cases, access specialized resources and services. They can, however, have a role in facilitating innovation, informing policies and in societal awareness and engagement.

Table 2. Definitions of different collaborative structures and number of HUBs responding to the best fit with their understanding of the BIOEAST HUBs. (Source: internal questionnaire to HUB Coordinators)

Definitions of different collaborative structures	Number of HUBs
A platform that serves as a focal point for stakeholders to exchange knowledge, access information, and access specialized resources and services.	5
An organizational structure that brings together different stakeholders to foster innovation in the sector, solve complex problems and develop innovative solutions to drive economic growth.	2
A network characterized by close geographical proximity that aims at enhancing industrial collaboration and competitiveness. It integrates various stakeholders facilitating technology and knowledge transfer between research and industry.	1
Strategic partnership between organizations or entities from different sectors coming together to work towards common goals and interests, such as advancing a particular agenda or addressing shared challenges.	1
A formal body or committee formed to advise or support policy and decision-making regarding specific issues or areas of interest, such us the development of a strategy.	1

3.1.1 Strategic objectives of the HUBs

Based on the preferences of the HUB Coordinators indicated in the internal questionnaire, the strategic objectives of the HUBs can be summarised as:

- To create and maintain knowledge sharing and innovation networks on key bioeconomy themes.
- To foster a co-creation process and develop shared agendas and action plans.
- To raise awareness on the challenges and opportunities of the bioeconomy at national level.

- To increase bonding, bridging and linking social capital, to maintain and to increase trust and shared visions among HUB stakeholders.

Other objectives were ranked with a medium/low priority. However, one or more of these objectives can be decided to be included as strategic or secondary objectives for the HUBs based on their national context, strengths, and priorities. The objectives, in order of priority, are:

1. to influence, advise and support policies,
2. to identify policy mixes,
3. to promote innovation,
4. to mobilize resources from public and private sources,
5. to strengthen human capital,
6. to facilitate access to knowledge and technology,
7. to enhance inter-ministerial concerted action,
8. to facilitate access to market and finance.

3.1.2 HUBs as knowledge sharing innovation networks

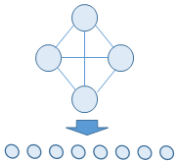
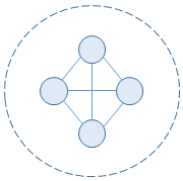
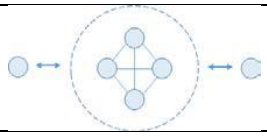
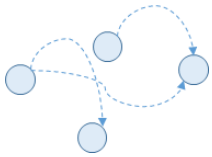
Networks are fundamental to understanding and managing innovation in complex, dynamic and often unpredictable environments. They are becoming increasingly important in helping different actors (companies, academia, NGOs, etc.) improve their competitiveness and value position through an enhanced access to knowledge, resource sharing and innovation (Koch 2017). As Schumpeter (1912) recognized a century ago, innovation frequently arises from new connections between ideas frequently coming from different sectors and contexts.

Falkowski (2019) defines an innovation network is a group (set) of a number of autonomous entities (including companies and their branches, universities, research centres, government institutions, and private individuals), interconnected via a series of direct or indirect relations, which cooperate in order to achieve synergy effects in the pursuit of common objectives focused on research and development, practical use of the existing and jointly developed knowledge, and the diffusion of innovations. Synergies are created through sharing knowledge, sharing resources and through mutual learning and co-creation.

Many types of innovation network exist. Networks can be both spontaneous (i.e. group of individuals because they need to obtain specific resources not currently owned, which are required to innovate), or deliberately created (by a leading private or public actor). They can be open to all actors sharing (in a sufficient manner) a common objective (e.g. a cluster, a thematic working group), or closed to a group of partners (e.g. a franchise network, suppliers' networks). They can be individual oriented (as in a peer-to-peer network), value chain, regionally or sector-oriented. They can be led by public actors, by business actors or by civil society (third sector).

This will define their core objectives. Finally, some networks are oriented to policy and institutional actors, while others can be oriented towards resourceful individuals and consumers. The table below presents some examples.

Table 3. Network types and related features. (Source: adapted from Doherty (2007), World Bank (2012) and Martinez de Arano (2018))

Network type	Network structure	Network creation	Network objectives	Examples
Peer-to peer		Spontaneous	-Knowledge exchange -Individual benefits maximization -Horizontal integration	Farmers' associations and cooperatives
Value chain		Deliberately created	-Innovation across the value chain -Vertical integration	Inter-professional association
Corporate consumer networks		Deliberately created	Advisory groups or other forums designed to involve customers in bringing forward both needs and customer-developed solutions.	User groups, beta tester networks
Bonding network		Spontaneous, Deliberately created	Internal integration of one large disperse unit within an organisation	-Internal staff committees -Consumer groups -Shareholders groups
Bridging network		Deliberately created	Integration of one large unit with external innovations/actors	Corporative accelerator units
Thematic networks		Spontaneous, Deliberately created	-Building relationships, sharing knowledge -Developing common visions, addressing common challenges	Cross-sectoral clusters and HUBs

BIOEAST HUBs can be understood as thematic networks, formed by groups of agents (including primary producers' organizations, biomass processing and related service companies, researchers and members of academia, policymakers in related domains, as well as other stakeholders related to land management, supply and demand of ecosystem services). These vast arrays of actors voluntarily coordinate their actions and contribute knowledge and other

resources to jointly develop the bioeconomy, and generate positive social, economic and environmental impacts. By definition, they are open to all actors that share a common objective. In fact, they should actively pursue the participation of actors across traditional sectors.

Fostering cross-sectoral knowledge exchange is a key element of the HUBs. These are open networks with dynamic participation, that gather all types of actors interested in generating positive economic, environmental, and social impacts through a green bio-based economic transition.

In this type of network, membership changes often in response to new challenges or new opportunities. This needs to be accepted naturally and planned for. This is in contrast with business networks such as, for example, franchise chains, retail and service chains, company joint ventures, strategic business alliances, that all have a clear commercial focus. Here, typically, one actor "organizes" and commands the network that has a relatively narrow, but very stable membership (World Bank 2012).

3.1.3 HUBs contributing to societal awareness

Raising awareness in the bioeconomy is crucial for fostering a sustainable and inclusive future. It is necessary to address the lack of knowledge about the social and environmental benefits and risks of bio-based products and processes, and notably on the capacity of the bioeconomy to generate economic development and quality employment.

By informing society at large – at national, regional and local levels – awareness actions can promote sustainable consumption patterns, enhance collaborative efforts within bioeconomy value chains, and help develop markets for bio-based products. Increased awareness helps overcome barriers to change, increases the ability to make informed choices, and supports collaborative actions. (LIFT project 2019; Laurens and Kiresiewa 2020)

Networks, such as those animated by the HUBs, often make an essential contribution to raising the awareness of stakeholders in specific economic sectors or across cross-sectoral themes. They can also help raising societal awareness in general. As a matter of fact, network members are not only among the most important target groups, but they are also very relevant multipliers.

During BOOST4BIOEAST, CETs of the HUBs will define appropriate approaches and concrete communication and dissemination activities, that will be part of the project's Communication, Dissemination and Exploitation (DEC) Strategy. For this, it will have support from T8.2, in a two-way communication where HUBs also act as liaison channels between BOOST4BIOEAST project and the HUBs' network of stakeholders.

Awareness raising efforts of the HUBs will leverage the opportunities opened by BOOST4BIOEAST core activities and key outputs. These include:

- BIOEAST SRIA and national bioeconomy action plans,
- BIOEAST Knowledge Platform and mapping exercises,
- Open Innovation Challenge (OIC) and pitching days,
- BIOEAST Bioeconomy Conferences and other project related events.

3.1.4 HUBs that generate social capital

While human capital refers to the knowledge, skills, health and motivation of individuals, social capital refers to the intrinsic value that is generated through the relationship with others. The functioning of networks, personal relationships, shared values, mutual trust and reciprocity are all key ingredients of social capital. Higher social capital is related to greater knowledge exchange, cooperation and social justice, and is thus an important factor explaining the development of communities. Networks with high social capital benefit all its members as they have better access to social resources, bigger opportunities to exchange information, and to engage in joint ventures and other common endeavours (Coleman 1988; Bourdieu 1985).

Scholars distinguish three types of social capital (Claridge 2018):

- *Bonding capital*: emerges from the connections within a group or community characterised by relatively high levels of similarity in different characteristics. For our purpose, we can think of HUB stakeholders or stakeholders in a given sector.
- *Bridging capital:* is based on the connections that link people across groups, that have significant differences. In our context, this can be understood as relationships among different HUBs or among stakeholders from different sectors.
- *Linking capital:* is based on vertical connections along power structures. It refers, for example, to the relationships between a local organization and the government. For our purpose, we can think of the connections between HUB stakeholders with government officials and top management of large corporations.

HUBs should aim to increase cohesion and trust within existing groups (bonding), access to peers in related sectors, access to individuals in groups with divergent views, or from regions or countries (bridging), and access to individuals in decision-making positions (linking). This access to individuals is what then unlocks the creation of partnerships and facilitates access to key resources such as funding, technology, etc.

HUB Coordinators will focus on offering engaged stakeholders the opportunity to increase their social capital in the three dimensions of social capital (bonding, bridging and linking capital). The mix of HUB activities will be accordingly designed.

3.2 WHO: The stakeholders of the HUBs

The identification of the stakeholders that will make up the network is a key success factor for the resilience and effectiveness of the knowledge exchange process. In turn, in order to attract the identified stakeholders is necessary to understand their needs and interests. HUBs are created to increase the social capital of bioeconomy stakeholders, to address their needs in relation to access to knowledge, networks, institutions, and resourceful individuals. While obvious, is important to emphasize that the HUBs are to serve stakeholder needs and not the opposite.

Table 4 shows the different needs and drivers that a network can assume when led by a private agent, a public one, or a combination of the two. Networks formed only by private entities would tend to be driven by commercialization challenges as they usually perceive innovation as a way to improve their market position and individual competitiveness. On the other hand, public innovation networks will be driven by a research agenda (research networks) and socio-economic issues (public national or international organizations) (Martínez de Arano *et al.* 2018).

Table 4. Network drivers and needs (Source: Adapted from World Bank (2012))

Agent types	Drivers	Needs
Private	Commercialisation	Market positioning
Public	Research, social inclusion	Knowledge advances, alleviation of social challenges
Private-public (private leads)	Commercialisation with high innovation component, research and development (R&D)	Market positioning, alleviation of social challenges
Public-private (public leads)	High impact research, territorial impact	Knowledge dissemination, innovation diffusion

When it comes to member selection, the broader is the set of actors involved in the network, the larger are the expectations members will anticipate from network activities and events. This is because the network will have a more complex interplay of stakeholder's personal needs and individual benefits to fulfil.

In the case of the HUBs:

- The network agents are both private (e.g., farmers, forest owners, entrepreneurs, NGOs etc.) and public (e.g., researchers, public sector officers, etc.).
- The network lead is public, coordinated by national ministries or publicly funded research organisations or universities.
- The shared objective is the willingness to advance towards a circular bioeconomy that is just, fair, inclusive and sustainable.

3.2.1 Collaboration with related initiatives, sectoral clusters or HUBs

The bioeconomy encompasses multiple sectors of the economy, linking primary producers with virtually all other sectors, not only in the agro-industry, but also in construction, transport mobility, fashion or (nature-based) tourism. While they have the biotechnologies as a core component, it also heavily overlaps with the digital, circular and service economies. In all these sectors, different types of networks, alliances, clusters and HUBs may already exist. In addition, bioeconomy-oriented HUBs may have been created in the past, or similar international research, technology and development projects may be created in the near future.

It is a priority for the HUBs to engage with existing clusters, HUBs and networks:

- to provide a natural continuation to the stakeholder collaboration sustained by short-lived projects and
- to provide an extra-layer of added value to existing sectoral initiatives related to the bioeconomy, for example leveraging BIOEAST institutional support, strong science-policy connections, and international dimensions.

For this purpose, whenever possible, HUBs will prioritize the inclusion of umbrella organizations/initiatives over the involvement of individual companies.

Table 5. Existing HUBs and related initiatives in the BIOEAST countries

Name	Regions/Countries	Focus	Notes
Power4Bio Regional bioeconomy HUBs	Central Germany; Southern Great Plain, Hungary; Lviv, Ukraine; Andalucia, Spain; Mazovia, Poland; South Bohemia, Czechia; Bavaria, Germany; 11 Italian regions; Flanders, Belgium; Nitra, Slovakia	Increase the capacity of regional and local policy makers and stakeholders to structure their bioeconomy and to support the emergence of a thriving bio-based sector.	Legacy cluster Project supported Project ended in 2021, HUBs still exist
CEE2ACT National	Bulgaria; Croatia; Czechia; Greece; Hungary; Poland;	Bring together relevant stakeholders to foster exchange of ideas and	Project supported

Bioeconomy HUBs	Romania; Serbia; Slovakia; Slovenia	common elaboration of national bioeconomy roadmaps.	Ongoing until 2025
BE-Rural open innovation platforms	Stara Zagora, Bulgaria; Vidzeme, Latvia; Strumica, North Macedonia; Szczecin Lagoon and Vistula Lagoon, Poland; Covasna, Romania	Develop regional bio-based economies through inclusive stakeholder involvement, sustainable resource use, and knowledge sharing.	Project supported Project ended in 2022
RuralBioUp Regional HUBs	Auvergne-Rhône-Alpes, France; Centru Region, Romania; Charles Spa, Czechia; Ireland; Latvia; Lombardia, Italy; Marche, Italy; Pays de la Loire & Bretagne, France; Puglia, Italy	Strengthen the cooperation among regional key actors and knowledge holders.	Project supported Ongoing until 2025
BIOLOC HUBs	Aragon, Spain; Western Macedonia, Greece; Plovdiv, Bulgaria; Nitra, Slovakia; Slovenia; Adriatic, Croatia; North Hungary; West Romania; Czechia; Apeldoorn, the Netherlands; Baden-Württemberg, Germany; Italy	Build permanent public-private multi-stakeholder working tables to discuss innovative and inclusive circular bioeconomy as a leveraging factor for sustainable and resilient local development.	Project supported Ongoing until 2025

3.3 HOW: Portfolio of HUB activities

In the longer-term HUBs will deploy a portfolio of activities and services to fulfil the BIOEAST mission (https://bioeast.eu/vision-objectives/), and to address the needs of their stakeholders. The main types of activities of the HUBs can be summarized as:

- knowledge exchange activities,
- business discovery and animation of innovation,
- facilitation of science-policy and science-business interface,
- policy advocacy in favour of sustainable, circular and just bioeconomy,
- awareness raising activities.

Some of the specific events and activities that can be carried out in the HUBs have been already identified. The potential activities in order of priority according to HUB Coordinators'

preferences are (based on the internal questionnaire):

1. Stakeholder meetings
2. Thematic workshops
3. Awareness raising campaigns
4. Policy forums
5. Project brokerage and matchmaking
6. Conferences
7. Pitching events
8. Study visits
9. Demonstration pilots
10. Entrepreneurship program
11. Training and capacity building activities

The BIOEAST Playbook in Appendix 3 provides a compilation of proposed activities, methodological approaches, best practices, and tools drawn from various sources and past projects. It comprises a portfolio of recommended activities intended for implementation and inspiration as part of the HUBs' operation. These activities were selected to help achieve the HUBs' objectives and ensure a strategic and effective operational framework. The Playbook will be continuously updated adding materials based on the implementation of the HUBs' activities and roadmaps.

The Playbook is divided into 7 chapters, each of them addressing a relevant topic for HUB management and activities. Materials are presented in factsheet classified in 4 categories: Activity, Concept, Best practice, Methodology.

In the shorter term, the HUBs are expected to deploy BOOST4BIOEAST activities at national level as necessary preparatory steps for a successful development. Different activities will be implemented throughout the project, but in general terms, HUBs will contribute:

- To compile knowledge and information on available biomass, bioeconomy competencies, educational materials, and innovation ecosystems at national levels.
- To facilitate knowledge exchange and networking activities at national levels, comprising sectoral scope (through NMGs activities) and cross-cutting themes.
- To encourage and facilitate inter-ministerial discussions.
- To contribute to macro-regional workshops and other events (e.g. BIOEAST Annual Conferences).
- To experiment with innovation support activities.
- To manage communication and dissemination activities at national levels, in coherence with the project DEC strategy.
- To evaluate and report of the HUB activities and impacts.

This structured approach will lead to a common shared process for all HUBs. Nevertheless,

as challenges and innovation triggers vary in each network, HUBs need to have sufficient flexibility to adapt to emerging problems, reshaping the narrative path through their action. For this reason, significant flexibility can be introduced in the organisation of activities for each HUB.

3.4 WHERE: International and regional dimensions

The HUBs have national scope; therefore, their priorities are aligned with national priorities based on the nature and characteristics of natural resources, biomass producing sectors and existing transforming industries, research capacities and societal preferences. To better fulfil their mission, HUBs can leverage the international connections provided by the BIOEAST Initiative and the extended international networks of HUB supporting organizations. On the other hand, regional action may be necessary to fulfil the HUB objectives.

According to the results of the internal questionnaire, HUB Coordinators expect to generate value for national bioeconomy development and for national stakeholders through international activities in specifically 4 areas:

- policy alignment,
- research cooperation,
- knowledge exchange and skill development,
- innovation and technology transfer.

HUB Coordinators, however, are less interested in providing to HUB stakeholders opportunities to access new markets or develop international business to business collaborations, as through trade mission or related activities (Figure 2).

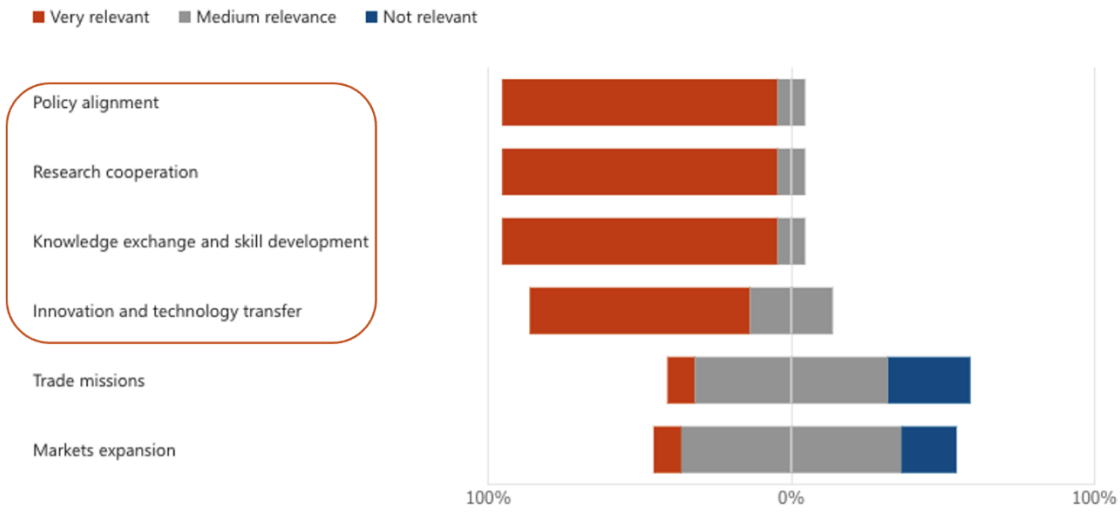


Figure 2. Benefits from international collaboration according to HUB coordinators' priorities (Source: internal questionnaire)

To realize these benefits, the BIOEAST Initiative and the BOOST4BIOEAST project provides various platforms for international collaboration (detailed in Table 6).

