ShapingBio

The bioeconomy of the future

D2.4 Report Bioeconomy Financing in Europe Analysis

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List of Abbreviations

Abbreviation	Full name
AI	Artificial Intelligence
APRE	Agency for the Promotion of the European Research
ART	Agriculture Research Troubsko, Ltd
BBEPP	Bio Base Europe Pilot Plant
CapEx	Capital expenditure
CBE JU	Circular Bio-based Europe Joint Undertaking
EIB	European Investment Bank
EIC	European Innovation Council
EIT	European Institute of Innovation & Technology
EU	The European Union
FBCD	Food & Bio Cluster Denmark
Fraunhofer ISI	Fraunhofer Institute for Systems and Innovation Research
H2020	Horizon 2020
MAG	Multi-Actor Group
R&D	Research and Development
R&D&I	Research, development and investment
ROI	Return on investment
SME	Small and medium sized enterprise
SUBNET	SUBMARINER Network
TTG	Tech Tour Global
TTE	Tech Tour Europe
TTO	Technology Transfer Office
WEF	World Economic Forum

Executive Summary

ShapingBio project is dedicated to enabling bioeconomy innovations and facilitating the dissemination of new knowledge within the European Union (EU) and its member states. Specifically, the project aims to deliver evidence-based information, guidelines, and recommendations that foster better policy alignment and encourage stakeholder actions. This initiative is designed to support the cross-sectoral potential of the bioeconomy in Europe, aiming to diminish the fragmentation and isolation observed across different bio-based sectors and the food system, and to harmonise and streamline policies spanning various regions, domains, and governance levels.

This deliverable presents a comprehensive analysis of bioeconomy financing in the European Union, emphasising on critical need for more adequate, accessible, and aligned funding mechanisms to support the bioeconomy across all stages of innovation development. The study draws from desk and data research, interviews and surveys with key stakeholders – both investors and companies – in the bioeconomy sector with extensive stakeholder input, highlighting the key challenges and opportunities in public and private financing for bioeconomy ventures. It leverages a range of public and private financing data to examine how current financial resources support research, development and investment (R&D&I) activities, scale-up, and commercialisation.

The analysis underscores the **significant role that public funding mechanisms, such as Horizon Europe and its Cluster 6 programme, play in advancing bioeconomy innovation**. Through a combination of research grants, innovation actions, and public-private partnerships, the EU has created a supportive environment for early-stage bioeconomy ventures. The outcomes of initiatives like the Bio-Based Industries Joint Undertaking (BBI JU) and its successor, Circular Bio-Based Europe Joint Undertaking (CBE JU), show some progress in aligning industry needs with research objectives. However, their impact on market readiness and large-scale commercialisation has been more limited than anticipated. While these programmes have facilitated cross-border collaborations and strengthened value chains, the translation of these efforts into significant market success has been slower, indicating the need for further refinements in aligning funding mechanisms with bioeconomy innovation and industry needs.

In this context, the European Circular Bioeconomy Fund (ECBF) was established to address some of these market challenges. As a key investment vehicle designed to finance innovative bio-based companies, the ECBF is mandated to provide targeted funding to help scale up and commercialise bioeconomy projects. By leveraging private sector co-investments alongside public funds, the ECBF is designed to mitigate investment risks and to facilitate the market entry of bio-based products, creating a bridge between research achievements and commercial viability. However, challenges remain, particularly regarding scaling-stage investment risk aversion and the need for a more agile response to emerging market opportunities.

These programmes have facilitated cross-border collaborations, strengthened value chains, and enabled the scaling of bio-based products across Europe, showcasing the added value of EU funding in fostering innovation ecosystems. Public funding mechanisms like Horizon Europe and Cluster 6 have been instrumental in driving early-stage bioeconomy ventures but there is a **pressing need for more targeted funding to support commercialisation and scaling**. Bio-Based Industries Joint Undertaking (BBI JU), Circular Bio-Based Europe (CBE JU) and ECBF have made progress in aligning industry and research but many projects continue to face challenges in transitioning from research to market. This is largely due to a lack of sufficient later-stage financial support and inadequate mechanisms for de-risking, which continue to hinder the commercialisation of innovative bio-based solutions.

Moreover, the **involvement of private investors in bioeconomy financing** has gained momentum, with growing interest in sectors like synthetic biology, biomaterials, and agri-tech. By encouraging co-investment opportunities and fostering greater synergies between public and private sectors, the bioeconomy landscape is becoming increasingly dynamic. Investors are beginning to recognise the long-term potential of bio-based solutions, particularly as regulatory measures such as CO_2 taxes and sustainability standards that will make the EU bioeconomy ventures more competitive. Private investors are increasingly recognising the potential of bioeconomy and its sectors but challenges remain. Regulatory fragmentation across EU countries, lack of tailored de-risking mechanisms, and high capital requirements

continue to limit the scaling and commercial viability of bio-based products. The complexity of regulations at EU, national and regional levels and the underutilisation of public-private synergies are significant barriers to investment, especially for emerging innovators. The development of tailored investment schemes, de-risking mechanisms, and scaling programmes has the potential to further unlock private capital, accelerating the commercialisation of bio-based innovations and driving Europe toward a more sustainable future.

The findings reveal **critical gaps in the commercialisation of R&D and the scaling-up of bioeconomy technologies**, where despite substantial early-stage funding, many promising innovations struggle to secure the necessary resources to reach the market. The transition from R&D to commercialisation remains a significant challenge due to high capital requirements, long timelines, and the perceived risks associated with bioeconomy projects. Both companies and investors report the need for more effective de-risking mechanisms, including more focused access to financing and better access to pilot plants and industrial facilities. Moreover, there is a noted **discrepancy in the availability of funding**, with strong and leading innovation ecosystems accessing more comprehensive financial support compared to emerging innovators (the classification of the ecosystems in accordance with the European Innovation Scoreboard).

The **complexity and fragmentation of regulations** across different EU countries further exacerbate the challenges faced by investors, particularly when expanding beyond their geographical or technological comfort zones. There is a pressing need for more consistent and transparent regulatory frameworks, such as the EU taxonomy, to facilitate smoother cross-border investments. Public-private synergies remain underutilised, with interview feedback highlighting that while public funds play a crucial role in de-risking investments, their administration often suffers from bureaucratic inefficiencies and lack of clarity.

The deliverable also identifies an **emerging gap in market information**, particularly in terms of accessing markets and scaling bio-based products, which continue to compete with well-established fossil-based alternatives. Investors highlight the necessity for better data transparency and more targeted data insights that address specific bioeconomy sectors like synthetic biology, biomaterials, and agri-tech.

The need for **urgent actions in bioeconomy financing** is highlighted in the deliverable, with key recommendations including the development of flexible financing schemes, improvement of regulatory coherence, and the establishment of more effective de-risking mechanisms. By addressing these gaps, the EU and the Member States can unlock private capital, enhance market competitiveness for bio-based products, and ensure that the bioeconomy contributes meaningfully to Europe’s sustainability and economic resilience goals. The importance of immediate action cannot be overstated; the future of Europe's bioeconomy hinges on its ability to align financial strategies with innovation goals.

The report serves as a foundation for developing **concrete, actionable recommendations** in the forthcoming activities of ShapingBio. These will focus on **enhancing business support programmes for bioeconomy companies**, creating more flexible and tailored equity investment schemes, and strengthening collaboration between public institutions and private investors. The recommendations will specifically address how existing instruments can be improved, propose additional instruments to fill critical gaps, and outline strategies to better target diverse stakeholder groups, such as SMEs and investors. Furthermore, they will consider the unique needs and capacities of different country groups, as defined by the European Innovation Scoreboard, ensuring that instruments are appropriately tailored to foster bioeconomy growth across all innovation ecosystems. By fostering better alignment between financing strategies and public policies, and by addressing regulatory inconsistencies, the bioeconomy sector can better leverage its potential for growth and contribute meaningfully to Europe’s sustainability goals.

The report highlights the pressing challenge of the limited competitiveness of bio-based processes and products compared to their fossil-based counterparts under current market conditions. This disparity represents a major barrier to de-risking investments and mobilising private capital. Addressing this requires policies that focus not only on supply-side innovations but also on enhancing market sizes and development for bio-based products. These efforts are essential to making bio-based innovations more economically attractive, thereby unlocking their full potential for sustainable market transformation.

1. Introduction

Innovations in the bioeconomy are knowledge-intensive, requiring collaborative, often cross-sectoral research and development efforts that scale from laboratory and pilot demonstrations to full industrial production. Many bio-based processes and products also face the challenge of competing with fossil-based alternatives that have been optimized over decades and operate in depreciated facilities. Given these complexities, financing for bioeconomy ventures presents unique challenges that require tailored, targeted solutions.

The ShapingBio concept for the analysis of bioeconomy financing in Europe builds on existing data to address these challenges. By identifying gaps, assessing adequacy, and aligning funding mechanisms with the needs of stakeholders, this analysis aims to ensure that the financing landscape supports the growth and scaling of bioeconomy innovations. This report examines how current initiatives align with stakeholder needs, based on the input gathered from ShapingBio activities and stakeholders to date, providing a clearer picture of how financing can be better structured to foster the sector's growth. To thoroughly assess bioeconomy financing, ShapingBio's analysis examines whether the diversity of available financing instruments and initiatives aligns with the classification levels of innovation ecosystem classification levels as defined by Regional Innovation Scoreboard (2023):

- Emerging innovator (Bulgaria, Croatia, Latvia, Poland, Romania, Slovakia)
- Moderate innovator (Czechia, Estonia, Greece, Hungary, Italy, Malta, Lithuania, Portugal, Slovenia, Spain)
- Strong innovator (Austria, Cyprus, France, Germany, Ireland, Luxemburg)
- Innovation Leader (Denmark, Finland, the Netherlands, Belgium, Sweden)

This analysis goes beyond merely cataloguing available funds; it critically examines whether these resources adequately meet the needs of stakeholders across different innovation stages. The study evaluates the extent to which the progression from 'Emerging Innovator' to 'Innovation Leader' correlates with increased availability, adequacy, and alignment of bioeconomy financing:

- By exploring **availability**, we understand the extent to which financial resources are accessible to support bioeconomy ventures across various stages of development, from early research to commercialisation.
- **Adequacy** of available funding is characterised by the variety and sufficiency of available funds to meet the specific needs and challenges of bioeconomy stakeholders, including high capital requirements and long development timelines.
- The degree to which funding mechanisms are coordinated, or their **alignment**, across public and private sectors, governance levels, and geographical regions to effectively support bioeconomy innovation and market development.

By identifying gaps and assessing the adequacy of existing initiatives, the analysis emphasises the importance of tailoring financial support to the specific needs of stakeholders within each innovation ecosystem, ensuring that resources are both accessible and effectively utilised.

The focus is on the **stakeholders** that are most involved in the bioeconomy financing interrelations:

- Companies operating in bioeconomy as receivers of financing: startups, scaleups, SMEs, mature companies, individual innovators and entrepreneurs. Their growth stage will be defined depending on the latest raised or currently raising financing round (pre-seed, seed, Series A, B, C, and mature companies (Series D and later).
- Investors – private and public as financing providers.
- Policy and decision-makers influencing bioeconomy financing, including those shaping public R&D&I funding, regulatory frameworks for products and market access, and public administrators

managing permits, licenses, and safety certificates. These distinct groups often act independently, affecting the innovation ecosystem at different stages, often lacking alignment or synergy.

Other stakeholders: academia, intermediaries like accelerators, incubators, Technology Transfer Offices, etc. are also included but only in the context of bioeconomy financing ecosystems.

In this analysis, we have focused on identifying key trends and gaps in bioeconomy financing across different innovation ecosystems. While this report primarily aims to provide a detailed assessment, we acknowledge the importance of formulating actionable recommendations. Preliminary recommendations will be outlined as part of our ongoing work in the conclusion of this deliverable, with a more comprehensive set of proposals to be developed in future ShapingBio activities, ensuring they are informed by continued analysis and stakeholder engagement.

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2. EU Bioeconomy Financing Analysis Methodology

2.1 Note on terms and definitions

Bioeconomy is defined in the European Bioeconomy Strategy as:

> *Sustainable & Circular: Bioeconomy the European way Eur18 \l 1033* (European Commission, 2018)
>
> The bioeconomy covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles. It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services (biomedicines and health biotechnology are excluded). To be successful, the European bioeconomy needs to have sustainability and circularity at its heart. This will drive the renewal of our industries, the modernisation of our primary production systems, the protection of the environment and will enhance biodiversity.

It is obvious that bioeconomy is a priority for the EU with dedicated programmes and funds encouraging R&D&I, scaling and growth, and this analysis encompasses both public and private financing.

By **public financing** we understand financial means that use budget from and are distributed by various levels of governance, be it at EU, macro-regional, national, regional or local level. The governance levels used in this document are in accordance with the EU Nomenclature of territorial units for statistics (NUTS) definitions. Public financing in this document is mainly understood in terms of grants (non-equity) or fiscal instruments (like subsidies, tax reduction and incentives, etc.).

By **private investment**, we refer to funding from non-budgetary sources used for obtaining equity. This definition primarily encompasses equity investments made by private sector entities. However, it is important to distinguish that equity investments made by national promotional banks, institutional investors, or other public institutions, although not grants, are not categorised under private financing. Despite their nature as investments rather than grants, they remain within the public financing domain because they originate from public entities.

It is crucial to differentiate between financing and investments, especially when it comes to direct support from the EU to bioeconomy stakeholders. **Financing** typically refers to grants, which are non-repayable funds provided by EU sources such as Horizon Europe and its programs like EIC, EIT, and CBE-JU, or by programmes at national or regional level. These grants are intended to support research, development and investment activities. On the other hand, **investments** involve funding that expects a return and is usually provided through financial instruments. These include mechanisms that pool funding from EU sources, such as the European Investment Bank (EIB) or other private investors, alongside national or regional contributions. Instruments like equity investments, loans, or blended financing involve some level of risk-sharing, and are often aimed at scaling up bioeconomy innovations, mixing both public and private funds through an investment scheme or deal, with each party using their expertise in a complementary way. Therefore, distinguishing between grants (non-repayable) and financial instruments (repayable, return-seeking funding) is essential for understanding the nature of the support provided. However, it is important to note that there is often significant overlap between these forms of support, especially at the EU level.

In this analysis we focus mainly on providers of funding (public or private investors) and the recipients (innovative companies). While the primary focus of this analysis is on SMEs as recipients, companies across all the developmental stages were also considered during the data collection (i.e., interviews and the survey). We use the definition of the European Commission for Small and medium sized companies.

To date, the relevance between Technology Readiness Level (TRL) and financing round does not have clear boundaries (for example, EIB, Financing the Deep Revolution, 2018), as for different industries the size of an investment round may vary profoundly (Dealroom, the European Deeptech Report). The financial requirements of deep tech bioeconomy companies typically demand much larger investments.

We use the amount of **financing or investment round** (Investopedia, "What is a series funding", 2024) as identifier of the development stage of a bioeconomy company (Table 1). This amount may vary for different industries, for example, an investment round in a digital company may require a smaller investment in early stages than in a bioeconomy company as the latter may require infrastructure and machinery to accommodate the technological process. In this analysis, it is presumed that pre-seed, seed and Series A financing rounds define the startup company development stage, or early stage. Series B and higher financing rounds are presumed as defining scaleup company development stage, or growth stage. In bioeconomy, we considered financing round amounts ranging from €500k to €3M as pre-seed funding, and other financial ranges are adapted accordingly to reflect the biotech industry's specifics. In principle, the higher the TRL, the bigger the amount of the financing round.

Table 1 Company growth stage determined by the size of financing round
Source: Dealroom.co

Financing round	Company development stage	Financing amount, million EUR
Pre-seed	Startup/Early	0 - 1
Seed	Startup/Early	1 – 4
Series A	Startup/Early	4 – 15
Series B	Scaleup/Growth	15 – 40
Series C	Scaleup/Growth	40 – 100
Mega rounds	Mature companies	100 +

A financing round may be financed by a single investor or, more often, this may be done by numerous investors (syndicate) and may pool financing from different sources, including private and public equity or non-equity (grants). That is why we distinguish between financing round and **investment**. A single round may be a sum of numerous investments. A financing round is reported in one single data entry on Dealroom as a total sum and there is no data on the investment amount each investor participated with. We only know the investors who participated in this particular round but not their share in it.

Our research includes information predominantly from 2021 onwards, including company data from Dealroom.com, so a company may have raised more than one round in the observed period 2021-2024, that is why the number of rounds may be bigger than the number of the companies in our research.

2.2 Brief inventory of used methodologies

We followed a structured process that involved collecting data from a variety of stakeholders in bioeconomy financing focusing on entrepreneurs and investors, exploring key aspects like accessibility, adequacy, and alignment of financial resources (Figure 1). The data was then analysed to identify patterns, gaps, and opportunities within the bioeconomy financing landscape.

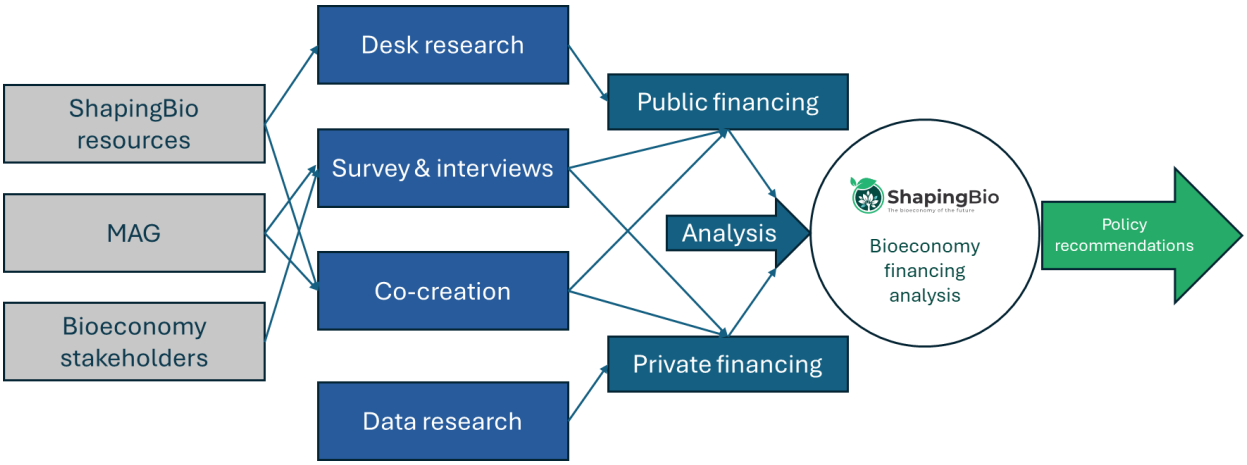

Figure 1 ShapingBio Bioeconomy Financing Analysis approach

We used information from different sources and we aimed to provide a comprehensive overview of the current state of bioeconomy financing across various innovation ecosystems in the European Union.

- **Input from ShapingBio** previous tasks and activities. These are reports elaborated in the frame of the project activities and scope:

  - D1.1 Methodology and stakeholder needs report (awaiting European Commission approval)

  - D1.2 Overall mapping of global and EUs policies on bio-based sectors & food-systems (awaiting European Commission approval)

  - D1.4 Report on macro-regions mapping of initiatives, structures, instruments and key challenges for EU's macro-regions (awaiting European Commission approval)

All used ShapingBio resources are available on the project webpage https://www.shapingbio.eu/.

- **Desk research**.

This analysis is based on researched and consolidated information from over 1500 pages of more than 40 publicly available publications, papers, studies, governance strategies and other documents to analyse the bioeconomy financing in Europe. Most of the reviewed documents are dated 2021 and later, but earlier documents were also considered.

For Chapter 3 Public funding for bioeconomy in the EU, data from the Horizon Europe funding program, as provided by the EU Horizon Dashboard, was systematically extracted and subjected to analysis across multiple variables. The Horizon Dashboard categorizes its data into Research and Innovation (R&I) Projects and R&I Proposals. To clarify, "R&I Proposals" refer to applications submitted for potential funding, whereas "R&I Projects" refer to the initiatives that have been approved and funded. The analysis distinguished between these stages, examining both the application process and the outcomes of successful funding. In the context of R&I Projects, the analysis focused on the variable of received funding, expressed in euros (EUR). For R&I Proposals, the variables under consideration included the number of eligible proposals, the number of retained (successful) proposals, and the overall proposal success rate. These variables were further dissected across various dimensions, encompassing different countries and country groups, organizational types, and thematic priorities.

The selected countries for the analysis include all individual European Union (EU) member states, collectively grouped as the EU27, and categorised according to their ranking in the European Innovation Scoreboard 2023. The analysed organisational types comprised of the private sector in its entirety, small and medium-sized enterprises (SMEs) within the private sector, and the aggregate of all organisation types. The thematic priorities under examination were "Food, Bioeconomy, Natural Resources, Agriculture and

Environment" (including Cluster 6, the Circular Bio-based Europe Joint Undertaking, and missions related to oceans and soil), alongside the thematic priority "The European Innovation Council (EIC)."

The authors analysed as many as possible national and regional instruments for bioeconomy financing. We analysed 116 such instruments listed in the ShapingBio **Policy Instruments and Strategies database**, without claiming that the list is exhaustive. Analysing the full range of the instruments used for bioeconomy, regardless of the governance level, proved challenging. We analysed both financing instruments with horizontal components relevant to all sectors and instruments dedicated to bioeconomy. The former may include horizontal support for the ecosystems for digitalisation, commercialisation, acceleration, growth, etc. which may be addressed to innovation companies from all industry sectors. The partners also explored examples of financing programme most relevant to financial instrumentalisation of policies for bioeconomy. To date, we explored 5 in total relevant programmes in Denmark, Germany (2), Belgium, Czech Republic.

- **Data research** on investment rounds

This analysis in the Chapter 4 Bioeconomy Private Financing was done using two dates for data extraction for funding rounds that took place on 13.04.2023 with 3822 financing rounds reported in dealroom.co after 01.01.2021. Summaries of the findings were used for private financing analysis contributing to the **Report on macro-regions: Mapping of initiatives, structures, instruments and key challenges for EU's macro-regions** endeavour (see above p. 1 Input from ShapingBio). The second was harvesting data from 2991 bioeconomy funding rounds in 1066 companies on 08.08.2024 to follow up on the developments in the ecosystems.

The Dealroom data research included bioeconomy companies in the EU at various stages of growth and respectively size, respectively. The investors are of EU and global origin and include private investors and EU financing schemes (public investors) that may participate in a financing round in syndicate. That is why the research also includes Horizon Europe financing and its programs like EIC, EIT, BBI-JU/CBE, as well as investments from EIB and other private but to some extent related to EU funding. The sectors researched were agriculture, including forestry, food and feed, biotech (except pharma, medical, medical devices) and clean energy and biofuels. It is based on reported data only. This is a limitation that may exclude some deals that have taken place but not reported or deals that were reported but the critical data like investment amount was not disclosed. Such is the case with deals in Cyprus and Malta for which little data is available. The data presented here include reported deals that are approximately relevant to all TRL tiers, and we compare the financing for bioeconomy as a whole related to the maturity of the companies and the ecosystems.

To identify the bioeconomy sectors in which the entrepreneurs operate or which are the focus of investor portfolios, we utilised the NACE (Nomenclature of Economic Activities) classification. NACE is a European industry standard used to categorise business activities, ensuring consistency and comparability of data across sectors and data sources. For example, we cannot distinguish the bio-based products in the current code C20 - Manufacture of chemicals and chemical products and the subcodes for other potentially related to bioeconomy products. This identifies a gap in the definitions of bioeconomy sectors, technologies and terminology in general that may need addressing.

Another aspect of the data research is the reported data being clustered. One investment deal may involve many investors who participated in it in a syndicate. In this case, the list of investors and the overall sum of the deal are reported. The contribution of each investor participating in the deal is not available. That is why we use the number of investment rounds and the sum of the investment round as the most reliable data.

- **Co-Creation**

Co-creation fosters collaborative innovation by actively engaging all stakeholders in the decision-making process, ensuring that diverse perspectives and expertise contribute to the development of shared solutions in a multi-actor group (MAG). The experts in the Bioeconomy Financing MAG were investors, policy agency representatives, industry experts, and staff from companies and accelerators. They provided their input from personal experience and not as representatives of their organisations. The 12 experts from Germany, the Netherlands, France, Austria, Denmark, Belgium, UK were selected based on the stakeholder

profile established during the initiation phase of the analysis (see more in ShapingBio Methodology and stakeholder needs report), representatives of public and private investors, accelerators and companies participating in the bioeconomy domain. As the majority of the experts are investors with international outreach who operate with pan-European and global scope, the expertise was well-balanced from geographic point of view, including for markets outside Europe.

Figure 2 Co-creation process with multi-actor group on bioeconomy financing

Through facilitated discussions and interactive exercises, participants harnessed their collective expertise and perspectives to co-design the implemented analysis that addressed shared challenges or opportunities related to bioeconomy financing (Figure 1Figure 2). The MAG collaborative process fostered ownership, alignment, and consensus among stakeholders, resulting in more effective and sustainable outcome, including input towards policy recommendations. The ShapingBio Bioeconomy Financing Analysis was immensely supported by the multi-actor group.

- **Collection of best practice examples**

We collected best practice examples through desk research, interviews with industry experts, and case study analyses. This involved identifying exemplary initiatives, projects, or strategies in the bioeconomy financing, assessing their effectiveness, and documenting key learnings and success factors to inform decision-making and guide future actions.

- **Interviews**

Interviews with key experts enabled us to affirm the initial findings on bioeconomy financing derived from the desk and data research and multi-actor group effort. The interviews were conducted with private investors and companies in various development stages. The MAG was actively engaged in the formulation of the questionnaire and during the interviews provided insights, perspectives, and validation on the identified financing mechanisms, challenges, and opportunities in the bioeconomy sector. Through structured interviews with experts from the partners stakeholder pool, the input enriched the understanding of bioeconomy financing dynamics and ensured the robustness and credibility of our analysis.

The interviews included two questionnaires, one for investors and one for companies. Sixteen respondents accepted to be interviewed, of whom 9 investors and 7 companies, including MAG participants.