Table 6. BOOST4BIOEAST instruments for international collaboration

Instrument	Description	Where in BOOST4BIOEAST	Opportunity for HUBs
TWGs	The connect national stakeholders at the macro-regional scale and support the work of BIOEAST Governing Bodies.	Each TWG meets at least once per year with their representatives (T6.1 led by MKPG). Their main objective is to update thematic SRIAs (T6.2, led by TTK).	Develop national NMGs linked to the TWGs. Connect national stakeholders to the SRIA updating process through consultations.
HUB Coordination Body	Community of Practice for the Coordinators to increase their capacities, share experiences and information.	T2.2 (TTK) will animate regular meetings of HUB Coordinators and maintain a continuous exchange of information between other WPs of BOOST4BIOEAST and the HUBs.	Plan and develop HUB to HUB exchanges and seize strategic opportunities for collaboration.
Open Innovation Challenge (OIC)	Open Innovation Challenge to identify relevant innovations and organise series of pitching events to connect them with HUB stakeholders and investors.	T4.2 (EFI) implements the OIC and T4.3 (IBF) organizes 5 pitching events.	Meet innovators and investors from other countries. Connect HUB stakeholders with resourceful individuals.
Science-policy events	Yearly thematic science-policy dialogues potentially synthetized in issue papers.	Under T6.3 (AKI), each TWG will organise at least one macro-regional science-policy dialogue per year, three in total.	Align the development of the research agendas with European framework program and facilitate participation of HUB stakeholders in project proposals.

Most of the HUBs understand that having presence/activities at regional level is important, even if the way to achieve this in a cost-effective way is not clear. Sharing approaches and experiences with the HUB Coordination Body is important (Figure 3).

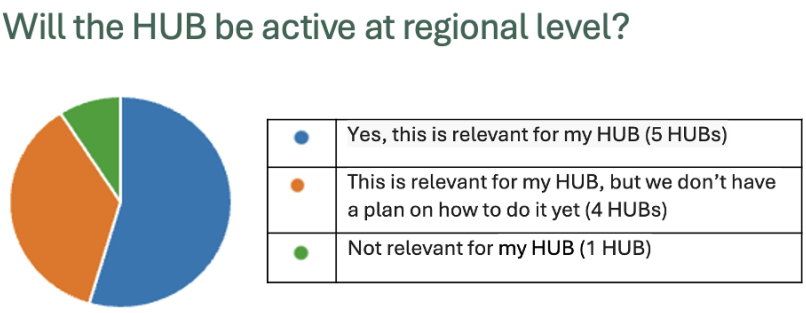


Figure 3. Interest of HUBs in regional action. (Source: internal questionnaire)

While being interregional in their structure, HUBs will be actively working at the local, national, and macro-regional scale in terms of dissemination outputs and activities. BOOST4BIOEAST will maximize integration and synergies with regional, national and European policies to facilitate a wide adoption of the proposed innovations. Policy implications at multiple levels will be developed, notably targeting rural development actors, networks and policymakers in cross-cutting areas. It will also target innovation-driven research, seeking feedback from and engagement with the Standing Committee on Agricultural Research (SCAR) and the Strategic Working Groups of the Agriculture Knowledge and Innovation Systems (SWG-AKIS) and the European Innovation Partnership – Agricultural Productivity and Sustainability (EIP-AGRI).

3.5 WHEN: Long-term sustainability of the HUBs

HUBs are intended to be self-sustained in the long term. As they are established and mature, they will need to develop a viable business model. This entails identifying a clear value proposition, target audience, operational methods, and necessary partnerships, as well as establishing the required revenue streams. Various options can be considered, recognizing that no single approach will suit all HUBs. Assuming that the value propositions of the HUBs are valid and well recognized by a significant group of HUB stakeholders, revenue streams could be generated by:

- governmental support,
- secondments and in-kind contributions from HUB coordinating and supporting organizations,
- membership fees for HUB stakeholders,
- service fees for concrete activities,
- participation in competitive projects,
- donations from public and private donors.

Each HUB will develop sustainability strategies in order to ensure their long-term financial and technical sustainability containing business model elements and to foresee the risks of future functioning beyond the project lifetime. HUB sustainability strategies will be created

by M36 as part of Milestone 17.

4 Creating the HUBs

HUBs must have a core shared objective that brings together and motivates stakeholders. They must focus on issues that are specific enough in order to provide some depth and avoid dispersion of efforts. A reduced set of themes can be addressed at any given moment, while a larger set of issues can be covered sequentially during the life of the HUB.

The aim of this chapter is to provide a common approach and a practical guidance to HUB Coordinators when setting up or re-launching a HUB. This handbook describes six steps for the creation of the HUBs from ecosystem mapping to its official kick-off and the exploitation of the kick-off outcomes (adapted from Martinez de Arano *et al.* 2018). The proposed steps are summarized in Figure 4. When possible, examples from existing HUBs or related networks are provided.

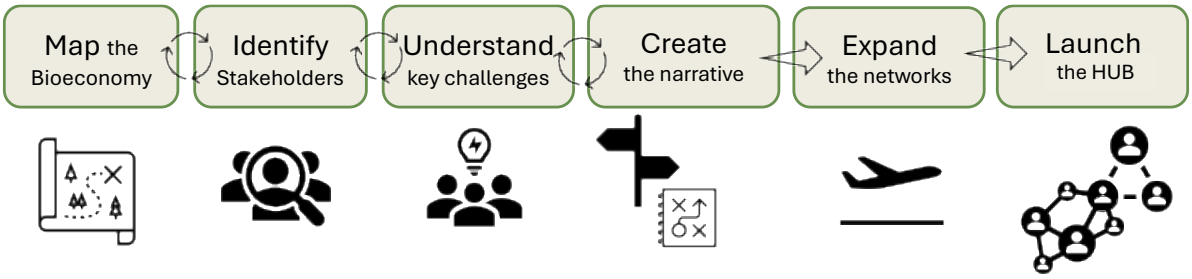


Figure 4. The HUB creation process

For each step of the HUB creation process described above, a template will be created to help collect information consistently across the HUBs and ensure that the process is structured, well documented and reported properly.

4.1 Step 1: Map the bioeconomy ecosystem

The first step in creating the HUB involves mapping the bioeconomy value chains and the ecosystem of current and potential actors. This can be accomplished in two phases: value chain and innovation ecosystems mapping.

Value chain mapping

A value chain map provides a simplified description of the various activities involved in the production of bio-based goods, helping to identify key stakeholder categories from biomass production to the final product. More generally, it can include value chains based not only on biomass but also on ecosystem services. In this case, the value chain mapping starts with land management practices that supply ecosystem services and ends when the ecosystem service is used or consumed. When mapping the value chain by following material flows, special

attention must be given to the fate of residues and side-streams at each step as well as to the fate of post-consumer goods, such as recovery for reuse, repurposing or recycling. The following figures provide examples of value chain maps (Tasa 2018; Martino Amadei *et al.* 2023; Brenko *et al.* 2018 and Incredible project).

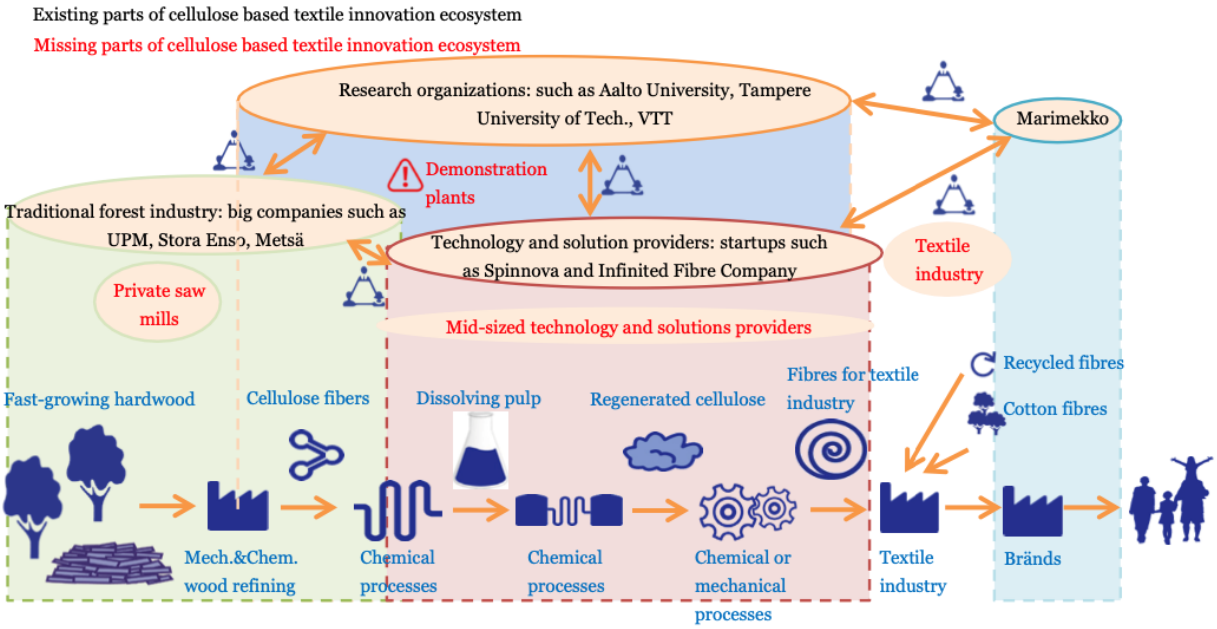


Figure 5. Map of the value chains of Finnish bio-based textiles. (Source: Tasa (2018))

In Figure 5, the existing players are mapped along "non-existing" players. This already identifies important challenges to be addressed. Notice that the part of the value chain related to circularity is only represented as input of recycled fibres into textile industry. It would be valuable to map also the types of actors involved in the collection, pre-processing, use of side-streams and post-consumer fibres.

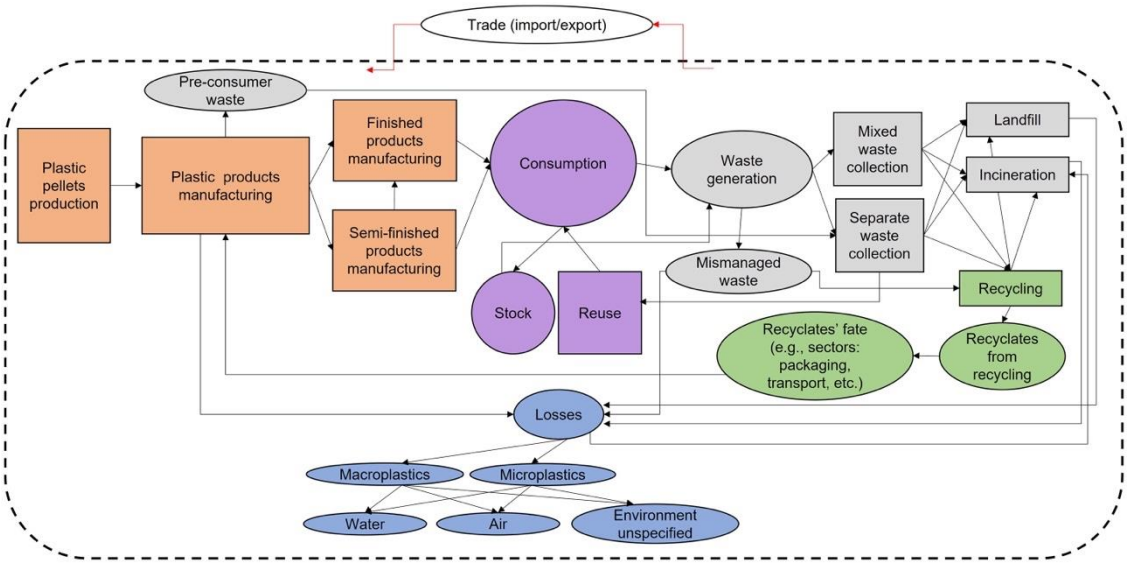


Figure 6. A material flow analysis of the EU plastic value chain. (Source: Martino Amadei et al. (2023))

Figure 6 shows a material flow analysis of the EU plastic value chain emphasising the circular component. This map provides good basis to identify the different types of actors to be engaged in a HUB.

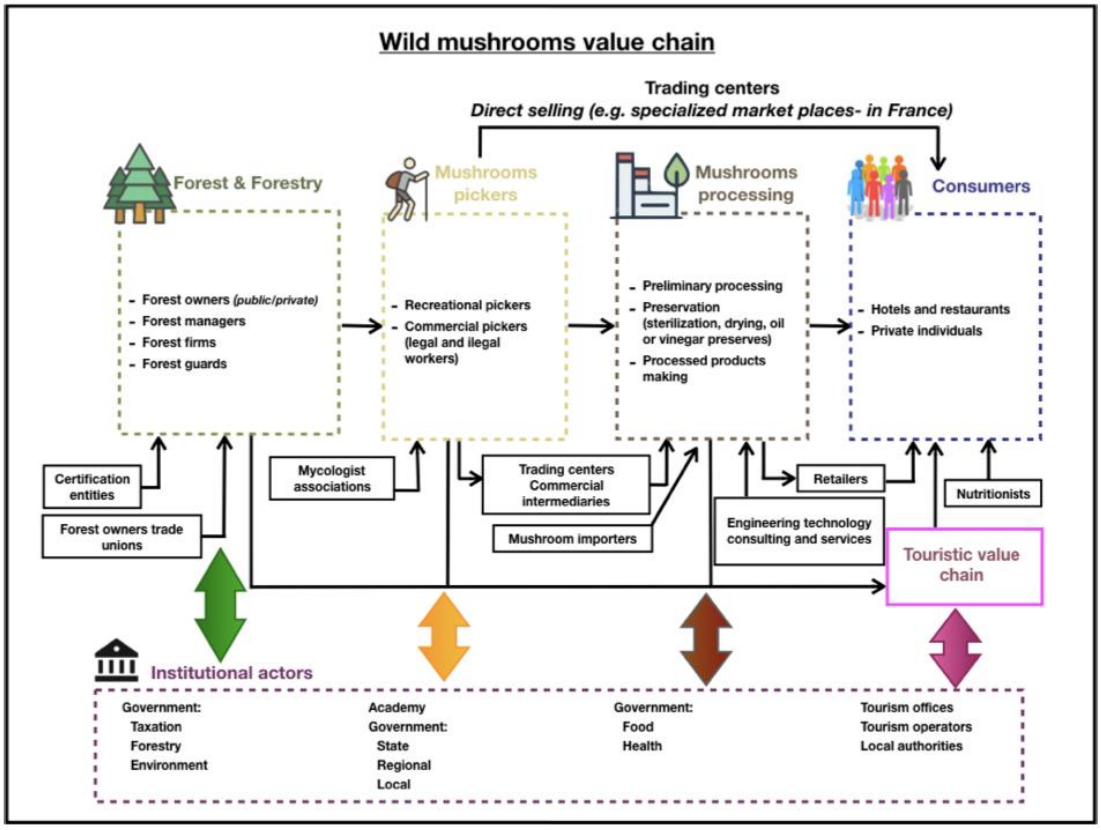


Figure 7. The map of the wild mushroom picking value chain in Europe. (Source: Brenko et al. 2018 and Incredible project)

Figure 7 shows the map of wild mushrooms picking depicting the interplay of five main set of actors: mushroom pickers (both recreational and commercial), mushroom buyers, intermediaries, forest managers and final consumers (both individuals and professionals). This figure was the product of multi-stakeholder discussions that helped identify key challenges (conflicts among professional and hobby pickers, grey markets, lack or traceability, unsecured supply, etc) and allowed to identify a roadmap for innovation.

From value chain to innovation ecosystems mapping

In an interdependent society, successful transformative innovation does not happen at the individual or company level. It frequently requires a large set of stakeholders to co-innovate in mutually reinforcing directions. For this reason, the value chain maps should be expanded to encompass the larger innovation ecosystem. Rephrasing Canter's (1994) definition, innovation ecosystems consist of groups of actors from different industries and sectors with distinct but complementary skills and capacities which interact to create value for end-users and society.

While the mapping of value chains certainly represents highly valuable information, ideally the notion of value chain should be expanded to include all other additional actors that have an influence in their development, and that are required in order to innovate (e.g. legislators, governmental bodies, academia, or civil society). Figure 8 shows the forest bioeconomy innovation ecosystem of the Basque country giving also an emphasis on actors not directly involved in the materials flows, and on the communication channels and major events as part of the ecosystem.

This is especially important in cases like the bioeconomy, which is a highly regulated, influenced by a rapidly evolving technological landscape, and at the same time, subject to intense social scrutiny. You can think of this innovation ecosystem as the minimum set of actors required to pursue the value chain development that the HUB is advocating for.

Figure 8. A visual summary of the forest bioeconomy innovation ecosystem of Basque country in 2021. (Source: Briers et al. (2021))

In summary, the HUBs should aim to animate bioeconomy innovation ecosystems based on value chain actors as well as additional actors who can positively impact the innovation process, even if they are not currently part of the value chain.

These actors can be identified by asking questions such as:

- Who else plays a relevant role in addressing current challenges and developing innovations?
- Who else can contribute to successful HUB activities?
- Who else can benefit from the HUB?

The resulting set of stakeholder types reveals an ecosystem that is richer and less linear than the value chain and includes the actors that will be instrumental for reaching the objectives of the HUBs.

Ideally, each HUB should map the value chains and related bioeconomy ecosystems of those bioeconomy sectors related to the active and prospective thematic groups (involving NMGs). This mapping should include all relevant actors engaged in the circular materials flows (as in Figure 6), identify potentially missing players (as in Figure 5), and identify other necessary players for the development of each bioeconomy sector (as in Figure 8). Also note that the resulting ecosystem map is not the final map, it should become more refined as the HUBs evolve.

4.2 Step 2: Identify key stakeholders

Based on Freeman's (1984) definition, HUB stakeholders are all institutions, organizations, networks or individuals who can affect, or can be affected by the achievements and the objectives of the HUB.

The first task of Step 2 ***(step 2a)*** consists of the ***identification of broad categories*** of relevant stakeholder groups. This should be a natural outcome of the bioeconomy ecosystem maps developed in Step 1. Naturally, the specific mission and objectives of each HUB will condition the final set of stakeholder categories that will be considered.

While bioeconomy innovation ecosystem mapping will help to enrich and refine the targeted stakeholder categories, HUB Coordinators already have a preliminary idea of the key stakeholder categories to be engaged (Table 7). Some more detailed categories should be identified based on value chain and ecosystem maps developed in Step 1 (for example, in relation to the policymakers (e.g. in what domains) and industry players (e.g. in what steps of the value chain).

Table 7. Priority stakeholder groups as identified by HUB Coordinators

	Priority stakeholders	**Other relevant stakeholders**
Public sector	- National and regional policymakers in bioeconomy related fields - Public companies and agencies in bioeconomy related fields	National NCP and inter-ministerial group
Industrial and business sectors	- Sectoral clusters - Industry associations - Tech SMEs - Start-ups	- Corporations & large businesses - Business support and investment: investors, venture capitalists, incubators and accelerators - Other HUBs and networks
Research and education	- Universities - Research and technology centres	- Ongoing project communities - Schools
Civil society and advocacy groups	- Professional associations - Primary producer associations - NGOs	- Students and youth organizations - Environmental organizations

Each HUB will select the most relevant stakeholder categories according to their priorities and goals. Mapping these stakeholder categories also reveals the potentially different interests, perspectives and backgrounds. Again, it is important that the HUB Management Teams conduct the mapping exercise (Step 1) and the identification of key stakeholder

categories (Step 2a) in their respective countries. In case NMGs or members are already present in the HUBs, ideally, they should be involved in both steps or validate the results.

The second task ***(step 2b)*** consists in the ***identification of names of organisations*** (companies, associations, departments etc.) that represent the different stakeholder categories.

Subsequently, in the third task ***(step 2c),*** the names of the ***individuals (persons) active within these organizations are listed.*** The search for individuals that can be contacted and invited to participate at HUB events can be time consuming. For that reason, we suggest starting as early as possible with the process of the identification of stakeholders.

The number of potential stakeholders can be very large. However, not all of them will be able –or willing– to contribute to the HUB objectives in the same manner. For this reason, it is important to focus on ***key stakeholders***. These are individuals that are willing to contribute to the HUB's endeavour and have more knowledge or access to resources that are relevant to the HUB; have a particularly important stake in it; or are in a position to exert stronger influence within decision-making processes.

To identify those stakeholders, you can use a variation of the "*power-interest grid*" originally proposed by Gardner *et al.* (1986), the so-called "*impact-interest grid*" shown in Figure 9. This classifies stakeholders according to two dimensions. Their willingness and motivation to participate on one side, and the level of their potential contribution (impact) on the other side.

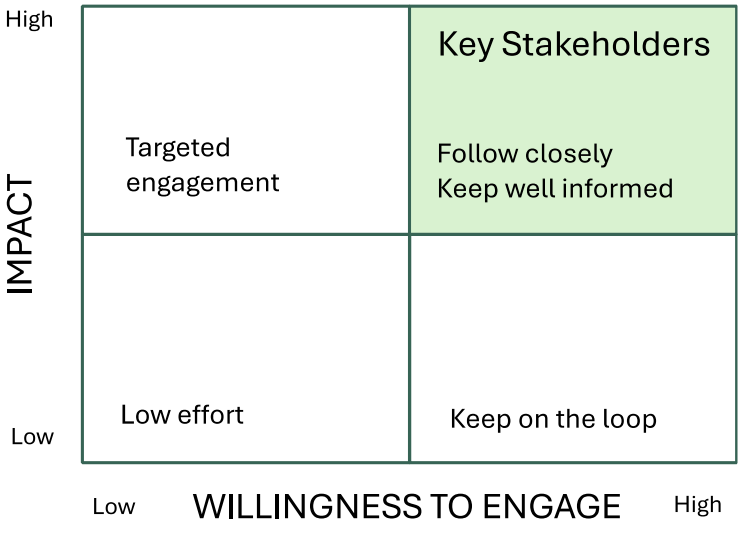


Figure 9. Identification of key stakeholders based on "impact-interest grid" adapted from Gardner et al. (1986), and some possible engagement strategies for the different types of stakeholders

As just hinted in Figure 9, this classification of stakeholders can be useful to define some basic engagement strategies and the prioritization of efforts. The willingness to engage can change rapidly during the life of the HUB as result of the HUB activities. It is crucial to prevent key stakeholders from losing interest by keeping them well informed and closely monitoring how they perceive HUB activities. Equally important is to enhance the willingness of high-impact stakeholders with low interest by understanding their needs and involving them in targeted, high-value activities. On the other hand, the capacity to deliver value to the HUB activities can also change in time. For this reason, it is important to keep interested stakeholders informed and engaged, irrespective of their potential impact today.

During the process of identifying and working with HUB stakeholders, large amount of data (names, affiliation, contact details, areas of expertise, their stake or interests, etc.) will be collected. This data must be managed efficiently and according to privacy regulations. It is recommended to use a professional customer relationships management software (CRM) or other appropriate tools with similar functions. This will facilitate to contact the relevant stakeholders, keep a record on who has participated at each HUB related event, organise follow-up interactions, and, very importantly, it will allow to keep this valuable information despite changes in the HUB Management Team. The HUB Coordination Body (T2.2) is a good place to look for advice and share knowledge in how to manage stakeholder information.

> Clearly, the identification of key stakeholders is expected to evolve during the project. As the HUB develops, the evolving situation and increased knowledge will contribute to a more refined classification and an ever-evolving networks of individuals. What is important at this stage is to conduct a first stakeholder mapping with an initial analysis of key stakeholders, and to use the tools for proper management of stakeholder data.

Moreover, as not all stakeholders are invited to contribute to all HUB activities, when selecting individual stakeholders for a HUB event, it is preferable, as far as possible, to aim for a balance in representation such as:

- A fair representation of all stakeholder categories (if relevant to the activity) in order to avoid over - or under- representation of certain sections of the HUB ecosystem or other stakeholder groups.
- Gender balance, cultural balance (if relevant) and fair representation of different age groups.
- Diversity in the profile of the stakeholders contacted: from senior managers, technical experts to junior associates.

4.3 Step 3: Identify key themes for the HUB

Each HUB must have a clear vision on the key challenges and opportunities of the bioeconomy in their country and must be able to communicate them in an effective and compelling way. The identified themes to be addressed must be salient to appeal to many stakeholders, yet

specific and detailed enough to actually engage those relevant actors in the bioeconomy landscape that can have an impact.

To identify these themes, the HUB Management Teams must build upon the work already done and their own knowledge of the bioeconomy in the country, supported by policy documents, scientific and grey literature, and leverage their stakeholder networks.

There is no optimal way to achieve this, and each HUB will develop the approach that better fits with the national situation, their degree of knowledge and the strength of their stakeholder networks. In general terms, the following path of action can be recommended:

- ***Review policy-related, scientific and grey literature***. This includes existing policy documents (strategies, action plans, roadmaps, etc.) on bioeconomy and related domains, both thematic (e.g., as circular economy, sustainable development, and Regional Research and Innovation Strategies for Smart Specialisation (RIS3)) or sectoral (agriculture, forestry, energy, etc). Although the HUBs have a national scope, it is important not to neglect the European/macro-regional level, and when relevant local level.

  The analysis of these documents should be complemented with scientific literature to understand researchers' perspectives on the opportunities ahead, barriers to overcome and possible pitfalls. Researchers frequently look at areas less covered by policy or business documents, such as risk related to biomass availability, sustainability and social issues all along the value chains. Additional perspectives can be gained from grey literature, as for example reports from bioeconomy related industry associations, or relevant NGOs. Finally, useful data and insights can be obtained from macro-regional reports from multilateral institutions such as the Organisation for Economic Co-operation and Development (OECD), World Bank, and of course the EU.

- ***Identify key barriers, challenges, innovation needs and opportunities at bioeconomy sub-sectors of interest.*** As suggested above, this should be done for each prospective thematic group (involving NMGs) and be organized in relation to each major step of the value chain (e.g., biomass production, harvest, and supply, first and second transformation, and access to market). Some tools for strategic planning used by organizations to identify different aspects of their internal and external environment can be used. Some of these analyses are *Strengths, Weaknesses, Opportunities and Threats* (SWOT); *Political, Economic, Sociological, Technological, Legal and Environmental* (PESTLE); or *Strengths, Opportunities, Aspirations, and Results* (SOAR).

SOAR focuses on current Strengths and related Opportunities to define Aspirations and the course of action through Results-driven actions. It differs from SWOT by explicitly outlining a desired future state and specifying actions to achieve it (Stavros and Cole 2014). While this approach aids in crafting a forward-looking HUB narrative, it may overlook weaknesses and threats that SWOT analysis identifies, or neglect crucial external factors captured by a PESTLE analysis (Stavros and Cole 2014; UNICEF 2023). Regardless of the tool used, it's crucial not only to identify problems, barriers, and bottlenecks but also to define a desired situation and potential courses of action.

Examples of barriers or innovation needs have been identified in various segments of the value chains related to forests and forest-based products which could be applicable in many regions in Europe. It is crucial that these barriers and needs are progressively transformed into courses of action through dialogue with key stakeholders.

Table 8. Examples of barriers or innovation needs in forestry (Source: own elaboration)

Bioeconomy / HUB	Production/harvesting challenges	Transformation challenges	Commercialization challenges
Forestry	Resource based affected by climate change. Fragmented ownership, missing owners. Societal and political divide on the use of forests. Harvesting, logging and transport are expensive, no traceability in place. Grey markets, lack of clarity in price setting disengages forest owners. Lack of professionals, difficulties to hire.	Large proportion of wood is exported round. Small, family sawmills with low access to technology. Wood is mainly used in low added value products. Missing players in engineered wood products. No use for side-streams limits competitiveness. Need to adapt to new and more diverse species. No upscaling facilities to bring new products to the market.	Lack of sustainability certification and traceability limit markets. Limited demand for high value wood-based products. Lack of bargaining power with large distribution.

Contact key persons in the HUB networks and conduct an informal survey to validate the main themes identified, verify the barriers and innovation needs, and, very importantly, explore a possible/viable desirable course of action.

This can be organized as an online survey; however, surveys are impersonal, they don't allow to follow on an existing conversation, and can create stakeholder fatigue. For these reasons, it is recommended that the HUB Management Teams engage in one-to-one conversations with a reduced number of stakeholders to validate and complement the findings of Steps 1 to 4 (remember that these are iterative steps, so their development can overlap). This can be done through a video conference, or sectoral gatherings. Active national and international projects in the bioeconomy, as well as actors in recently finalized projects (see Table 9) offer additional information to validate and enrich the analysis. Engaged project partners and communities present a good opportunity to validate HUB priorities and to expand HUB networks.

Table 9. Ongoing and recently ended projects relevant for the analysis of innovation opportunities for BIOEAST HUBs. (Source: CBE JU Widening Participation Strategy (2023) and CORDIS)

PROJECT	DESCRIPTION	COUNTRIES/REGIONS
ROBIN. Deploying circular bioeconomies at regional level with a territorial approach	Studies regional bioeconomy governance models and proposes a toolbox aiming at supporting governance models towards circular bioeconomy transition.	Central Macedonia, Greece, Zilina, Slovakia
BIOMODEL4REGIONS. Supporting establishment innovative models to achieve better-informed decision-making processes, social engagement and innovation in the bio-based economy	Develops governance and business models applied to the municipal waste management and to the production, storage and transportation of the forest and agriculture biomass.	Slovakia, Western Macedonia (Greece)
BlueRev. Revitalisation of European local communities with innovative business models and social innovation in the blue bio-based sector	Increases awareness and promotes integration in the bio-based value chains, with a special focus on blue bioeconomy.	Estonia, Portugal
BIOLOC. Bio-based and social innovation to revitalise European local communities	Identifies solutions to realize the circular bioeconomy potential and animates co-creation initiatives to foster the inclusion of marginalised groups.	Western Macedonia (Greece), Bulgaria, Slovakia, Croatia, Slovenia, Hungary, Czechia, Romania

BlueBioCluster. Supporting European coastal regions in their transition to a sustainable blue bioeconomy	Showcases integrated circular value chains and develops tools to support business in the blue economy sector.	Estonia, Lithuania, Portugal
CEE2ACT. Empowering the Central and Eastern European countries to develop circular bioeconomy strategies and action plans	Creates national bioeconomy HUBs to promote knowledge exchange, capacity building and develops guidelines and action plans for national bioeconomy strategy development.	Bulgaria, Croatia, Czechia, Greece, Hungary, Poland, Romania, Serbia, Slovakia, Slovenia
ShapingBio. Shaping the future bioeconomy across sectoral, governmental and geographical levels	Provides evidence and recommendations for better policy alignment and stakeholder actions to realize the cross-sectoral potential of the bioeconomy levels.	Bulgaria, Czechia
Branches. Boosting rural bioeconomy networks following multi-actor approaches	Summarizes best practices and research results to match knowledge needs of practitioners, through thematic networks.	Poland, Spain, Italy, Finland, Germany
POWER4BIO. Empowering regional stakeholders for realising the full potential of European bioeconomy	Proposed a *Bioregional Strategy Accelerator Toolkit (BSAT)* to help regions prepare and review their regional bioeconomy strategy.	Czechia, Hungary, Poland, Slovakia, Germany, Italy, Ukraine, Spain, Belgium
BeRural. Bio-based strategies and roadmaps for enhanced rural and regional development in the EU	Participatory development of bioeconomy strategies and roadmaps in selected regions.	Bulgaria, Croatia, Latvia, Poland, Romania

In summary, HUB Coordinators must build on their knowledge, experience and stakeholder networks to identify a reduced set of priorities at each major step of the value chain that reflect the interests of broad range of stakeholders and that can be effectively tackled by the HUB and its activities. It is important to validate and enrich these themes through direct conversation with key stakeholders. Furthermore, these will allow not only to refine the key themes, but also to explore/validate possible courses of action as well as to complement and expand the mapping and classification of stakeholders.

4.4 Step 4: Develop a compelling narrative

A narrative is "a written account of connected events representing situation and processes in such a way as to reflect or conform to an overarching set of aims or values" (Oxford English Dictionary).

Creating a condensed narrative about the HUBs will allow to clearly communicate the context in which the HUB is created, its strategic objectives and how it creates value for its stakeholders.

In BOOST4BIOEAST, this will mean in practice:

- a short state of the art of the bioeconomy in the country, including needs, challenges, opportunities, which should be based on reference policy, academic documents and tested with key stakeholders,
- the objectives and primary themes pursued by the HUB,
- a set of priority actions for the development of the HUB,
- the impact on value chain actors,
- benefits for HUB members,
- the value proposition for the HUB.

The narrative will be a summarized and engaging version of the Terms of Reference that the HUBs will develop by M14 (D2.2) with some adaptations to highlight the value and benefits for stakeholders joining the HUB. While the Terms of Refence aims to be a document describing the internal rules and procedures of the HUBs, the narrative aims to be the "pitch" for recruiting participants.

This narrative will allow all HUB members to present in a few minutes the context of bioeconomy in the HUB country, the mission and objectives of the HUB, and the value proposition for HUB stakeholders validated by the outcomes of informal interviews carried out in the different sub-sectors.

When developing the narrative, it is important to consider the HUB's value proposition in relation to innovation opportunities and the needs of different stakeholder groups. Engagement is a crucial element. Combining insights from reference policy documents, the edited mapping of the ecosystem and/or value chains, identified themes and innovation opportunities from Steps 1 and 3, and an understanding of stakeholder needs will be essential to create the narrative.

The narrative should be a one-page document in English and translated to the national languages.

Stakeholders will be only mobilized if they can perceive the value, they can obtain from participating in the HUB activities, or in other BOOST4BIOEAST activities. In general terms, what a HUB can do for stakeholders is always related to access to information, knowledge, training, and access to resourceful individuals that increase one's social capital as discussed in Chapter 3.

4.5 Step 5: Expand the HUB

This step consists of the dissemination of the narrative through relevant networks, inviting additional actors to participate in the HUB activities. Eventually, a survey will be conducted based on the narrative and findings of Step 3 as a tool to identify and engage relevant people.

It is important to actively pursue key stakeholders that are considered particularly central to the HUB. By now, the willingness to participate of those already contacted in Step 1 should be clear. At this stage, the HUB Management Team should actively search for those actors that are relevant for the identified challenges but are not yet active or have not been involved in the project. In particular, the HUB Coordinator should make sure that all principal stakeholder groups are represented in the HUB to avoid unequal representation of the value chain and miss out existing knowledge which could be important for the HUB development.

In addition, a form should be sent to additional stakeholders (not to the already engaged ones) to declare their interest in different aspects of the project and collect their answers. This questionnaire is aimed primarily at collecting the following information:

- willingness to participate in HUB and BOOST4BIOEAST activities (including HUB workshops, the NMGs, annual BIOEAST conferences, the OIC etc.) and to possibly suggest other activities,
- interest in receiving information about the project in general and / or specific HUB events.

4.6 Step 6: Prepare the kick-off meeting of the HUB

The kick-off meeting is the first official meeting of the HUB. All HUBs will organize a kick-off meeting in their country by M11 supported by T2.2. If relevant, more than one kick-off meeting can be organised to target specific regions withing large countries.

Objectives of the kick-off meeting

The general objective of the kick-off meeting is to bring stakeholders on-board for the HUB activities, legitimizing the narrative, themes, approaches and activities planned. In a sense, the kick-off meeting can be understood as the moment when deal between stakeholders and the HUB Management Team is publicly made and announced.

Specific objectives are:

- to validate the narrative, priority themes to be addressed during the initial phase of the HUB as supported by BOOST4BIOEAST,
- to present, discuss and validate a roadmap for the development of the HUB. This includes the themes that will be addressed throughout the project, giving the participants the opportunity to propose bottom-up, complementary activities.

- to manage stakeholder expectations, clearly presenting the offer that the HUB is making considering what can be reasonably achieved though the roadmap of activities,
- to give participants opportunities for networking, animating a discussion around the challenges for the national bioeconomy, key opportunities, needs to innovate, and priority actions to implement,
- to increase the visibility of the HUB, create a positive news item and disseminating it though the HUB network.

Of course, depending on the context of each HUB and the history of interaction with stakeholders, these objectives can be amended. Discussions at the kick-off meeting should never start with an empty sheet. It is important to set the scene based on the outcomes of previously conducted work and past stakeholders' discussions. This is why it is so important to develop a compelling narrative based on a good understanding of the functioning of the different value chains and validated with key stakeholders.

Layout

It is recommended that the kick-off meeting takes place in one intensive networking day. It should be planned as a combination of keynotes, group exercises, short presentations, and networking time. It is important to have a balance between what is asked from stakeholders (e.g. strategic planning, group exercises) and what is given to stakeholders of immediate value (e.g. relevant information, networking). A possible layout could be:

Block 1 - Opening words (20 mins)

This must be kept as brief as possible, while giving space to the necessary diplomacy, it could include:

- Welcome from authorities/BIOEAST Initiative/HUB Coordinator.
- Welcome from BOOST4BIOEAST and presentation of the meeting programme, goals, and expectations.

Possible coffee break to allow for interaction with high level authorities if they are present.

Block 2 - Opening Keynotes (50 mins)

One or two keynotes, each about 20 mins, followed by 5 minutes of questions and answers if the speakers agree with it. You may consider three keynotes, depending on the starting time and the length of the following blocks. This allows to give voice to different stakeholder groups; however, it risks creating unnecessary fatigue. Themes and speakers should be chosen to address a key theme with credibility and salience. The focus of these keynotes will depend on the context. Presentation options to consider:

- A key policy instrument by the national government or the EU (a new or updated strategy, action plan, as for example the new CEE initiative to establish a pan-European research and innovation partnership with a focus on Eastern Europe (Hungarian Presidency 2024).
- A significant scientific work, or technical report relevant for the development of the bioeconomy e.g., foresight analysis, the state of the bioeconomy etc.
- A sectoral roadmap from a relevant industrial association or farmer-foresters organization.

Possible coffee break to allow for interaction with keynote speakers.

Block 3 - Validation of the value chains analysis and narrative (60-90 mins)

The suggestion here is to create a group dynamic to validate the value chain maps, identify key priorities for action, and discover new stakeholder groups and concrete stakeholders to be engaged. This means revisiting the work done in the previous steps with participants. Different options for this can be considered. The main recommendation is not to design a tight process with many steps that prevent spontaneous input from stakeholders, as not all of them may be willing to participate in that type of activity.

HUB Coordinators may consider a SOAR or SWOT exercise for each step of the value chain, in a world café[3] or similar setup. The value chain maps, the ecosystem of actors, and the narrative should be the starting points. The tables/groups can be organized in different ways to make the best use of the participants (e.g. by mirror group, by value chain within a mirror group, by value chain step, etc.). Stakeholders can be asked to review the value chain maps and reflect on the key strengths/barriers, opportunities, ambitions, and actions needed. As suggested in Step 3, a forward-looking exercise such as a SOAR analysis is preferred. Be aware of the limitations of the approach selected.

The outcomes of each group can be shared in plenary. Following this, the HUB Coordinator plays a critical role. The Coordinator must wrap up the discussion and determine how the stakeholders' inputs will be incorporated, whether to fine-tune or modify the narrative, objectives, and ambitions of the HUB. These changes should then be reflected in an updated narrative.

Lunch break, or coffee break. It is possible to finish the workshop with a networking lunch.