The questionnaire for companies included 4 clusters of questions related to:

- Understanding of What the Investor is Looking for
- Challenges in Securing Investment
- Co-investment, De-risking, and Synergies with Public Financing
- Companies' Awareness of European Bioeconomy Strategy

The questionnaire for investors addressed 3 clusters of topics in line with:

- Investor Needs and Awareness
- Investment, De-Risking, and Synergies
- Bioeconomy Financing Support Structures

The potential interviewees were reached through the networks of ShapingBio project partners and were selected based on their active involvement and expertise in bioeconomy financing. Policy makers were also of interest, particularly in the context of ShapingBio Policy and Governance Analysis for bioeconomy policy. However, the participation of policy makers competent in bioeconomy financing in the interviews was limited, highlighting a gap that may need further attention in future research efforts.

- **Survey**

To ensure maximum alignment and reliability of the data, a survey was implemented with questions that were designed to closely mirror the questions used in the interviews. This approach was intended to affirm consistency across desk and data research, allowing for a more robust comparison of results. Additionally, insights gathered from the interview responses helped inform the creation of multiple-choice options in the survey, ensuring that the predefined answers were relevant and reflective of the key themes identified during the interviews. We used insights from the interviews to inform the design of the survey questions, aiming to enhance the coherence of our analysis on bioeconomy financing.

Multiple-option questions with pre-defined answers were used for an online survey. The questions were elaborated to identify and address further gaps in our predictions and knowledge related to bioeconomy financing in the EU. The ShapingBio survey questions were tailored to each specific group of target respondents and were similar to those in the questionnaire used for the interviews with the stakeholders for comparability of the results. Companies from different growth stages, public and private investors were the target respondents. The survey was disseminated to approximately 500 addressees through social media and ShapingBio contact networks. 51 responses were received, of which 36 companies, 11 private investors and 3 public investors, 1 answer was incomplete.

The issue with the bioeconomy industry nomenclature persists for the definitions of the bioeconomy sector the entrepreneurs operate in or of the investment portfolio focus.

This analysis also uses the findings from another survey in the frame of the evaluation of Horizon Europe (Dinges /Coatanroach 2024). We did not have direct access to the survey results per se to make our own interpretation but considered the conclusions from this evaluation. To distinguish between the two surveys, we mention explicitly to which one the ShapingBio analysis refers.

- **Analysis**

We used all the collected information to describe the status of bioeconomy financing in the European Union from different angles. This involved a comprehensive analysis using a combination of qualitative and quantitative tools. For the qualitative aspect, we used the results from the interviews and surveys with key bioeconomy stakeholders, such as entrepreneurs and investors to gain insights into their experiences and challenges with bioeconomy financing. The data was then categorised based on common themes, such as accessibility, adequacy, and alignment of funding sources. On the quantitative side, we analysed data from various funding sources, including Dealroom, EU programs like Horizon Europe, EIC, and CBE-JU, using descriptive statistics to assess the aspects of distribution and allocation of funds. These tools allowed us to develop a multi-dimensional view of bioeconomy financing, capturing both the financial and practical challenges faced by stakeholders across different innovation stages. The analysis provides rationale to elaborate policy recommendations for change in the EU bioeconomy policy.

3. Public funding for bioeconomy in the EU

Public funding in the European Union is a substantial financing source for stakeholders in the bioeconomy, especially for companies in early and growth stage. While a comprehensive list of potential EU funding sources is provided in Annex 1, this chapter focuses on key funding sources specifically relevant to the bioeconomy. These include Horizon Europe funding, particularly within the thematic priority "Food, Bioeconomy, Natural Resources, Agriculture and Environment," which encompasses Cluster 6, the Circular Bio-based Europe Joint Undertaking (CBE JU), and programmes related to oceans and soil. Additionally, the European Innovation Council (EIC) serves as a significa"t horizontal funding source, particularly through instruments such as the EIC Pathfinder and EIC Accelerator, which are essential for supporting innovative small and medium-sized enterprises (SMEs) across multiple sectors.

In addition to the significant funding opportunities provided by the European Union, national and regional funding sources also play a pivotal role in supporting the bioeconomy. These funding sources are often tailored to the specific needs and priorities of individual countries or regions, enabling targeted support for local bioeconomy initiatives. National and regional programs may offer grants, tax incentives, or loans to encourage research and innovation within the bioeconomy, and focus on fostering collaboration among local stakeholders, including academia, industry, and public institutions. These programs are complementary to broader EU funding, providing more localised support that aligns with national strategies for sustainable development and economic growth within the bioeconomy sector. However, this is also a hindrance as the transposition of laws at national level, their adaptation to local strategies and priorities make compliance of an emerging technology very complex to the extent that it affects the market and decisions to expand or withhold investment (ShapingBio **Report on macro-regions: Mapping of initiatives, structures, instruments and key challenges for EU's macro-regions**, Chapter 7).

In assessing the adequacy, accessibility and alignment of the public funding sources related to bioeconomy, it is important to recognise that EU, as well as national and regional level funding, are designed to achieve broad and diverse objectives with different alignment across governance levels and geography. For example, Cluster 6 funding is specifically aimed at stimulating innovation in emerging fields and addressing cross-disciplinary and cross-sectoral needs. By design, this funding may not always align directly with the current research and development (R&D) activities of bioeconomy stakeholders, potentially leading to challenges in meeting their immediate needs.

Bioeconomy public funding also serves a transformative purpose, seeking to establish new value chains and promote bio-based processes and products as alternatives to fossil-based ones. This creates an inherent challenge: while such funding incentivises stakeholders to adapt their R&D&I activities to align with future market demands and sustainability goals, there is often a mismatch between these long-term objectives and the immediate focus of stakeholders' existing R&D agendas. Addressing this gap requires better communication and strategic guidance to help stakeholders align their priorities with funding objectives while ensuring that transformative funding initiatives remain accessible and relevant to their needs.

bioeconomy financing

We considered two different perspectives to analyse the public bioeconomy financing. We explored key insights from current evaluations of the Horizon Europe program which are from broader societal and funders' perspectives. We also analyse the survey results and interview feedback from SME and investor perspective. We examine the distribution of submitted and granted proposals, as well as the associated funding.

This analysis primarily draws on the evaluation of Horizon 2020 in relation to the Bioeconomy, Food, Marine, and Agriculture sectors, including the Bio-Based Industries Joint Undertaking (BBI JU) and its successor, the Circular Bio-based Europe Joint Undertaking (CBE JU). Insights for Horizon Europe are incorporated as far as they are available. In evaluating the funding programs, the European Commission (EC) typically employs criteria such as relevance, coherence, efficiency, and EU added value (DG R&I, Assessment criteria for Horizon Europe missions).

3.1.1 Adequacy of public funding for bioeconomy SMEs from EU-level programmes

Overall recent evaluations have provided a rather positive assessment of Horizon Europe (Dinges, M., Coatanroach, G. (2024): Horizon Europe and the Green Transition: Interim evaluation support study Final Report ("Phase 2" study)). However, according to the stakeholders approached in ShapingBio some shortcomings remain, such as insufficient total funding, sub-optimal engagement with relevant actors in the bioeconomy, and challenges related to ensuring accessible information for different stakeholder groups. For a detailed assessment focus on different dimensions in the following sub-section to further analyse the existing application and funding structure.

Feedback from MAG work and ShapingBio interviews indicated that while Horizon Europe successfully promotes research and innovation, navigating the application process remains complex, especially for small and medium-sized enterprises (SMEs). Additionally, stakeholders mentioned that the breadth of topics within Cluster 6 creates overlap and fragmentation, making it difficult to align funding opportunities with specific bioeconomy needs. Stakeholders also expressed concerns regarding the limited systematic support for projects at higher Technology Readiness Levels (TRLs), which are crucial for scaling innovations. The feedback highlights the need, from their perspective, to simplify the application process by clearer communication from funding bodies and greater focus on facilitating late-stage development and commercialization under the Horizon Europe framework.

A significant finding is that Cluster 6 ("Food, Bioeconomy, Natural Resources, Agriculture and Environment") addresses highly relevant topics for the future evolution of these fields and facilitates collaboration among partners. While Horizon Europe continues to prioritize technical solutions to achieve a green transition, it addresses socio-cultural issues to a lesser extent, despite its alignment with broader green transition objectives. The broad scope of calls and topics within Cluster 6, which span multiple instruments and project types, increases complexity of the overall impact and outcomes. Although the focus varies, Cluster calls, Partnerships, and Missions support similar project types, including Innovation Actions (IA), Research and Innovation Actions (RIA), and Coordination and Support Actions (CSA). The most significant EU added value is reflected in the fact that three-quarters of respondents for the Horizon Europe evaluation indicated that without EU funding, their projects would not have been implemented, or if implemented, the scope would have been significantly reduced (Dinges; Gotanroch 2023b). Furthermore, EU funding has enabled the formation of multinational consortia and the integration of diverse partners (Horizon Europe Dashboard).

In the bio-based field, the relevance of the BBI JU/CBE JU stems from its significant funding and its focus on higher Technology Readiness Levels (TRLs) and Innovation Actions, in contrast to the broader Cluster or Societal Challenge work programs in Horizon 2020 and Horizon Europe. Thus, it plays a critical role in advancing bio-based products toward commercialization and upscaling. The BBI JU has provided funding aligned with industry priorities, thereby creating added value for universities and research institutions by synchronizing their work with industry expectations. Additionally, the BBI JU has acted as a catalyst for collaboration, encouraging stakeholders to consider the entire value chain and identify optimal international cooperation partners. Without the BBI JU/CBE JU framework for cooperation and funding, the substantial implementation of research and innovation projects in the bio-based sector within the EU would have been challenging, if not impossible (Dinges; Gotanroch 2023b). Earlier assessments indicate that the BBI JU largely met its key performance indicators, although it remains too early to assess the performance of its successor, the CBE JU (Sierra et al. 2021).

Funding per type of organization

Considering the Horizon Europe funding of successful R&I projects in the whole EU27, the funds for Food, Bioeconomy Natural Resources, Agriculture and Environment projects are more extensive (€3.182 billion) than for EIC Innovation Council projects (€2.197 billion; Figure 3). The two thematic priorities differ in the type of organisations which they target: private companies receive proportionately more funding from the EIC than from Food, Bioeconomy Natural Resources, Agriculture and Environment. While in Food,

Bioeconomy, Natural Resources, Agriculture and Environment SMEs received around 15% of the overall funding (€ 458 million out of the total of €3.182 billion) (, SMEs received 59 % (€1.298 billion out of a total funding of €2.197 billion in the EIC Innovation Council thematic priority. For the latter, please note that most of this funding didn't go to bioeconomy actors, but to innovative SMEs across the different sectors.

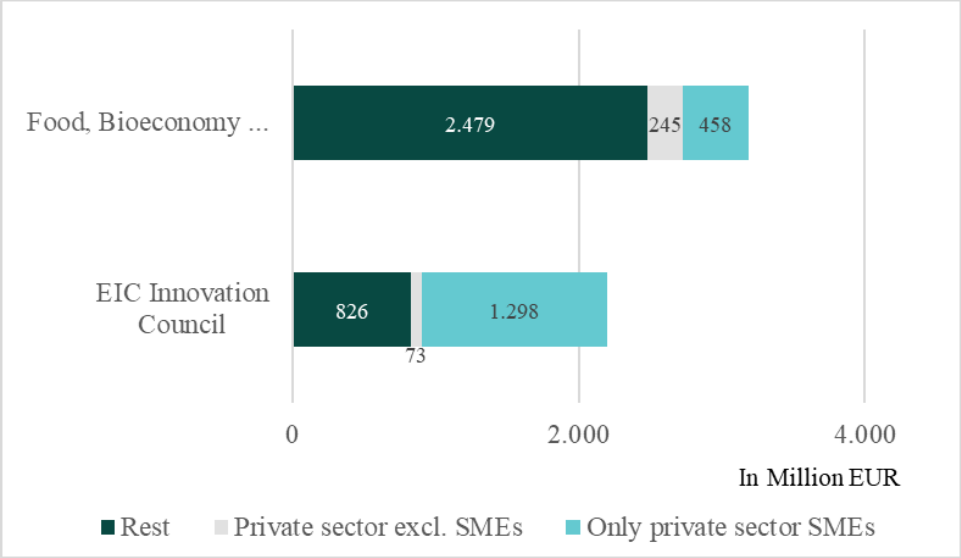

Figure 3 Received funding of EU27 in Horizon Europe in million EUR.
Source: Horizon Europe Dashboard.

Horizon Europe Funding for Bioeconomy SMEs compared to other themes

In a very recent study, the EC (2024) analysed in-depth SMEs participation in different parts of the Horizon Europe programme, with the same project data used in this chapter, however with an earlier reference date (01 Jan 2024) and therefore less entries.

This analysis points out the following results for Cluster 6 (Food, Bioeconomy Natural Resources, Agriculture and Environment) in comparison to Cluster 4 (Digital, Industry and Space) and Cluster 5 "Climate, Energy and Mobility ", which are content-wise and concept-wise most reasonable to compare with:

- The total funding (€570 million) for SMEs of Cluster 6 is lower than the funding for Cluster 5 (€1073 million) and Cluster 4 (€1238 million) This lower funding derives from lower participation of SMEs as well as lower average funding per SME and project in Cluster 6.

- This lower funding for Cluster 6 reflects mostly the general higher funding volume for all type of organizations in Cluster 4 and 5. The SME share of funding for Cluster 6 is 19%, it is lower for Cluster 5 (17,2 %), but higher for Cluster 4 (23,7%).

The share of micro companies as part of the SMEs is a bit higher for Cluster 6 (37,5%) than in the Cluster 4 (29,7 %) and Cluster 5 (33 %), which have more medium sized companies, while the share of small companies is similar across the Clusters (approximately 40 %). At the same time the funded SMEs are significantly older for Cluster 6 (17,5 years on average) than for Cluster 4 (14 years) and Cluster 5 15,1 years). For EIC Accelerator the average is only 5,7 years. While there could be various reasons for the rather high average age of Cluster 6, one explanation that appears plausible in the context of the

interviews and workshops is that there is only a limited number of early-stage SMEs (start-ups) in that area.

Horizon Europe, despite its broad scope and comprehensive support for research and innovation, has been noted by the Bioeconomy Financing MAG for not adequately addressing the commercialisation phase. While the programme excels in funding R&D activities, it provides limited support for critical areas such as market research, business development, and company scaling. While many Horizon Europe Calls in principal are open to fund some of these activities, this might be not known or cannibalised by the need to fund other activities in the projects. This gap in support for transforming research into market-ready innovations can hinder the commercial impact of bioeconomy projects, making it challenging for SMEs to bridge the gap between research outcomes and successful market entry. Enhancing targeted support for these business-related activities could significantly improve Horizon Europe's effectiveness in fostering sustainable bioeconomy growth and competitiveness across Europe. To address this, it is recommended to adjust the allocation of funding within Horizon Europe with a proportion of the budget towards business-related innovation and development initiatives. Programmes like CBE-JU and EIC could play a pivotal role by focusing more resources on activities that support commercialisation, scaling, and market readiness while retaining their overarching programme concepts. This rebalancing could significantly enhance Horizon Europe's effectiveness in fostering sustainable bioeconomy growth and competitiveness across Europe.

Geographical distribution

The geographical distribution of Horizon Europe and CBE JU funding, as analysed in ShapingBio deliverable **Overall mapping of global and EUs policies on bio-based sectors & food-systems**, reveals that 6-7 Member States, primarily from Western Europe, receive over 70% of the funding. This disparity stems from factors such as the focus of Central and Eastern European countries on primary production rather than R&D and established long-term collaborations in Western Europe that hinder new partners' involvement. When funding is normalised per capita, Western Europe still dominates, with smaller nations like Finland, Denmark, Belgium (lead innovators) and Cyprus (strong innovator) leading.

Focusing on innovation potential and SMEs, strong innovators receive the highest funding in both thematic priorities (Figure 4), followed by lead, moderate and emerging innovators. In the EIC Innovation Council, SMEs in innovation-leading countries have the highest shares, while in the "Food, Bioeconomy, Natural Resources, Agriculture and Environment" category, SMEs perform relatively well in moderate innovator countries.

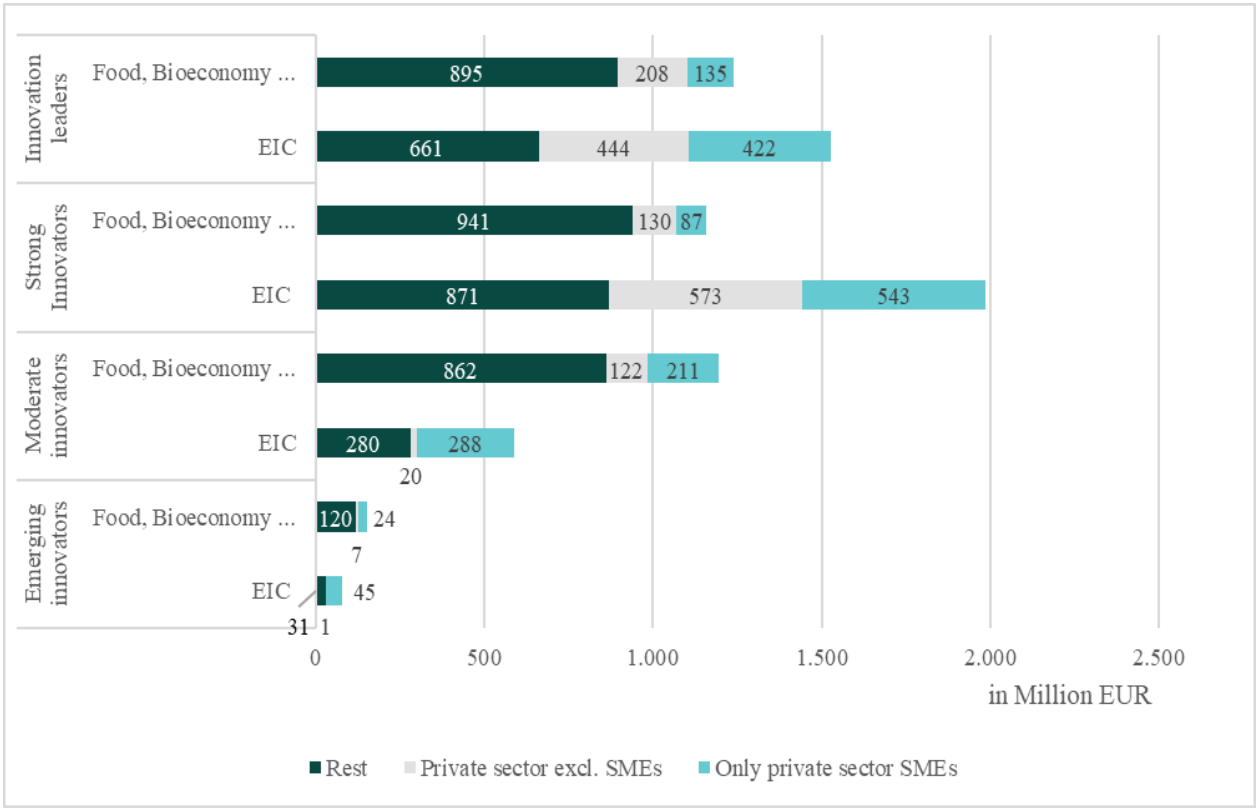

Figure 4 Received funding of EU27 innovation groups in Horizon Europe in EUR.
Source: Horizon Dashboard.

There is no open granular data available for specific SMEs funded by CL6 on the specific sectors of the bioeconomy, neither on their development stage, nor a "before-after" data on the short- and midterm impact of the received funding, including geographical distribution.

To fill this information and analytical gap, we combined data from our research to provide a more precise picture of the bioeconomy SMEs' public financing at EU level. We examined the attitudes of the private investors and SMEs to the processes for application, approval, management and reporting relevant to EU-level public funding.

Our interviews and MAG work revealed that both SMEs and private investors still perceive challenges in navigating the complex EU-level public funding process. Key findings include the need for better access to information and clearer communication regarding funding opportunities, as well as the complexities of the application, approval, and reporting processes. So the SMEs covered in the interviews and survey report to struggle with the bureaucracy involved in managing these funds, particularly when it comes to aligning their development timelines with the rigid structures of EU financing instruments. Additionally, private investors highlighted the lack of alignment between EU public funding and the actual needs of bioeconomy companies, especially during the scaling-up phase. The funding conditions under Cluster 6 are better aligned with the unique needs of bioeconomy innovation, which often involves longer timelines and a delayed return on investment compared to the faster-paced innovations in clusters 4 (Digital, Industry and Space and 5 (Climate, Energy and Mobility). However, this alignment does not fully address the gaps in support for scaling and commercialisation. Unlike other clusters, bioeconomy SMEs require sustained funding beyond initial R&D to navigate the extended development phases of bio-based solutions. Addressing this would involve introducing additional mechanisms, such as long-term investment incentives or milestone-based follow-on funding, to ensure that bioeconomy SMEs are equipped to transition from innovation to market readiness effectively.

SMEs in moderate innovator countries manage to acquire notably higher amounts of Cluster 6 funding compared to other innovator groups, indicating their ability to navigate the complexities of the EU funding system. This pattern suggests that other factors, such as a greater reliance on EU funding due to limited

national funding availability or a higher prevalence of early-stage SMEs requiring foundational support, may also influence the distribution of funding. Differentiating the underlying factors driving this pattern is essential for tailoring financial instruments to address the unique needs of SMEs across different innovation ecosystems. Ultimately, this analysis emphasizes the importance of streamlining funding mechanisms to better support the growth of bioeconomy innovations across the EU.

Information on EU-level financing sources and grants related to bioeconomy

It is difficult to navigate and find the public financing that is most suitable for a concrete applicant in accordance with their specialisation and needs. There are hundreds of granting schemes and calls for proposals at EU and national and regional level. When looking for a matching public funding source, it is easier to find a generalist approach, addressing horizontal issues relevant to various industry sectors and innovation. Some funding sources provide information and assistance but overall, each programme has their own topics, eligibility criteria, application forms, deadlines, budgets. The information sources on finding appropriate public funding for an SME are scattered across vast landscape. The main source of information on Horizon Europe programmes is the EU Funding & Tenders Portal. Sources of information on other EU programmes also include information on national and regional funding. The most relevant include: the webpages of the funding institutions and their national contact points or authorised representatives; innovation agencies, industry clusters, accelerators, private advisors. Special case is the Enterprise Europe Network (EEN) that provides generalist information on EU programmes (not specifically dedicated to bioeconomy) and its offices are often national contact points for them. ShapingBio explored in more detail the information sources for intersectoral collaboration in its Analysis of Collaboration in Bioeconomy.

We examined the EC Funding and Tenders portal search engine to search for calls for proposals using the search term "bioeconomy". Only one open call for proposals came up (Figure 5, retrieved on 22.08.2024). For an unexperienced individual or entrepreneur who is on research and investment path, or a bioeconomy entrepreneur with limited experience in EU programmes seeking R&I funding and co-investment opportunities, this is an obstacle for access to the abundant funds that the EU offers. This is confirmed in ShapingBio survey where the majority (64%) SME respondents chose the answer "I am aware that such opportunities exist" to the question "Are you aware of and/or have experience with co-investment opportunities with public funds and instruments available for the bioeconomy sector?", and only 1 out of 32 companies who replied stated "My company frequently uses these opportunities".

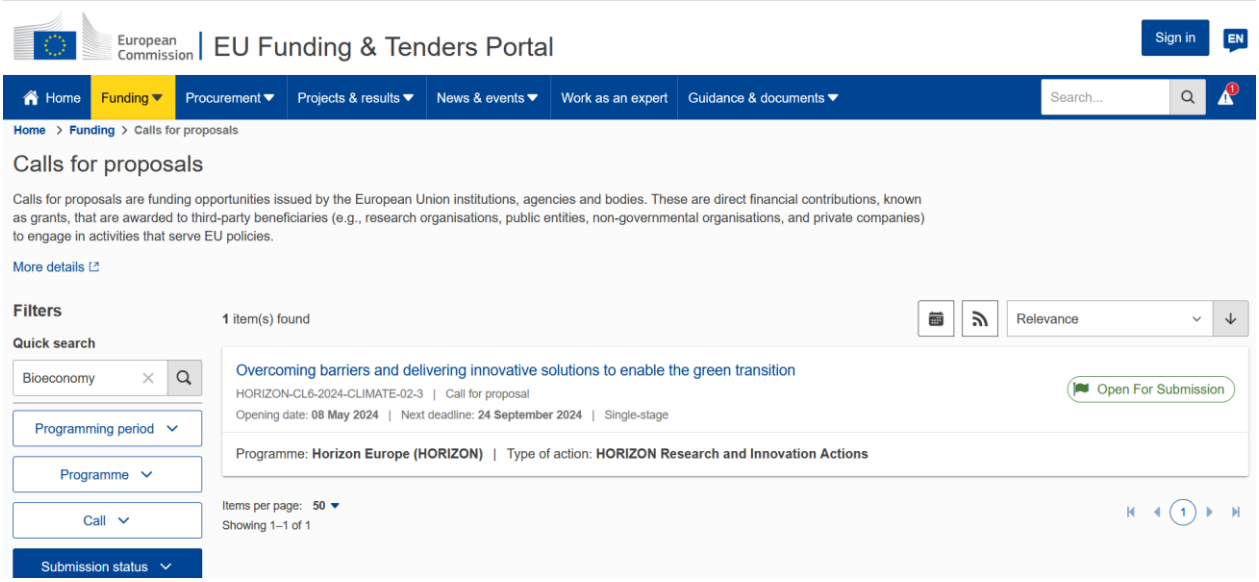

Figure 5 Results on calls for proposals at EU Funding and Tenders Portal using the search term "bioeconomy", retrieved on 22.08.2024
Source: EU Funding and Tenders Portal

The weak understanding of bioeconomy as industry, the non-unified nomenclature for the bioeconomy sectors and the technologies they include is another complexity the SME applicants face. We also tried with the search term "fermentation" and there was no result for an open call for proposals (Figure 6, retrieved on 22.08.2024). This underscores a broader issue: the lack of relevant and commonly recognised bioeconomy-related keywords in key search portals. Terms that are included in strategic documents like Horizon Europe Cluster 6 shall be optimised for search functionality. Such gaps in indexing or search optimisation hinder stakeholders' ability to find relevant funding opportunities, pointing to a need for novel technologies to update these systems and ensure they adequately reflect emerging trends and innovations in the bioeconomy.