World cafe is a workshop method which makes use of an informal cafe setting for participants to explore an issue by discussing it in small table groups held in multiple rounds (WCCF 2015).

Block - 4 Stakeholder voices (optional) 60-90 mins

A panel discussion can be organized after lunch on a topic of key interest. It could be, for example, on education related to bioeconomy, on access to finance, on innovation support, or on a specific value chain. It can gather relevant EU or national projects to present themselves or can also invite other BIOEAST HUBs to present their roadmaps. This offers different stakeholders the opportunity to present their organizations, visions, activities, increases networking opportunities and attract key stakeholders. Remember that some stakeholders will only participate if they have a role in the meeting.

Block 5 - Next steps and farewell

It is important to reserve 15 mins at the end of the kick-off meeting to present the next steps. These include post event communication and the roadmap of HUB activities as these are opportunities for stakeholders to participate. This can be done in a structured way to allow stakeholders to signal their interest to be engaged in HUB activities. Consider that stakeholders may be interested in participating in:

- thematic group and/or mirror group activities,
- mapping exercises (e.g. validation of mappings within BOOST4BIOEAST),
- consultations on policy processes, research agendas and roadmaps,
- the OIC and pitching events,
- project related workshops and annual BIOEAST Bioeconomy Conferences.

Post kick-off dissemination

Each HUB should design a post-event dissemination strategy. This may include:

- a press release of the HUB kick-off, which will be sent to national/local/regional media (guidelines for contacting media will be provided to all HUBs upon request through T2.2),
- a one-page summary of the outcomes of the kick-off meeting including the roadmap of next activities, to be sent directly to members, and to be published on the BIOEAST and BOOST4BIOEAST website,
- social media-friendly version of the one-pager as post to be shared though the HUB members' accounts.

Practical arrangements

All kick-off meetings will be held in national languages, but in case of BOOST4BIOEAST partners' participation, HUB Coordinators need to consider the use of translation from

English to local language or vice versa to overcome language barriers and misinterpretation of participating stakeholders.

Each HUB may consider the convenience of a hybrid event. Online presentations should be limited to one of the opening keynotes as this will facilitate participation of high-level representatives from EU institutions.

A save-the-date announcement identifying the date and venue should be launched at least 3 months before the event. A well-developed draft program and practical information should be disseminated at least 2 months before the event. Registration should open 2 months before the event.

It is recommended to arrange a finger lunch with farewell drinks at the end of the kick-off if it extends into the afternoon to facilitate networking.

5 Key factors for successful stakeholder engagement

5.1 Key principles

BOOST4BIOEAST is based on facilitating knowledge exchange, and fostering innovation, through the HUBs. The HUBs intend to identify challenges and innovation needs that are common to large groups of stakeholders and to explore ways to address them by building on the competences and contributions of all actors within the HUB ecosystem. More strategically, HUBs aim at increasing the social capital of all actors involved in the different bioeconomy value chains.

One of the challenges then lies in creating a constructive setting within the HUBs, in which all actors of the ecosystem can contribute to establishing and achieving the innovation targets, while at the same time allowing stakeholders to achieve some of their specific goals. Key to this is a successful stakeholder engagement allowing the various actors of the HUB ecosystem to be part in the design and implementation of HUB activities.

The participation of stakeholders relevant to the HUB ecosystems in the discussions and decision-making processes is the best way to ensure that their perspective and knowledge contribute to the HUBs outcomes. Stakeholder participation results in a richer picture of the HUB challenges and allows to better capture desirable, feasible pathways, and concrete actions to reach them.

Managing stakeholders is a key task for the HUB Coordinator. Maximum effort must be placed in creating a space for stakeholders to interact, increase their social capital, achieve goals, and progress towards sustainable and socially inclusive bioeconomy.

5.2 A legitimate and credible position

One of the most important objectives of the HUB Management Team is to preserve and increase trust among all HUB members and to maintain a position of ***legitimacy, credibility, and salience.*** There are three basic recommendations to achieve this:

Legitimacy. The HUB Coordinator, as the visible figure of the HUB Management Team, has to be accepted and supported in this role by all stakeholders. Ideally, the Coordinator is well recognized expert in bioeconomy research. In all HUB activities and communications, the Coordinator must hold an impartial position towards stakeholders, its focus needs to be on the process of the HUB development while remaining firmly committed to the objectives and the ambitions of the HUB.

Credibility. Three different sources of credibility must be considered. First, to clearly communicate the mandate for creating the HUB. BIOEAST HUBs are not a project effort, but a core structure of the BIOEAST Initiative and thus have the endorsement and mandate from the national ministry responsible for bioeconomy. Second, it is important that the HUB Management Team, as a whole, is recognized as a respected player in the field of bioeconomy in the country. This means that the HUB Coordinator and supporting organizations are themselves relevant players in the bioeconomy. As there may be specialized organizations that cover only certain aspects of the value chains (e.g. biotechnology, bioenergy, agriculture, etc), it is important that they engage with the HUB Management Team in other bioeconomy sub-sectors. Third, it is important to be consistent with the activities of the HUB as highlighted in other sections.

Salience. The objectives and key themes tackled by the HUBs must be relevant to different stakeholder groups, while also pointing at the direction marked by national and EU policies. A permanent consultation with key stakeholders during the HUB creation, as proposed above and later during the life of the HUB, contributes to the salience of HUB activities. This is, however, not enough, as the functioning of the HUBs must be evaluated with special attention to communication, dissemination, and other activities laid down in the Terms of References.

5.3 Managing expectations

Managing stakeholder expectations is a critical success factor for any endeavour in which stakeholder engagement has a prominent role. Indeed, if the expectations of the stakeholders are not known and not properly managed, some of the stakeholders might experience disillusions for hopes not being fulfilled, (personal) ambitions not being met, and fears not being properly addressed. They might feel the project remains under-ambitious or perhaps even over-ambitious. In both cases, there is a *mismatch between the objectives of the HUB and what the stakeholders had in mind.*

Another potential mismatch relates to the effort and time stakeholders are willing to invest

in the HUB in contrast with what is asked and needed from them. This mismatch contributes to a phenomenon known as *stakeholder fatigue*.

Expectation management starts at the very beginning of the HUB, but it should continue as the HUB progresses with reality checks against expectations conducted at various points throughout the lifetime of the HUB.

- ***The first step*** in managing expectations lies in ***understanding the expectations.*** Therefore, making these explicit is an important task and it should ideally happen during the identification of key stakeholders, the informal consultations prior the establishment of the HUB, at HUB meetings (e.g. at the kick-off meeting) and through the evaluation of HUB activities. As each stakeholder enters the HUB with his or her own set of expectations, the group of HUB stakeholders will most likely have a rather broad range of individual expectations.

- ***The second step*** consists of coming to a common understanding with the HUB stakeholders on a set of ***shared expectations that relates to the HUB ambitions.*** While HUB objectives should be sufficiently ambitious to create enough "pulling power" towards the stakeholders, it is important to ensure that unrealistic expectations are discussed and toned down. It is recommended to revisit the (shared) expectations and conduct a reality check with a certain periodicity (e.g. once each year).

- ***The third step consists*** of ***avoiding stakeholder fatigue***. Organising each HUB meeting as a highly interactive, energetic event, as something that resonates positively within the group of stakeholders, is a way to prevent stakeholder fatigue. However, there is a delicate balance to be respected between engaging stakeholders with an intensity (frequency) that is high enough to maintain momentum for the HUB, versus "over charging" stakeholders.

5.4 Maintaining communication

The success of any network depends on its ability to develop and maintain effective relationships with its stakeholders. In this context, communication is the primary tool for building such relationships and contributing to desired outcomes.

In the case of BIOEAST HUBs - that work at national level but need to maintain information flows at regional and international levels -, the challenge is to maintain effective communication flows among the main components of the network.

BOOST4BIOEAST offers several tools to facilitate iterative and unrestricted communication.

The main communication flows among the different project bodies are shown in Figure 10.

At national (HUB) level:

- ***CET***, that will co-develop, implement and update the BOOST4BIOEAST DEC strategy in T8.1. This team provides opportunities for HUB members to be present at national and international bioeconomy events and be active on various communication channels such as the BOOST4BIOEAST website, HUB mini-pages, or social media channels.
- ***Training for HUB and TWG Coordinators on the effective and engaging usage of online communication channels***, to best exploit the HUB mini-pages and encourage to use different networks, including but not limited to national AKIS, Common Agricultural Policy (CAP), and bioeconomy networks, in their day-to- day work, their own or third-parties social media channels.
- ***Thematic group and NMG Coordinators*** are responsible for maintaining fluent communication with stakeholders in their domain of interest via newsletter, social media, email or telephone as appropriate, giving adequate notice of meetings, events, activities and seeking feedback on the HUB functioning. They must be in perfect coordination with the HUB and TWGs Coordinators.
- ***BIOEAST NCPs*** that provide the formal connection to keep regular information flows with governmental stakeholders.

At macro-regional and international level:

- ***The HUB Coordination Body***, as the main platform to share information and provide mutual support across HUB Coordinators.
- ***TWGs*** connect science-policy stakeholders in the different bioeconomy domains at macro-regional level. The TWG Coordinators are encouraged to participate in the meetings and activities of the HUB Coordination Body as they must keep permanent information exchanges with the different HUBs and be able to identify and tap on emerging research and innovation opportunities.
- ***Open channels to other bioeconomy ecosystem-building initiatives***, provided by T8.3, specifically with projects or initiatives like RuralBIOUp, BIOloc, CEE2ACT, GenB, ShapingBIO, EUBioNet, the CBE JU, and organizations such as Bio-based Industries Consortium (BIC), Europabio, etc. These channels provide opportunities to keep national and international stakeholders well informed and are also a source of information that can be shared with stakeholders.

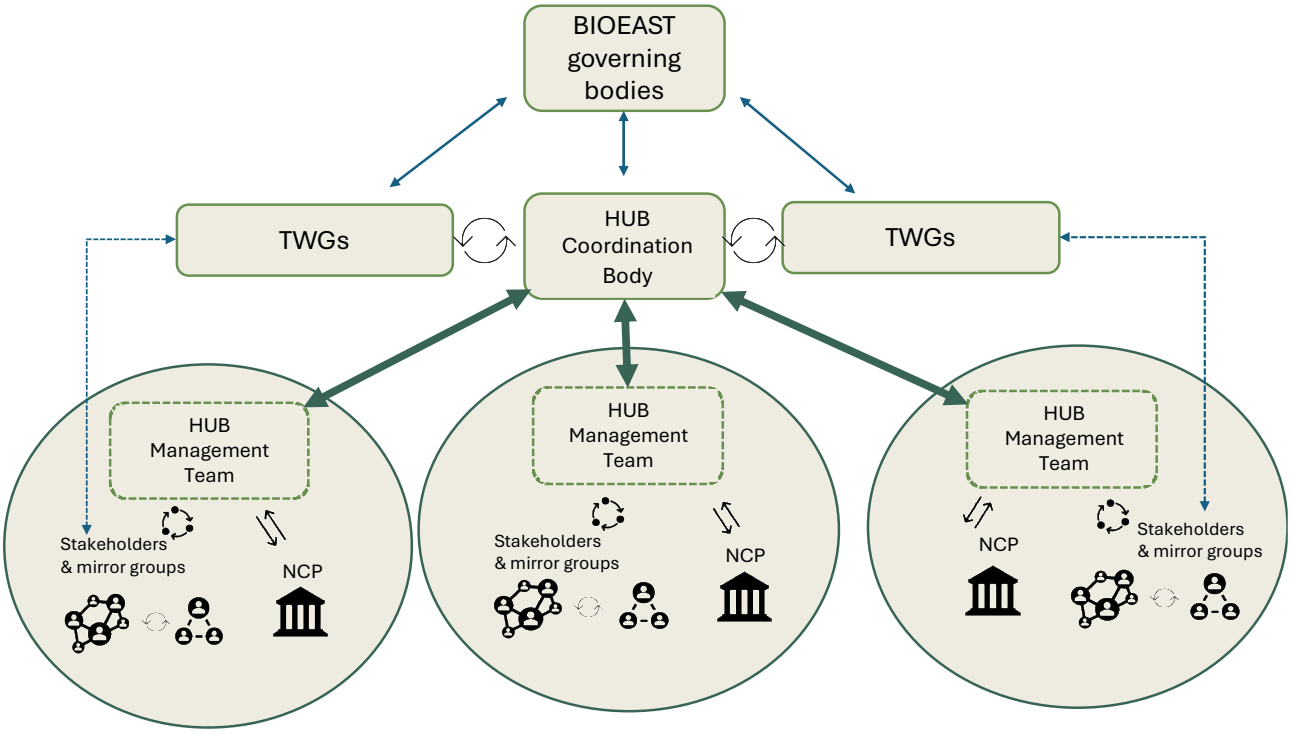


Figure 10. Main communication flows for HUB Management Teams

5.5 Final recommendations

Successfully engaging stakeholders in achieving shared ambitious goals will be crucial for the HUBs. Some lessons can be drawn from experiences from other projects such as Incredible, POWER4BIO and BiodivERsA in which active stakeholder participation has been one of the key success factors.

- The need for ***sustained and active stakeholder management***. Engaging stakeholders is not a one-off event, but a transversal process along the HUB creation and management. It requires a sustained effort; therefore, it requires good coordination from the HUB Management Team. Ideally, there will be one person that takes the lead and is accepted by the stakeholders in that role. This creates trust and stronger bonds and avoids confusion.

- The need to ***be ambitious.*** A HUB without a clear and attractive objective is not a very compelling network. The objective needs to be ambitious yet achievable. It also needs to be shared by the stakeholders without being the minimum common denominator. Innovation is not achieved by consensus. So not everybody needs to be active in all activities, but there must be some activity for each stakeholder.

- The need to continuously ***monitor the level of ambition***. One of the challenges for

the HUB Coordinator will be to ensure the ambition remains intact and doesn't erode as the HUB evolves.

- ***Stick to the agreed roadmaps of activities*** and communicate about them before and after the activity, permanently measuring the impact and satisfaction levels. Be consistent. Sometimes it just takes time to achieve the necessary visibility and credibility.

- The HUB Management Team must ***manage both the content and the process***. Even if, content wise, everything is ready for implementation, the implementation will fail if, from a process perspective, the stakeholder setting is not ready.

- ***Use professional grade tools*** (e.g., CMR, event management tools, email campaigns, etc.) to structure and manage the data on the HUB ecosystem and its stakeholders. Start using them at an early stage before the wealth of information becomes difficult to manage.

6 Guidelines for the HUB management

Effectively managing and coordinating the HUBs after their establishment is a complex task that requires successful stakeholder management and facilitation of network activities, as well as the knowledge and resource exchange process among members. Managing a HUB needs skilled innovation and knowledge brokers who can lead participants from the establishment phase to consolidation.

The governance structure and roles within each HUB should be defined in a clear and transparent manner to ensure accountability and efficiency. This includes outlining specific responsibilities, decision-making processes and communication channels. Additionally, establishing regular review mechanisms and iterative learning will be crucial to adapt and improve the coordination efforts as the HUB evolves.

6.1 Governance of the HUBs

As stated in the BOOST4BIOEAST Grant Agreement, each BIOEAST country will have a HUB with a Coordinator dedicated to ensuring the delivery of all HUB tasks, integration and creation of NMGs, aligning activities with other WPs and TWGs and acting as a direct link with the HUB Coordination Body. To manage the creation and improvement of the HUBs and reflect on the progress of the national HUB activities, a BIOEAST HUB Coordination Body is put in place, comprising of 11 HUB Coordinators and governed by BME (T2.2). The HUB Coordination Body functions as a Community of Practice for the Coordinators to increase their capacities, share experiences and information, to learn and support each other, to develop HUB to HUB

exchanges, seize strategic opportunities, and to strategically reflect on project assumptions in relation to HUB dynamics, activities, and outcomes. The Coordination Body is responsible to maintain a continuous flow of information exchange between the HUB Coordinators, the BIOEAST Board, Secretary (via T1.1) and WP3-7.

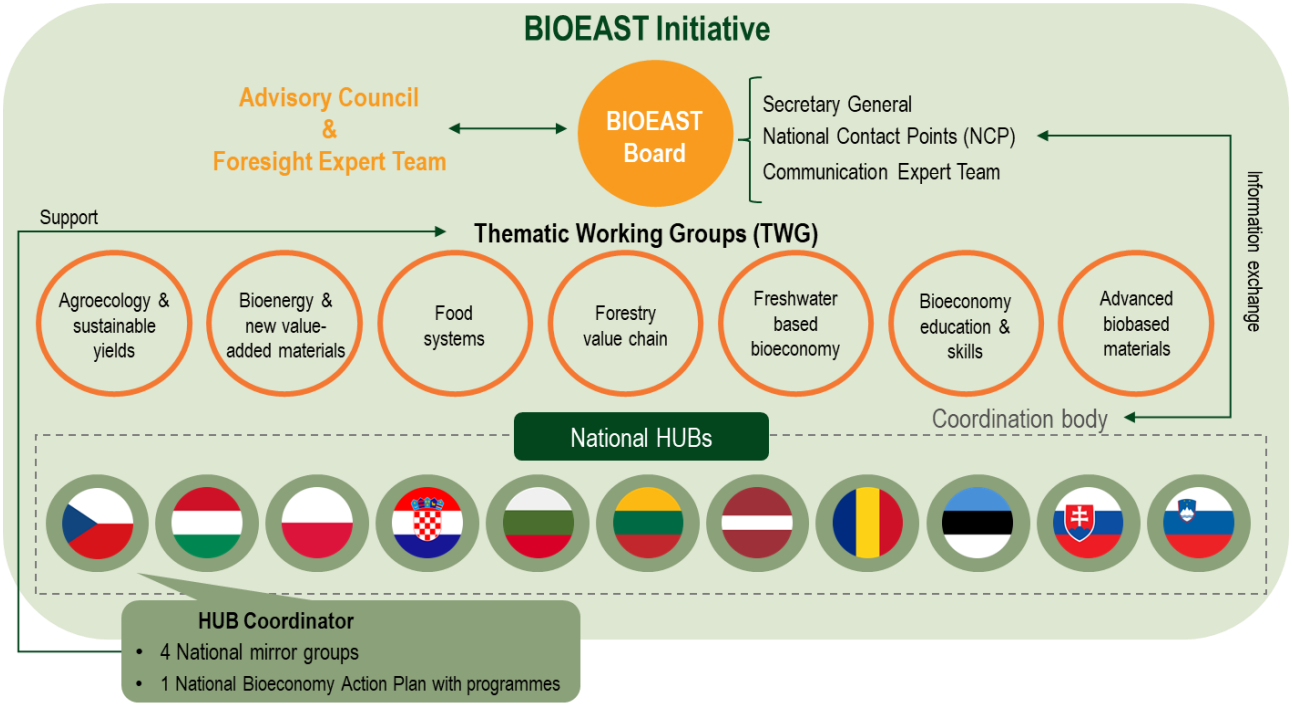


Figure 11. Governance scheme of BIOEAST Initiative led by the Board and supported by macro-regional (TWGs) and national structures (HUBs) for effective operations. (Source: BOOST4BIOEAST Grant Agreement)

6.2 Duties of the HUB Coordinator

The role of the HUB Coordinator is crucial for the successful development of the HUBs. The HUB Coordinator will serve as the main contact point and the official administrator of the HUB. In addition, one or more official additional contact, and a Co-Coordinator can be appointed to assist with the day-to-day management and administration of the networks. NCPs must maintain close communication with the HUB Coordinators to address any issues related to the national or interregional dimension of the HUBs effectively.

The HUB Coordinator is responsible for:

1. Creating and animating the HUBs which include:
    - planning and preparing the kick-off and regular meetings of the HUB including the content and facilitation,
    - managing day-to-day operations of the HUB, following the guidelines of the present document,
    - guaranteeing effective internal communication among the HUB members.

2. Maintaining contact with the HUB Coordination Body including:
    - working closely with and to ensure information flow between the HUB Coordination Body and the HUB members, reporting on activities and any emerging conflicts,
    - collaborating with the HUB Coordination Body to share experiences and information flow among HUBs,
    - supporting the activation of NMGs and their communication with TWGs.

3. Supporting the implementation of other BOOST4BIOEAST activities including:
    - supporting WP and Task leaders in the deployment of BOOST4BIOEAST activities in the HUB countries,
    - monitoring HUB activities and ensuring compliance with procedures and objectives,
    - planning and preparing the content of major events scheduled for the HUB, with the help of the NCPs and/or the Co-Coordinator,
    - summarising the information and results of the HUB workshops and events providing feedback to stakeholders by using appropriate templates, documents and communication channels.

6.3 Planning HUB activities and deploying BOOST4BIOEAST activities

During the establishment and initial function of the HUB, its main activities will be linked to those foreseen in the BOOST4BIOEAST project since the key role of HUBs is to implement common BIOEAST activities at national level. While working on the establishment of the HUBs and the initial roadmap of activities, HUB Coordinators must reflect on the best approaches to deploy those common activities that are summarized in Table 10.

Table 10. BOOST4BIOEAST activities and expected contributions from HUBs

Activity	Expected contribution from HUBs	Related task and deliverable	Start and end month	Lead
Establishment of HUB Coordination Body	• Active participation in HUB Coordination Body meetings monthly. • Establishment of HUB Management Teams. • Preparation of Terms of References describing rationale, vision, goals, activities, topical areas roles, benefits and expectations, basic internal rules and procedures, and the creation of HUB working groups.	T2.2.1 / D2.2	M1-M36	BME

	• Activation of mirror groups.			
Capacity building for HUBs and TWGs	Participation in the capacity building programme.	T2.2.2	M1-M36	CC
Mobilisation of inter-ministerial collaboration and policy-science interface	Participation in inter-ministerial meetings with bioeconomy relevant policymakers (Guidelines in Appendix 2).	T2.3	M6-M36	CR HUB
Mapping bioeconomy-related competencies	• Participation in related survey. • Testing of mapping methodology (Romanian, Latvian, Hungarian and Slovakian HUBs). • Giving feedback on methodology and deployment.	T3.1	M1-M18	DBFZ
Identification and assessment of biomass feedstocks	• Participation and distribution of survey at national level. • Deployment of methodology for mapping key information on biomass availability.	T3.2 / D3.1	M1-M18	TTK
Mapping innovation ecosystems	Deployment of methodology for mapping companies, investors, funding bodies, policymakers, stakeholders' groups, etc. that take part in bioeconomy innovation activities in the macro-region.	T4.1 / D4.1	M1-M12	AKI
BIOEAST OIC	Engagement in preparatory actions, dissemination and recruitment of solution providers.	T4.2 / D4.2	M6–M30	EFI
BIOEAST pitching events	Support events logistics, organizations, recruitment of local innovators and investors.	T4.3 / D4.3	M12-M36	IBF
Mapping educational materials	Deployment and dissemination of the questionnaire for collecting bioeconomy educational materials among education providers in the HUBs countries.	T5.1 / D5.1	M1-M12	EFI

6.4 Internal reporting and monitoring

Reporting is essential to continuously inform partners about the HUBs status, HUB progress, events, work planning and other relevant issues. Progress reporting should be done by the HUB Coordinators to the HUB Coordination Body via the monthly meetings and to the Project Coordinator through the HUB Logframe Matrix on a yearly basis.

The Logframe Matrix tool provides a standardized framework for HUBs to track their progress in alignment with their goals throughout the project. Logframe matrices will be updated annually and evaluated at various stages of the project's implementation, facilitating structured monitoring of HUB activities (detailed logframes of each HUB will be found in D1.4 and D1.5 after M19).

6.5 Dissemination, communication and impact

HUBs must support the communication and dissemination of their activities, events, outcomes, knowledge, and materials. This effort will be guided by the DEC strategy (D8.1), which provides guidelines to ensure that know-how, data, and assets developed in the project are accessible and easily replicable by BOOST4BIOEAST stakeholders. The CETs of each HUB act as the main contact point for the HUB communication and dissemination activities. The narrative developed in each HUB should be communicated to the WP8 leader to strengthen the key messages contained in the DEC Strategy.

Knowledge dissemination will be ensured through the BIOEAST Knowledge Platform (developed in T5.3) via dissemination on the project website, social media and most importantly through the HUB mini-sites (accessible through the project's website) each available in national languages and English.

Events organized by the HUBs will serve to disseminate HUB activities (Table 11). Prior to each HUB event, these should be announced regionally and locally through media and specialized channels with the support from WP8. Soon after the event, an article about the event, including its conclusions, should be disseminated.

WP8 will provide templates and general content for HUB-specific materials summarizing activities, calls to action, and policy news, in consultation with the HUBs' CETs. These materials may include press releases, news, leaflets, posters, or banners. HUB Coordinators may choose to produce these materials in local languages where appropriate and feasible.

Table 11. Events organized by the HUBs in the framework of the BOOST4BIOEAST project

Event // Purpose	Task/Date	Mode	Audience / KPI
HUB kick-off meetings (national) // Establish relationships between HUB participants to ensure understanding of benefits, expectations, future	T2.2 // M3-12	In-person	HUB partners // >10 att per HUB

acts.			
HUB follow-up meetings // Monitoring progress, identifying solutions, reporting achievements.	T2.2 // M10-M36	1 in-person and 2-3 online/ year	HUB partners // >10 att per HUB
Inter-ministerial group meetings // Act as platforms for the identification of barriers and enablers to involve policymakers in bioeconomy and to validate policy documents produced by the project.	T2.3 // M6-M35	1 in-person/ year	National policy makers // > 10 att/ HUB
National meetings for science-policy development (once a year/HUB) // Discuss national bioeconomy topics and priorities and their policy implications.	T2.3 // M10-M30	Online or in-person	All stakeholders// > 20 att per HUB
National workshop on policy needs for the use of biomass and competencies (1 per HUB) // Discussion on needs and expectations of national policymakers about the use of the multidimensional analysis in terms of the policy recommendations.	T3.4 // M18-M30	Online	HUB partners and policy makers // >10 att per HUB
Action Plan Workshops (3 per HUB) to develop or refine 11 national bioeconomy action plans using Three Horizons Framework (2023 Diagnose; 2030 Envision; 2023-2030 Strategize).	T7.2 // M13-M21	Online	HUB partners // >15-20 att per HUB
Future-proofing workshops (1 per HUB) // stress-test action plans in changing external conditions and increase their implementation potential by addressing potential risks and opportunities.	T7.5 // M25-M30	Online	HUB Partners // >15-20 att per HUB

6.6 Data management and protection of personal data

Initiating and operating the HUBs will involve interactions with many stakeholders. Consequently, stakeholder information will be collected, analysed, and stored to ensure effective stakeholder management. Therefore, the protection of personal data is of high importance.

At the beginning of HUB meetings and workshops, participants will be asked to sign a disclaimer. By signing, they agree that any information they provide will be treated as confidential and used exclusively by the respective HUB and the BOOST4BIOEAST project.

Participants also consent to the possibility of videos, audio recordings and pictures being taken and used in communication channels. Furthermore, their information will be added to the HUBs' database. Stakeholders have the option to decline being filmed, recorded, or photographed, opt out of receiving HUB or BOOST4BIOEAST related correspondence, or request the deletion of their personal information from the HUB and project's database, and these preferences will be respected.

Further guidelines on personal data management are provided in the Data Management Plan (D1.2).

6.7 Risk assesment

Careful consideration should be given to the possible emerging technical, management and legal risks linked to the HUBs' activities and day-to-day duties. Risks can emerge from a diverse set of situations and can affect the overall performance of the HUBs.

In HUB management, a risk management must cover all HUB activities and aim at a timely response to critical issues and delays that were not foreseen in the planning phase. HUBs must follow the risk management process methodology proposed in the Risk Management Plan (D1.1), which includes the identification, assessment, treatment and monitoring of risks. The exercise should be carried out after defining the HUB activities, and yearly monitored.

6.8 Gender balance and inclusion of vulnerable groups

BOOST4BIOEAST is committed to fostering an inclusive and equitable bioeconomy by ensuring equal representation and participation of all genders and vulnerable groups in its innovation ecosystem. For that, HUBs must take into consideration clear measures to ensure their compliance to that goal.

HUB Coordinators must implement and enforce the gender strategies within the HUBs. In case of any conflict or need for support, the HUB Coordination Body will assist in resolving the issue and, if necessary, find an expert to provide further assistance.

The following considerations must be considered in HUBs' management and activities:

- Gender balance in HUBs:
  - Ensure gender balance in the composition of HUB members, decision-making, and leadership roles by defining a minimal quota of female participants.
  - Actively seek to include women and individuals from underrepresented groups in all HUB activities and positions.

- Stakeholder engagement and HUBs' activities:
  - Engage a diverse range of stakeholders, ensuring that all voices are heard, particularly those from vulnerable groups.

- Organize workshops that are accessible and inclusive, taking into account the needs of different populations.
- Encourage the involvement of youth groups and individuals with disabilities in HUB activities, workshops, and events.
- Design activities and workshops to be accessible to people with disabilities, including providing necessary accommodation and support.
- Choose meeting and event locations that are accessible to people with disabilities.
- Schedule meetings and events at times that accommodate various populations, including those with caregiving responsibilities or other commitments.

- Inclusive research activities:
  - Ensure that research activities, such as surveys and mappings, are designed for and include participants from all gender groups and vulnerable populations.
  - Analyse data in a way that highlights and addresses the perspectives and needs of diverse groups.

- Safe environment and anti-harassment mechanisms:
  - Create and maintain a safe and respectful environment for all participants in HUB activities.
  - Implement and enforce a process for reporting, investigating, and addressing complaints.

6.9 HUB membership and withdrawal

HUBs work as informal networks and are open to all interested stakeholders. In principle, no formal registration is needed, nevertheless, the HUB Management Team will assess if a formal accession for a HUB membership will be needed for decision-making processes that require voting. As mentioned in Section 4.6, data from participants of HUB activities will be stored in a database and will receive information from the HUB and from the BOOST4BIOEAST project e.g. newsletters, unless they disagree.

It might occur that members wish to be withdrawn from the HUB database, due to disagreement with the HUB narrative, personal or professional reason, etc. If this happens, the HUB Coordinator should alert immediately the HUB Management Team, WP8 Lead, and the Project Coordinator, who will decide how to follow up the issue and remove (if necessary) the stakeholder's information from the database.

6.10 Conflict resolution

Conflicts that interfere with the activities and goals may arise in the HUBs. It is therefore important to have a clear procedure for conflict resolution to ensure a timely and effective action to maintain a collaborative and productive environment in the HUBs. Conflicts may arise due to:

- diverging stakeholder interests or even between individual members and their respective organizations,
- miscommunication or misunderstandings among stakeholders,
- lack of clarity in roles and responsibilities,
- harassment or misconduct.

To minimize the chances of conflict occurring, it is important that the HUB Coordinator acts as an unbiased figure. In addition, this risk can be mitigated by reaching and recording consensus around key decisions and priorities of the HUB and striving to get the buy-in of all actors involved through an inclusive approach.

In the case of major conflicts arising, which might affect the functioning or the overall work of the HUB, the following steps are recommended:

- The HUB Coordinator must immediately alert the Project Coordinator and the HUB Coordination Body.
- The HUB Management Team will gather information about the conflict from all involved members.
- The HUB Management Team will integrate the collected information and propose possible solutions to all involved members.
- If necessary, bilateral discussions will take place.
- Consensus on the conflict resolution, guided by principles of ethics, equality, and collaboration, will be sought in an in-person meeting.
- If the conflict remains unresolved, an independent third party might be involved.

6.11 Language barriers

Communication among HUBs might present a challenge in terms of managing multiple languages and might pose critical risks to the effectiveness of the HUBs' knowledge transfer process. Therefore, macro-regional events will be held in English to ensure smooth communication among different HUB members. Translation into local languages will be assessed by the HUB Coordinators if there are stakeholder groups unable to understand English. National events will be held in local languages to allow all stakeholder groups to actively participate.

7 Conclusion

This handbook serves as a comprehensive guide, detailing the processes and procedures necessary for the successful establishment and operation of the BIOEAST HUBs. It offers a flexible but consistent framework, ensuring that while national contexts may vary, the core principles of stakeholder engagement and HUB management remain effective.
The Playbook in Appendix 3 provides a complication of relevant activities, best practices, concepts and methodologies that can serve as inspiration for managing and developing HUB activities.

As a dynamic and evolving document, the handbook (along with the Playbook) will be regularly updated to incorporate new insights, materials and guidelines according to the roadmaps, BOOST4BIOEAST activities, and activities planned by the HUBs. The HUB Coordination Body and Task leaders will support the improvement of the document along the BOOST4BIOEAST project lifetime, ensuring its relevance and utility in supporting the management of the HUBs.

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9 Appendices

Appendix 1. Internal questionnaire to HUB Coordinators

1. Name
2. Which HUB are you representing?
3. Which of these definitions fits best with your understanding of the BIOEAST HUB?
    - An organizational structure that brings together different stakeholders to foster innovation in the sector, solve complex problems and develop innovative solutions to drive economic growth.
    - A platform that serves as a focal point for stakeholders to exchange knowledge, access information, and access specialized resources and services.
    - A network characterized by close geographical proximity that aims at enhancing industrial collaboration and competitiveness. It integrates various stakeholders facilitating technology and knowledge transfer between research and industry.
    - Strategic partnership between organizations or entities from different sectors coming together to work towards common goals and interests, such as advancing a particular agenda or addressing shared challenges.
    - A formal body or committee formed to advise or support policy and decision-making regarding specific issues or areas of interest, such us the development of a strategy.
4. Which objectives would you like to achieve with the creation of the HUB? (with option to select priority: High priority, Medium priority, and Low priority)
    - Facilitate cooperation among bioeconomy players,
    - Develop action plans,
    - Influence policies,
    - Identify effective policy mix,
    - Mobilisation of resources from public and private sources,
    - Enhance inter-ministerial concerted action,
    - Identify innovation opportunities,
    - Foster cross-sectoral collaboration,
    - Strengthening human capital (training and skills),
    - Facilitating access to knowledge and technology,
    - Deploy BOOST4BIOEAST activities at national levels,
    - Increase societal awareness on the bioeconomy,

- Facilitate access to market,
- Facilitate access to finance.

5. Are there any other objectives that you would like to achieve with the creation of the HUB?

6. Which upstream sectors of the bioeconomy (as biomass sources) will the HUB prioritise? (Please note that the HUBs will address bioeconomy in a broad sense including all sectors)

    - Agriculture and livestock
    - Forestry
    - Aquaculture and fisheries
    - Primary waste (from agriculture, forestry or aquaculture and fisheries)
    - Secondary waste (e.g. agrifood waste, wood processing waste)
    - Urban waste
    - Other

7. Which downstream sectors of the bioeconomy will the HUB prioritise? (Please note that the HUBs will address bioeconomy in a broad sense including all sectors)

    - Agritech and forestech (e.g. biofertilizers)
    - Industrial biotech and pharmaceuticals
    - Food and beverages
    - Paper and packaging
    - Wood-based products and furniture
    - Bio-based construction
    - Bio-based textiles
    - Green chemistry (e.g. bioplastics, rubber)
    - Bioenergy
    - Ecosystem services

8. Which type of stakeholders do you want to engage in the HUB?

    - National policy makers
    - Regional policy makers
    - Public agencies
    - Clusters
    - Industry associations
    - Other HUBs and networks
    - Universities
    - Research and technological centres
    - Professional associations

- Farmer organizations
- Corporations and large businesses
- Start-ups and SMEs
- Investors and venture capitalists
- Accelerators and incubators
- NGOs and civil society
- Environmental organizations
- Research projects

9. Is there any other type of stakeholders that you would like to engage in the HUB?
10. Could you name the top 3 actors that you would like to engage in your HUB? (Name of organizations, clusters, HUBs, etc.)
11. Which type of activities do you expect in the HUB?

- Policy forums
- Stakeholder meetings
- Project brokerage and matchmaking
- Thematic workshops
- Conferences
- Pitching events
- Study visits
- Demonstration pilots
- Entrepreneurship programs
- Training and capacity building activities
- Awareness raising campaigns
- Expertise support for bioeconomy stakeholders
- International trade missions

12. Are there any other activities that you would like to have in the HUB?
13. Will the HUB be active at regional level?

- Yes, this is relevant for my HUB.
- This is relevant for my HUB, but we don't have a plan on how to do it yet.
- Not relevant for my HUB.

14. Which benefits do you expect from international collaboration? (with option to select priority: High priority, Medium priority, and Low priority)

- Policy alignment
- Research cooperation
- Knowledge exchange and skill development

- Innovation and technology transfer
- Trade missions
- Markets expansion

15. Do you expect any other benefits from international collaboration?
16. Which stakeholders are of priority for your HUB for international collaboration? (with option to select priority: High priority, Medium priority, and Low priority)
    - Other HUBs in Eastern Europe
    - Other HUBs in the rest of Europe
    - Brussel-based organizations (EU Commission, intergovernmental governments, lobby organizations, etc)
    - Other national and regional governments
17. Is there any other type of organizations that you consider relevant for international collaboration?
18. Could you name any successful experiences for the creation and animation of HUBs that you identify as a model or reference? (Please provide a link and contact if possible)
19. Could you define your bioeconomy HUB in less than 100 words?
20. Any other comment

Appendix 2. Guidelines for establishing inter-ministerial groups

Up from the establishment of the BIOEAST HUB, it is important to start to develop a cooperation with the BIOEAST NCP to support the bioeconomy and the BIOEAST agenda on the national level. BIOEAST HUBs need to create connections, alignment and an open dialogue with policymakers in the national level. Of course, the higher hierarchy is encouraged, however this might be difficult in some countries or ministries. Most important is to begin and not to give up. This is in line with the specific position of the BIOEAST HUBs as working tools of the BIOEAST Initiative, that is covering the whole macro-region, in comparison to other existing bioeconomy HUBs. In this sense, the ministries and the NCPs are a very special type of stakeholder to the BIOEAST HUBs. Their involvement in the HUB, and consecutively in the project is described in the T2.3 *Mobilisation of inter-ministerial collaboration and policy-science interface* (M6-M36). This type of stakeholder can be described as highly important but possibly not so willing to engage. For this reason, special support and actions will be followed to maximize the chances of the involvement of inter-ministerial groups in BOOST4BIOEAST and hopefully to continue a fruitful cooperation with the national BIOEAST HUBs after the project lifetime.

Objectives

The key objective of the inter-ministerial collaboration and policy-science interface is to nurture and expand inter-ministerial relationships for the HUBs' networks in order to strengthen the diverse involvement of national policymakers in development of bioeconomy-related strategic and policy documents (e.g. SRIA, bioeconomy action plans, etc.), eventually achieving ministerial adoption and legitimacy.

Role distribution and authority

BIOEAST NCPs: The inter-ministerial groups are coordinated by the BIOEAST NCPs, this means that only the NCP can call for an inter-ministerial discussion. Only some BIOEAST NCPs are BOOST4BIOEAST partners which can cause some difficulties (see below on Challenges and mitigation).

National BIOEAST HUBs are providing support to the National NCP to stir the dialogue. This support can be multilevel from communication support to the organization of related conferences.