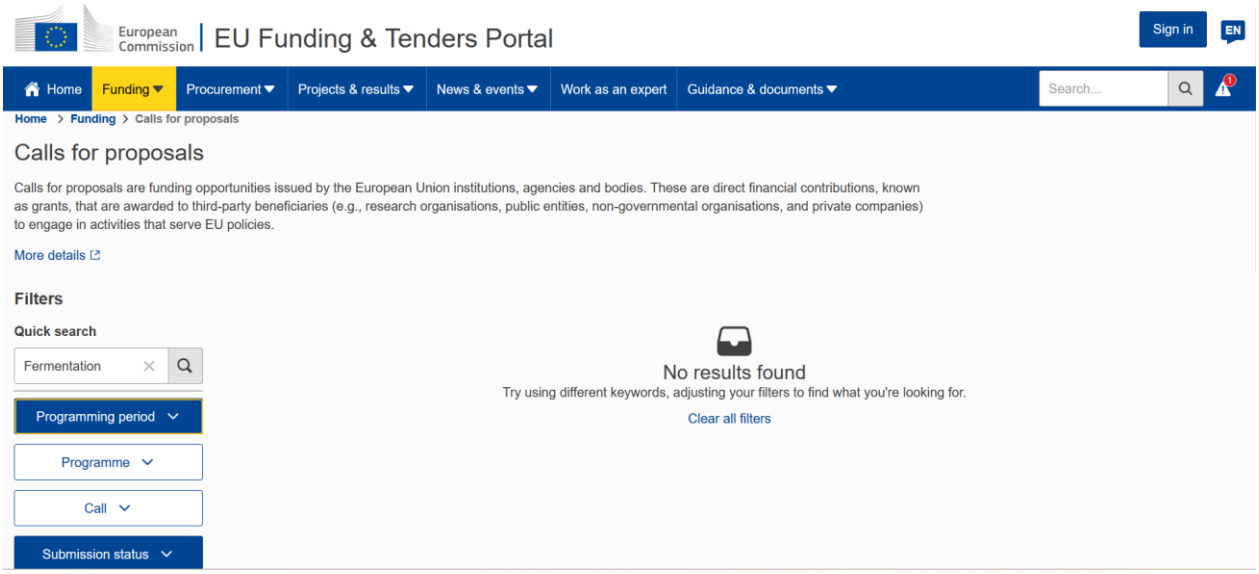

Figure 6 Results on calls for proposals at EU Funding and Tenders Portal using the search term "fermentation", retrieved on 22.08.2024
Source: EU Funding and Tenders Portal

The standardisation of definitions on bioeconomy has been identified as an issue in the previous edit of the EU Bioeconomy strategy (EU Bioeconomy Strategy Progress Report, DG R&I) and some progress has been made in terms of promotion and/or development standards and incentives for bio-based products, particularly regarding end-of-life management, waste, compostability, and sustainability (Regulation (EU) 2020/852 of the European Parliament and of the Council, 2020). A wholesome bioeconomy nomenclature with definitions and terms has not been developed yet.

Identified gap: Bioeconomy technologies definitions, taxonomy, standards, and technology nomenclature

A significant gap in the bioeconomy sector, as highlighted by the feedback from both investors and companies, lies in the lack of clear, standardised definitions, taxonomy, and technology nomenclature across the EU. The absence of uniform standards and a consistent taxonomy for bioeconomy technologies creates challenges in both public and private financing. This fragmentation makes it difficult for stakeholders to evaluate the sustainability and economic potential of bio-based projects uniformly. Investors pointed out that differing definitions and regulatory interpretations across EU countries complicate cross-border investments, as each jurisdiction may apply its own criteria for what qualifies as a "bioeconomy" project or a sustainable investment. A good example is the development of a joint understanding of terms by the U.S. National Institute of Standards and Technology (NIST) through the Bioeconomy Lexicon, created as part of the Bioeconomy Executive Order.

Moreover, the complexity of existing EU regulations, such as those related to the EU taxonomy, further exacerbates these challenges by imposing varying compliance requirements that can deter private investment. For instance, the EU's efforts to define sustainable economic activities through a taxonomy

regulation are crucial and currently lack the granularity needed to address the diverse and evolving nature of bioeconomy technologies. This regulatory ambiguity often leads to inconsistencies in how technologies are classified and supported, making it difficult for companies and investors to align their strategies with EU goals.

The feedback from the interviews underscores the need for a more coordinated approach to developing bioeconomy standards, including a more refined taxonomy and standardized technology nomenclature. Such standardisation would facilitate better alignment of public and private investment strategies, improve the clarity and consistency of regulatory frameworks across the EU, and ultimately foster a more cohesive and supportive environment for the growth of bioeconomy technologies. This alignment is critical not only for reducing investment risks but also for enabling the broader adoption of bio-based innovations across different regions and markets within Europe.

Navigating the complex landscape of public financing across various governance levels, particularly at the EU level, poses significant challenges for SMEs and entrepreneurs in the bioeconomy sector due to non-standardised definitions and frameworks. The abundance of information from various sources on granting schemes, and the amount of information also complicates the search for appropriate funding sources. Lack of a centralised, bioeconomy-specific information source remains a significant barrier. This fragmentation makes it difficult for less experienced applicants to fully access the opportunities available.

Finding the appropriate call for proposals requires deep search and comparative analysis of the available strategies, programmes, schemes. The length of the programming document only for a single Horizon Europe Work Programme 2023-2024 Food, Bioeconomy, Natural Resources, Agriculture and Environment is 595 pages (retrieved on 22.08.2024). The applicants are often not aware of the requirements for administrative side of project proposals, the application process, the timing, and the applicant may not be aware of the resources necessary to commit both for application and further, if application is successful, project implementation.

This also adds to the timing and duration of EU-level programs for the bioeconomy programmes search, where understanding the structure and lifecycle of these programmes becomes essential for effectively planning and securing funding.

Timing and duration of the EU-level programmes for bioeconomy

Given these challenges in adequate information on appropriate funding, understanding the timing and duration of EU-level programmes becomes crucial for bioeconomy companies. In this chapter, we explore the structure, timelines, and key deadlines of these programs to help better align funding strategies with available opportunities.

Table 2 EU Programmes funding innovation in bioeconomy. presents some of the largest programs in terms of overall funding available for the programming period 2021–2027, illustrating the accessibility of funding for the bioeconomy SMEs. Notably, the total budget available to applicants under Horizon Europe is €95 billion for the entire EU programming period 2021–2027. Of this, €902.40 million is allocated for calls for proposals in the circular economy and bioeconomy sectors under Cluster 6 for the year 2024 (European Commission Decision, 2023).

Table 2 EU Programmes funding innovation in bioeconomy. Source: Tech Tour based on various policy instrument descriptions

Programme	Dedicated or relevant BE component	Applicant min TRL	Size of grant, M€ min	max	Application form, max pages	Max time b/w call deadline and grant agreement, months
Horizon Europe	9. Food, Bioeconomy, Natural Resources, Agriculture and Environment	1-8	1,5	7	35	8
EIC Pathfinder	II.2.3 Nature inspired alternatives for food packaging and films for agriculture	1-4	0,05	4	30	8
EIC Transition	No	3	0,5	2,5	22	6
EIC Accelerator	IV.2.4 Food from precision fermentation and algae	5	0,5	17,5	Not specified	5
CBE JU	Fully dedicated programme	3	3	20	70	8,2
EIB	Diverse programmes and schemes	Not specified	Depending on scheme		Depending on scheme	Depending on scheme
EIT Food	Mostly soft measures	1	Depending on scheme		Not specified	Not specified

To compose a consortium (3-6 months), write a project proposal (3-6 months), wait for financing authority's decision (5-8 months) and start implementation may shift or diminish the initial focus, objectives and relevance of the project proposal for a bioeconomy company at any stage of development and make it inadequate whatsoever. This issue is particularly challenging in the fast-paced environment of startups, where flexibility and constant adjustments are essential for success. Startups often operate in dynamic markets where the ability to pivot, iterate, and refine their offerings is key to staying competitive. Without this, startups risk stalled development and missed market opportunities, which can be detrimental in a competitive landscape. Thus, funding bodies must consider more flexible, ongoing support structures that allow for continuous investment as projects evolve with relevant mechanisms for project results' monitoring and quality control and timing of payments.

This is confirmed in the answers of both companies and investors to our question "What benefits have you experienced, and what barriers have you encountered?" in the ShapingBio interview questionnaire cluster Co-investment, De-risking, and Synergies with Public Financing. While securing external financing and market connections through EU-funded projects offers significant benefits, several challenges arise, concerning the timing and duration of these projects. The extended timelines of 3-4 years, often required

for meeting predetermined milestones to be achieved over comparatively long time, can limit agility and make it difficult to pivot when necessary. Startups, in particular, may struggle with the rigidity of long-term commitments, which can stifle innovation and slow down growth. Additionally, the complexity of managing consortia, negotiating intellectual property rights, and aligning with large corporate partners further complicates the process. These factors highlight the need for greater flexibility in project timelines and structures to better accommodate the dynamic nature of innovation-driven enterprises.

Another aspect of timing of EU programme applications to consider is the inherent time lag between the definition of Work Programmes and the start of project implementation. Multi-year framework programmes, by their nature, take considerable time to develop, run, and execute. In 2018, the Commission proposed Horizon Europe to succeed Horizon 2020, followed by a provisional agreement of the European Parliament and the Council of the EU reached in March and April 2019 on Horizon Europe. The EU institutions reached a political agreement on Horizon Europe on 11 December 2020 and set the budget for Horizon Europe at €95.5 billion, including €5.4 billion from the Next Generation of the EU – Recovery Fund, followed by procedures for adoption of related legal acts by the European Parliament and the Council of the EU (EU R&D, How Horizon Europe Was Developed). This lag presents challenges in swiftly adapting to new market conditions or urgent crises, as pointed out in the Draghi report on European competitiveness. The report emphasises the need for more agile and flexible funding mechanisms that can respond promptly to dynamic global and economic challenges, ensuring that the EU remains competitive on the global stage (The future of European competitiveness, M.Draghi, 2024).

During this period, the focus or relevance of the planned calls may shift, as significant developments with profound effects, like the COVID-19 pandemic, or programme effects/impacts in the field can render the original topics less pertinent or even outdated by the time projects are selected and initiated. This temporal gap underlines the need for mechanisms that allow for greater flexibility and adaptability in programme planning and execution, ensuring that funded projects remain aligned with the most current and pressing needs of the bioeconomy sector. To address this, the EU should consider a more nuanced approach by maintaining a diverse portfolio of funding programmes, each tailored to specific stages of innovation, such as scientific research, applied research, scaling up, market preparation and penetration, and demand-side measures. This would involve not only refining the focus of existing programmes like Horizon Europe and its clusters but also potentially introducing new instruments or reallocating budgets to better match the evolving priorities and gaps within the bioeconomy sector.

Sectorial adequacy of the EU-level programmes

The investors' feedback in ShapingBio interviews highlights a general consensus on the need for more specialised and adequate funding mechanisms tailored to the unique requirements of the bioeconomy sector, such as longer timelines and return on investment, high capital intensity, regulatory complexity and fragmented markets. There is recognition that while some early-stage funding is available, significant gaps remain, particularly in the scale-up phase.

Based on the interviews and MAG feedback, investors emphasize the need for funds specifically designed to bridge the critical gap between pilot and demo scale and full-scale commercial production. While EU-level programmes like CBE JU and dedicated national programmes, such as those in Germany, exist to support bioeconomy innovation, challenges remain in addressing the capital-intensive nature and extended timelines of bioeconomy ventures. These programmes often focus on early-stage R&D or specific project types, leaving a gap in consistent funding for scaling and commercialization efforts, which are vital for long-term profitability in this sector. In ShapingBio survey, this was the mode for the investors and close to 45% of the total company responses included the answer that there should be additional specially dedicated funds for bioeconomy financing of growth/scaling up to the question "Should there be additional specially dedicated funds for bioeconomy financing, and if so, what types of funds?". ShapingBio survey results for bioeconomy financing analysis further reaffirm this with answers to questions concerning supporting structures, enhancement of investment opportunities and collaborations for de-risking of bioeconomy investments related to public funding.

Respondents in the ShapingBio survey emphasised the necessity of matching funds that are both broad enough to cover the diverse aspects of the bioeconomy and specific enough to address the high-risk nature of certain technologies, such as future food technologies and advanced biotechnologies. There is a call for funds that not only provide capital but also bring in specialised knowledge and networks enhanced by public institutional support to create synergies and ensure the success of bioeconomy investments.

In addition to the need for scaling-focused funds, investors and stakeholders also highlighted the importance of developing specialised funds that target specific sectors within the bioeconomy, such as food technologies and industrial biotechnology. These sectors often have distinct financial needs due to their unique technological, regulatory, and market dynamics. Tailoring funds not only by the scale of the venture but also by the vertical focus would help address the specific challenges faced by companies operating in areas like sustainable food production or advanced biotechnologies, ensuring that the financial support is both relevant and impactful. This approach would enhance the alignment of funding with cross-sectoral innovation trajectories, fostering more effective development and commercialisation of bioeconomy solutions.

Case Study: PhotonHub Europe - a model for sector-specific innovation support

PhotonHub Europe, funded under the Horizon 2020 programme, exemplifies a successful initiative that could serve as a model that may be followed for developing specialised funds tailored to bioeconomy sectors. The project, a one-stop-shop for photonics innovation, addresses key challenges faced by companies in scaling up and commercialising high-tech innovations.

Key features and transferable practices

- **Sector-specific focus:** PhotonHub targets photonics, a critical enabling technology with applications across industries. Similarly, bioeconomy sectors, such as industrial biotechnology and sustainable food systems, could benefit from dedicated funding mechanisms that consider their unique technological, regulatory, and market dynamics.
- **Comprehensive support**: PhotonHub provides a range of services, including access to cutting-edge technology, pilot lines, and business development expertise. This model could be adapted for bioeconomy ventures to ensure access to pilot plants, testing facilities, and specialised expertise.
- **Innovation-to-market pathways**: The initiative focuses on bridging the gap between research and market readiness through services like investor matchmaking and training. Such pathways are critical in the bioeconomy, where lengthy timelines and high regulatory hurdles often deter private investment.
- **Public-private synergies**: PhotonHub combines public funding with private investment incentives, creating a robust ecosystem for innovation. For bioeconomy sectors, similar synergies could de-risk investments and foster growth in emerging fields like synthetic biology and biomaterials.

By leveraging lessons from PhotonHub, bioeconomy stakeholders can develop initiatives that enhance scalability by creating infrastructure to support the transition from laboratory research to market-ready solutions, including pilot and demonstration facilities. These initiatives should also address sector-specific challenges, such as sustainable biomass sourcing or replacing fossil-based inputs, ensuring tailored approaches to unique technological, regulatory, and market needs.

Fostering collaboration by building ecosystems that effectively align public and private resources can play a pivotal role in de-risking investments and driving growth in emerging bioeconomy fields. This comprehensive approach, inspired by PhotonHub's model, underscores the importance of designing funding mechanisms that support the distinct needs of high-potential sectors, fostering innovation and enabling market competitiveness.

However, there is also caution against creating too narrow a focus in bioeconomy-specific funds, as this could lead to supporting technologies that may not be economically viable in the long term. A balanced approach, possibly involving quotas within broader deep tech or green tech funds, is suggested as a way to ensure both the financial sustainability of the funds and the economic viability of the supported technologies. These quotas could allocate a defined percentage of the fund to bioeconomy innovations while reserving the rest for technologies in complementary sectors, thus diversifying investment risk and fostering cross-sectoral synergies.

Overall, the feedback suggests that while current funding mechanisms are a start, they are not fully adequate to meet the needs of bioeconomy ventures, particularly in the critical scale-up phase. More targeted and specialised funding, with an understanding of the specific challenges and opportunities within the bioeconomy, is needed to bridge these gaps. In alignment with the recommendations from the Draghi report on European competitiveness, it is essential to focus on creating flexible, innovation-driven financing models. The report emphasises the importance of providing more tailored support mechanisms to ensure Europe stays competitive (The future of European competitiveness, M. Draghi, 2024) that also can be applied to high-potential sectors like the bioeconomy.

3.1.2 Accessibility of public funding for bioeconomy SMEs from EU-level programmes

Despite overall positive assessment of Horizon Europe, still there may be shortcomings, such as insufficient total funding, a sub-optimal addressing of relevant actors in the bioeconomy as well as accessible information and well-communicated opportunities for different stakeholder groups. Therefore, we focus on R&D&I proposals, in the following sub-section to further analyse the existing application and funding structure.

R&D&I Proposals

The limited success rate of Horizon Europe programs is a frequently discussed issue. If there were a proportionally lower success rate for the SMEs this would mean that many applicants would invest significant effort without securing funding. Low success rates (for all applicants) may also reflect the program's goal of broad participation and fostering potential collaborations between various stakeholders, even if not immediately funded. Success rates can be affected by the program's scope, where a broader scope invites more participation, thereby lowering success rates due to fixed funding limits and limited pre-defined topics. From the discussions with the Bioeconomy Financing MAG, the limited success rate of project proposals is not necessarily a bad thing as it shows that the process is competitive. This competition reflects the healthy demand for public funding, ensuring that only the strongest proposals, with the most potential for impactful innovation, move forward. While increasing the funding limits could provide more opportunities, maintaining a rejection rate of 80-90% means that projects must continue to stand out, driving both innovation and quality in the bioeconomy sector.

Success rates are calculated by dividing the number of successful proposals by the total number of eligible submissions. For example, in the "Food, Bioeconomy, Natural Resources, Agriculture and Environment" category, the success rate is around 26%, significantly higher than the 15% seen in the related Societal Challenge 5 in Horizon Europe (Figure 7). This increase may be due to modest proposal submissions in some Cluster 6 calls, such as Destination Governance, where available funds exceeded the number of eligible proposals, thus improving applicants' chances. Key programs like CBE JU and Farm2Fork have success rates between 18-20%, while the EIC Innovation Council shows only modest variation between its calls with success rates of appr. 12 %.

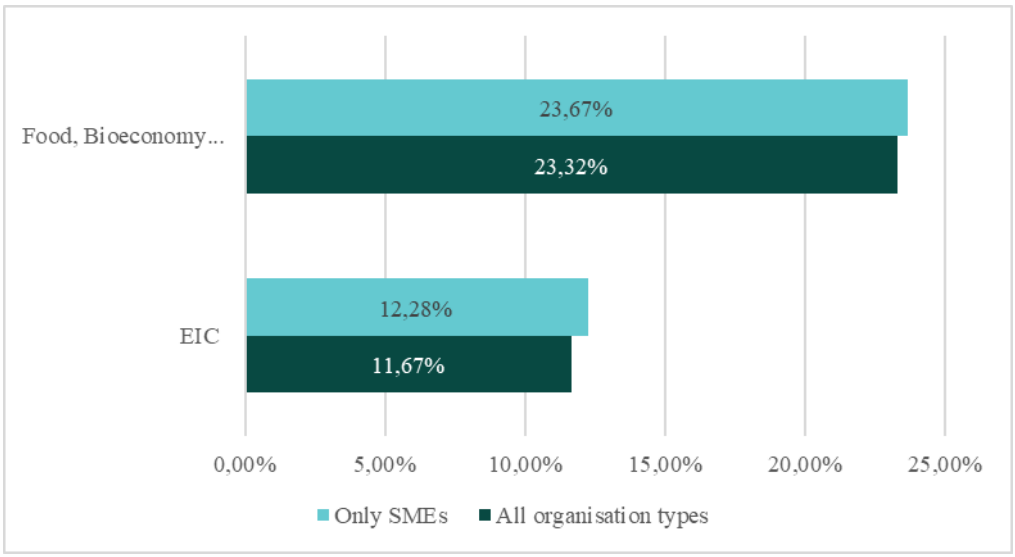

Figure 7 Success rate proposals of EU27 in Horizon Europe.
Source: Horizon Dashboard.

Figure 8 shows the countries who submitted most eligible proposals (in absolute numbers) for Food, Bioeconomy Natural Resources, Agriculture and Environment SMEs as well as the EIC Innovation Council Spain, Italy (moderate innovators) and Germany (strong innovator). The countries that submitted the smallest number of eligible proposals for Food, Bioeconomy Natural Resources, Agriculture and Environment SMEs were Malta (moderate), Latvia (emerging) and Luxembourg (strong innovator). In the case of EIC Innovation Council, those were Croatia, Slovakia and Latvia (emerging innovators).

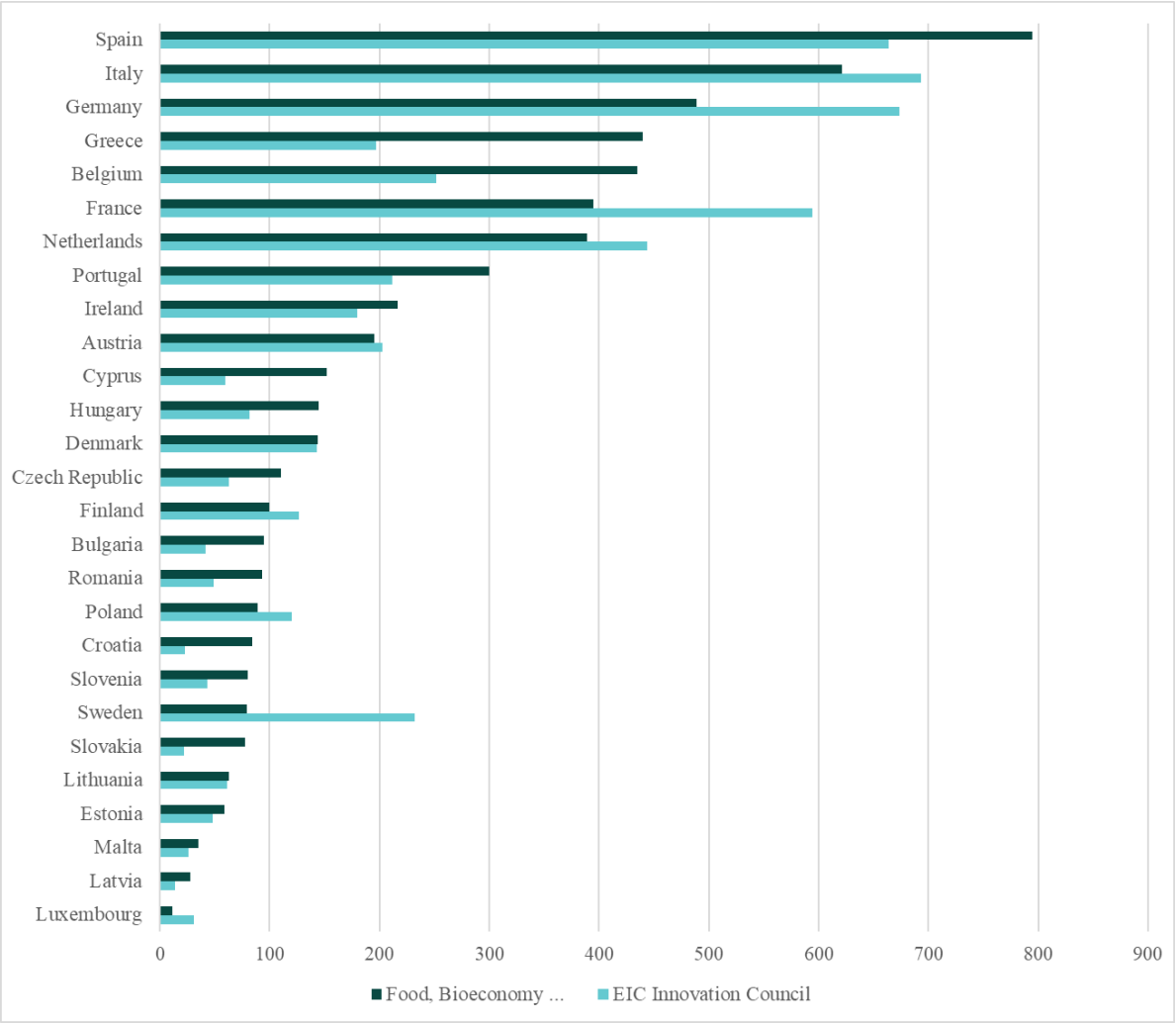

Figure 8 Absolute number of eligible proposals of EU27 SMEs in Horizon Europe.
Source: Horizon Dashboard.

When considering the absolute number of retained (successful in winning financing) proposals of SMEs (Figure 9), the leading countries for Food, Bioeconomy Natural Resources, Agriculture and Environment are Spain, Germany and Belgium, and for EIC those are Germany, France and Spain. The countries that submitted the least number of retained proposals for SMEs in Food, Bioeconomy Natural Resources, Agriculture and Environment are Malta, Latvia and Luxembourg, while in EIC those are Croatia, Lithuania and Latvia.

This distribution highlights disparities in the success rates of SMEs across countries and innovation categories. Emerging innovators, such as Malta, Latvia, and Luxembourg for Food, Bioeconomy Natural Resources, Agriculture and Environment, and Croatia, Lithuania, and Latvia for EIC, demonstrate proportionally lower success rates compared to strong innovators like Germany, France, and Spain. These differences may stem from variations in national support systems, experience with EU project frameworks, and alignment of proposals with programme priorities. Addressing these disparities requires targeted capacity-building measures, enhanced national support structures, and better alignment of proposal guidelines to ensure broader participation and success across all EU countries.

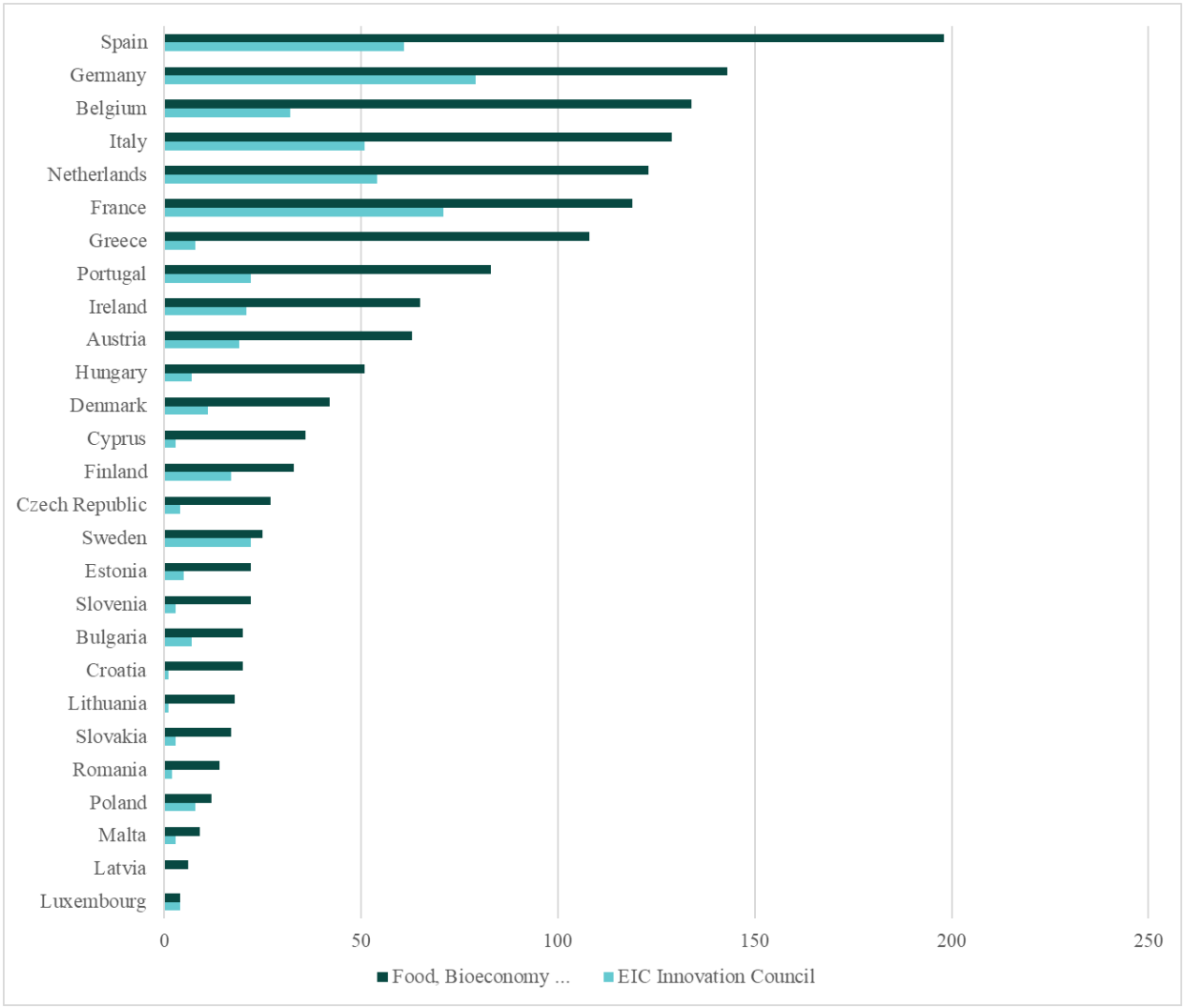

Figure 9 Number of retained proposals of EU27 SMEs in Horizon Europe.
Source: Horizon Dashboard.

R&D funding

Overall, the administration and implementation across the project cycle was considered efficient providing that the respondents in the Horizon Europe survey are from all types of organisations and sectors in the Horizon Europe spectrum. Most survey respondents expressed satisfaction with the Horizon Europe application process related to from Cluster 6, particularly regarding the effort required to prepare and submit proposals. However, only 45-46% were satisfied with the ease of identifying relevant consortium partners. The number of person-days spent on proposals varied by organisation type, budget, and role (partner or lead). Notably, 25% of respondents for the Horizon Europe evaluation survey allocated 16% or more of their budget to administrative tasks, a higher proportion than in H2020 green transition proposals. Changes to the application process compared to H2020 were generally well received, with a satisfaction rate of 40-50% and a low dissatisfaction rate of 10%.

A different picture is shown in the answers in ShapingBio survey by the bioeconomy private and public investors with bureaucratic burden considered the highest obstacle for obtaining public financing, and by the companies the second most obstructive. The reasons for these different results are not entirely clear, but they may stem from variations in the number of consulted experts or differences in their direct involvement with administrative tasks. It is also possible that recent positive improvements in administrative processes have not been widely recognised across the entire community. Additionally, some experts included in the

ShapingBio survey may already feel discouraged from coordinating or participating in such projects, further influencing the perceptions reflected in the results.

The forms for Horizon Europe and related schemes like EIC are more or less unified. However, writing an EU project proposal is a skill requiring specific knowledge and experience, English language at quite advanced level, understanding of EU-projects structure, processes and jargon.

To address the apparent contradictions in the feedback, it is essential to recognize that the satisfaction levels regarding Horizon Europe's application process can vary significantly depending on the respondent's role, sector, and level of experience with EU funding mechanisms. While survey respondents with prior experience in EU projects may find the process manageable, others, particularly newcomers or those from less experienced organizations, may perceive the administrative burden and complexity as more significant obstacles. This disparity highlights the need for tailored support and capacity-building initiatives to address varying levels of familiarity and expertise across stakeholders.

When we focus only on SME at EU level, according to Figure 10 the leading countries for funding Food, Bioeconomy Natural Resources, Agriculture and Environment SMEs were Greece, Spain (moderate), and France (strong innovator). Overall, on the top of the list are countries from moderate and strong innovator ecosystems, while the lead innovators are only in the middle and most emerging innovators and some of the moderate ones are rather at the end of the recipient list. For the EIC the leading countries were France, Germany (strong innovator) and the Netherlands (lead innovator), while those with the fewest funding were Slovakia, Croatia (emerging) and Cyprus (strong innovator).

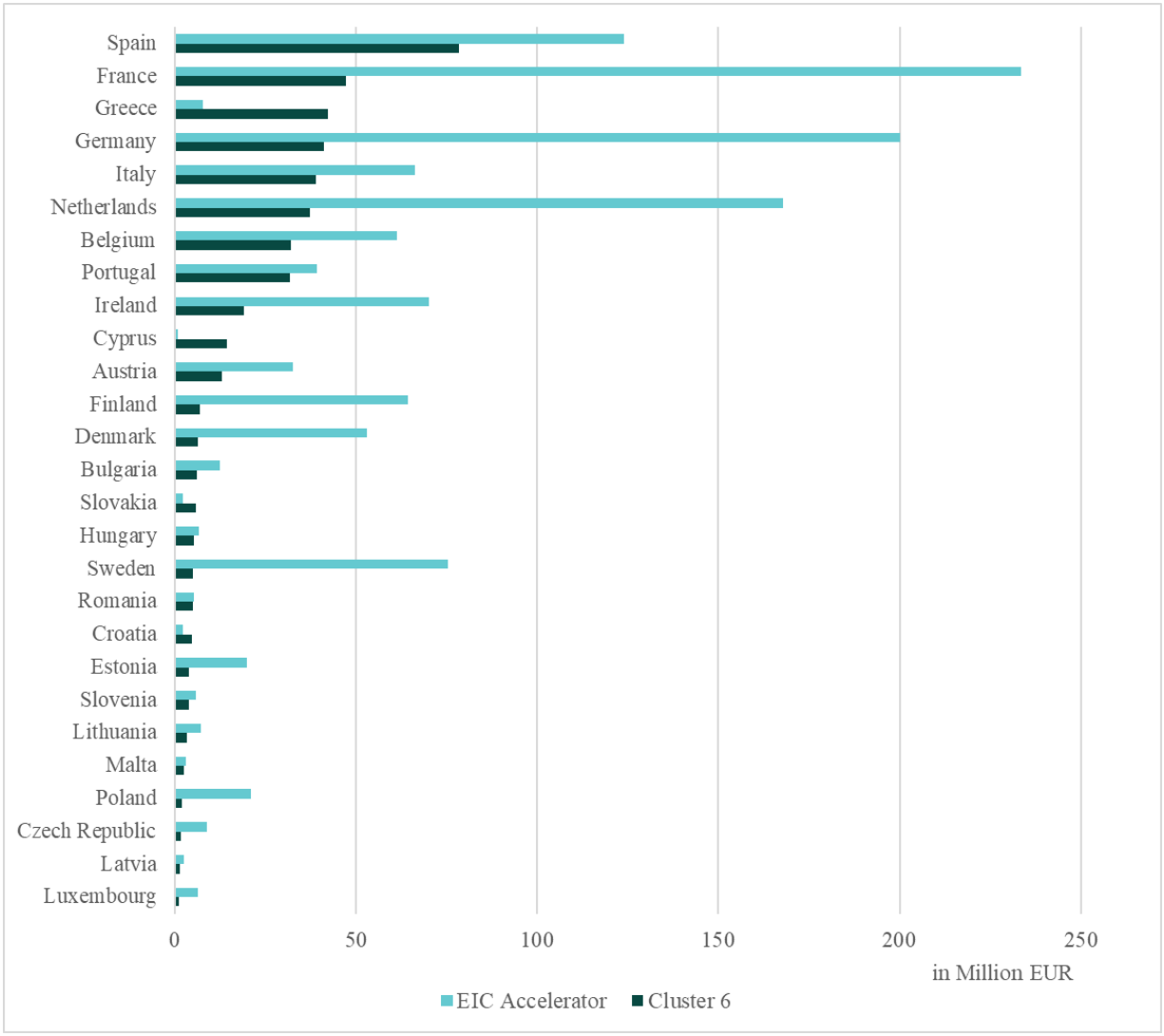

Figure 10 Received funding of EU27 SMEs in Horizon Europe in EUR.
Source: Horizon Dashboard.

Size of public financing or grant scheme for a bioeconomy project, proposal quality and fierce competition amongst applicants make the effort to get into the EU-level public financing not so attractive, yet this may be a lifeline for many entrepreneurs in bioeconomy. Often, applicants are not experienced and seek to improve their chances of success by hiring external advisors to assist in writing their proposals, which entails further resource commitment (as clear from the ShapingBio interviews). However, this investment may prove inadequate if the proposal is not approved for funding; this is the case for 3 out of 4 proposals submitted for Cluster 6 calls. Moreover, failing to secure funding not only represents a financial loss but also the potential to miss a unique opportunity that perfectly aligns with their specific needs – an opportunity that may not easily present itself again.

The responses in the ShapingBio interviews and survey suggest that while public financing is available, it often does not fully align with the specific needs of bioeconomy companies. For example, one respondent noted the challenge of securing financing that accommodates the long-term nature and capital intensity of bioeconomy projects compared to other sectors like IT, where faster returns are possible. The need for more tailored public support that understands the unique timelines and scaling challenges of bioeconomy projects is evident, as companies often require significant investment before generating revenue. This refers to two main issues: first, the funding mechanisms often prioritize short-term key performance indicators (KPIs), which may not align with the longer development cycles and delayed returns typical of bioeconomy ventures. Second, the per-project funding amounts can be insufficient to support the high capital requirements of scaling activities, particularly for pilot plants and first-of-a-kind industrial facilities. These

challenges underscore the need for funding frameworks that consider the extended timelines and substantial upfront investments required for bioeconomy innovation. Furthermore, several companies mentioned the importance of having access to guidance and programs that can help them navigate the public financing landscape and better understand the expectations and requirements of investors.

The accessibility of public funding for bioeconomy SMEs from EU-level programmes, while invaluable for early-stage innovation, presents certain challenges that require careful consideration. This was expressed by the investors in both MAG work and the ShapingBio interviews with investors. Public funding, as taxpayer money, is highly competitive, with a low success rate that ensures only the most deserving projects are funded. Some participants argued that it is not particularly difficult to secure these funds, as four companies receiving EU funding demonstrate in one of the investor's portfolio. However, public funding, though equity-free, often comes with considerable administrative complexity that can disrupt a company's cash flow.

A recurring concern raised during MAG group discussions and interviews is also that certain startups become overly dependent on public grants, focusing more on attracting these funds than generating sustainable revenues. For example, some companies may secure significant public funding – sometimes up to €20 million across multiple grants – without building the necessary expertise in product marketing or commercialisation. This dependency risks turning them into "project companies" that fail to develop viable business models, potentially reducing the EU's overall return on investment in terms of job creation and competitiveness. Encouraging better alignment between public funding and commercial viability, possibly through more robust investor engagement and face-to-face online screening or possibly interactive proposal review process using AI, could improve outcomes and foster long-term innovation success. To address this concern, it is crucial that funding mechanisms not only prevent dependency on public grants but also align with the growth trajectory of startups, allowing them to progress through various Technology Readiness Levels (TRLs). Startups need continuous and adequate funding to scale up their operations, engage in large-scale research, and outsource key business development activities. Providing follow-on funding for these critical phases ensures startups don't stagnate as "project companies" but instead mature into commercially viable entities with the capacity for long-term growth and innovation. Highlighting this need can lead to more sustainable economic outcomes and a higher return on public investment.

3.1.3 Alignment of policy and policy instruments for bioeconomy at EU level

The alignment of policy and financing instruments in the bioeconomy is not merely a matter of funding availability but encompasses broader policy issues highlighted by stakeholders. Respondents in ShapingBio interviews and surveys identified diverse challenges, ranging from the general bureaucracy of EU-level funding processes to the need for more targeted demand-side measures, such as quotas for bio-based materials, and dedicated SME schemes. These concerns reflect the complexity of addressing bioeconomy financing within the EU's broader policy framework, which must simultaneously foster innovation, enable commercialisation, and promote sustainability. By considering these varied perspectives, we aim to explore the interplay between policy intent and implementation and identify analytical insights that will enable a more supportive environment for bioeconomy stakeholders.

The EU Bioeconomy Strategy addresses environmental, economic and societal challenges through bioeconomy development that has impact on various sectors, including investments and innovation. It emphasises a sustainable bioeconomy as a key driver for a circular economy and sustainable development. It focuses on transforming natural resources into sustainable products, promoting innovation in areas such as agriculture, forestry, fisheries, and the bio-based industries. The strategy seeks to balance environmental sustainability with economic growth and competitiveness, aiming to reduce dependency on non-renewable resources and mitigate climate change.

Innovation support in the EU strategy is provided through research funding programs like Horizon Europe, which finances projects in bioeconomy-related fields. The strategy encourages multi-disciplinary research, public-private partnerships, and the integration of digital technologies to enhance innovation in the bioeconomy. It also supports the creation of knowledge-sharing platforms and networks to accelerate the uptake of innovations across the EU (DG R&I, Horizon Europe).

This holistic approach of the EU Bioeconomy Strategy is perceived by the bioeconomy companies and investors that we interviewed and surveyed with diminished focus on industry and manufacturing. This is how we explain the comparatively low rate of companies absorbing funding from EU-level instruments for bioeconomy. To the survey question "How can European bioeconomy policy enhance investment opportunities for private investors in bioeconomy?" the answer "By making the EU bioeconomy policy more comprehensive and focused" was amongst the top 2 answers by the investors, and the answer "By making the bioeconomy policy more industry oriented" by the companies.

The ShapingBio interviews' feedback suggests several key areas for aligning bioeconomy policies with financing instruments in the EU. First, there is a strong call for improving market development for bio-based products, which currently face challenges compared to well-established fossil fuel-based markets (Arthur D. Little/Nova Institute Accelerating the tech-driven bioeconomy: Challenges and opportunities in Europe, 2024). Respondents emphasise the need for reduced bureaucracy, easier access to financing, and clearer communication to ensure that the bioeconomy policies are better understood and more effectively implemented by industry stakeholders. There is also a suggestion for stronger alignment between the Green Deal's political objectives and the industrial sector, ensuring that policy direction is practical and accessible for those responsible for execution. Incorporating bio-based materials in high-value products was another key point mentioned in the MAG discussions. A potential recommendation from participants was for governments to set mandatory targets for bio-based content in specific high-value products, replacing fossil-based materials. This approach could significantly enhance market competitiveness for bio-based alternatives, stimulating demand and accelerating the transition to more sustainable products. However, it was also noted that such measures should be balanced with the need for sustainable sourcing of biomass to ensure the long-term viability of the bioeconomy.

Additionally, respondents highlight the importance of involving specialised investors in the bioeconomy, as they can more effectively drive innovation and company growth compared to grant-based funding alone. Clearer and better-organised financing pathways, especially for startups and research institutes, are crucial, particularly in the early stages of development and commercialisation. The need for a regulatory-friendly environment and consistent public acceptance across Europe is also noted, as well as the importance of bolstering subsidies for bioeconomy infrastructure and creating specialised bodies to evaluate and support the most promising bioeconomy ventures. These insights underline the need for a more coordinated and supportive policy framework that bridges the gap between policy intent and industrial implementation.

ShapingBio researched bioeconomy policies compared to the highly successful United States bioeconomy sector (Overall mapping of global and EUs policies on bio-based sectors & food-systems). For comparison, while both the U.S. and EU strategies aim to leverage biotechnology and bioeconomy for societal and economic benefits, the U.S. focuses heavily on biomanufacturing and maintaining global leadership in biotechnology, whereas the EU emphasises sustainability, circular economy, and regional development in its bioeconomy strategy (The White House, Bold Goals for U.S. Biotechnology and Biomanufacturing, 2023). Both strategies recognise the importance of innovation support but the U.S. strategy places a stronger emphasis on commercialisation and scaling, while the EU strategy is more focused on sustainability and resource efficiency.

We also compared the entry points and processes of two public funding instruments: EIC Fund portal (https://eic.ec.europa.eu/eic-fund_en) and the Small Business Innovation Research (SBIR) (https://www.sbir.gov/) governed by the United States Small Business Administration. The SBIR portal is designed to be highly accessible for small businesses and startups, with a clear and straightforward structure that guides users through the process of finding and applying for funding opportunities, also access to training for specific entrepreneurial needs and guidance on how to apply, and available local support. It focuses primarily on innovation-driven small businesses, offering a targeted and user-friendly experience that emphasises the key steps in the application process and provides resources specifically for the needs of these companies.

The EIC portal, on the other hand, serves a broader range of innovators across Europe and focuses on funding for breakthrough innovations with high growth potential. While it offers extensive resources and detailed information, the EIC portal can be more complex to navigate due to its comprehensive coverage of various funding instruments, including the EIC Fund. This complexity might present a challenge for new

users who are unfamiliar with the intricacies of EU funding processes. However, the EIC portal also provides robust support and guidance, aiming to accommodate a diverse set of innovative projects across different stages of development.

In summary, the SBIR portal is more straightforward and user-friendly, specifically tailored for small businesses in the U.S., while the EIC portal offers a broader and more complex array of funding opportunities, requiring more navigation but also supporting a wider range of innovation activities across Europe.

From a point of view of applying financing instruments and their outcomes, many participants in Horizon Europe reported that their projects largely achieved their objectives, contributing significantly to knowledge and capacity building as well as to scientific and technological development. Key achievements in coordination and collaboration include cross-border and cross-sectoral integration, strengthened pan-European collaboration across sectors, and the creation of networks to address common challenges and improve stakeholder involvement (Dinges; Gotanroch 2023b). However, market and business goals have only been partially realised in Horizon 2020 projects, with indications that this may also apply to Horizon Europe, as evidenced by the limited participation of private partners. The impact of these programs on microeconomic indicators – such as turnover, employment, and profit – remains limited. Various barriers, including limited financial resources and restrictive legal frameworks, have impeded project uptake to varying degrees (Dinges; Gotanroch 2023b). This conclusion corresponds with the findings from the MAG work, the interviews and the survey that we implemented.

While Horizon Europe has significantly contributed to scientific and technological advancements, including cross-border collaborations and knowledge building, its impact on market-oriented goals remains limited. Many Horizon Europe projects have struggled to realise business outcomes, particularly due to barriers such as restrictive legal frameworks and limited private sector participation. This aligns with findings from the MAG work and our survey, which highlighted challenges in transforming scientific achievements into marketable products. To address this gap, instruments like the European Circular Bioeconomy Fund (ECBF) play a crucial role. ECBF, co-financed by the European Investment Bank (EIB), is specifically designed to bridge the gap between innovation and commercialisation by providing targeted equity investments. It supports growth-stage bioeconomy ventures, helping them scale and access private capital while ensuring alignment with the EU's broader sustainability goals.

Case Study: European Circular Bioeconomy Fund (ECBF)

The European Circular Bioeconomy Fund (ECBF) serves as a significant model of how EU-level financing instruments can be aligned to foster bioeconomy innovation across Europe. Established with a clear mission to bridge the funding gap in Europe's bio-based industries, ECBF aims to provide capital to high-potential companies that work towards sustainability and circularity in the bioeconomy sector. Its primary focus lies in accelerating the transition to a circular economy by investing in companies that leverage innovative technologies to create sustainable bio-based solutions.

*Alignment with EU Bioeconomy Goals***:** ECBF is uniquely aligned with the European Green Deal and other EU sustainability initiatives. It plays a pivotal role in supporting the transition to a bio-based circular economy by funding companies that advance the EU's objectives of reducing waste, increasing resource efficiency, and promoting sustainable growth. The fund aligns with the broader EU agenda by focusing on sectors like renewable energy, bioplastics, sustainable agriculture, and innovative food systems—all of which are central to the European bioeconomy strategy. By doing so, ECBF not only helps companies scale their technologies but also contributes directly to meeting the EU's ambitious environmental and economic goals.

Investment Criteria and Focus Areas: ECBF follows a rigorous investment strategy targeting growth-stage companies across Europe. With a strong emphasis on high-tech innovations that contribute to a more sustainable economy, ECBF finances ventures in key areas such as bio-based materials, biotechnology, and industrial biotechnology. The investment criteria focus on three main factors: scalability, potential for circularity, and alignment with sustainable development goals (SDGs). According to ECBF's investment

guidelines, companies must demonstrate their potential to significantly impact the European bioeconomy by addressing key sustainability challenges, such as reducing CO2 emissions or replacing fossil-based materials. European financial instruments like the European Investment Bank (EIB) and private sector investors strengthen its ability to invest in high-risk ventures, ensuring that companies receive the financial support needed to scale up their operations. ECBF's investment model showcases how EU-level funding can be effectively integrated with private capital to de-risk investments, a crucial aspect for bioeconomy ventures that often require substantial capital for infrastructure development.

Challenges: Despite its successes, ECBF has faced challenges typical of large-scale investment funds in the bioeconomy sector. One issue is the complexity of navigating regulatory frameworks across different European countries, a challenge ECBF shares with many EU-backed initiatives. Nonetheless, by aligning public and private funding efforts, ECBF reduces investment risk for private investors while encouraging them to participate in high-potential bioeconomy ventures. The fund's impact is seen through the creation of a more cohesive and dynamic European bioeconomy ecosystem, enabling startups and scaleups to access the capital needed to commercialise their innovations.

Through its collaborative structure, including partnerships with both public and private investors, ECBF represents a strong example of how EU financing instruments can align to support the bioeconomy. By addressing the financing gap in bio-based industries, ECBF contributes to the European Commission's long-term vision of a sustainable, circular economy.

The alignment of policy and policy instruments for bioeconomy at the EU level is an ongoing process, with initiatives like the European Circular Bioeconomy Fund (ECBF) playing a key role in addressing existing gaps. These instruments complement broader EU programs like Horizon Europe by focusing more directly on market-driven results, helping to ensure that innovations are not only developed but also commercialised. Continued efforts to align public and private financing, streamline regulatory frameworks, and foster public-private partnerships will be critical in creating a supportive ecosystem that enables the bioeconomy sector to thrive across all stages of development.

3.2 National and regional level instruments for bioeconomy financing

National and regional financing programs can serve as a crucial first step for bioeconomy stakeholders, particularly in the early stages of company development when funding is needed to commercialise innovative ideas. These programs often provide funding that is well-aligned with the needs of emerging companies, offering appropriate timing, manageable reporting requirements, and a clear focus on impactful outcomes. While pan-European programmes for bioeconomy offer broader opportunities in terms of the number of funded projects and total funding available, national and regional programs play a vital role in building a strong foundation for further growth and development within the bioeconomy sector.

3.2.1 Adequacy of national and regional financing instruments for bioeconomy

Of the 116 national policy instruments quoted by the project consortium partners across the EU countries, one third are dedicated or highly related to bioeconomy (Figure 11). The limitations of the collected data shall be taken into account, as stated in the Methodology chapter.

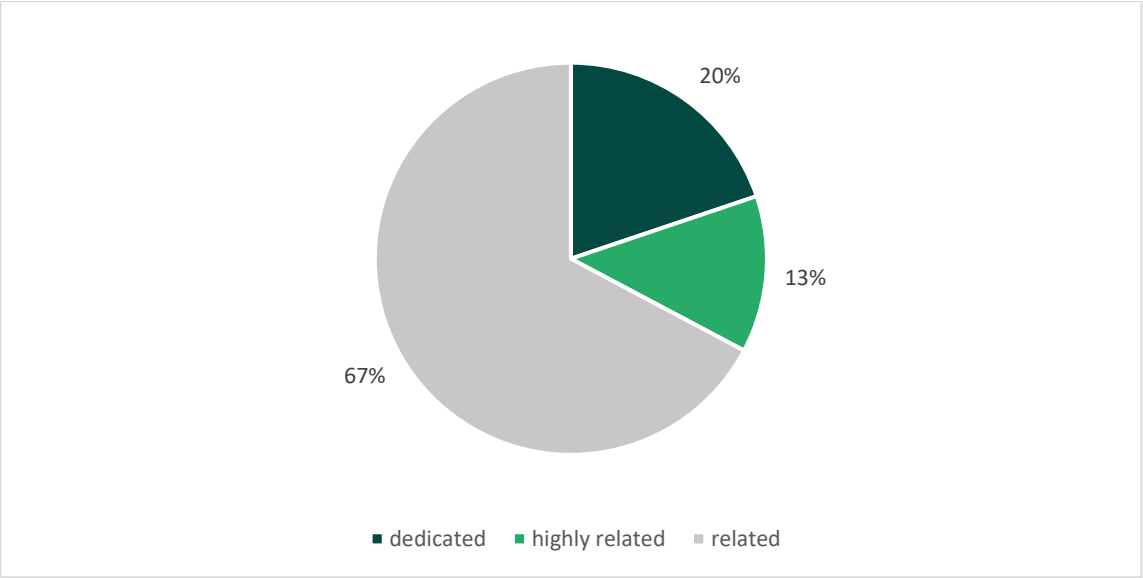

Figure 11 National instruments for bioeconomy financing across the EU innovation ecosystems – adequacy to bioeconomy
Source: Policy Instruments and Strategies database, ShapingBio

Of those 38 national policy instruments across the EU reported as dedicated or highly related, 21 provide grants for industrial R&D.