Ministries to be involved

Depending on each country's themes/sectors identified, the inter-ministerial groups should support the involvement of multiple ministries to ensure that bioeconomy is not solely associated with the Ministry of Agriculture, as can be the case of some BIOEAST countries. In doing so, inter-ministerial dialogues will also support other BOOST4BIOEAST tasks such as:

- to identify barriers and enablers to involve policymakers in bioeconomy, to demonstrate the importance of bioeconomy innovation (T4.1),
- to support involvement of policymakers in the enhancement of bioeconomy education (T5.2),
- to ensure active participation of policymakers in the development of the national bioeconomy action plans (T7.3, 7.5), macro-regional TWG thematic SRIAs (T6.2) and science-policy dialogues (T6.3.), and
- to support the mainstreaming of bioeconomy and related awareness raising and communication efforts of the HUBs at national level in close collaboration with the CET (T8.2, T8.3).

Coordination and next steps

Each HUB Coordinator is encouraged to reach out to CR HUB (Coordinator of HUB CZ) team to gather knowledge on the establishment of inter-ministerial groups. Based on the experience gained from the team's involvement in the BIOEASTsUP project (established the Czech inter-ministerial group in 2019 with the support of the Ministry of Agriculture), the following actions are proposed to launch the national inter-ministerial groups:

- It is important to consider each country's specific situation. In order to provide support for both HUB Coordinators and BIOEAST NCPs, CR HUB launched a survey to monitor the current situation. All HUB Coordinators should fill it in to assist the task.
- Organize a meeting for the HUB Coordinators facilitated by the HUB Coordination Body.
- Organize bilateral meetings between BIOEAST HUB Coordinators and BIOEAST NCPs (regardless of whether they are involved or not involved in the project). These meetings will be initiated from September 2024 to discuss how to enhance the inter-ministerial dialogue. The BIOEAST NCPs will be invited to these meetings to establish the connections.

The meetings aim:

- to discuss the objectives of this task,
- to find out the status quo - How active is the inter-ministerial cooperation?
- to discuss what kind of a support can BIOEAST HUB Coordinators provide to BIOEAST NCPs.

Challenges and risk mitigation

Inter-ministerial groups are coordinated by BIOEAST NCPs, supported by the HUBs**,** nevertheless only some BIOEAST NCPs are beneficiaries of the BOOST4BIOEAST project. This might cause difficulties (lacking time, no capacity, financial resources etc.) in engaging this important group efficiently. To maximize participation and interest, timely, moderate and meaningful communication is necessary. Furthermore, in many cases, this will include active support and work on behalf of the HUB Coordinators where only the validation or comments of the inter-ministerial discussions will be needed. Creating bonds with the national NCPs is crucial to this end, as they are the ones entitled to kick-start discussions. It is important to view the inter-ministerial groups as a special stakeholder type to which the HUB provides “services” to support policy alignment, to communicate opportunities and stir interest on bioeconomy related topics aiming at national development. The CR HUB team will be available to provide feedback and support throughout the task development starting by the aforementioned bilateral meetings. An update with the status and next steps will be provided in the update of the handbook.

BIOEAST HUB Handbook:

The Playbook

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The BIOEAST Playbook

This Playbook offers **a diverse compilation of activities, methodological approaches, best practices, and tools** drawn from various sources and past projects. It comprises a portfolio of recommended activities intended for implementation and inspiration as part of the HUB's operations. These activities were selected to help achieve the HUB's objectives and ensure a strategic and effective operational framework. The Playbook is part of D2.1 BIOEAST HUB Handbook, which as a living document will be continuously updated throughout the BOOST4BIOEAST project with materials based on the implementation of the HUBs' roadmaps.

The Playbook is divided in 7 chapters, each of them addressing a relevant topic for the HUBs management and activities.

Materials are presented in factsheet format classified in 4 categories:

Activity: Specific actions or tasks recommended for implementation within the HUB.

Concept: Fundamental ideas or principles that support specific activities.

Best practice: Proven strategies and approaches from past projects that have yielded successful results.

Methodology: Structured processes or frameworks guiding the HUB's activities.

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Chapter 1: Stakeholder engagement

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Stakeholder identification

Activity

Topic: Stakeholder engagement

Aim: To identify and engage all relevant stakeholders from the start.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Stakeholder mapping - Climate KIC [2]

Typology of intermediaries in sustainability transitions [3]

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WHAT

For successful results in participatory processes, it is important to identify those groups and individuals concerned who can share their knowledge, expertise and ideas in participatory processes and agree on common goals through a common understanding. These stakeholders are therefore those who are affected by a common problem and are willing to contribute to achieving common goals. It is important to keep an exploratory mind as some groups who may not be concerned today may become so in the future. Furthermore, as some stakeholders may not be able to directly contribute, it is still essential to give them a voice. This can help (technological) innovation serving as a solution rather than exacerbating problems.

WHY

To enable a sociotechnical transition, a set of stakeholders for a given goal must be included from the beginning. This helps ensure inclusivity and democracy in solving challenges.

These stakeholders can contribute with their diverse knowledge, norms and behaviours and take on new and different roles, which may be needed in a transition. Identifying stakeholders at an early stage and working with them in as many phases as possible can considerably improve the way they participate and their contribution to achieving the set goals.

HOW

Identifying a broad range of stakeholders can be costly, but the social, environmental and economic cost of not doing it can be higher. Among government, industry and academia, civil society represents many significant voices, which risk being diluted. Rather than trying to fit players in pre-defined groups, look at your territory and identify potential partners beyond the usual ones. With a clear understanding of your stakeholders, you can then determine their level of involvement and the engagement necessary to set out your strategic goals together. You can involve them in setting up a shared space for dialogue.

To help with this activity, you can use the *actor tree*. It is a visual tool that helps you identify, list and categorise stakeholders around a challenge.

Stakeholder analysis: Stakeholder Matrix

Methodology

Topic: Stakeholder engagement

Aim: To identify and prioritize stakeholders by their interest and influence.

Source: Effective Engagement: building relationships with community and other stakeholders. Book 3: The engagement toolkit [4]

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A common method of stakeholder analysis is a Stakeholder Matrix. This is where stakeholders are plotted against two variables. These variables might be plotting the level of 'stake' in the outcomes of the project against 'resources' of the stakeholder. Another is the 'importance' of the stakeholder against the 'influence' of the stakeholder. The concept is the same, though the emphasis is slightly different.

METHODOLOGY

1. Make a list of all stakeholders.
2. Write the name of each stakeholder on a post-it note or index card.
3. Rank the stakeholders on a scale of one to five, according to one of the criteria on the matrix, such as 'interest in the project outcomes' or 'interest in the subject'.
4. Keeping this ranking for one of the criteria, plot the stakeholders against the other criteria of the matrix. This is where using post-it notes, or removable cards are useful.
5. Ask the following questions: Are there any surprises? Which stakeholders do we have the most/least contact with? Which stakeholders might we have to make special efforts to ensure engagement?

Box A. These are stakeholders appearing to have a high degree of influence on the project, who are also of high importance for its success.

Box B. These are stakeholders of high importance to the success of the project, but with low influence. This implies that they will require special initiatives if their interests are to be protected.

Box C. These are stakeholders with high influence, who can therefore affect the project outcomes, but whose interests are not necessarily aligned with the overall goals of the project.

Box D. The stakeholders in this box, with low influence on, or importance to the project objectives, may require limited monitoring or evaluation, but are of low priority.

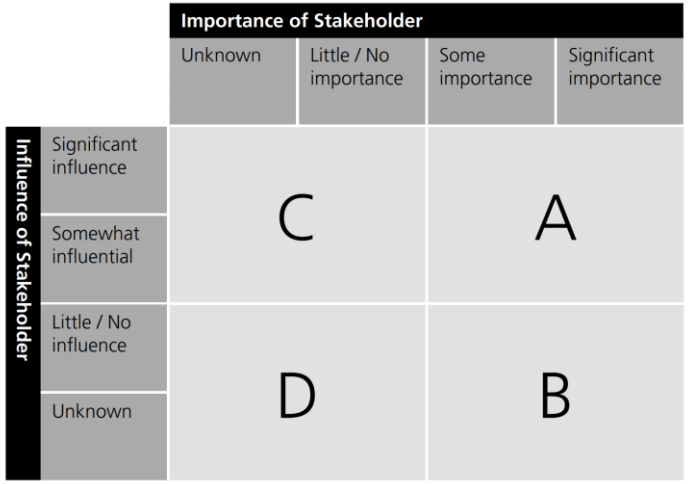

Figure 1. Stakeholder Matrix. (Source: Victorian Government DSE 2005)

Best practice

Topic: Stakeholder engagement

Aim: To engage diverse experts to create a circular hub.

Location of the best practice: Asturias, Spain

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Innovation Camp Methodology Handbook [5]

Funded by the European Union

Identifying stakeholders for green transformation goals

On March 2019, Instituto de Desarrollo Económico del principado de Asturias (IDEPA) (now SEKUENS) brought together experts in Covadonga to address the industrial transition through the circular economy under the slogan "a natural paradise in modern times". In Asturias, a strongly industrialised economic model coexists with a natural environment of great value, which raises the need to reach a consensus with society on measures aimed at creating a circular hub in Asturias. The Asturias region is highly specialised in the processing industry, which accounts for 40% of regional industrial employment. At the same time, one third of the territory is protected.

The event was funded by the Joint Research Center (JRC) as part of the Science Meets Regions project, subject of a public tender in July 2018. The challenge was addressed in a workshop of one day and a half, and the 38 participants were carefully selected, taking into account their skills and a balanced participation, considering the following profiles and roles: authorities (institutional representation); administration (responsible for the challenge); scientific and technological researchers (technological opportunities); socio-economic researchers (non-technological feasibility); industry (establish the objectives and needs); international/national experts (framing the challenge in the international/national context); societal groups (advocate for social responsibility); rapporteur (group leader, drafts conclusions)

The methodology applied was inspired from the "Innovation Camp Methodology Handbook" edited by the JRC. The venue was organised to encourage open dialogue and explore ideas, with the preparation of a plenary, two spaces for group work, and a meeting place or agora. A central screen showed real time events to allow social networks to follow and interact. Preparatory work was intense, with the following tasks standing out: careful preparation of support documentation; selected participants were contacted with detailed instructions for group work; design of outreach tools; adaptation of methodology to challenge; elaboration of manual as a result.

LESSONS LEARNED:

- Engage with technical work (avoid outsourcing all tasks);
- Build key partnerships (e.g., with industry leading this process);
- Identify and engage with appropriate firm individuals/entity (e.g., R&D and environmental departments);
- Strong legal barriers (avoid involving only research and innovation or economy ministries, go broader, e.g. environment);
- Monitor continuously to identify unexpected results.

Concept

Topic:

Stakeholder engagement

Aim: To build partnerships, action plans and projects.

Source: Partnerships for Regional Innovation Playbook [6]

More: Discovery processes for transformative innovation policy, Lessons learned from the entrepreneurial discovery process (EDP) practice [7]

Funded by the European Union

Open Discovery Process (ODP)

Open discovery process (ODP) builds and extends on success of **entrepreneurial discovery process** to mobilise stakeholders and develop action plans or projects. Seeking more impact, ODP concept aligns research and innovation actions (and policy) with economy (industrial policy) as well as society and environment (sustainability policy).

The core of ODP is working backwards from mutually agreed goals with coalitions of stakeholders in a multi-level perspective. Public support encourages stakeholders to open their agendas, which will allow for synergies/sequencing and building shared agendas.

Continuous, growing and reflexive coalitions result in multiple actions beyond publicly funded projects. Working in multiple policy domains, ODP aims to synergise multiple funding streams, other policies and stakeholder actions.

- Can you think of how the ODP would benefit your strategy design?
- Think about a problem in your country: do you know who are the main stakeholders involved and those affected?
- Think about how you could implement an ODP: share vision, look for training opportunities, look for examples.

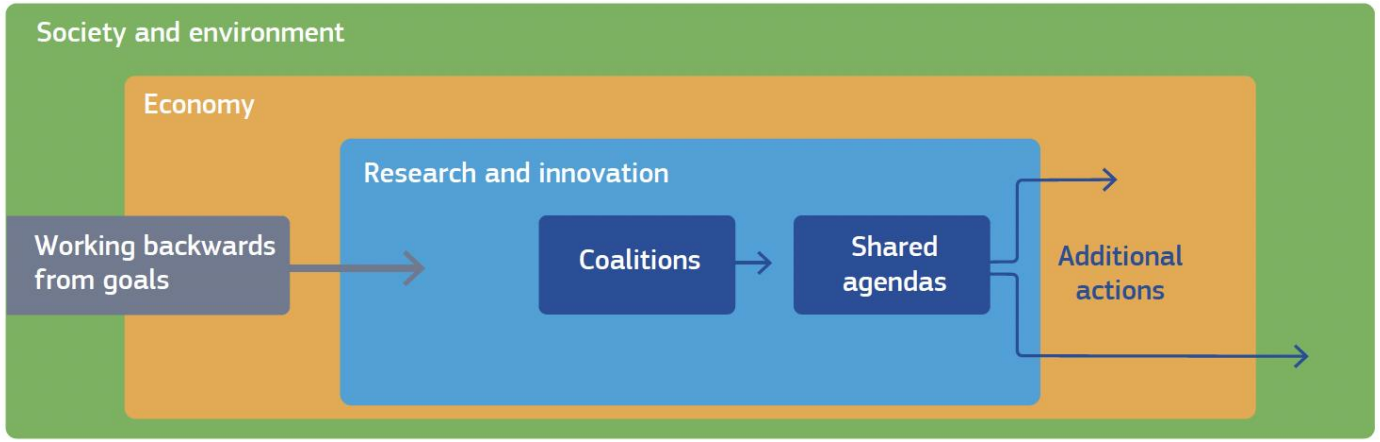

Figure 2. ODP multi-level perspective. (Source: Pontikakis *et al*. 2022)

Methodology

Topic: Stakeholder engagement

Aim: To enhance industrial and territorial development.

Source: Projecting Opportunities for INdustrial Transitions (POINT) [8]

Funded by the European Union

Projecting Opportunities for INdustrial Transitions (POINT) Methodology

The POINT methodology provides a framework for conducting reviews on globally significant industrial themes, such as climate change and renewable energy, as suggested by territorial authorities. It aims to develop coordinated territorial responses involving multiple portfolios and stakeholders. The reviews generate evidence for managing industrial transitions, aligned with EU Structural Funds' governance criteria, and inform Smart Specialisation Strategies (S3). They help refine priorities, enhance the entrepreneurial discovery process, and promote funding synergies. Additionally, the methodology supports broader industrial and territorial development strategies by engaging stakeholders to create motivating future visions.

Step 1. Defining the theme. This step defines the industrial theme and ambition for the review, aligned with regional or national priorities. Starting with an agreed theme, it sets system boundaries and proposes a transition indicator. It identifies the geographic scope, transition rationales, and aligns with strategic documents, specifying ambition levels and targets. The results include a transition rationale, a list of relevant technologies and sectors, and a proposed indicator with a timeline.

Step 2. Mapping the current system. This step aims to map the current system by identifying key actors and understanding their roles. It focuses on both established ('sunset') and emerging ('sunrise') elements across government, finance, industry, and academia. Through research and interviews, it highlights how these actors interact in functions like planning, resource management, production, and consumption, providing insights into the system's dynamics and regulatory environment.

Step 3. Visioning a desirable future system. This step envisions the transition's future by identifying gaps and using insights from diagrams, stakeholder interviews, and global examples. It creates a framework for planning, resource mobilization, production, and consumption, aiming to find innovative strategies aligned with the territory's goals and informed by strategic documents and international practices.

Step 4. Identifying leverage points for the transition. This step offers strategic guidance in government governance, coalition-building, resistance management, and policy formulation. It identifies leverage points to drive transformative change, with recommendations for improving governance, mobilizing coalitions, mitigating resistance, and implementing targeted policy reforms. The aim is to align stakeholders, overcome barriers, and effectively support the transition's vision.

Chapter 2: Knowledge exchange

Funded by
the European Union

Managing and transforming knowledge

Activity

Topic: Knowledge exchange

Aim: To foster innovation and learning through dynamic knowledge management.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Diffusion of innovation knowledge and lessons [9]

WHAT

Knowledge management accompanies various activities and is maintained over time as a crucial mechanism for innovation and learning. It enables the exchange, combination and adaptation of broad knowledge between stakeholders, applied in flexible and dynamic environments using team skills, methods and knowledge infrastructures. Harvesting from different sources enables a system perspective. Orchestrating the knowledge flow and effective communication are critical to running operations. Transforming data, insights and lessons learned into actionable knowledge through continuous feedback and learning loops is crucial to enable links and strengthen synergies between different activities.

WHY

Providing actionable knowledge requires a combination of harvesting and documentation, with conceptualisation and analysis to highlight key patterns and insights that can be integrated into other activities. This transformed knowledge enables multiple stakeholders to act by following a challenge-led approach such as:

A systemic perspective, through evidence gathering with alternative mechanisms, that recognise the nested nature of systems, addressing the different needs of various indicators to conduct monitoring, evaluation and learning by introducing, future-oriented inputs at each stage.

Outcome-oriented, aiming to integrate data, knowledge and shared meanings into a story that allows to examine impacts by collecting examples of what has changed. This is useful for building trust, supporting two-way communication and activating subsequent decision-making processes.

Policymakers can make knowledge management a common practice to help identify signals to measure and track changes in the various parts of the system (actions, relationships, policies and practices) and then retrospectively determine whether and how an action contributed to those changes, alongside other activities such as monitoring, evaluation, design, orchestration and implementation.

Funded by the European Union

Managing and transforming knowledge

Activity

Topic: Knowledge exchange

Aim: To foster innovation and learning through dynamic knowledge management.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Diffusion of innovation knowledge and lessons [9]

HOW

Operational knowledge management requires a wide range of formats and resources to meet different needs and audiences. Some practices can ease implementation and enable the application of knowledge developed as part of the policy process.

- **Scoping and framing** through a better understanding of how to monitor system dynamics by introducing different types of indicators, with a particular focus on contextual indicators that capture real-time signals of emerging changes.
- **Integrating a forward-looking perspective** as a common element based on inputs developed through foresight processes such as horizon scanning, megatrend analysis and related sense-making exercises.
- **Harvesting and documentation.** This focuses on managing information and includes two interrelated actions: nurturing the flow of information and reframing ideas as part of the ongoing policy process.
- **Developing actionable knowledge.** This focuses on conceptualising and analysing the combined data, co-created knowledge and insights to highlight the main patterns and achieve some degree of synthesis.
- **Developing a knowledge infrastructure** that includes practices, a dedicated team and facilities to ensure continuous knowledge transfer between those involved in building, operating and using the infrastructure.

Funded by the European Union

Mobilizing competences

Activity

Topic: Knowledge exchange

Aim: To empower stakeholders for innovative territorial development through lifelong learning.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

WHAT

Acquiring competences is a lifelong learning activity. This is true to different types of stakeholders, who are tasked with dealing with new opportunities and challenges, or old challenges that require new approaches. Competences are described as a dynamic combination of knowledge (facts, concepts, ideas), skills (abilities based on that knowledge) and attitudes (intentions and dispositions to activate skills and knowledge).

WHY

Public officials, policymakers and any professional working on territorial development are increasingly tasked with making plans, actions, strategies and policies – and rethinking existing ones - to address complex and interlinked problems. The increasing complexity of their job requires them to become actors of change, or sustainability innovators in the public sector. Their job as sustainability innovators requires expert knowledge and requires transversal competences. It demands the capacity to value, plan, and enact place-based transformative innovation, think systemically and generate solutions that create value to be future-oriented, and become change thinkers and makers.

HOW

Lifelong learning is a key concept. Competences need to be constantly updated to keep the pace with global rapid development, environmental and social complex problems (e.g., biodiversity loss and rising inequalities), and changing working conditions.