A related challenge is the scattered nature of regional, national, and EU-level financing mechanisms across Europe. Unlike more centralized systems like that of the US, where funding is more streamlined and accessible, the EU's landscape requires stakeholders to navigate various doors depending on the region or funding body. Knowing which funding opportunities to pursue and where to apply becomes a crucial skill for success in the bioeconomy, alongside having a strong entrepreneurial mindset and innovative ideas.

Familiarity with available support and opportunities for co-investment with public instruments across the EU innovation ecosystems

Distributed by country type of innovator, grants for industrial R&D, equity support and public procurement for innovative goods show that the industrial R&D and equity support in innovation leader countries is to limited extent provided by national policy instruments, these are probably left to the private investors and stakeholders participating in these more developed financial markets. For the emerging innovator countries, on one hand, there is no reported dedicated bioeconomy policy instrument; on the other, the policy instruments that address bioeconomy offer limited support for research and development or offer generalist support on horizontal topics adequate to companies from all sectors (not only bioeconomy). In the ShapingBio survey, to the question if the stakeholders were familiar with co-investment opportunities with public funds and instruments in bioeconomy at national level, both investors and companies show familiarity with those instruments when choosing from pre-defined answers (Figure 12).

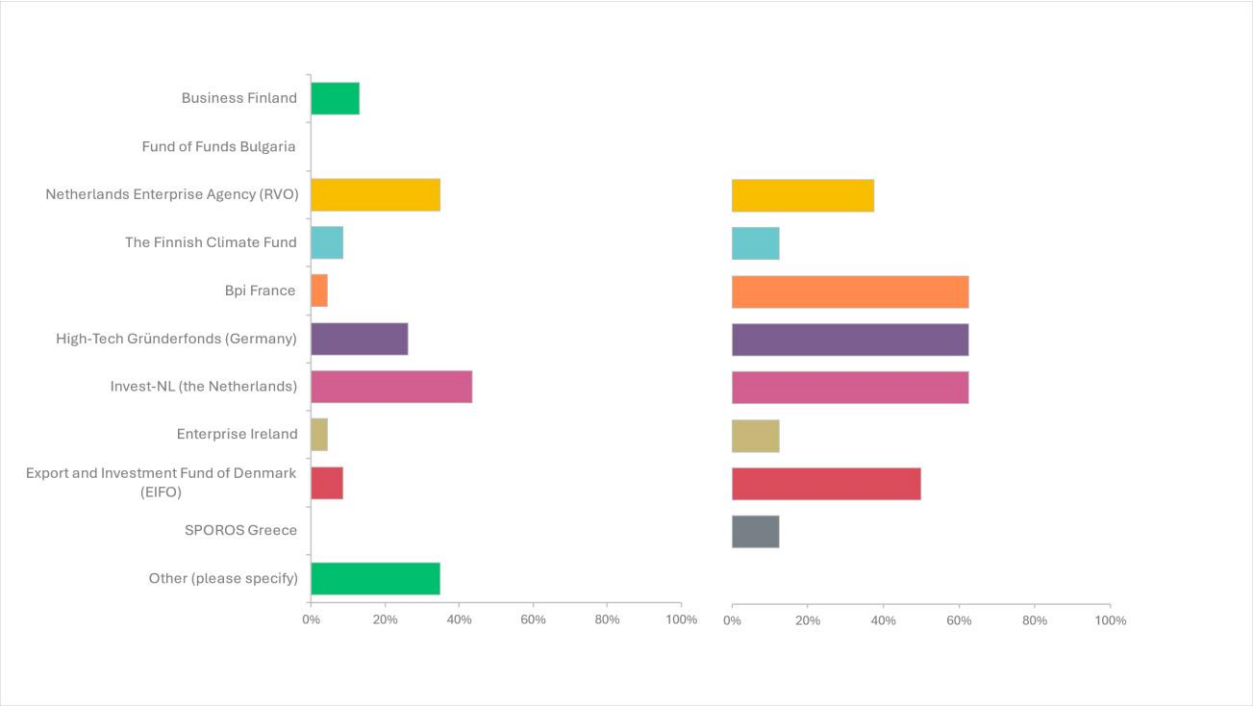

Figure 12 Familiarity with national instruments for co-investments – entrepreneurs (left) private investors (right). 36 entrepreneurs, 11 private and 3 public investors took the survey.
Source: ShapingBio survey on bioeconomy financing

The entrepreneurs had the additional and optional field to name other national instruments that may not be in the pre-defined list and the overwhelming majority of the answers included only the name of the funding authority – a ministry or a country. We interpret this as weakness in dissemination and information capacity of the managing authorities. The situation is similar with the regional programmes and instruments (Figure 13).

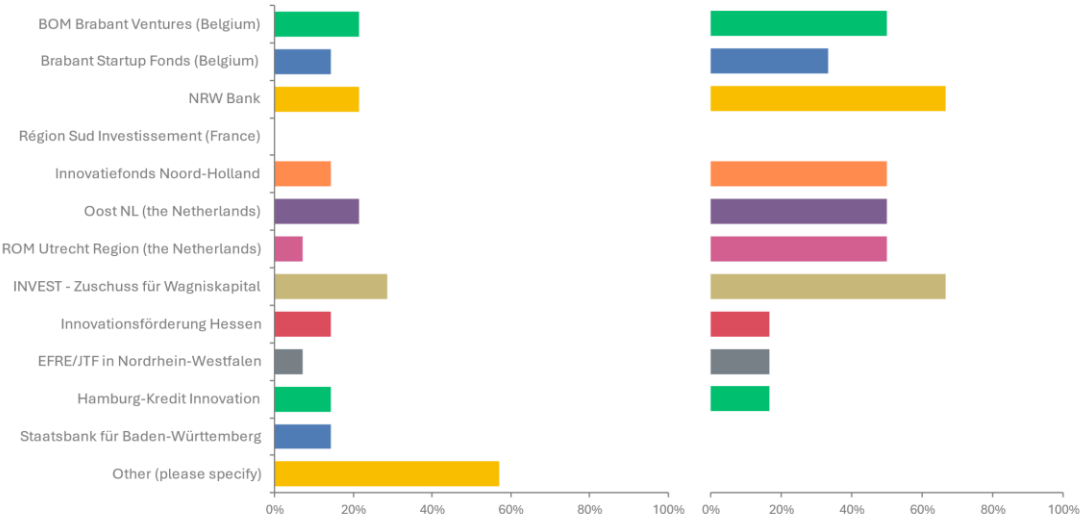

Figure 13 Familiarity with regional instruments for co-investments – entrepreneurs (left), private investors (right). 36 entrepreneurs, 11 private and 3 public investors took the survey.

Source: ShapingBio survey on bioeconomy financing

The regional programmes that the entrepreneurs mentioned additionally are EEA Grants, Liechtenstein and Norway (non-EU), Impuls Zeeland, Innovation Quarter, LIOF (the Netherlands), Moravian-Silesian Funds (Czech Republic) and some managing authorities.

Fiscal incentives

For the participants in bioeconomy such as: corporation tax reductions for volume or increment in R&D, reductions in employers payroll tax and contributions, personal tax incentives for R&D workers, or other support of private demand like on-demand subsidies and tax incentives, articulation of private demand, awareness raising, catalytic procurement – are mostly applied in policy instruments in Moderate and Strong innovators (Figure 14). Further, more detailed input or comparison of existing data is necessary with a more representative number of national and regional programmes addressing bioeconomy needs.

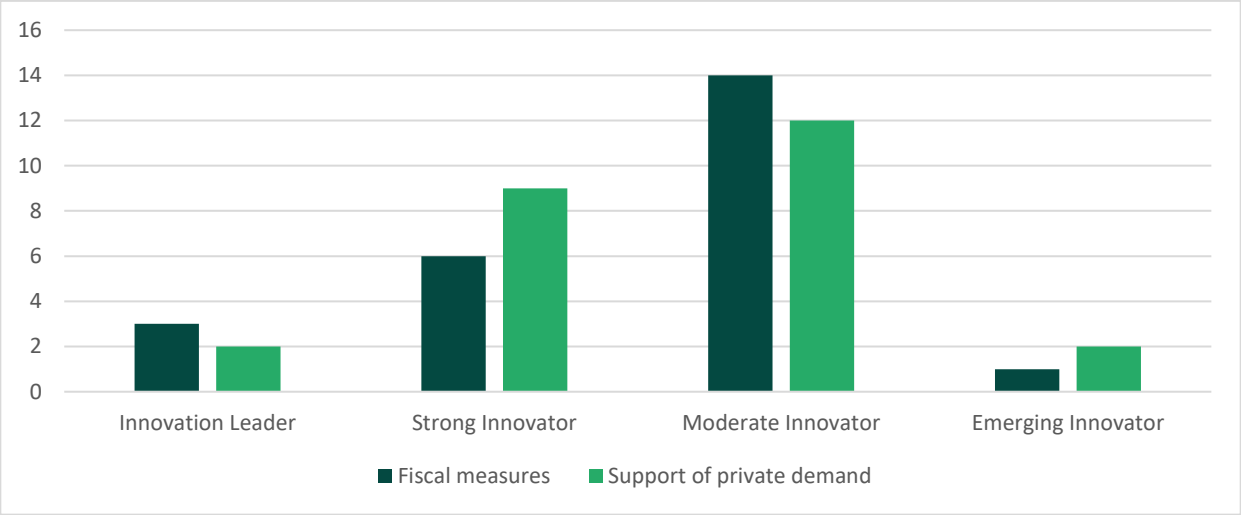

Figure 14 Fiscal incentives in the researched national policy instruments across EU.
Source: Policy Instruments and Strategies database, ShapingBio

While demand-driven instruments were not initially the main focus of the analysis, additional area of concern not initially addressed in the interview questions was highlighted by ShapingBio interview respondents. This is the critical role of CO2 taxing as a mechanism for levelling the playing field between bio-based products and their fossil-based competitors, which currently benefit from established economies of scale and lower costs (WEF, Accelerating the tech-driven bioeconomy June 2024). This underscores the need to consider market-driven policies as a complementary approach to fostering bioeconomy innovation. Respondents emphasise that bioeconomy ventures face significant challenges in competing against these entrenched value chains. Implementing stricter CO_2 taxes could incentivise the adoption of bio-based alternatives by making fossil-based materials less economically attractive. Such a policy would drive market demand for products with lower carbon footprints, supporting the transition to a more sustainable economy by narrowing the application areas for fossil-based products and encouraging innovation in the bioeconomy sector. However, the CO_2 taxing shall be very carefully considered as some of the MAG experts also highlighted the volatility of CO_2 certificate prices as a significant challenge for bioeconomy ventures. The fluctuating carbon prices make it difficult for companies to incorporate long-term carbon cost planning into their financial models, creating uncertainty that hampers investment in bio-based technologies. To counter this volatility, the introduction of direct subsidies, alongside CO_2 taxes, could offer a more stable and predictable form of support. This balanced approach would allow companies to confidently invest in sustainable technologies while addressing the economic challenges posed by the fluctuating carbon market. Maintaining equilibrium between CO_2 taxes and opening the bioeconomy market to bio-based products is essential for fostering innovation and ensuring long-term viability.

3.2.2 Accessibility of national and regional financing instruments for bioeconomy

If applying for financing to EU-level is considered complex and resource-consuming, when it comes to national and regional policy instruments, the bureaucratic burden increases, especially in less developed emerging and moderate ecosystems with requirements for administrative documents and proof of status, for example, in Bulgaria (emerging innovator) (https://eufunds.bg/bg). The applicant shall navigate through complex documentation and application process to affirm their identity, eligibility, administrative and content compliance with a specific call for proposals.

In general, the national and regional programmes across the innovation ecosystems provide various support to the bioeconomy stakeholders, including soft measures like information and networking and direct support like fiscal incentives, equity, etc. (Figure 15).

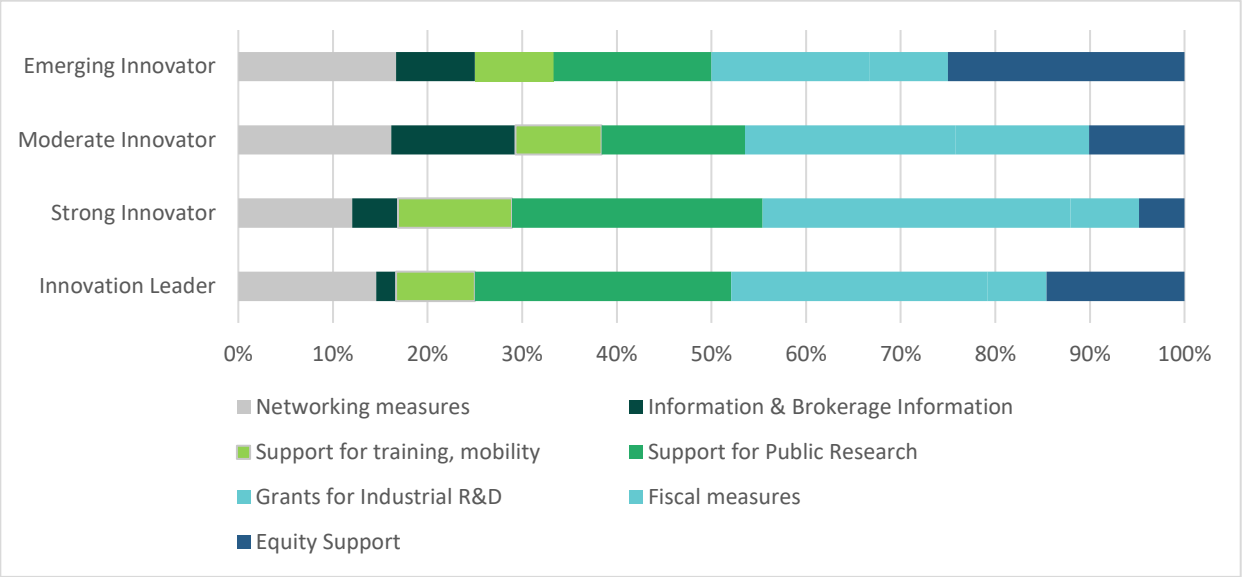

Figure 15 Measures supporting bioeconomy financing by national and regional programmes
Source: Policy Instruments and Strategies database, ShapingBio

The accessibility of national and regional instruments for bioeconomy is characterised also by the availability of funding for cross-border activities. In this case, the information related to the instrument is published in the local language that limits participation of companies that are established in the neighbouring geographical region and may have partnerships and use resources in the neighbouring region. This may be a hindrance for cross-border regional networking. From the 116 reviewed programmes researched at national level, 81 offer to their stakeholders support for training, mobility, information & brokerage information and networking measures.

3.3 Alignment of national and regional financing instruments for bioeconomy

The alignment of national and regional financing instruments with bioeconomy goals varies significantly across countries, depending on their innovation classification. Innovation leaders show the strongest alignment, while emerging innovators face significant challenges in ensuring that their funding instruments effectively support bioeconomy innovation. Moderate and strong innovators are in between, with varying degrees of alignment that reflect their national priorities and the effectiveness of their regional programs (ShapingBio, **Policy Instruments and Strategies database**, also **Report on macro-regions: Mapping of initiatives, structures, instruments and key challenges for EU's macro-regions**).

A generalist programme (not sector-specific) will usually cater for horizontal measures like networking, information provision, digitalisation. Of the 30 devoted and highly related to bioeconomy national instruments, only 6 programmes across moderate ecosystems provide information and brokerage information specific to bioeconomy (Figure 16).

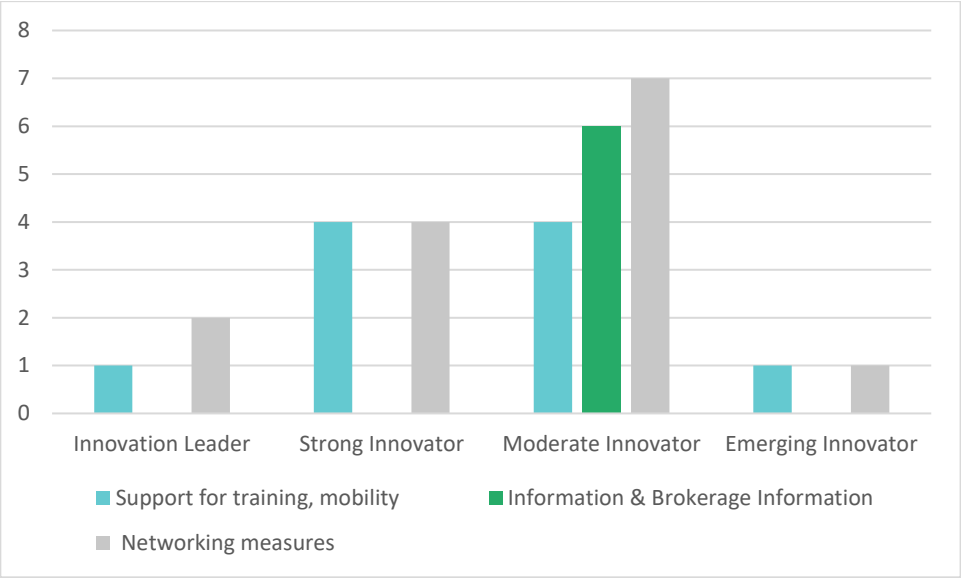

Figure 16 Support for training, mobility, sectoral information and networking in the devoted and highly relevant bioeconomy programmes at national and regional level.
Source: Policy Instruments and Strategies database, ShapingBio

Emerging innovators, such as Bulgaria, Croatia, and Romania, often face challenges in aligning their national and regional financing instruments with the broader goals of bioeconomy innovation. These countries typically have less developed bioeconomy sectors and companies there rely heavily on EU funding instruments such as Horizon Europe and national grants that are often limited in scope. For example, Croatia's bioeconomy strategy primarily focuses on agricultural bioeconomy, with limited national funding available for advanced bio-based innovation. The alignment is often hampered by the lack of comprehensive national strategies and insufficient funding dedicated to bioeconomy innovation, which results in a gap between the needs of innovative companies and the available funding instruments. In addition to the challenges of aligning national and regional financing instruments with broader bioeconomy goals, the lack of infrastructure for scaling and pre-pilot setups in emerging innovators like Bulgaria, Croatia, and Romania further exacerbates this gap. Scaling facilities and pre-pilot programs could provide these countries with the necessary tools to move innovative bio-based technologies beyond the early R&D stages. Moreover, the development of dedicated education programs to ensure that skilled workers are available for the bioeconomy sector is crucial. This would help bridge the gap between innovative potential and market readiness, creating a more conducive environment for bioeconomy growth in these regions.

Countries classified as moderate Innovators, such as Estonia, Portugal, and Spain, have made more progress in aligning their financing instruments with bioeconomy objectives. These countries typically have specific national programs aimed at fostering innovation in the bioeconomy sector, although the scope and scale of these programs can vary. For instance, Spain has implemented regional programs that support bio-based innovations, particularly in the agricultural sector. However, the alignment with EU strategies is sometimes fragmented, with regional differences in the focus and availability of funds. Estonia, despite being a small country, has successfully attracted significant investments in bioeconomy, especially in food logistics, showing a better alignment between national priorities and available funding instruments.

Countries like Germany, France, and Ireland, classified as strong innovators, exhibit a higher degree of alignment between their national/regional financing instruments and bioeconomy innovation goals. Germany, for example, has well-established programs that provide substantial funding for bio-based industries, with a focus on scaling up innovative technologies. The Bioeconomy Strategy 2030 of Germany aligns closely with the EU's Green Deal and Circular Economy Action Plan, ensuring that national funds complement EU instruments effectively. France also has a robust alignment between its national strategies and regional funding instruments, particularly through initiatives like France's Investment for the Future program, which funds bioeconomy projects that contribute to sustainable development.

Case study: Bioeconomy on Marine Sites Association (BaMS) in Germany

The Bioeconomy on Marine Sites Association (BaMS) represents a robust example of how national and regional financing instruments can align to support innovation in the bioeconomy, specifically within the blue bioeconomy sector. Managed by Kiel University and funded by the Federal Ministry for Education and Research (BMBF) in Germany, BaMS is focused on developing sustainable aquatic circular economies involving fish, mussels, and algae. The program exemplifies the strategic alignment of financing instruments with national bioeconomy goals, emphasizing ecological sensitivity and sustainability.

Programme Structure and Implementation: BaMS operates within Northern Germany but extends its impact across the entire federal territory, demonstrating the effective alignment of regional and national objectives. The program's funding structure, supported by a €20 million investment from the BMBF, is designed to foster collaboration between universities, research institutions, and companies. This collaborative approach ensures that both academic research and industrial innovation are adequately supported, with a specific focus on integrating material and energy flows across various sectors, including agriculture, water management, renewable energy, and climate protection.

The program's application process is streamlined to enhance accessibility, starting with a three-page draft submission, which is reviewed for alignment with the pre-established BaMS roadmap. This process highlights the importance of having a clear strategic framework that guides funding decisions, ensuring that projects contribute to the broader goals of sustainability and bioeconomy development.

Challenges and Flexibility: Despite its strengths, BaMS also illustrates some challenges related to the rigidity of funding schemes. The requirement that companies must always be involved, with research institutions receiving 100% funding, while companies receive only 50%, can create barriers for smaller enterprises. Additionally, the administrative burden associated with reallocating funds for unforeseen needs during the project lifecycle is significant. This rigidity can stifle innovation by limiting the flexibility needed to respond to new insights or opportunities that arise during project implementation.

Impact and Alignment: BaMS has successfully supported projects like OptiRAS, which focuses on the effective use of residual flows in an integrated saltwater aquaculture system. The project integrates the cultivation of salt-tolerant plants and the production of biochar fertilizer, contributing to resource-efficient food production. This outcome exemplifies how aligned financing instruments can drive impactful, sustainable innovations within the bioeconomy.

Overall, BaMS serves as a case of how national and regional financing instruments can be effectively aligned to support the development of the bioeconomy. Despite its contributions to blue bioeconomy research, the program faces challenges in attracting significant venture capital attention. However, it highlights the need for greater flexibility in funding mechanisms to accommodate the dynamic nature of innovative research and development projects.

Innovation Leaders, such as Denmark, Finland, and the Netherlands, demonstrate the highest level of alignment in financing instruments for bioeconomy. These countries have successfully integrated bioeconomy goals into their broader innovation strategies, ensuring that funding is available across all stages of the innovation pipeline, from early-stage R&D to commercialisation. Finland's Bioeconomy Strategy, for example, emphasises the importance of public-private partnerships, reflected in the alignment of regional funds with national strategies that prioritise bio-based industries.

The Netherlands' PlanetB.io, located on the Biotech Campus Delft, functions as a hub for open innovation, particularly focused on advancing industrial biotechnology. It facilitates collaboration between companies, research institutions, and governments, ensuring a strong alignment between public funding and private investment. Similarly, Denmark's BioInnovation Institute (BII) serves as a cornerstone of its bioeconomy ecosystem, offering incubation, funding, and support for startups in life sciences and biotechnology. These initiatives highlight how lead innovators align dedicated funding streams with private financiers, creating a cohesive and well-supported funding ecosystem that advances bioeconomy innovation.

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4. Private bioeconomy financing in the EU innovation ecosystems

Private financing plays a critical role in advancing the bioeconomy within the EU, providing essential capital for startups and established companies alike as they navigate the path from innovation to commercialisation and growth. Unlike public funding, which often targets early-stage research and development, private investment typically focuses on scaling up and market entry, driving growth in a competitive landscape. In recent years, there has been a growing interest from venture capital, private equity, and corporate investors in bioeconomy sectors such as biotechnology, sustainable agriculture, and bio-based products. These investments are instrumental in bridging the funding gap that public resources alone cannot cover and are relevant to all stages of company development in bioeconomy. As a result, private financing not only complements public initiatives but also accelerates the pace of innovation and commercialisation within the bioeconomy across the EU.

4.1 Adequacy of private bioeconomy financing

The adequacy of private financing for bioeconomy companies was explored with a focus on the type, origin, extent and distribution of private investments across the EU bioeconomy innovation ecosystems. We examined the key investors in the European bioeconomy and the distribution of investment sources, offering insights into the adequacy of private financing in supporting the growth and innovation within the sector.

Investors in the EU bioeconomy

Bioeconomy companies use various funding sources to advance their innovation projects. In accordance with the data obtained in the 2024 Dealroom harvest, the investment funds hold the biggest share in the bioeconomy private investments in 2991 reported investments (Figure 17).

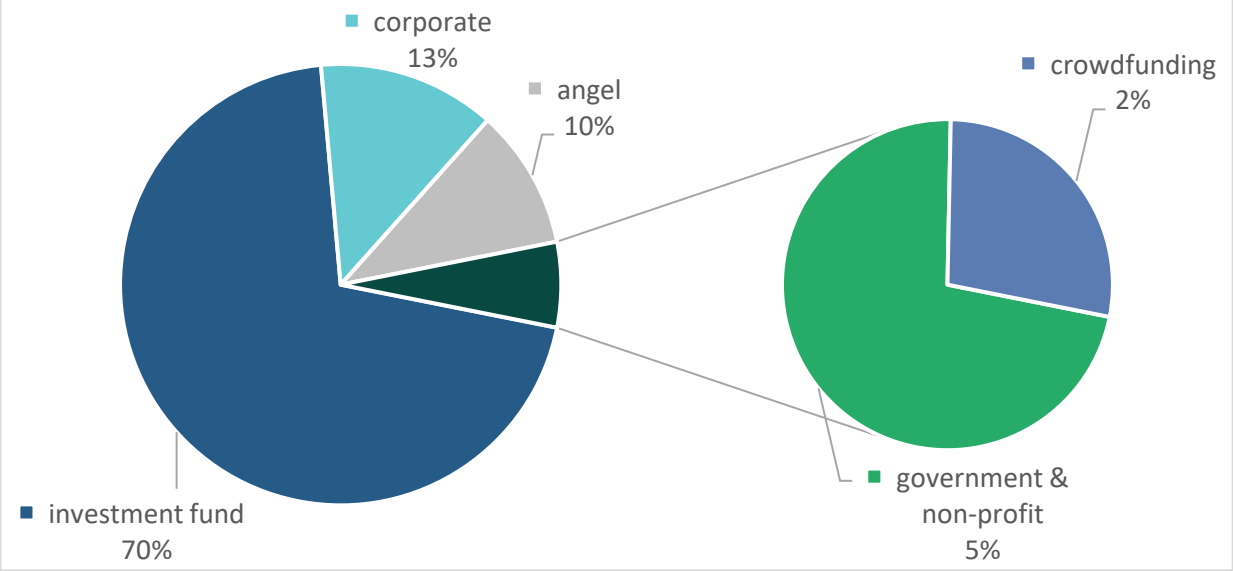

Figure 17 Share of type of investments in the total number of investments in the EU bioeconomy.
Source: Dealroom.co

Companies across all bioeconomy ecosystems in the EU secure funding from private investors situated both domestically and internationally, including global investors (Figure 18). Close to three-quarters of the investors' HQ in the EU bioeconomy are located outside Europe, estimated by the amount of the investments. Of the private investment round financed by an investor outside Europe, the most significant share hod the USA with a little over 36% of the total investment sum.

The investments from investors with HQ in the EU come predominantly from strong (9% of the total sum of investments) and lead innovators (5,7%). Moderate innovators hold 0,8% of the sums of private investments in the bioeconomy, while emerging innovators – less than 0,1% of the total sum of investments.

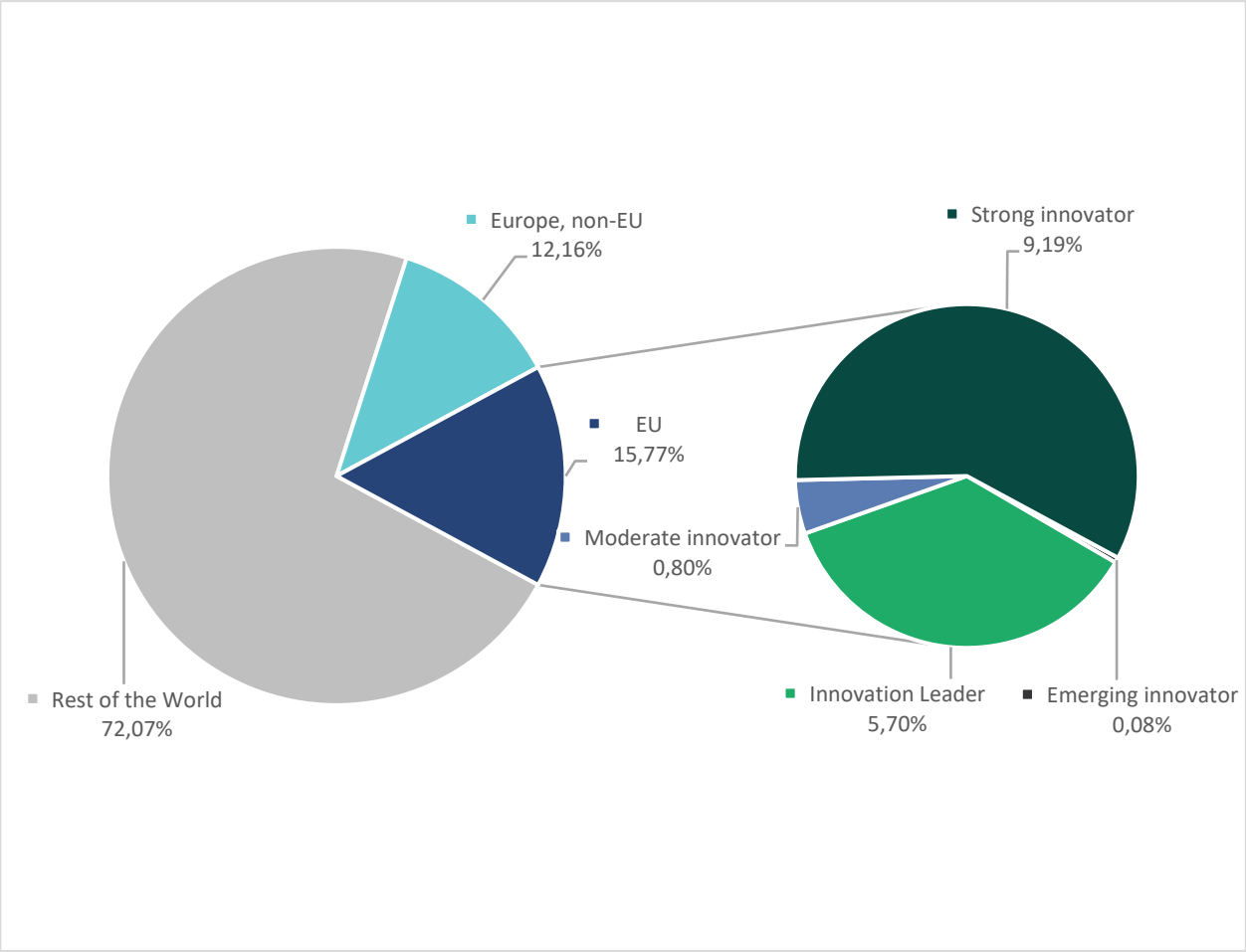

Figure 18 HQ of investors in the EU bioeconomy by sum of investment amounts.
Source: Dealroom.co

Estimated by the number of rounds, the EU private investors hold significant part (68,64%) of the reported deals, with the strong innovators contributing to 42,62% of the number of the investment rounds made in the EU bioeconomy, lead innovators to 36,17%, moderate to 19,09% and emerging innovators to 4,38%. There is no data for 4,51% of the total number of rounds. This could be interpreted as the EU investors in bioeconomy take part in many deals with numerous investments, in syndicates, investing in early-stage companies, and are risk averse. The investors from outside the EU invest in more mature companies.

The top 20 European investors in the European bioeconomy in terms of number of participations in investment rounds are presented on Table 3. Public institutions (institutional investors, NPBIs, EU instruments) play a key role in de-risking investments in bioeconomy and still steer and encourage private investments in bioeconomy rounds.

EU instrument | National Promotional Bank
National Investment instrument | Private investor

	Investor Name	# of Rounds	% of Total
1	Bpifrance	42	1.40%
2	Diputación Foral de Bizkaia	34	1.14%
3	EIT InnoEnergy	19	0.64%
4	Invest-NL	16	0.53%
5	Demeter Partners	16	0.53%
6	Crowdcube	13	0.43%
7	VF Venture (Vækstfonden)*	11	0.37%
8	Übermorgen Ventures	11	0.37%
9	Speedinvest	11	0.37%
10	Norrsken VC	10	0.33%
11	Five Seasons Ventures	10	0.33%
12	European Circular Bioeconomy Fund (ECBF)	10	0.33%
13	EUSPA	10	0.33%
14	Business Finland	10	0.33%
15	Big Idea Ventures	10	0.33%
16	Tesi	9	0.30%
17	FoodLabs	9	0.30%
18	CDTI	9	0.30%
19	Export and Investment Fund of Denmark*	9	0.30%
20	Astanor Ventures	9	0.30%

Table 3 Top 20 investors in the European bioeconomy by number of investment rounds.
Source: Dealroom.co
* At the time the investment deal was reported, VF Venture (Vækstfonden) and the Export and Investment Fund of Denmark were operating as separate entities. However, the Export and Investment Fund of Denmark now integrates both.

Eighty-six private investors participated in 5 or more investment rounds of the total number of rounds raised.

Companies in the EU bioeconomy

Following the examination of private investors in the EU bioeconomy, it is essential to consider the perspective of the companies that seek and utilise these investments. Understanding the distribution and dynamics of funding rounds across different types of innovators provides insights into the adequacy and accessibility of private bioeconomy financing in the EU related to the company development stage.

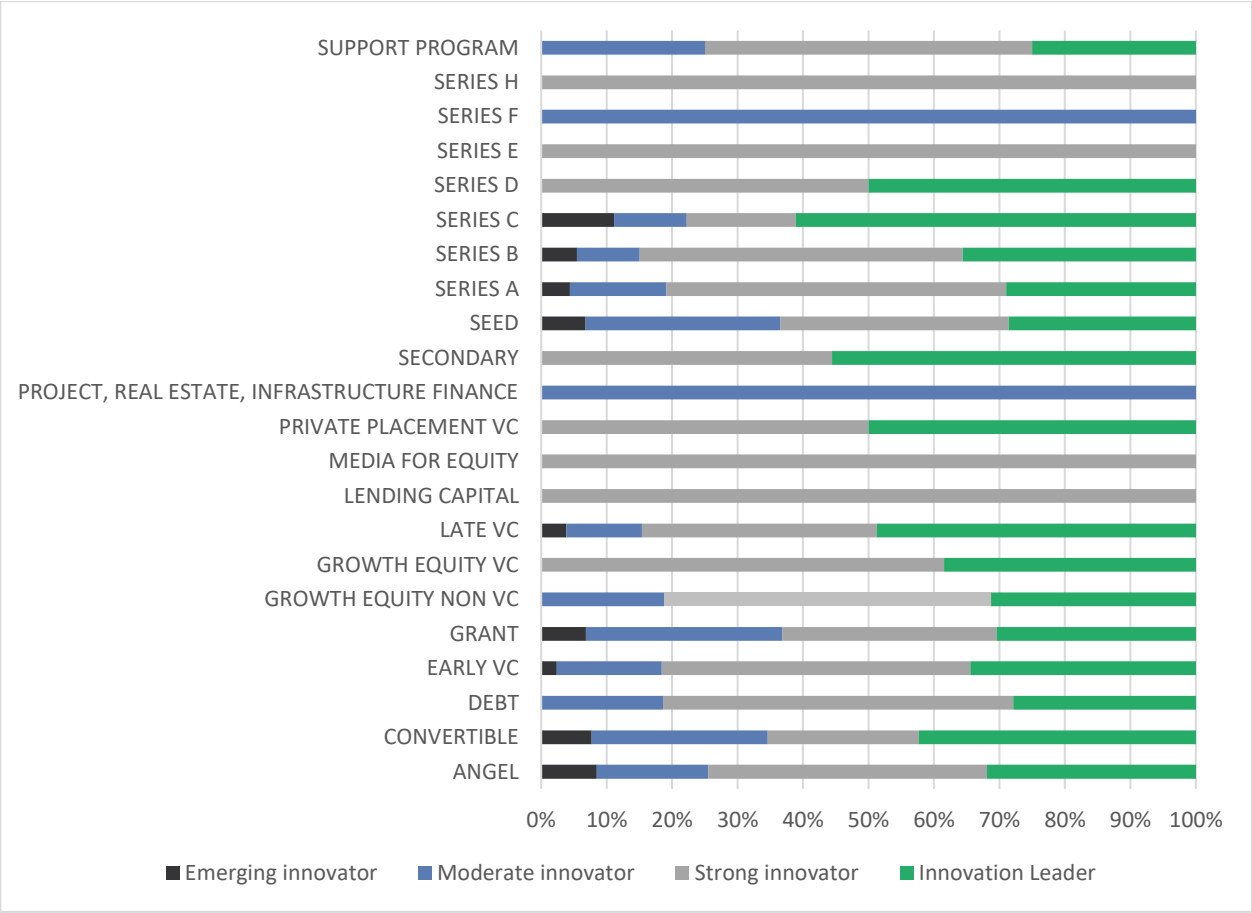

Figure 19 Company development stage related to type of investment round across bioeconomy ecosystems
Source: Dealroom.co

Companies from lead innovators, which include Denmark, Finland, the Netherlands, Belgium, and Sweden, exhibit robust participation in both early and later-stage financing rounds. They are particularly active in Seed (168 rounds) and Early VC (73 rounds) stages, demonstrating strong foundational support for startups. Later-stage investments are also well-represented with Series A (53 rounds) and Series B (26 rounds), indicating a comprehensive ecosystem that supports companies from inception through growth phases (Figure 19)

Strong innovators, represented by Austria, Cyprus, France, Germany, Ireland, and Luxembourg, show a high concentration of funding in early-stage rounds such as Seed (205 rounds) and Early VC (100 rounds). They also maintain substantial engagement in Series A (95 rounds) and grant funding (72 rounds). This indicates a supportive environment for scaling bioeconomy companies, although their presence in later stages like Series C (3 rounds) and beyond is less pronounced compared to lead innovators.

Moderate innovators, including Czechia, Estonia, Greece, Hungary, Italy, Malta, Lithuania, Portugal, Slovenia, and Spain, participate actively in Seed (175 rounds) and grant funding (66 rounds). Early VC rounds (34 rounds) are also notable, reflecting reasonable access to early-stage financing. However, their engagement in more advanced stages like Series A (27 rounds) and Series B (7 rounds) is modest, suggesting that while initial support is available, scaling opportunities may be less accessible.

Emerging innovators, which encompass Bulgaria, Croatia, Latvia, Poland, Romania, and Slovakia, have limited access across all financing stages, with a focus on Seed (40 rounds) and grants (15 rounds). Early VC (5 rounds) and Series A (8 rounds) investments are minimal, highlighting the need for enhanced access to diversified private financing options. The limited number of rounds across most categories underscores significant challenges in attracting and securing comprehensive funding for bioeconomy initiatives in these regions.

To address this investment ecosystem disparity, it is crucial to highlight the role of policy support in bridging gaps between developed and emerging ecosystems. While lead and strong innovators benefit from well-established funding structures, emerging ecosystems, such as those in Bulgaria, Croatia, Latvia, Poland, Romania, and Slovakia, face considerable limitations in accessing diversified financing options. This underlines the need for tailored policy interventions to build capacity, develop investment ecosystems, and enhance access to both public and private funds. Such support could include initiatives that foster investor networks, create specialized funds, and provide targeted grant mechanisms aimed at strengthening financial infrastructure in these less-developed regions. Expanding these resources will ensure that bioeconomy startups in emerging ecosystems have better opportunities to scale and contribute to the overall European bioeconomy.

The differences across the innovation ecosystems with the most developed bioeconomy in terms of variety of funding rounds in bioeconomy, amount and number of deals may also come from the differences in the bioeconomy industry volume in the ecosystem, its maturity and access to international markets historically. These are probably the reasons behind the data for emerging and moderate ecosystems suggesting bioeconomy financing at national level with modest number of financing rounds and financing amounts, on condition that all deals were proportionately reported. The grants are a notable part of the financing rounds in all ecosystems suggesting that the financing available from Europe-wide programmes like Horizon Europe are on the radar of the bioeconomy stakeholders. The reasons why in some innovation ecosystems they are more successful in accessing finance from grants may suggest higher awareness on the financing opportunities at European level combined with more targeted policies in individual countries resulting in better finance absorption capacity of the ecosystems. The proportion of higher amounts for individual deals in early company development stages could be a result of more developed technology transfer and commercialisation mechanisms in research, development and investment (Figure 20).

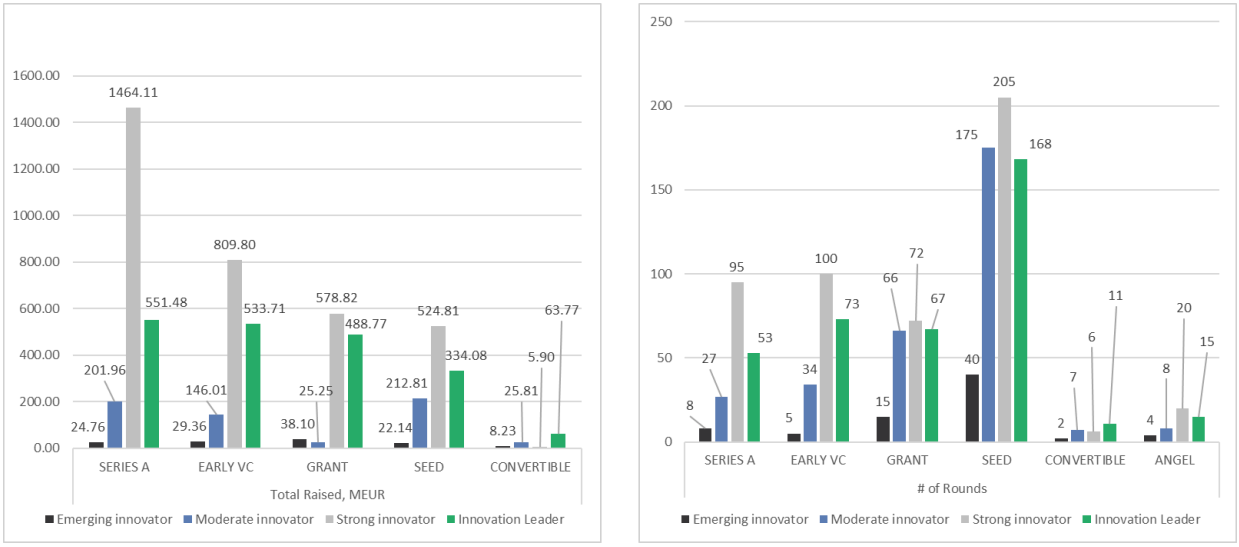

Figure 20 Early-stage financing amounts (left) and number of rounds (right) across the EU bioeconomy ecosystems.
Source: Dealroom.co

The companies listed in Table 4 are those that raised the most investment rounds and amounts within bioeconomy-related sectors. These companies are involved in various bioeconomy areas, ranging from renewable energy technologies to sustainable food production and biotechnology. Highlighting these specific bioeconomy investment cases allows for a focused view of how investment is being distributed in this critical sector, ensuring that the table clearly reflects its relevance to bioeconomy stakeholders.

Table 4 Top 20 companies with 5 or more investment rounds raised in 2021-24.
Source: Dealroom

No	Companies	Country HQ	% of total amount raised	Total amount raised in 2021-24, MEUR	% of # of Rounds	Number of Rounds Raised in 2021-24
1	Flink	Germany	5.30%	1,141.64	0.32%	5
2	Sunfire	Germany	4.08%	879.00	0.38%	6
3	Oda	Finland	2.28%	490.16	0.32%	5
4	Again	Denmark	0.64%	136.78	0.32%	5
5	neoom	Austria	0.44%	95.60	0.32%	5
6	Heüra	Spain	0.39%	83.59	0.38%	6
7	Focused Energy	Germany	0.36%	76.70	0.32%	5
8	Onego Bio	Finland	0.30%	65.00	0.32%	5
9	Solar Foods	Finland	0.29%	63.00	0.32%	5
10	LiveEO	Germany	0.28%	60.11	0.32%	5
11	Enifer	Finland	0.22%	48.20	0.32%	5
12	constellr	Germany	0.18%	38.06	0.38%	6
13	Cuyna	Spain	0.12%	25.94	0.32%	5
14	Fresh Inset	Poland	0.07%	15.11	0.32%	5
15	Melt&Marble	Sweden	0.04%	9.26	0.32%	5
16	Odd.Bot	Netherlands	0.03%	5.85	0.32%	5
17	HAWK Biosystems	Spain	0.01%	2.83	0.32%	5
18	Trabotyx	Netherlands	0.01%	1.78	0.32%	5
19	Composite Recycling Sàrl	Ireland	0.00%	0.39	0.32%	5

The companies that raised 5 and more rounds are also in the list of top 20 companies in terms of amounts raised. Three companies from Spain (moderate) and 1 from Poland (emerging innovator) are in this list. The remaining 16 companies' HQ are situated in countries of strong and lead innovators.

Identified gap: financing of commercialisation of R&D and scaling up in bioeconomy

The commercialisation of R&D and scaling up within the bioeconomy sector relates to the adequacy of bioeconomy financing. Despite substantial innovation and research activity in sectors relevant to bioeconomy, the transition from R&D to commercial viability remains challenging due to the high capital requirements and long timelines involved. Private investors often hesitate to finance the later stages of bioeconomy projects, particularly in the scaling and commercialisation phases, due to perceived risks and the extended time required to see returns on investment.

Feedback from ShapingBio interviews highlighted that while there is sufficient early-stage funding, there is a significant shortfall in financing for the critical scale-up phase, where substantial capital is required to build infrastructure, enter the market, and achieve commercial viability. This gap is exacerbated by the complexity and specificity of bioeconomy technologies, which require investors to have specialised knowledge and confidence in the sector's long-term potential. Consequently, many promising bioeconomy innovations struggle to secure the necessary funding to reach the market, leading to a disconnect between research achievements and their practical application in the industry.

Women in bioeconomy

Another aspect of the EU bioeconomy landscape is the involvement of women entrepreneurs as founders and co-founders of companies (Figure 21). Of the reported founders' and co-founders' sex, the proportion of women is around 11,5% based on the reported research data for all types of innovation ecosystems. Of those who reported, those who chose "none of the options" options are around 0,3%.

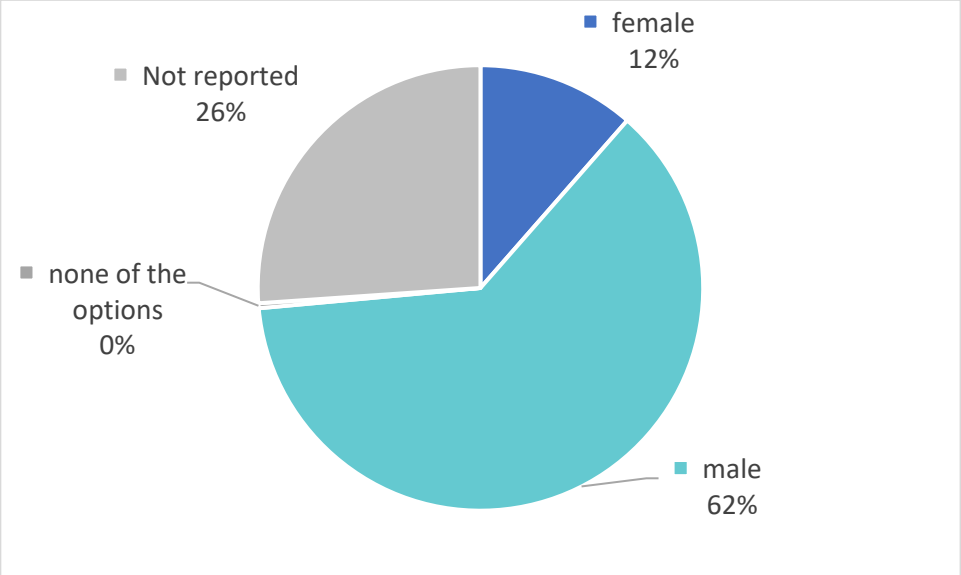

Figure 21 Women founders and co-founders share in the researched bioeconomy companies.
Source: Dealroom

This graph is based on the reported 5054 employees in the researched 1060 bioeconomy companies.

Bioeconomy sectors

The financing rounds research data on Dealroom indicates that companies in the food sector are the most active participants in the EU bioeconomy, with 476 funding rounds (Figure 22), highlighting significant investment interest and growth potential in this industry. Clean Energy & Biofuels also represent a major sector, with 385 rounds, emphasizing the EU's focus on sustainable energy solutions within the bioeconomy framework.

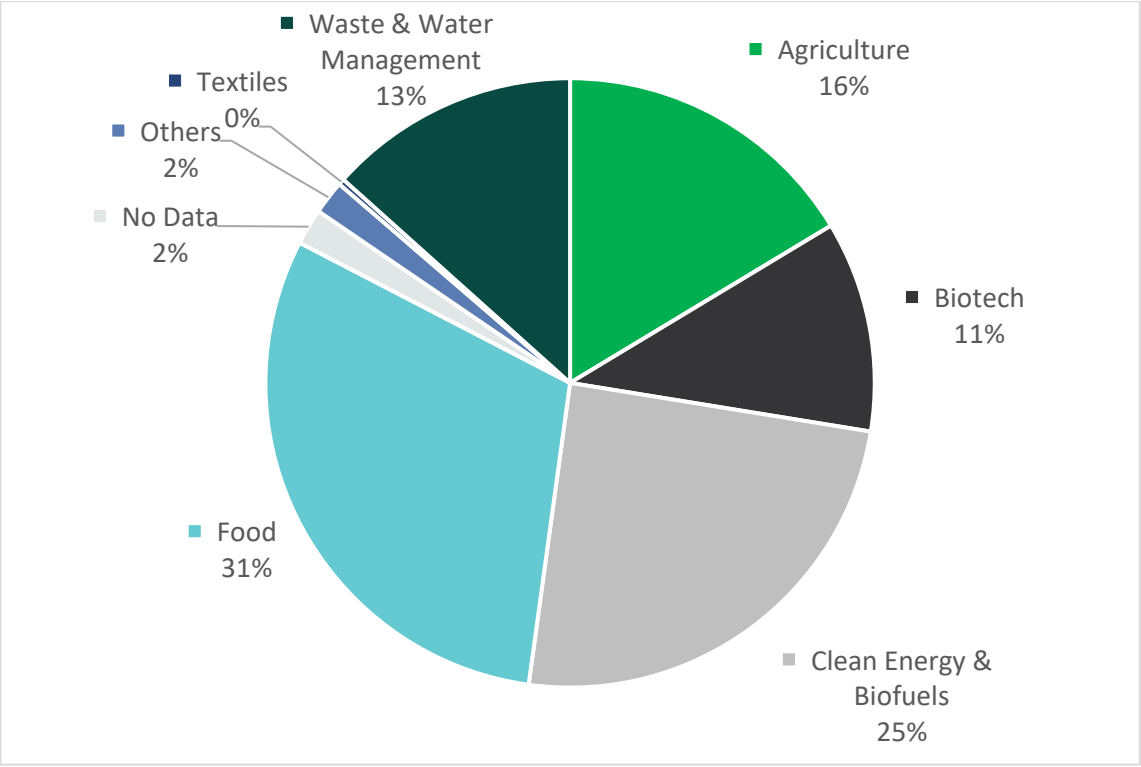

Figure 22 Industries in the EU bioeconomy represented by number of investment rounds.
Source: Dealroom.co

Agriculture, with 256 rounds, and Waste & Water Management, with 209 rounds, demonstrate substantial involvement, reflecting the EU's broader sustainability and resource efficiency goals. Meanwhile, biotech companies, with 175 rounds, show a robust but comparatively smaller level of engagement, indicating a developing but promising area within the bioeconomy.