Innovation competences can be developed or outsourced. If human resources are limited, it is in fact possible to form strategic partnerships with agencies and people who have those competences. We can then talk about networks of competences. This can be done within and beyond organisational boundaries, being able to collaborate, ensure diversity of perspective, critical thinking, (un)learning, cultivate creativity and trust - which are all key competences to build into collective intelligence.

It is critical to agree on common goals and shared interests to form strategic partnerships to form networks of competences.

Funded by the European Union

Science-Policy Interfaces (SPIs)

Concept

Topic: Knowledge exchange

Aim: To enhance decision-making through Science-Policy Interfaces.

Source: Effective interfaces between science, policy and society. The Spiral Project Handbook [10]

More:

SPIRAL project [11]

SPIs are the many ways in which scientists, policymakers and others link up to communicate, exchange ideas, and jointly develop knowledge to enrich policy and decision-making processes and/or research. SPIs involve exchange of information and knowledge leading to learning, and ultimately influencing decisions and changing behaviour – i.e. doing something differently as a result of learning. These changes may be made by policymakers, local-level decision-makers, scientists, other stakeholders or citizens. As such SPIs can lead to many – sometimes surprising – practical impacts.

FUNCTIONS

- Allowing for exchange and co-evolution of scientific and policy knowledge, in a dynamic fashion.
- Contributing to the scientific quality control process by allowing critical assessment of scientific outputs in light of users' needs and of other types of knowledge.
- Facilitating timely and coherent translation of research into policy options or advice.
- Facilitating rapid uptake of research results by stakeholders.
- Alerting decision-makers and other stakeholders about emerging issues.
- Ensuring strategic orientation of research in support of policies and societal issues.
- Raising public awareness about important societal issues.
- Raising willingness to act and to support policy amongst the public and stakeholders.

MAINTAINING SPIs

Effective SPIs and communication strategies should be integrated from the outset of a project and maintained throughout its duration. Establishing dialogue with policymakers and stakeholders early on and involving them continuously can enhance the effectiveness of interactions between science and policy realms. Key steps to support this approach include building the project's brand or identity to facilitate recognition and engagement, maintaining and improving SPI strategies, and incorporating internal evaluation processes to identify weaknesses and build on strengths.

Involving policymakers and stakeholders in scenario development, modelling, and decision-support tools ensures these outputs meet user needs. Interaction events throughout the project, including personal meetings and larger events, should be facilitated, with adequate time and resources allocated for engagement, especially at critical stages of the project. Maintaining dialogue beyond the project's duration can further foster the uptake of project results in policymaking, contributing to long-term impact and sustainability.

Funded by the European Union

Knowledge brokers

Concept

Topic: Knowledge exchange

Aim: To translate complex information and facilitate science-policy communication.

Sources: Effective interfaces between science, policy and society. The Spiral Project Handbook (10)

Broker roles in open innovation (12)

Knowledge brokers are also referred to as translators, linker or bridging individuals, boundary individuals. They are skilled persons able to speak to multiple communities in understandable ways. They can:

- condense information to deliver accessible, clear and robust messages,
- help scientists understand better the complex and fuzzy policy making context,
- open the complexities of environmental issues into understandable language for policymakers.

Within research organisations knowledge brokers may be knowledge exchange specialists, or within policy departments these may be specialist scientific advisors, but in both cases, they can be researchers or policy-makers who are good at and interested in bridging activities. It is important not to confuse knowledge brokers and facilitators. Although some facilitators may have good brokerage skills on some topics, others may either not know enough about a topic or not have the synthetic skills required to be good knowledge brokers. The challenge is in training or recruiting scientists who are able to efficiently communicate with counterparts from other disciplines, as well as with the media, policy makers, and popular audiences. 'Translation' roles are, however, at present not always formally recognised or rewarded.

Translators or linker individuals should not and cannot absolve all individuals from having some role to play in seeking out dialogue, learning and sharing opportunities. Otherwise, a risk is that dialogue can become overly vulnerable to the continuity of key personnel, and those personnel struggle to learn and share what is needed.

The role of a broker in open innovation is nuanced and complex, and not all brokerage actions lead to successful outcomes. For example, mismatching partners, can lead to communication breakdowns, loss of trust, and stalled innovation. This highlights the delicate balance brokers must maintain, as poor brokerage can waste time and resources and undermine confidence.

Brokers are crucial in the early stages of an open innovation partnership (see page 30), helping participants familiarize themselves with each other's knowledge and connecting them with relevant expertise across organizations.

Funded by the European Union

Knowledge brokers

Concept

Topic: Knowledge exchange

Aim: To translate complex information and facilitate science-policy communication.

Sources: Effective interfaces between science, policy and society. The Spiral Project Handbook [10]

Broker roles in open innovation [12]

Key propositions for effective knowledge sharing in open innovation:

- **Sensitivity to knowledge type**: In open innovation, brokers are more essential for connecting tacit knowledge (know-how) than for explicit knowledge (know-what).
- **Variability in knowledge-sharing behavior:** Knowledge-sharing behaviors in open innovation are influenced by various factors, including organizational dynamics, individual preferences, and trust levels.
- **Centrality of trust**: The sharing of tacit knowledge in open innovation environments depends significantly on cognition-based trust.
- **Significance of specific broker roles**: Liaison and representative broker roles are crucial for encouraging knowledge-sharing and fostering collaborative environments in open innovation partnerships.

Funded by the European Union

Best practice

Topic: Knowledge exchange

Aim: To enhance knowledge transfer.

Location of the best practice: Uppsala (Sweden) and Nord-Pas de Calais (France)

Source: Proyecto Reune. Evaluación de casos de éxito en la relación Universidad – Empresa [13]

More:

- CD2E [14]
- Innovation approach - University of Uppsala, Sweden [15]
- AMA University of Uppsala, Sweden [16]

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Strategic platforms for knowledge transfer between universities and business

In order to be transformed into innovation and to generate wealth, the results of research and development in universities and educational training require the backing of private enterprises. Therefore, apart from supporting basic and applied training and research, additional measures are needed to dynamise transfer processes by using activities which promote projects such as open innovation programmes, that encourage learning and strengthen relationships. The objectives of this recommendation therefore include: the dynamisation of knowledge transfer processes through events and physical or virtual reports which support learning and the exchange of knowledge; the promotion of open innovation programmes; and the establishment of links so that the results of research carried out in companies and universities can be transferred to society as a whole.

The REUNE PROJECT has identified two interesting examples of such platforms: Uppsala (Sweden) and Nord-Pas de Calais (France). The first, called the ***Angstrom Materials Academy*** **(AMA)** and run by the University of Uppsala, was founded by the government's innovation agency and is currently managed by *UUInnovation* (University of Uppsala *Innovation*).

Its members include university researchers and industry representatives. Its mission is to provide links between materials science related projects at the Angstrom Laboratory and Business. AMA organises the annual Material Day - AIM Day, where companies are invited annually to visit the laboratory, consult and discuss proposals.

The other, the **Accélérateur de l'éco-transition** (**CD2E) organisation in Nord-Pas de Calais** (France), focuses on stimulating innovation through the creation of businesses, projects, products and services associated with the environment. One of its main activities is to encourage links between the production sector and university laboratories. The organisation is well aware that the only way to begin to exchange and transfer knowledge is through a process of exchange visits between the laboratory and business so that the different agents can fully appreciate the social potential of collaborative activities.

Chapter 3: Developing common strategies and action plans

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the European Union

Diagnosing and developing a vision

Activity

Topic: Developing common strategies and action plans

Aim: To diagnose current performance and future opportunities for positive transitions.

Source:

Innovation for place-based transformations. ACTIONbook, practices and tools [1]

Funded by the European Union

WHAT

This activity seeks to answer the question: **'Where are we now and where can we go from here?'** It does so, initially, independently of where we want to go. A diagnosis can have many aspects. It can look at how the system performs now to gain an understanding of its strengths and weaknesses. It can also look prospectively at opportunities and threats, which also means looking outside the system and into the future. This is how vision development begins, and it should feed into a broader process of engagement, deliberation, alignment, exploration and a conscious pursuit of positive transition pathways.

WHY

Diagnostic methods are necessary to inform policy debates about transformation. Good diagnostics can help you to act in targeting limited policy attention and resources. Diagnostic tools and methods aiming to address transformation require looking in detail at specific needs to create new anticipatory capabilities. This helps balance the traditional strong focus on the supply-side/production sector with a strong focus on the demand side and user needs. In addition, it also reveals more important factors that may shape the global context in the coming years. Positive collective visions are in short supply in a world facing many escalating crises.

The challenge lies in that these positive visions may not be apparent to any stakeholder and accepting them may require an independent mediator. Supporting the creation of positive visions may well be one of the most valuable public goods governments can provide.

HOW

Diagnostic methods combine gathering evidence with stakeholder discussions and collective imagination. Methods for a system-level diagnosis include system mapping (such as network analysis), policy evaluation inspired by system dynamics (such as causal loop diagrams) or policy reviews with a transformative framing (such as the POINT methodology developed by JRC). To choose the right diagnostic method to try and answer the first question (Where are we now and where can we go from here?), you should first answer the following questions.

- What is the objective of the diagnosis?
- What is the diagnostic approach or method to be used, considering the objective?
- How will the findings of the diagnosis link back to executive decisions?
- How will the findings of the diagnosis feed into developing a vision?

Activity

Topic: Developing common strategies and action plans

Aim: To guide actions towards shared visions amidst uncertainty.

Source:

Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Multilevel perspective: Walkthrough videos - Visual toolbox for system Innovation[17]

Funded by the European Union

Developing transition pathways and roadmaps

WHAT

Transition pathways and roadmaps can be used to explore the process of building strong networks. They outline the different steps, actions and interrelationships between those involved, resources and policies to achieve a vision. It is about considering what might happen to better understand what drives change and explore areas where decisions need to be taken. Enriched by a participatory process, transition pathways and roadmaps facilitate stakeholder engagement in designing and implementing areas for action in a transformation.

WHY

Navigating the uncertainty about the future requires mechanisms to explore consistent measures over time and across government levels, sectors and territories. The choice of mechanism depends on the capacity of the agency to influence the outcome of future events, and the degree of uncertainty faced by policymakers.

Transition pathways help outline the timing, scope and scale of change required for a territory, sector or economy. They can help identify many alternative routes to a desired vision or aspirational scenario under uncertain conditions by enabling the emergence of innovative ideas in the community.

Roadmaps give a preferred, structured, temporal and often graphical representation of the direction to lead a society or sector to its desired endpoint. They are ideal for exploring the dynamic relationships between resources and organisational goals in an innovation system and programme.

Activity

Topic: Developing common strategies and action plans

Aim: To guide actions towards shared visions amidst uncertainty.

Source:

Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More:

Multilevel perspective: Walkthrough videos - Visual toolbox for system Innovation [17]

Funded by the European Union

Developing transition pathways and roadmaps

HOW

Evidence and data are crucial for design and implementation. Transition pathways and roadmaps produce actionable knowledge for policymaking.

Transition pathways:

1. Require less structured information, which includes future signals, trends, narratives and visions shared by the community.
2. Benefit from decision-making and consensus-building.
3. Stimulate discussion on how change occurs through a systemic view, looking at projects and programmes simultaneously.

Roadmaps:

1. Rely on indicators to measure time, resources and outputs, often using multiple layers to show relationships between policies, markets, products and technologies.
2. Emphasise the need for stakeholder alignment.
3. (Often in conjunction with action plans) can play a more specific instrumental role in analysing the feasibility and implementation capacity in evaluations or impact assessments, carried out when specific programmes or instruments are being developed.

In practice, they are both usually combined with workshops to promote knowledge-generation and exchange.

Activity

Topic: Developing common strategies and action plans

Aim: To implement a comprehensive policy mix.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More: Knowledge management as a service for science-policy-practice interface[18]

Funded by the European Union

Developing the policy and action mix

WHAT

A well-designed policy and action mix (sometimes referred to as a policy mix) is needed to address policy complexity and push for desirable change. Governments are increasingly reconsidering their policies in response to urgent societal and environmental challenges. They seek to align public measures across different policy areas and take advantage of innovations within systems that could potentially drive transformative change. The policy mix involves using a combination of various policy instruments and linked stakeholder actions to achieve a set of policy goals. For example, governments may use regulatory policies such as laws, regulations and standards to achieve environmental policy goals. In addition, a policy mix can include financial incentives such as subsidies, tax credits and grants to promote the adoption of environmentally-friendly practices. Moreover, governments can roll out certain initiatives, public awareness campaigns, education and training programmes, encouraging a change in behaviour not only at producer level, but also at consumer level.

WHY

The policy and action mix approach acknowledges that no single policy instrument or action is sufficient to tackle complex and interlinked challenges. Instead, it recognises the importance of combining various instruments and actions tailored to specific contexts and goals. Such an approach ensures that various measures encourage directionality, synergies and complementarities, promotes stakeholder ownership and change.

Overall, the policy and action mix approach enables policymakers to create comprehensive and effective strategies to achieve policy goals by combining different policy instruments and other actions to create positive change.

Activity

Topic: Developing common strategies and action plans

Aim: To implement a comprehensive policy mix.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

More: Knowledge management as a service for science-policy-practice interface[18]

Funded by the European Union

Developing the policy and action mix

HOW

A policy and action mix can potentially include further actions and avail of budgets from other policy areas to tackle common challenges.

1. Identify the problem along with stakeholders. It is important to include stakeholders from start and share problem ownership.
2. Set the policy goals, which should be measurable and achievable within a given time frame. Allow for corrections while implementing.
3. Ensure the existing sets of policies are consistent with each other and ensure policy mixes for transformation do not emerge in a vacuum.
4. Identify missing policy instruments and mechanisms to co-opt actions that are most appropriate to achieve the policy goals.
5. Develop an implementation plan by allocating resources, a timeframe, responsibilities and communication activities.
6. Monitor, discuss, evaluate, refine and make corrections to the implementation plan.

Activity

Topic: Developing common strategies and action plans

Aim: To drive policy innovation and informed decision-making.

Source: Co-creation for policy. Participatory methodologies to structure multi-stakeholder policymaking processes [19]

More:

MOTION handbook. Developing a transformative theory of change[20]

Using Policy Labs as a process to bring evidence closer to public policymaking: a guide to one approach[21]

Funded by the European Union

Co-creation for policy (CfP)

CfP are intended as dynamic processes that can be structured around a series of specific events (e.g. workshops, innovation camps, policy labs), which are considered milestones of that process. This means that the preparation and follow-up phases of these events are at least as important as the events themselves, if not more.

As part of this multi-stakeholder policymaking process, CfP events gather participants from diverse backgrounds, countries and disciplines. Together they work to discover and leverage both in- and out-of-the-box opportunities for creating breakthroughs in a process of collaborative solution seeking.

During CfP events, the challenges of the key stakeholders are identified, refined and analysed from different perspectives by diverse participants, who transform them into opportunities that can be further developed and realised in practice. To address such challenges requires bottom-up perspectives, full stakeholder involvement and shared ownership of the decision-making processes.

Ultimately, CfPs contribute to the stimulation and enhancement of a creative culture of policy innovation, systems thinking and problem-solving on the ground. At the same time, CfPs generate evidence to inform policymaking while gathering knowledge that may reduce uncertainties around the policy options helping to achieve a greater policy impact.

Principles of CfP processes:

1. **Clarity of scope and purpose:** the purpose and scope of the exercise must be clearly identified and defined.
2. **Focus on outcome:** expectations and expected concrete outcomes must be defined from the design stage of the event to enable an optimal harvesting of results.
3. **Inclusiveness and representativeness**: the right participants must be selected, in terms of individual expertise, representation of all the relevant stakeholder groups and diversity of personal backgrounds for an optimal development of collective intelligence.
4. **High-quality, tailored process:** the design of the event must be tailored to best serve the purpose and not be the slave of orthodoxy regarding standard tools. Preparation and resources should be allocated for the smooth implementation of the process and the harvesting and analysis of the results.
5. **Systemic perspective**: this is essential for understanding the positioning and dependency of the issue at stake on external factors for connecting the parts to the whole with all the sensibilities involved and maintaining coherence of action.

Chapter 4: Cross-sectoral collaboration

Funded by
the European Union

Activity

Topic: Cross-sectoral collaboration

Aim: To foster multilevel cooperation for effective transformation.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

Funded by the European Union

Enabling multilevel cooperation

WHAT

Multilevel cooperation is critical to address the multiple and simultaneous transformation processes that need to be activated and jointly managed by steering synergies across territorial levels and sectors. Places are affected by actions taken at different governance levels, from the most local level to EU level. Territories implementing transformation agenda usually only have some responsibility over and knowledge of the relevant policies and action that require involving other governance levels. Multilevel cooperation can be about (bidirectional) information and data sharing, awareness raising and increasing ownership, strategy co-design and collaboration on implementation. Territories are also well positioned to bring different EU policies and funding instruments together with national and local ones for implementation. Territorial experimentation can provide lessons learned that can be shared with higher levels of governance.

WHY

Cooperation can enable the building of a distributed capacity between different European actors, including governments, civil society and businesses at every level, to act in complex and uncertain conditions. Involving higher governance levels makes it possible to increase the power to act with relevant policies and funding across different governance levels. Understanding lower levels is crucial for identifying barriers to implementation and alternative solutions and promoting local needs.

It also builds capacity to act on and learn about the relevance or obsolescence of territorial policies as well as trade-offs and contradictions. Multilevel cooperation also enables mobilising and sharing resources that create synergies in how funds are used.

Enabling multilevel cooperation

Activity

Topic: Cross-sectoral collaboration

Aim: To foster multilevel cooperation for effective transformation.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

HOW

Different actions can help multiple actors to go beyond managing different resources, competences and processes and look at the big picture; in particular, how we can build distributed capacities to facilitate decision-making and innovation in policymaking at system level.

- It is essential to know all relevant policies, why they are relevant, and how responsibilities are distributed. Tools like *power maps* are useful to build a territorial transformation agenda.
- Facilitating co-creation processes are paramount to make sense of the overall challenges and place-based context and identify key principles for collaboration in participatory policy design and implementation.
- Negotiations between governance levels can increase collaboration, promote a sharing and learning culture, and involve lower levels in planning and implementation.
- Making coordination more efficient and applying good practices is crucial for limiting coordination costs.
- Implementing foresight processes is important to explore the emergence and evolution of collaborations at different levels (including governance models) with the aim of developing multi-actor anticipatory capacity to catalyse transformative change for sustainability transitions.

Funded by the European Union

Chapter 5: International and interregional collaboration

Funded by
the European Union

Activity

Topic: International and interregional collaboration

Aim: To encourage interterritorial collaboration for effective responses to rapid societal changes.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

Funded by the European Union

Collaborating across territories

WHAT

Interterritorial collaboration can take many forms, including networks, platforms, joint projects, cross-border clusters, twinning, strategic partnerships and alliances. The type of collaboration depends on several factors, such as the specific context, the groups involved (e.g. regional administrations, cities, universities, businesses, civil society organisations), the objectives, and the available resources.

WHY

The rapid environmental, social, and economic changes that societies face today can be addressed more effectively if territories collaborate and leverage each other's expertise, capabilities and resources.

HOW

Starting with networking and exploratory activities, territories can advance by designing and implementing projects together. In later phases, territories could mobilise joint capacity, manage common resources and share investment risks. The EU supports interterritorial collaboration with initiatives targeted at regional administrations (e.g. Interreg), the research and development community (for example, Horizon Europe) and clusters (e.g. Euroclusters) or ecosystems (e.g. European Innovation Ecosystems and Regional Innovation Valleys). Joint initiatives could be based on shared infrastructure, shared risks for climate adaptation or skills development (through Erasmus+). However, developing a forward-looking, comprehensive, and stepwise roadmap on interterritorial collaboration could help achieve major goals and have a bigger local impact.