The presence of categories with fewer rounds, such as Textiles (5 rounds) and Others, including (28 rounds), suggests niche opportunities or emerging sectors within the bioeconomy. The "No Data" category with 30 rounds indicates some gaps in data reporting, which could affect the overall analysis and understanding of sector-specific investment dynamics.

As per adequacy of financing for the bioeconomy industries (Figure 23), **c**ompanies in innovation leader countries, primarily Denmark, Finland, the Netherlands, Belgium, and Sweden, dominate across most sectors, especially in Clean Energy & Biofuels and Food. This indicates strong accessibility to private financing, aligning with their advanced innovation ecosystems. The significant presence across diverse sectors suggests that companies from these countries are well-positioned to secure funding for various bioeconomy initiatives.

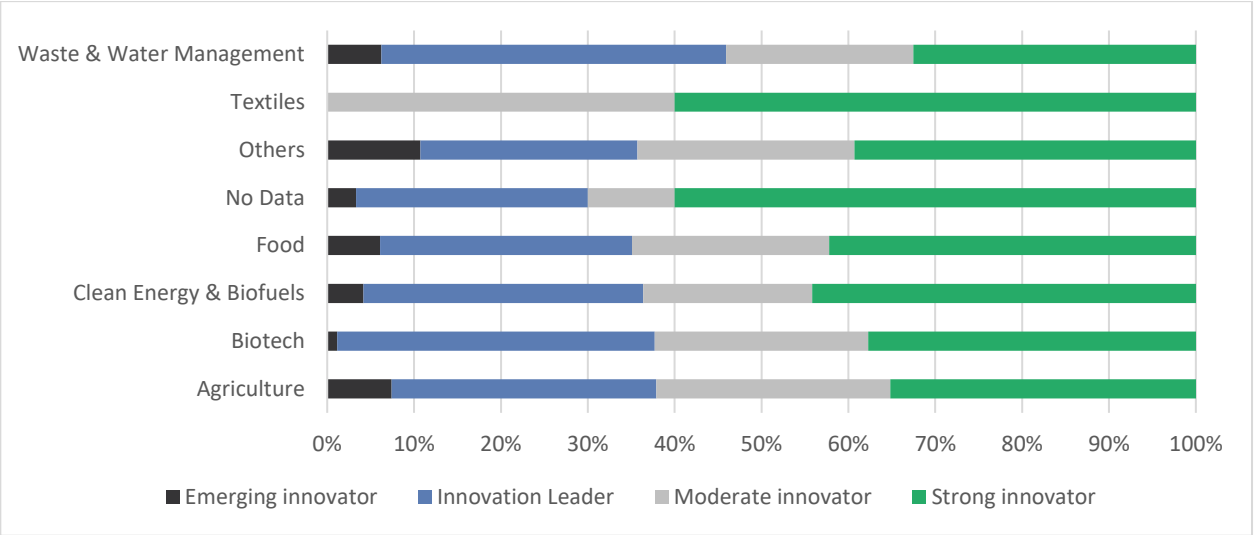

Figure 23 Number of investment rounds in bioeconomy industries
Source: Dealroo.co

In countries like Germany, France, and Ireland, categorized as strong innovators, investments are heavily represented in sectors such as Food, Agriculture, and Biotech. This group's substantial involvement across multiple bioeconomy sectors underscores their relatively high access to private financing. However, their lower participation in Waste & Water Management compared to other sectors suggests potential gaps in financing accessibility for niche areas.

Moderate innovators, including Czech Republic, Estonia, and Spain, have noticeable participation in sectors like Food and Agriculture but are less prominent in areas such as Waste & Water Management and Biotech. This pattern indicates moderate accessibility to financing, with potential challenges in accessing funds for more specialized or emerging bioeconomy sectors. Companies from these countries may need additional support to fully engage across all bioeconomy sectors.

Emerging innovators, including Bulgaria, Croatia, and Romania, show the lowest levels of participation across most sectors. Their presence is especially limited in high-investment areas like Clean Energy & Biofuels and Biotech, highlighting significant barriers to financing accessibility. The minimal representation suggests that companies from these countries face considerable challenges in securing private investments, limiting their potential to scale and innovate within the bioeconomy.

4.2 Accessibility of private bioeconomy financing

An EU bioeconomy company must be aware of the opportunities for financing relevant to their individual needs, specific for bioeconomy. The accessibility of private bioeconomy financing across EU countries reflects the innovation potential and capacity of emerging, moderate, strong innovators, and innovation leaders. It highlights the significant disparities in funding accessibility, revealing that innovation leaders and strong innovators have considerably better access to private investments, while moderate and emerging innovators face substantial challenges in securing financing for their bioeconomy initiatives.

Private bioeconomy financing in the EU across innovator types

There are distinct disparities in financing accessibility across the different categories of innovators. Innovation leaders and strong innovators have notably better access to private bioeconomy financing, evidenced by higher funding amounts and more frequent investment rounds (Figure 24).

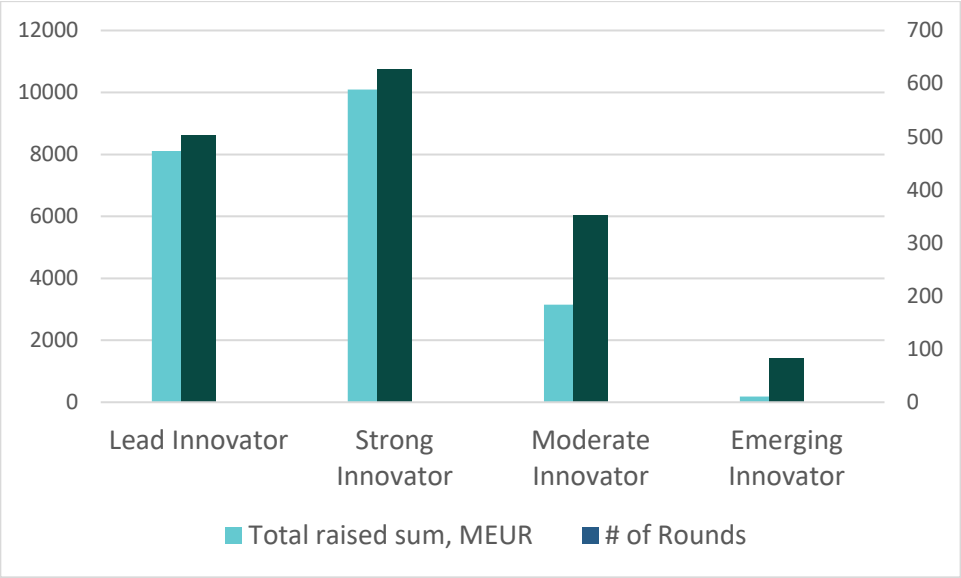

Figure 24 Total amounts and number rounds raised per ecosystem, all deals.
Source: Dealroom

Innovation leaders exhibit the highest accessibility to bioeconomy financing, with substantial total amounts raised and significant numbers of investment rounds (Figure 25). The Netherlands (€3,896.16 million, 173 rounds) and Sweden (€960.45 million, 122 rounds) exemplify robust funding environments, driven by established innovation ecosystems and strong investor engagement. This indicates a highly accessible financing landscape for bioeconomy projects, supported by mature financial markets and substantial investor confidence.

Strong innovators also show considerable access to bioeconomy financing, with Germany (€4,761.43 million, 256 rounds) and France (€4,250.61 million, 289 rounds) leading in both total funding and number of rounds. This group's performance underlines their competitive position in the bioeconomy financing space, reflecting strong innovation systems and favourable conditions for attracting private investment.

Moderate innovators display a mixed performance in bioeconomy financing accessibility. Spain (€889.88 million, 184 rounds) and Estonia (€1,527.12 million, 25 rounds) highlight relatively successful cases within this group, suggesting that some moderate innovators can secure significant investments. Estonia's notably high total funding amount is primarily driven by the largest investment in Europe in 2024 within the food logistics sector, significantly boosting its total bioeconomy financing. However, other countries like Greece (€15.61 million, 7 rounds) and Hungary (€7.87 million, 9 rounds) face challenges, indicating variability in financing accessibility linked to differing innovation capacities and economic conditions.

Emerging innovators encounter the most pronounced challenges in accessing bioeconomy financing, with consistently low amounts raised and few investment rounds. For instance, Latvia (€0.43 million, 5 rounds) and Slovakia (€33.46 million, 5 rounds) illustrate limited access to private investments, reflecting underdeveloped innovation ecosystems and less mature financial markets. This group’s struggle to attract funding emphasises the need for enhanced support to improve financing accessibility and investor confidence.

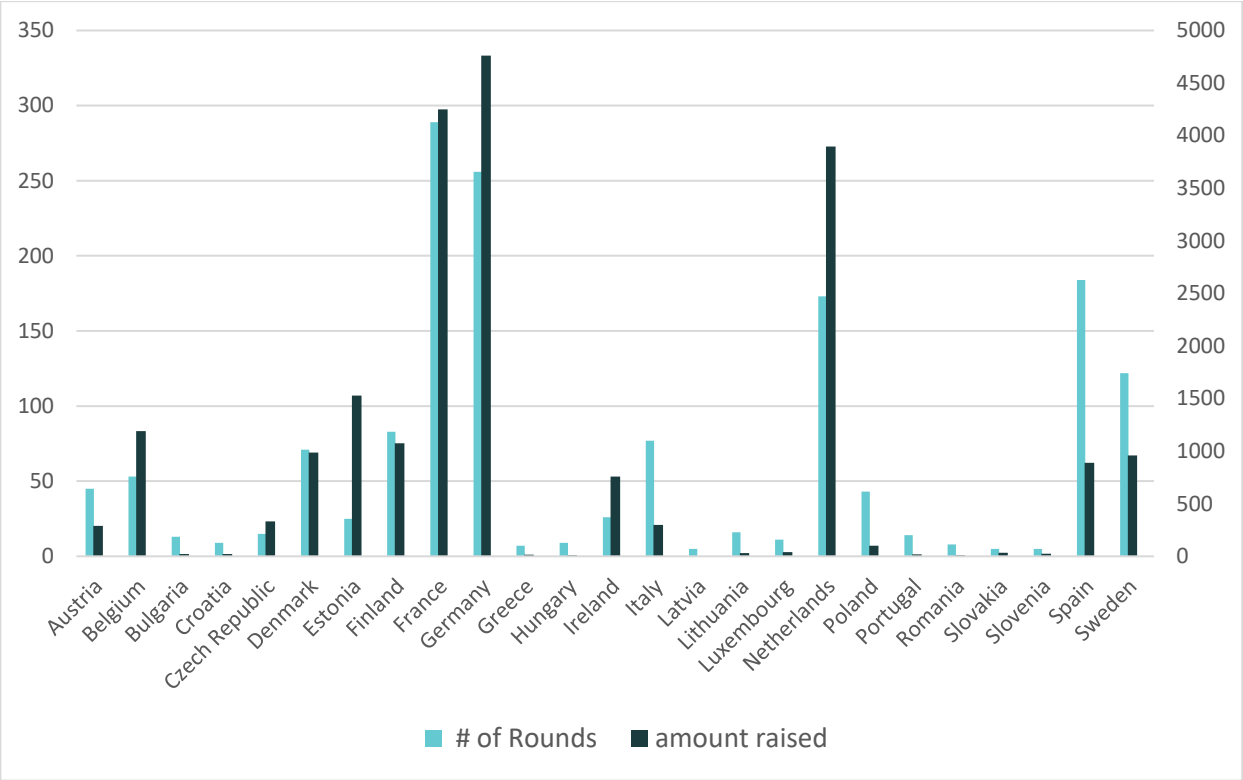

Figure 25 Total amounts and number of deals raised per country, all company development stages. Source: Dealroom

To address the challenges faced by the companies and improve bioeconomy financing accessibility, the role of institutional and public investors becomes critical in attracting private investments across the innovation ecosystems. Initiatives at the EU level, such as Scaling Clubs or Bioeconomy Hubs, could play a pivotal role in fostering local and regional investment ecosystems. These platforms would not only connect entrepreneurs with the right funding opportunities but also provide the necessary mentorship and support to prepare them for investment readiness. Such initiatives would strengthen the alignment between public and private funding sources, enhancing the capacity of emerging and moderate innovators to secure financing both within their local ecosystems and on an international scale.

Pilot plants

The observed variations in financing accessibility across different types of sectors and deals in bioeconomy directly impact the ability of companies to scale their operations and access critical resources such as pilot plants. For innovation leaders and strong innovators, the availability of private financing not only supports broader sectoral engagement but also facilitates scaling up from laboratory to pilot and demonstration stages, which are essential for commercialising and validation of new technologies. In contrast, companies in moderate and emerging innovator countries, with their more limited access to funding, often struggle to bridge the gap between early-stage development and scaling. This lack of financial support can hinder their ability to access pilot plants and other crucial infrastructure, thereby stalling the progression of their innovative projects. Strengthening the funding landscape and improving access to pilot plants could significantly enhance the scaling potential for companies in these regions, enabling them to compete more effectively within the broader EU bioeconomy.

In 2019, a survey was conducted in 11 countries, across northern, central and southern Europe and several others from across the globe by NNFCC. It aimed to understand the requirements of industry participants regarding the scaling-up of new bio-based processes or products within the context of the BBI JU Pilots4U project. It revealed that industry respondents, predominantly micro or small businesses and large commercial manufacturers, expressed a strong need for large-scale infrastructure in the next 5 to 10 years.

The mapping and analysis in ShapingBio so far confirm these findings. The main drivers for utilizing open-access infrastructure were lower costs compared to in-house pilot line construction and access to expertise and equipment not available internally. However, concerns about preserving intellectual property (IP) and the cost of accessing open-access centres were identified as barriers. The findings emphasize the importance of effective communication to address misconceptions about the open-access model. Additionally, understanding the specific services valued by industry allows open-access centres to assess their capabilities and tailor their offerings accordingly.

These findings are further reinforced by the results from ShapingBio interviews and survey. The necessity for additional specially dedicated funds for access to pilot plants is the most frequent answer (mode) for public and private investors and second mode for the companies.

A more in-depth analysis on pilot plants is part of the ShapingBio deliverable 2.2 related to R&D and Technology Transfer Analysis.

Investment de-risking and synergies

Investment, de-risking, and synergies are important components in advancing bioeconomy ventures, particularly given the sector's inherent challenges such as high capital expenditures and long timelines (WEF, Accelerating the tech-driven bioeconomy June 2024). Both companies and investors in the ShapinBio interviews and survey highlight the difficulty of securing sufficient funding for large-scale investments, such as pilot plants and scaling operations, due to the significant financial risks involved. Investors often find it challenging to invest in capital-intensive bioeconomy projects, particularly in early stages, without clear exit strategies or de-risking mechanisms. To address these challenges, public and private sectors must collaborate more effectively. Public funding could play a pivotal role in reducing investment risks by providing support for pilot plant facilities, offering more flexible financing mechanisms, and enhancing market development through regulatory support, such as implementing CO_2 taxes to make bio-based alternatives more competitive against fossil-based products.

Synergies between public and private stakeholders can be fostered through better alignment of policies and targeted funding instruments that support high-risk, high-reward investments in the bioeconomy. Both investors and companies suggest that the creation of specialised funds or co-investment opportunities, particularly those that include public capital to mitigate risks, could encourage greater private investment in the sector. Additionally, improving access to technical expertise and fostering stronger networks between investors, startups, and public institutions would enhance due diligence processes and ultimately lead to more informed and confident investment decisions. These synergies, supported by clear, consistent, and flexible regulatory frameworks, could significantly boost the growth and sustainability of the bioeconomy.

The entrepreneurs who responded to our question “Which of the co-investment opportunities with public funds and instruments in bioeconomy on a EU level are you aware of?” are most familiar with the programmes of EIC Fund. The second mode “the European Commission” we interpret as it being generally known funding institution.

In addition to public and private collaboration, comprehensive business support programmes are essential to help bioeconomy ventures navigate their financing and scaling challenges. These programmes should offer a holistic approach, similar to initiatives like PhotonHub Europe (look also at the case study in Chapter 3.1.1) and Phactory in the photonics sector, where companies receive access to pilot plants and technical facilities alongside tailored business support. A complete scheme for product development would not only provide access to essential technical resources for scaling but also guide companies in understanding investment strategies, market access, and deployment. By combining technical upscaling with business upscaling, such programmes would ensure that bioeconomy ventures are better prepared to overcome financial barriers, attract investment, and successfully transition from R&D to commercial viability. This dual support framework would strengthen the entire innovation ecosystem, enhancing the competitiveness of bio-based products and services.

To ensure a balanced perspective, it is important to acknowledge that while the analysis highlights public funding mechanisms as pivotal in de-risking and catalysing private investment in bioeconomy ventures, this emphasis stems from the scope of the ShapingBio study, which is primarily addressed to the stakeholders from the public and bioeconomy communities, although private investors actively contributed to the study. However, the analysis focuses on identifying further considerations that can be taken within the realm of public financing to address the gaps and challenges highlighted. While private financing mechanisms and contributions are acknowledged, this study primarily examines how public funding can be structured, aligned, and leveraged to complement and catalyse private investment efforts. The goal is to explore solutions that enhance the overall financing ecosystem, with a particular emphasis on public-sector interventions that can de-risk investments and foster synergies between public and private stakeholders. Future analyses could delve deeper into the standalone strategies and mechanisms of private investors to provide a more holistic view of the bioeconomy financing landscape.

4.3 Alignment of private bioeconomy financing

The alignment of private bioeconomy financing within the broader context of European and national strategies presents both opportunities and challenges. The European Union's regulatory environment is designed to foster innovation in the bioeconomy sector. However, private investors often face challenges in aligning their strategies with these regulatory frameworks. The complexity and diversity of regulations across different EU countries create a fragmented landscape, making it difficult for investors to operate uniformly across the region. This is compounded by the need for clarity and consistency in the application of rules such as EU bioeconomy taxonomy, which will enable to standardise what qualifies as sustainable investment but can also impose additional compliance burdens on private financiers.

Feedback from interviews with investors highlights the challenges of navigating these regulatory frameworks, particularly when investing in capital-intensive bioeconomy ventures. Many investors expressed concerns about the lack of alignment between public investment and bioeconomy market needs and priorities. They pointed out that while public funds and regulations are crucial for de-risking investments, the process often lacks flexibility and is burdened by bureaucracy. For instance, investors called for more streamlined application processes and clearer communication from public institutions to reduce the complexity and time required to secure co-investments. Moreover, the need for consistent support structures, such as pilot plants, bioeconomy valleys and innovation hubs, was emphasised as a way to foster collaboration between private investors, SMEs, and research institutions, thereby enhancing the effectiveness of bioeconomy financing across Europe. The alignment between private financing strategies and public policies could be improved by focusing on creating clearer, more accessible pathways for investment, reducing regulatory fragmentation, and ensuring that public funds are used to complement, rather than complicate, private investment efforts.

Combined support from public and private sources in facilitating access to pilot plants and technical facilities, bioeconomy valleys that identify priorities and innovation opportunities, business support and innovation hubs fostering collaborative support for preparation and investment readiness, market access and deployment would be the business support services that may be a combined programme providing all support needed by entrepreneurs by a one stop shop available at EU level.

One possible way to address this in early company stages is to provide integrated support that combines capital with strategic guidance and operational resources. Venture studios help bridge the alignment challenges faced by private investors in navigating complex regulatory environments across Europe. Their model aligns well with the need for more streamlined and flexible financing pathways, as identified in the broader discussion of alignment in private bioeconomy financing, offering a practical example of how private investment can be more effectively coordinated with public policies and regulatory frameworks.

Case study: Venture Studios

Venture studios such as Wilbe Venture Studio, Studio Investments, and Antler Venture Studio represent a dynamic and effective model for fostering innovation in technology-driven sectors and combine capital investment with hands-on operational support. During the MAG discussions, the attention to venture studios was highlighted as an example of setting that can play a critical role in the early stages of startup development, particularly in high-risk, high-reward sectors such as the bioeconomy.

One of the key strengths of venture studios is their integrated approach to startup creation and growth. Unlike traditional venture capital firms, which primarily provide funding, venture studios are deeply involved in the ideation, development, and scaling phases of a startup's life cycle. For example, Wilbe Venture Studio focuses on leveraging science and technology to address global challenges, offering both seed funding and strategic guidance. Similarly, Studio Investments operates across multiple thematic areas, such as sustainability and health tech, providing tailored support to ensure that startups have strong foundations for long-term success. Antler Venture Studio further enhances this model by offering a structured Residency program, where selected entrepreneurs receive mentorship, funding, and access to a global network.

These studios have been instrumental in overcoming common barriers to innovation, such as the high cost of scaling proprietary processes and the complexity of market entry. By offering well-equipped facilities, mentorship, and financial support, venture studios could lower the barriers for startups in the bioeconomy to scale their technologies and achieve market readiness. Additionally, their global reach and thematic focus is bioeconomy, could allow them to align their resources and expertise with the specific needs of the bioeconomy, making them a vital component in the ecosystem of bioeconomy financing.

The success of these venture studios highlights the importance of an integrated support system for bioeconomy that goes beyond mere financial investment. By combining capital with strategic and operational support, these studios could create an environment where innovative bioeconomy startups can thrive, addressing both the technological and market challenges inherent in this sector.

The two main challenges that prevent investors from increasing their investments in their current operational regions revolve around balancing the types of projects and the proximity to the ventures. Investors emphasised the need to diversify their portfolios, avoiding over-concentration in capex-heavy projects and instead seeking a balance between different types of investments. They also highlighted the importance of focusing on projects with clear market potential, which often limits their ability to expand investments. Proximity also plays a crucial role; many investors prefer to invest in ventures that are geographically close to them, allowing for a more hands-on operational approach. As one investor noted in their interview, “the farther they travel, the more disconnected they feel from the company”, which discourages them from expanding their reach. Additionally, the high technology risks associated with early-stage bioeconomy innovations further limit investment growth within these regions, particularly when there is a lack of disruptive technologies and innovative startups.

Investing outside of an investor’s comfort zone – whether in terms of geography, technology, or company development stage – presents additional challenges. One of the main barriers is a lack of networks and reliable partners in unfamiliar regions. Without strong personal relationships and knowledge of local legal frameworks and startup ecosystems, investors are hesitant to venture into new territories. Regulatory risk is another major factor that discourages investors from stepping outside their comfort zones. Uncertainty regarding how regulators will treat new technologies, coupled with a lack of clear information on the policies involved, makes it difficult for investors to commit. Additionally, investors pointed out the necessity of achieving specific financial returns, which requires balancing the risk and return profile of each target. This is compounded by concerns about the risk-return ratio and a lack of private investors in certain regions.

Publicly funded equity programmes can play a pivotal role in fostering collaboration between public and private capital, encouraging private investors to engage with ventures that align with societal and sustainability goals. Rather than acting as a "public insurance" for investors, these programmes aim to de-risk investments in high-potential but challenging sectors like the bioeconomy, while simultaneously advancing public policy objectives. By strengthening the bioeconomy sector and enabling the scaling of

innovative solutions, such programmes contribute to broader societal benefits and sustainable economic growth, ensuring that public funds serve both immediate and long-term interests.

Trust and transparency also emerged as significant issues, with investors calling for more clarity in public funding schemes and the rationale behind institutional support, such as that provided by the EIC. Ultimately, it is a combination of operational limitations, regulatory risk, and a lack of strategic focus that stops investors from exploring opportunities outside their familiar zones.

5. Conclusions

The analysis of bioeconomy financing across EU countries at different innovation stages reveals complex patterns and significant disparities. Emerging innovators face limited access to capital and support, while innovation leaders benefit from well-established funding mechanisms and investor networks. The availability, adequacy, and alignment of financial resources vary widely between early-stage ventures and those in advanced growth phases in all types of innovation ecosystems. Numerous funding mechanisms exist, many do not sufficiently address the specific needs of bioeconomy stakeholders in the particular national or regional bioeconomy ecosystem. While it is commonly understood that innovation leaders like Sweden, Denmark, and the Netherlands prosper from a more robust financing ecosystems, this study uncovers discrepancies where countries typically classified as 'strong innovators' – such as France and Germany – face bureaucratic delays that hamper the rapid scaling of bioeconomy ventures. Conversely, in countries like Estonia, categorised as a 'moderate innovator,' the recent surge in bioeconomy financing, notably through a significant mature investment in the food logistics sector in 2024, demonstrates that even mid-tier ecosystems can outperform expectations under the right conditions. The study highlights the importance of ensuring that financial support is tailored to the innovation ecosystem's progression, particularly in high-risk, capital-intensive bioeconomy sectors such as bio-based chemicals and materials, food, sustainable agriculture, and biofuels. These sectors require significant investment in scaling technologies, infrastructure development, and de-risking mechanisms to ensure that innovative projects can transition from R&D stages to commercial viability.

Availability of funding and progression from emerging innovators to innovation leaders

Emerging innovators face substantial challenges in accessing financing for bioeconomy ventures. Public funding mechanisms are available to all tech companies, but they are often difficult to navigate, with limited private investment options, especially for high-capex projects such as bio-based materials and bioplastics. Moderate innovators have greater access to venture capital and public-private partnerships; however, significant gaps remain in securing adequate funding for pilot plants and infrastructure development. In contrast, innovation leaders such as Sweden and Denmark where both public and private funds are more readily available, still face challenges, particularly in aligning capital with long-term sustainable development goals and scaling infrastructure.

Countries like Bulgaria, Croatia, Poland and Romania with significant potential for bioeconomy development continue to struggle with limited capital access with only 3% of the private investors originating in these countries in the researched bioeconomy deals. Some countries classified as moderate innovators, such as Estonia, Italy, Spain demonstrate that strong policy interventions can create spikes in investment. This complex influence of targeted government measures – education, innovation support, digitalisation – pay off in the medium and long term: in 2024 Estonia is already in the category of the strong innovation ecosystems. While innovation leaders do exhibit more advanced funding ecosystems, as expected, the surprising variability within the 'moderate' and 'emerging' categories calls for a more granular approach in understanding the local and regional dynamics that contribute to unexpected successes or underperformance.

Adequacy of financial support

The study reveals that bioeconomy financing is frequently inadequate, particularly for emerging innovators. In countries like Croatia and Poland, early-stage ventures struggle to secure the necessary funding for R&D and commercialisation. Public funds are often overly focused on short-term outcomes, failing to meet the long-term needs of bioeconomy projects, which typically require extended timelines for development and commercialisation. In moderate innovators like Spain and Greece, scale-up funding is insufficient, with stakeholders expressing the need for more flexible, risk-tolerant investment models. Strong and lead innovation ecosystems such as Germany and Finland and Belgium have more comprehensive funding schemes, but even they report challenges in the adequacy of financial support for large-scale projects and

cross-border collaborations, especially where bureaucratic rigidity limits the reallocation of funds. This may be one of the reasons Belgium qualified to be among the strong innovators in 2024 (being a lead innovator in 2022).

Alignment of bioeconomy financing

Alignment between public and private financing is crucial but remains inconsistent across Europe. In emerging innovators, particularly in Eastern European countries, funding schemes are misaligned with private investment priorities: In emerging innovators like Bulgaria, Croatia, and Romania, national and regional funding programs often focus on short-term public grants, which prioritise research and development that are insufficient to align with the timelines and return expectations of private investors, who seek longer-term commercial viability and clear exit strategies. For instance, private investors require flexible mechanisms that reduce risk and provide scalable opportunities but existing schemes are often too rigid and bureaucratic, limiting investment potential. This misalignment is exacerbated by fragmented regulatory frameworks and the absence of well-defined bioeconomy policies that can attract private capital. Investors in the ShapingBio interviews emphasized the need for co-investment opportunities with clear de-risking mechanisms, such as pilot plants, or tax incentives like CO_2 taxes, which are currently underutilised in these regions. Furthermore, in contrast to countries like the Netherlands and Denmark, where public and private sectors collaborate more effectively, emerging innovators struggle with inconsistent strategies that fail to integrate private sector needs into public funding structures. As a result, private investors are hesitant to commit, leaving many bioeconomy ventures underfunded at crucial stages of their development.

The complexity of the EU taxonomy and varying regulatory requirements across countries create significant barriers to investment. This misalignment is less pronounced in innovation leaders like the Netherlands, where clearer strategies and more cohesive public-private collaboration exist. However, even in these countries, the rigid regulatory frameworks and fragmented national policies still hinder seamless investment flows. Stakeholders from both public and private sectors in countries like Austria, France and Germany call for simplified and harmonised regulations to reduce administrative burdens and foster easier access to bioeconomy funding.

With the support of training, mobility, sectoral information and networking in the devoted and highly relevant bioeconomy programmes at national and regional level in the moderate innovators, there is huge potential for bioeconomy development. The success of Estonia illustrates that with the right policy alignment and private sector engagement, significant bioeconomy investment can be unlocked even in less mature ecosystems, offering a blueprint for other moderate innovators.

Identified gaps and recommendations

Gaps in bioeconomy financing are especially stark for emerging and moderate innovators. For example, companies in Hungary (moderate) and Slovakia (emerging innovator) report difficulties in securing early-stage financing due to the high-risk profile of bioeconomy projects. While public funds are available, the process to secure them is often bureaucratically complex, deterring smaller startups. Even in strong innovators like France, stakeholders express frustration over the slow approval process for public funds, which limits their ability to scale quickly and take advantage of market opportunities. To bridge these gaps, the study recommends creating more tailored financial instruments that focus on early-stage companies, increasing public-private partnerships that mitigate risk, and improving regulatory coherence across the EU to facilitate cross-border investments.

While there are significant bioeconomy financing opportunities across Europe, they remain unevenly distributed and inadequately aligned with stakeholder needs. By addressing these gaps through targeted financial support and regulatory alignment, the EU and national governments can better enable the bioeconomy sector to thrive across all stages of innovation.

Based on the bioeconomy financing analysis in this document, we already have some hints for recommendations towards improving bioeconomy financing, both public and private.

Please note that the main focus of the following recommendations addresses policy makers, mainly directly resulting from the investor and companies view, as we regard it as important to directly summarise those insights. A more comprehensive set of proposals to be developed in future ShapingBio activities, ensuring

they are informed by continued analysis, synthesis with the other topics on analysis and engagement of different stakeholder groups.

Gaps and recommendations

1. **Time lag between the definition of EU framework programmes** and the start of EU-financed bioeconomy project implementation: the gap between the definition of Work Programmes and the start of EU-financed bioeconomy project implementation creates several challenges that affect the efficiency and relevance of funding for bioeconomy ventures. Multi-year framework programmes like Horizon Europe take a significant amount of time to develop, negotiate, and roll out. For example, the timeline from the initial proposal of Horizon Europe in 2018 to its eventual adoption in 2020 illustrates the inherent delays in such complex funding mechanisms.

Recommendations:

- Introduce adaptive work programmes: work programmes should include built-in mechanisms that allow for periodic reviews and adjustments based on emerging trends, significant global events, or shifts in market and sectoral needs. While maintaining the ability to pursue strategic long-term goals, increasing flexibility in calls for proposals would ensure their relevance and adaptability to evolving contexts by the time of implementation.
- Speed up processes from Work Programme definition to implementation and fast-track call adjustments where possible by implementing a procedure for the revision of calls when urgent global issues or technological advancements arise, ensuring that the program can respond more quickly to unforeseen challenges, such as the COVID-19 pandemic, which significantly shifted priorities in various sectors. Fast-tracked calls could focus on addressing immediate crises or accelerating innovations that have proven vital.

2. **Regulatory and Administrative Complexity of public funding:** Both investors and bioeconomy companies express frustration over the complexity of EU, national and regional regulatory frameworks and the administrative burden that comes with applying for and managing public funding. For instance, the rigid nature of existing public funding mechanisms makes it difficult for companies to adapt to changing market conditions or pivot their business models when necessary.

Recommendations:

- Simplifying regulations and harmonising regulatory frameworks across EU member states would significantly reduce administrative burdens and accelerate access to bioeconomy funding. Developing more flexible funding structures that allow reallocation of funds based on the evolving needs of bioeconomy projects will also enhance their ability to scale and commercialise. This includes fostering collaboration between EU, national and regional bodies to create a coherent funding environment that supports bioeconomy innovation. Specifically, coherence could focus on aligning funding conditions (e.g., eligibility criteria, reporting requirements, success metrics) and streamlining administrative processes (e.g., application timelines and evaluation procedures) to ensure consistent and predictable support across governance levels. This approach would enable bioeconomy stakeholders to better navigate funding opportunities and allocate resources effectively in response to market and technological developments.
- To address the regulatory and administrative complexity gap, a coordinated effort is needed to standardise bioeconomy taxonomy and technology nomenclature across the EU. Feedback from interviews highlighted the need for clearer, more unified standards to align public and private investment strategies. Implementing refined and consistent standards would not only streamline regulatory frameworks but also facilitate cross-border investments, reduce

uncertainty for investors, and foster broader understanding and adoption of bio-based technologies. This refined nomenclature could then be incorporated into funding calls at the EU, national, and regional levels, integrated into regulatory frameworks, and adopted in private market assessments, studies, and other relevant analyses. Such alignment is crucial to creating a cohesive environment for the bioeconomy sector, simplifying public financing application process, mitigating investment risks, and supporting the growth of bio-based innovations throughout Europe.

- Navigating the vast and complex ecosystem of calls for proposals across EU funding programs remains a significant challenge. Implementing artificial intelligence/machine learning tools to help bioeconomy companies automatically match their innovations with the most suitable funding opportunities could streamline the application process. By using AI to filter relevant calls, companies could save valuable time and effort, improving their chances of securing the right financial support for their needs.

3. **Public-Private Collaboration Gap:** Public and private sector financing efforts are often misaligned, particularly in countries categorised as emerging or moderate innovators. For instance, in Eastern Europe, public funds frequently focus on long-term R&D objectives, while private investors seek scalable opportunities that align with their short-term investment strategies. This misalignment can lead to insufficient co-investment in bioeconomy ventures, limiting growth and innovation.

Recommendations:

- To bridge this gap, it is crucial to establish higher number of structured mechanisms for public-private partnerships (PPPs) aimed at bioeconomy sectors, taking a good example from CBE-JU. This could involve offering joint funding mechanisms where public funds match private investments, particularly in scaling stages. These PPPs should focus on de-risking mechanisms, such as access to market and infrastructure support, to lower the entry barriers for private investors and increase cross-border collaboration. PPPs can address the access-to-market challenge by combining public funding to de-risk investments with private expertise and networks to navigate market entry, particularly in less mature bioeconomy ecosystems. By fostering cross-border collaboration, especially between regions with different innovation capacities, PPPs can enable knowledge sharing, harmonize market access strategies, and support the development of transnational value chains, ultimately reducing market risks and aligning public and private investment goals.
- Equity investment schemes, particularly those piloted by public organisations, play an essential role in supporting riskier bioeconomy projects by providing a critical buffer for private investors. By offering equity investments alongside private sector capital, public institutions such as the European Investment Bank (EIB) or European Innovation Council (EIC) can help mitigate the perceived risks associated with bioeconomy projects, particularly in the early and scaling stages. These public equity schemes often invest in ventures where private investors may be reluctant to engage due to high uncertainty around market viability, regulatory challenges, or technology readiness.

  By co-investing with private funds, public equity schemes help distribute the financial risks and demonstrate confidence in these bioeconomy ventures, encouraging private co-investors to participate. Additionally, public equity investments signal to the market that the ventures are promising and in line with broader EU strategies, which can attract further private capital. Furthermore, these schemes are often structured to offer favourable conditions, such as longer investment horizons or lower return expectations, allowing bioeconomy projects the time and flexibility needed to reach commercialisation and market entry. By aligning public and private financing efforts, these equity investment schemes foster a more robust innovation ecosystem, making bioeconomy projects more attractive and viable for private investors.

4. **Access to Market:** Bioeconomy companies face significant challenges in accessing markets, particularly due to competition from fossil-based products, which benefit from economies of scale and lower costs.

Recommendation:

- To help bio-based alternatives compete more effectively, implementing stricter CO_2 taxes on fossil-based products could level the playing field and incentivize the adoption of bio-based products. Additionally, the introduction of direct subsidies aimed at lowering the cost burden for bio-based ventures would provide stable financial support and encourage companies to invest in sustainable alternatives without the market pressures of fluctuating fossil-based product prices.
- Increase the availability of targeted funds that support scaling efforts, such as grants for pilot plants and infrastructure development. Support for scaling efforts should go hand in hand with investment readiness programs that focus on building business and entrepreneurial skills, ensuring that bioeconomy ventures are equipped to attract private investors and manage growth effectively. Additionally, aligning these funds with the private sector's needs through public equity schemes, as demonstrated by the European Investment Bank (EIB) and European Innovation Council (EIC), can help bridge the gap and drive innovation to market readiness. This is to supports access to market by enabling bioeconomy ventures to scale their production capacities and meet market demand, thereby overcoming one of the primary barriers to commercialisation and competitive positioning against fossil-based alternatives.

5. **Early-Stage Financing Gap:** One of the most significant gaps identified in the bioeconomy financing landscape is the lack of sufficient early-stage financing, particularly in countries classified as emerging innovators like Slovakia and moderate innovators such as Hungary. Bioeconomy projects are perceived as high-risk, especially in their R&D phases, due to uncertainty around technology readiness and market viability. Despite the availability of public funds in other countries, the bureaucratic processes required to secure them are often too complex and time-consuming, deterring smaller startups from accessing essential financing.

Recommendation:

- To address this, one option is to create better streamlined financial instruments tailored specifically for early-stage bioeconomy innovators. Simplified application processes, more transparent project selection, and enhanced support from public institutions, such as dedicated assistance for navigating the funding landscape, are needed. Furthermore, public equity investment schemes can mitigate risk and foster confidence among private investors, making early-stage bioeconomy projects more attractive.
- EU and the majority of the EU Member States should streamline the pathway to commercialisation by creating specialised funding schemes that provide early-stage capital to bioeconomy startups, particularly those emerging from universities and research institutions. By offering pre-seed and seed funding, as well as tailored mentorship and business development support, these programs can address the gap in technology transfer and help scale the number of companies that reach investment-readiness. Furthermore, the creation of bioeconomy-specific venture studios or co-creation platforms could foster collaboration between researchers, investors, and entrepreneurs.
- To address the early-stage financing gap, universities should not only adopt flexible IP policies and strengthen Technology Transfer Offices (TTOs) to streamline the licensing and commercialisation of research but also incorporate programs that teach business skills, investment readiness, and effective communication with investors. By equipping researchers

and startups with entrepreneurial expertise, universities can foster a more robust pipeline of investment-ready ventures, enabling them to scale more effectively, attract funding, and bring academic innovations into the bioeconomy sector.

6. **Scaling and Commercialisation Gap:** Bioeconomy ventures, particularly those in moderate and emerging innovators, face challenges in securing adequate funding for scaling and commercialization. While public funds support early-stage research, they often fall short in later stages, where substantial investments are required for infrastructure and market entry. As identified in ShapingBio interviews, even strong innovators like Germany and Finland report challenges in securing sufficient financing for large-scale projects.

Recommendations:

- To address the scaling and commercialisation gap in bioeconomy ventures, funding disbursements, particularly from large public funds like the EIC and EIT, could be structured around milestone-based financing. This approach aligns funding releases with specific developmental, market, or technological achievements, promoting strategic and measurable progress. By fostering a staged growth process, this model ensures that funding supports investment readiness and scalability while maintaining a sustainable and efficient use of capital without introducing additional complexity or reducing available resources for companies.
- Scaling programs should provide targeted support for business development and market entry, helping companies transition from research-focused to commercially viable entities. This will also allow for better alignment between public funding objectives and the actual growth trajectory of bioeconomy startups.
- The process of selecting bioeconomy companies for public funding should aim to include more specialised expertise in industrialisation and scaling. This would involve engaging industry professionals with practical experience in the production processes and technological readiness of bio-based ventures. These experts, with a deep understanding of both scientific innovation and industrial application, can provide a more targeted evaluation of a startup's potential to scale and commercialise. By ensuring that such expertise is integrated into the decision-making process, EU funding bodies can more effectively filter out ventures that are truly ready for commercialisation and can make a tangible impact in the market. This approach would also promote trust, making it easier for investors and stakeholders to understand and support the companies selected for financing. So far, the EC and at least some national procedures rely on external experts' assessments, and there are no specific efforts to address experts in scaling-up in such procedures. This should be enhanced by pro-active seeking such experts and provide more incentives for them to participate
- Increase the availability of targeted funds that support scaling efforts, such as grants for pilot plants and infrastructure development. Additionally, aligning these funds with the private sector's needs through public equity schemes, as demonstrated by the European Investment Bank (EIB) and European Innovation Council (EIC), can help bridge the gap and drive innovation to market readiness.

7. **Capacity Building in Bioeconomy Companies Gap: Bioeconomy companies often face** significant challenges related to capacity building within their bioeconomy sectors. One of the most critical gaps is the shortage of skilled workers relevant to the needs of bioeconomy, which hampers the development of a sustainable bioeconomy workforce and limits the capacity of companies to scale their innovations effectively. Without targeted entrepreneurial capacity-building efforts, including entrepreneurial skills training, workforce development, and entrepreneurial support, bioeconomy sectors struggle to realize their full potential.

Recommendations:

- Scaling and pre-pilot setups could provide valuable opportunities, alongside efforts to develop comprehensive education programs. Increasing support for capacity building, such as technical training and skills development for bioeconomy workers, will ensure effective alignment of need and demand for qualified workforce in the bioeconomy sector. Establishing regional bioeconomy hubs with integrated financing and skill-building programs will further foster a supportive innovation ecosystem.
- To enhance capacity building within bioeconomy companies, funding bodies like the EIC should actively engage in proactive portfolio management by appointing dedicated teams or representatives to foster direct communication with ventures and build trust and confidence. This could include setting up mechanisms for regular interactions between EC project portfolio managers and company leaders, particularly during key events like summits or conferences. By increasing transparency and sharing insights, funding bodies can provide clearer guidance on how their financial support contributes to the broader ecosystem.
- There is a clear need to improve the dissemination and communication efforts of the EU, national and regional funding authorities. Many entrepreneurs are only aware of the overarching funding bodies, without detailed knowledge of specific instruments available to them. Strengthening the information-sharing capacity of these managing authorities through workshops, outreach programs, and dedicated informational platforms could significantly improve access to relevant resources for companies, ultimately supporting their growth and scalability in the bioeconomy sector.

8. **Gap in Long-Term Innovation Project Funding:** Current funding mechanisms impede that an Innovation in a firm is funded multiple times throughout the innovation cycle, even if the needed activities change along the maturity path, e.g. that more applied and application-specific further developments are needed than e.g. in a funded development phase.. While this policy aims to distribute resources widely and tries to impede double funding of same activities and takeaway effects, it inadvertently creates barriers for complex projects that require continued funding across multiple phases of development, particularly in the bioeconomy sector. This restriction may hinder the refinement, iteration, and eventual commercialization of innovative solutions, leaving promising projects underfunded and incomplete.

Recommendations:

- Introduce flexible multi-stage funding and coherent funding programme portfolios that allow projects to apply for support at different stages of their lifecycle, from R&D to commercialization, ensuring that critical long-term projects receive continuous investment.
- Implement mechanisms to evaluate project progress at regular intervals, providing the option for follow-on funding based on milestones achieved. This approach would encourage iterative refinement and support the development of innovative solutions.
- Foster better coordination between local, regional, and EU funding bodies to create integrated funding pipelines that support high-potential projects through multiple development phases, avoiding gaps in financing that hinder project completion.

6. Annexes

Annex 1

This Annex provides a list of relevant EU policy instruments for the Bioeconomy. It is an update of a table from Deliverable 1.2 " Overall mapping of global and EUs policies on bio-based sectors & food-systems".

Name of Policy Instrument	Focus	Focus areas	Type of policy Instrument	Activities/measures related to bioeconomy
Bio-Based Industries Joint Undertaking (CBE JU)[1]	Challenges of Europe's bio-based industry. Brings together stakeholders of bio-based industries, boosts innovation and market deployment and paves the way for future investments.	All bio-based sectors	Networking measure, Information, Grants for / industrial) R&D, Support for public research	- R&I support - De-risking investments in innovative, circular bio-based production plants - Addressing the technological, regulatory & market challenges of the bioeconomy - Placing sustainability at the heart of its operations - Strengthening the collaboration of all bioeconomy actors
Directive on Single-Use Plastics/Packaging Directive/Plastic Bags Directive	EU regulation on single-use plastic products	Chemicals, Pharma & Plastics	Regulation	- Directed towards prevention and reduction of the impact of certain plastic products on the environment, in particular the marine environment, and on human health.
European Agricultural Fund for Rural Development (EAFRD)[2]	EAFRD finances the EU's contribution to rural development programmes	Agriculture, Blue Economy, Forestry, Food, Feed and Beverage, Wood	Grants for (industrial) R&D	- Improve the competitiveness of agriculture - Encourage sustainable management of natural resources and climate action
European Agricultural Guarantee Fund (EAGF)[3]	Fund will be provided for income support schemes, with the remainder dedicated to supporting agricultural markets.	Agriculture, Blue Economy, Forestry, Food, Feed and Beverage, Wood	Grants for (industrial) R&D	- Payment scheme for farmers - Green direct payments (for sustainable farming methods) - Support/payment for young farmers
European Circular Bioeconomy Fund (ECBF)[4]	Private venture capital impact fund exclusively dedicated to the (circular-) bioeconomy; ECBF aims to catalyse the transition towards a sustainable future.	All bio-based sectors	Equity support	Funding targeted towards the transition towards a sustainable future.
European Fund for Strategic Investments (EFSI)[5]	Bioeconomy is one of the nine sectors that EFSI invests.	Agriculture, Food, Feed and Beverage, Bioenergy and Biofuels, Chemicals,	Grants for (industr.) R&D,	Funding of Small and medium-sized enterprises (with large investment plans of at least €15 million), mid-cap cooperatives and larger private sector enterprises active in the bioeconomy across the European Un

[1] https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/circular-bio-based-europe-joint-undertaking-cbe-ju_en

[2] https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/european-agricultural-fund-rural-development-eafrd_en

[3] https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/european-agricultural-guarantee-fund-eagf_en

[4] 'https://www.cbef.org

[5] https://www.eib.org/en/products/mandates-partnerships/efsi/index.htm

Name of Policy Instrument	Focus	Focus areas	Type of policy Instrument	Activities/measures related to bioeconomy
		Pharma & Plastics		
European Innovation Council (EIC)[6]	EIC provides various funds to research teams and companies related to bioeconomy. EIC supports game changing innovations throughout the lifecycle from early stage research, to proof of concept, technology transfer, and the financing and scale up of start-ups and SMEs.	Agriculture, Food, Feed and Beverage, Bioenergy and Biofuels, Chemicals, Pharma & Plastics, Blue Economy, Waste and water management	Equity Grants for (industr.) R&D, Support for public research	- EIC Pathfinder - Support to research teams to research or develop an emerging breakthrough technology - EIC Transition - Building on promising research results to demonstrate and mature the technology and develop business plans for specific applications - EIC Accelerator - Funding and investments through the EIC Fund for individual start-ups and small companies to develop and scale up game changing innovations
European Maritime, Fisheries and Aquaculture Fund (EMFAF)[7]	Focus on sustainable use of aquatic and maritime resources.	Blue Economy	Equity Grants for (industr.) R&D, Support for public research	- R&I support for sustainable blue bioeconomy - transition to sustainable and low-carbon fishing - the protection of marine biodiversity and ecosystems - the supply of quality and healthy seafood to European consumers - the development of a sustainable and competitive aquaculture contributing to food security
European Regional Development Fund (ERDF)[8]	ERDF aims to strengthen economic, social and territorial cohesion in the EU and within its regions towards smarter, greener, more connected Europe.	EU Regions	Equity Grants for (industr.) R&D, Support for public research	- Innovtion and support to SMEs - Greener, low-carbon and resilient economy - Closer to citizens, supporting locally-led development and sustainable urban development across the EU
Green Public Procurement [9]	Green Public Procurement as a voluntary instrument can help stimulate a critical mass of demand for more sustainable goods and services which otherwise would be difficult to get onto the market.	Food, Feed and Beverage, Chemicals, Pharma & Plastics, Bioenergy and Biofuels, Wood, Pulp & Paper & Printing, Textiles	Public procurement	
Horizon Europe[10]	Bioeconomy is considered as one of the six clusters of global challenges and Europ. industrial competitiveness in HE. HE facilitates collaboration and strengthens the impact of	Biodiversity, Agriculture and Forestry, Food and Feed, Circular Economy, Blue Economy, Green	Support for public research, grants for industrial R&D	- R&I support - Addressing the technological, regulatory & market challenges of the bioeconomy - Strengthening the collaboration of all bioeconomy actors

[6] https://eic.ec.europa.eu/index_en

[7] https://oceans-and-fisheries.ec.europa.eu/funding/emfaf_en

[8] https://ec.europa.eu/regional_policy/funding/erdf_en

[9] https://ec.europa.eu/environment/gpp/index_en.htm

[10] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

Name of Policy Instrument	Focus	Focus areas	Type of policy Instrument	Activities/measures related to bioeconomy
	research and innovation in developing, supporting and implementing EU policies while tackling global challenges.	Deal, Bio-Based Innovation System, Resilient inclusive healthy and green communities		
InvestEU Programme	The fund aims to help use public funding, including funding from the EU budget, to mobilise private investment for a wide range projects carried out in the EU, including bioeconomy.	Agriculture, Forestry, Blue Economy, Biodiversity, Food, Feed and Beverage, Bioenergy and Biofuels	Equity Grants for (industr.) R&D, Support for public research	- Sustainable infrastructure - Research, innovation and digitalisation - SMEs
Knowledge for Policy (K4P) programme[11]	K4P supports policy-making in Bioeconomy by providing scientific evidence. K4P aims to bridge the science-policy gap by bringing together evidence for policy from scientists across Europe, to policy makers across Europe.	Bioeconomy	Networking measure, Information	visualisation tool of bioeconomy in different countries
Renewable Energy Directive (RED)	The renewable energy directive is the legal framework for the development of renewable energy across all sectors of the EU economy, and supports cooperation across EU countries.	Bioenergy and Biofuels	Regulation	EU sustainability criteria are extended to cover biomass for heating and cooling and power generation in the revised Directive (EU) 2018/2001. EU countries were required to transpose the new rules by 30 June 2021, and the voluntary schemes have to adjust the certification approaches to meet the new requirements. Additional rules are enshrined in the Implementing Regulation on sustainability certification, foreseen to be adopted in the second half of 2022
Life	The LIFE programme is the only EU funding programme entirely dedicated to environmental, climate and energy objectives. The programme seeks to develop, demonstrate and promote innovative techniques, methods and approaches to reach EU environmental and climate goals.	environment and climate action.	Funding	Depending on the calls different kinds of actions are funded, e.g. Strategic Integrated Projects (SIPs), Standard Action Projects (SAPs)
Regional Innovation Valleys for Bioeconomy and Food Systems	The RIV4BFS aim to support and accelerate the deployment of the bioeconomy in 100 regional deep-tech innovation valleys.	Bioeocnomy and Food	Funding, networking, information	Cofund Action under the Horizon Europe Pillar III “European Innovation Ecosystems” on “Interconnected InnovationEcosystems (HORIZON-EIE-2023-CONNECT-03)

[11] ‘https://knowledge4policy.ec.europa.eu/visualisation/bioeconomy-different-countries_en#regionalstrategies

Name of Policy Instrument	Focus	Focus areas	Type of policy Instrument	Activities/measures related to bioeconomy
				Interregional innovation investments (I3) as part of the European Regional and Development Fund (ERDF)

Table 5 Overview of EU policy instruments for the Bioeconomy
Source: Fraunhofer ISI based on various policy instrument descriptions

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