Activity

Topic: International and interregional collaboration

Aim: To encourage interterritorial collaboration for effective responses to rapid societal changes.

Source: Innovation for place-based transformations. ACTIONbook, practices and tools [1]

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Collaborating across territories

Recommendations at local level:

- Promote local ownership by ensuring commitment from high levels of government and enough resources to support long-term interterritorial collaboration.
- Set a clear vision and promote agreements involving all stakeholders to discuss your territorial challenges and local missions and identify areas relevant to other territories (from benchmarking to joint initiatives).
- Facilitate decision-making by identifying bottlenecks, gaps and enablers for interterritorial collaboration, reviewing governance barriers and spotting internal investment needs for place-based innovation. In addition, encourage learning by regularly monitoring and evaluating the process with your stakeholders.
- Develop and nurture relationships by identifying and facilitating exchanges with relevant territories (complementarities, economies of scale, shared value chains, gathering critical mass, etc.) and networks that can give you an external perspective of your territory.

Recommendations at interregional level:

- Develop an interterritorial narrative based on common challenges and missions; co-create a map of key stakeholders involved in the targeted local missions.
- Design a toolbox that enables a step-by-step flow so that the collaboration process can evolve and learn through regular monitoring and evaluation.
- Build a strong governance model for collaboration by sharing costs and benefits, reflecting on their distribution and evolution, and building trust to develop strong relations over time.

Chapter 6: Awareness raising

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Activity

Topic: Awareness raising

Aim: To raise awareness through targeted public outreach.

Source: Awareness Raising and Communication. LIFT project [22]

Awareness raising and communication

Communicating bioeconomy, is a complex and difficult task. Lack of awareness and terminological misunderstandings are common challenges. Nevertheless, raising overall awareness and understanding of the social, economic and environmental impacts of bio-based products, processes and the bioeconomy at large is of utmost importance. Awareness raising has an important role in the future development of a smart, sustainable and inclusive bioeconomy to create a market for bio-based products and to promote more sustainable consumption and lifestyle patterns. Public awareness actions are needed particularly on regional and local level, informing the various target stakeholders, using diverse arguments, messages and tools.

Recommendations for success:

- Design impactful awareness and communication strategies, tailoring the message to the different target audiences. Use innovative channels (large scale events, science festivals, workshops, fairs), tools (games, videos, art gallery, augmented reality, 60 second science, contests) and different social media.
- Messages should be simple, concrete, applicable in real life, but based on solid and trustable scientific background. Address potential risks and hurdles like terminology and language, confusion and contradictory messages, fake news, miscommunication, and green washing.
- The focus should not only be on awareness, but knowledge transfer and info-education, providing real, tangible, appealing and inspiring examples to make bioeconomy concrete for the target beneficiaries. Build trust and acceptance by providing objective, knowledge, including impacts, pros and cons.
- Explore new solutions and multipliers to inform not only citizens, but also other stakeholders about opportunities offered by the bioeconomy.
- Promote school projects (targeting young people at different levels of education), activities in the context of science festivals, large scale events, exhibitions, and social media (e.g. Instagram).
- Target and involve multipliers and ambassadors like informed/sensitive consumers, teachers, students, professionals, influencers, science promoters, testimonials, media, researchers, start-ups, brand owners, retailers, industries and politicians.
- Facilitate clustering, exchange and mutual learning among projects, initiatives and multi-actor stakeholders in an open dialogue and jointly draw up a prioritised and structured consolidated action plan on the future communication of the bioeconomy, as stated in the update of the European Bioeconomy Strategy (EC 2018).

Funded by the European Union

Best practice

Topic: Awareness raising

Aim: To promote circular economy through awareness raising, education, and expert collaboration.

Location of the good practice: Prague, Czechia

Source: Best Practice Brochure The mobilization of actors for the Circular Bioeconomy [23]

More: INCIEN website[24]

Funded by the European Union

Institute of Circular Economy (INCIEN)

INCIEN was established in 2015 to raise awareness on the circular economy concept and demonstrate it in practice. INCIEN promotes more efficient ways of managing raw materials in Czechia. Since 2015, it has contributed to the fact that the circular economy has become more widely known in Czechia. INCIEN promotes this change both from above (in working groups of ministries, etc.) and from below (through the media, social networks, blogs, or newsletters). Education, publicity and lobbying in favour of the circular economy can be effective and free of charge. INCIEN operates as a think-tank whose activities are at the intersection of government, academia, and business. It provides information and data on current materials management in the country and proposes recommendations to the government, regions, cities, or other players. It supplies the necessary expertise, educates, prepares expert studies, and engages in research. Most of its activities are developed within the framework of long-term thematic programs, which it implements in cooperation with partners.

The beneficiary entities are:

- SMEs, supply chain actors,
- local public authorities,
- regional agencies and institutes,
- NGOs,
- experts and catalyst entities,
- general public.

RESULTS

INCIEN promotes the circular economy as a priority for Czechia. It organizes lectures, workshops, and webinars to inspire and educate. It also develops education in the form of specialized courses for the public or professionals. INCIEN seeks to clarify how materials are handled in Czechia to find a way to use them as efficiently as possible. It formulates recommendations for implementing changes and improvements. INCIEN actively speaks about the topic at conferences and seminars, and shares everything new on social media. INCIEN is part of a web of working groups at the level of ministries, government, regions, and municipalities. It provides supervision for putting circular economy principles into practice.

LESSONS LEARNED

The importance of knowledge transfer is essential to create visions and long-term business development strategies. Current challenges such as the use of renewable energies, cascading approach in forest-based industries, and circular economy principles should be transferred into the business ecosystems. The hardest part of this dissemination is to engage SMEs and stakeholders in innovation and new pathways to become pioneers in the different business sectors. A weak point is the fact that activities are financed on a project basis only. Therefore, public financial support should be provided for such business services.

Best practice

Topic: Awareness raising

Aim: To facilitate bioeconomy education and training to foster collaboration.

Location of the good practice: Baden-Württemberg, Germany

Source: Best Practice Brochure The mobilization of actors for the Circular Bioeconomy [23]

More: Network initiatives for the further development of the leading region for sustainable bioeconomy in Baden-Württemberg[25]

Funded by the European Union

Competent academic and communication network on bioeconomy

For a successful bioeconomy, all actors must pull together, including society. Therefore, it is important that education in the field of bioeconomy is well equiped to directly train professionals. This includes not only plain bioeconomy education, but also the bioeconomisation of existing educational pathways (e.g., by offering modules in degree courses or teaching materials for students).

Within the funding program "Network initiatives for the further development of the leading region for sustainable bioeconomy in Baden-Württemberg (BW)," concrete concepts, recommendations for action and training materials can be created for consultation, education, and training in the bioeconomy, or a selected topic area of the bioeconomy. Students and young professionals can get in touch with the industry via the promotion of innovation partnerships between universities and 19 companies, including financial support. BW also has a strong research sector in the field of bioeconomy. The research sector must not only be linked to industry, but also to all other actors. Congresses and events can help to disseminate the results. An example is Bioeconomy Day, which is organized by the Ministry of Food, Rural Affairs and Consumer Protection. Beneficiaries of such activities are students, society in general, enterprises (large industry, SME, start-ups), public administration, and business support organizations.

RESULTS

The interlocking of research, science and communication has different advantages. Young people can thus be trained directly in the field of bioeconomy. This helps them become young professionals who can go their way in research and industry. This support for communication helps to leverage the results out of research and science. This also contributes to young people becoming interested in the bioeconomy and the rest of society becoming familiar with its products. Many technologies are currently still in the scale-up phase; intensive research on the processes for implementation in the industry are necessary. Start-ups can play a bridging role here. Funding programs can also help to implement ideas and put them into practice.

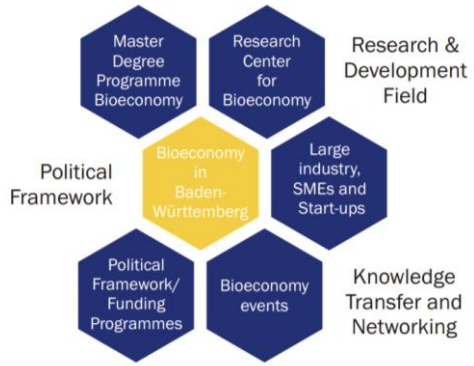

Figure 3. Bioeconomy actors and initiatives in Baden-Württemberg. (Source: DanuBioValNet 2019)

Chapter 7: Business discovery and animation of innovation

Funded by
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Activity

Topic: Business discovery and animation of innovation

Aim: To identify bio-based business models to maximize benefits and facilitate stakeholder understanding.

Source: New value chains and business models. LIFT project [26]

Bio-based Business Models: specific and general learnings from recent good practice cases in different business sectors [27]

New value chains and business models

Raising awareness, educating, showcasing and demonstrating the added value of new business opportunities and scalable innovative business models to primary producers and industries is important to create new value chains and attract investments. Successful concepts and initiatives stimulating networking and knowledge transfer should be continued and replicated in different contexts.

Identifying business models in the bio-based sector is crucial for facilitating mutual understanding among stakeholders and fostering the replication of successful bio-based businesses.

Business Model Canvas (BMC) assessments provide valuable insights into general or sector-specific aspects of bioeconomy businesses, enabling stakeholders to comprehend the potential benefits and challenges of various business models. This understanding not only benefits SMEs and large enterprises but also creates opportunities for other stakeholders, such as producers of bio-based wastes, rural communities, investors, and policymakers.

BMC assessments help in elaborating business models, especially regarding customer-related aspects, and can serve as a practical tool for early-stage business planning and replication of successful cases.

Additionally, integrating scaling systems like Bio-Based Readiness Levels (BRLs) into the assessment process can provide a more objective evaluation of business potential and facilitate technology innovation and business acceleration.

Extending BMC with sustainability-related factors and business ecosystem considerations further enhances its utility in guiding the development of bio-based start-up companies and funding instruments. Overall, identifying business models is essential for maximizing the economic, environmental, and social benefits of bioeconomy initiatives.

Funded by the European Union

Open innovation

Concept

Topic: Business discovery and animation of innovation

Aim: To utilize open innovation for competitive advantage in the bio-based sector.

Source: Open Innovation Platforms and Facilities . LIFT project [28]

Proyecto Reune. Evaluación de casos de éxito en la relación Universidad – Empresa [29]

More:

Visual toolbox for system innovation [30]

Open Innovation relates to the methodology used in the collaborative innovation process, allowing companies to access knowledge and ideas beyond those created internally, thus providing unique competitive benefits.

Several supporting activities can unlock the innovation potential of industries, especially SMEs and start-ups in the bio-based sector, reducing operational costs and increasing competitiveness. These activities include open access research infrastructures, where interested parties can use operating equipment and facilities to conduct lab, test, or pilot work. This access helps facilitate the innovation process and encourages broader participation in collaborative projects.

Entities, can initiate open collaborative projects within their organization using their employees, between customers and suppliers, or more broadly with other organizations. These projects are characterized by their dynamic and voluntary nature, with working groups formed and disbanded as needed to implement each project.

Open collaboration is based on three main concepts: *equality*, where everyone can contribute; *meritocracy*, where contributions are valued based on transparency and quality; and *self-management*, where there are no hierarchies or imposed decisions, and teams determine their own course of action.

By leveraging open innovation and collaboration, organizations can gain access to a wider pool of knowledge and resources, fostering a more innovative and competitive environment. This approach not only benefits individual entities but also contributes to the overall advancement of industries and the economy.

Funded by the European Union

Open innovation

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Proyecto Reune. Evaluación de casos de éxito en la relación Universidad – Empresa [29]

More:

Visual toolbox for system innovation [30]

Funded by the European Union

RECOMMENDATIONS

- In a political and industrial wider strategy for regional bioeconomy development, the role of shared-research facilities and open platforms should be valorised as a solution to reduce technological risks and investments needed at early stages or to scale-up.
- The potential of existing open access infrastructure could be optimised by analysing their effectiveness, developing new business and exploitation pathways, increasing flexibility to handle a variety of feedstock, guaranteeing state-of-the-art technologies, and promoting collaboration and networking among existing facilities.
- The risks of duplication can be minimised by creating collaborative networks that own complementary infrastructures within a specific value chain.
- Promote the collaboration among clusters/companies and service providers (shared research facilities and open innovation platforms) to facilitate the merge among the available technologies, requirements, knowledge and networks of local actors.
- Integrate various open innovation resources and platforms in bioeconomy to provide a single-entry point to access opportunities.

European Digital Innovation Hubs (EDIHs)

Concept

Topic: Business discovery and animation of innovation

Aim: To accelerate place-based digital transformation of businesses and society.

Source: Partnerships for Regional Innovation Playbook (6)

More:

Catalogue of DIHs/Candidate EDIHs (31)

The recent global crisis incited by the COVID-19 pandemic has further highlighted the critical role of digitalisation and the benefits it can bring to the European economy and society. SMEs, the cornerstone of the EU economy, need to embark upon the digitalisation challenge and use it to introduce new innovative production processes, new business models and upgraded innovative products.

EDIHs play a key role for the digital transition. A DIH is a networked support facility (formed by research and technology organisations, universities, clusters, industry associations, chambers of commerce, incubator/accelerators, regional development agencies, and governments) that helps companies become more competitive by improving their business/production processes as well as products by means of digital technology. DIHs are partnerships (formalised or not) with a non-profit mission that act as one-stop-shops, serving companies within their local region and beyond to digitalise their business.

Think of DIHs as powerful policy tools, which can support regional or national policymakers in implementing their innovation strategies and facilitating the recovery of their economies.

Starting 2022 and funded by EU and national funds, a network of 200 EDIHs will be gradually deployed until 2027. EDIHs will help companies of any size, sector and digitalization level to get access to advanced digital technologies and face the objectives of the European Green Deal and the recovery of economy. They will present a more specific profile as they will have both local and European functions and will play a central role to stimulate the broad uptake of artificial intelligence, high performance computing and cybersecurity as well as other digital technologies by industry (in particular SMEs and mid-caps) and/or public sector organisations.

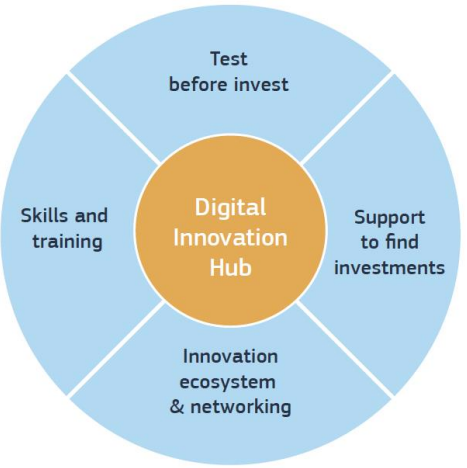

Figure 4. Main functions of EDIHs. (Source: Pontikakis *et al.* 2022)

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Best practice

Topic: Business discovery and animation of innovation

Aim: To make use of DIHs for improving biomass valorisation at a regional level.

Location of the best practice:
Andalusia, Spain
South-East Irish, Ireland

Source: Digital Innovation Hubs as a Tool for Boosting Biomass Valorisation in Regional Bioeconomies: Andalusian and South-East Irish Case Studies (32)

More:
ICT-BIOCHAIN CORDIS website (33)

Funded by the European Union

DIH as a tool for boosting biomass valorisation in regional bioeconomies

The establishment of DIHs in Andalusia, Spain, and South-East Ireland, showcases the potential of digital tools to improve biomass valorisation, significantly contributing to regional bioeconomy development. By engaging stakeholders, offering support services, and promoting business opportunities, these hubs were successful in fostering innovation and economic growth. Furthermore, integrating companies and universities in technology parks or techno-business incubators created a robust network that generates business opportunities and jobs, focusing on knowledge acquisition, technology generation, transfer, and commercialization.

Lessons learned:

- To maximise the impact of DIHs, integrating them in the local context of digitization actions and policies is of utmost relevance.
- Understanding the needs of the industries participating is very relevant to become an effective DIH.
- Practical insights from businesses and industries in DIH discussions drive more significant impact.
- Well-formed communication and dissemination plans and DIH service definition are crucial when establishing this type of structure to maximise mutual benefits and collaborations.

Activities implemented in the DIHs are related to: stakeholder engagement, promoting business opportunities, support service and training, implementation of digital tools, networking and ecosystem building, barrier mitigation, and monitoring and evaluation.

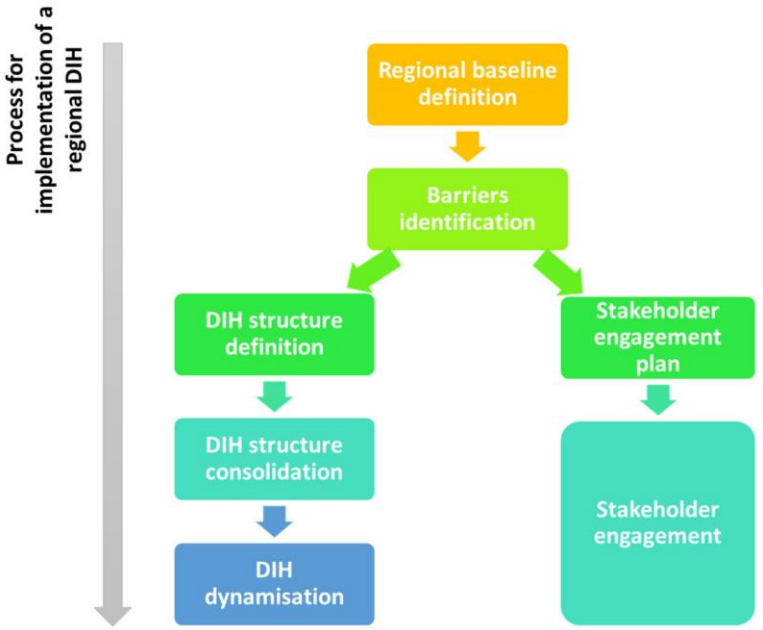

Figure 5. Process methodology for implementation of a regional DIH. (Source: Macias Aragonés *et al*. 2022)

Best practice

Topic: Business discovery and animation of innovation

Aim: To connect bioeconomy actors through targeted matchmaking events.

Location of the best practice:
Gradignan, France
Baden-Württemberg, Germany

Source: Xylofutur [34]

Cluster Tool Box "New Cluster Services to support SMEs in bio-based industries" [35]

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Matchmaking events

XyloDatings from Xylofutur

Since 2014, Xylofutur has been organizing the "XyloDatings" events across France, which are designed to connect forest-wood industry actors, professionals, and researchers through both in-person and online formats. These events aim to promote networking, skill sharing, and partnership opportunities. Each event is centered around a specific topic, featuring around seven presenters who each deliver 20-minute presentations on their latest research or project outcomes. The morning session is dedicated to these presentations and a subsequent Q&A round.

In the afternoon, the focus shifts to business-to-business meetings, where attendees can choose to meet with potential partners for more in-depth discussions. This structure not only facilitates the discovery of advancements in the field but also encourages the formation of valuable connections among stakeholders. Overall, „XyloDatings" events provide a platform for sharing information, promoting collaboration, and driving progress within the wood industry.

Meet&Match events

BIOPRO Baden-Württemberg GmbH hosts Meet&Match events for 10 to 60 participants to encourage idea exchange and partnerships, involving external science and economy partners. Since 2014, these events have engaged around 800 participants annually, leading to many collaborations. The events are free and come in three formats:

1. **Classic**: A full-day event with lectures and networking breaks, where participants present their organizations to facilitate connections.
2. **Speed dating**: A half or whole-day event for quick identification of cooperation partners, featuring short presentations and one-on-one discussions. It includes networking breaks and can be combined with company tours.
3. **One-to-One**: Prearranged meetings between clusters/networks for identifying cooperation at national and international levels, including networking breaks and possible company tours.

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