



Interim Evaluation of the Bio-based Industries Joint Undertaking (2014-2016) operating under Horizon 2020

Experts Group Report

June 2017

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Interim Evaluation of the Bio-based Industries Joint Undertaking (2014-2016) operating under Horizon 2020

Experts Group Report

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1. EXECUTIVE SUMMARY

Introduction

The Bio-Based Industries Joint Undertaking (BBI JU) is a **public-private partnership (PPP)**¹ **between the European Commission and the Bio-based Industries Consortium (BIC)**. The Council Regulation (EU) No 560/2014 sets the basis for the establishment of the Bio-based Industries Joint Undertaking (BBI JU).²

BIC developed the **Strategic Innovation and Research Agenda (SIRA)** based on extensive consultation with public and private stakeholders. As per all the seven JUs, BBI JU awards Horizon 2020 funding for projects based on competitive calls. Five JUs were already set up in 2007-2008 under the Seventh Framework Programme (FP7), whereas **Bio-based Industries (BBI)** is one of the newly established JUs under Horizon 2020 with the specific aim of developing sustainable and competitive bio-based industries in Europe.

BBI JU set out financial commitments from both the EU and from the industry members in order to provide funding for large-scale, longer-term and high risk/reward research. The objectives of BBI JU may best be achieved by the Partnerships and, most importantly, by bringing together of companies, universities, research centres, innovative SMEs and other groups and organisations around the topic of the bio-based economy, which is of great industrial and social relevance. BBI JU is expected to be a concrete example of the European Union's efforts towards strengthening its competitiveness through scientific excellence, industry led research, openness and innovation.

According to Article 32(3) of the Horizon 2020 Regulation, the Commission must provide an in-depth assessment of all JUs. Article 11(1) of BBI JU regulation³ provides the main legal basis for this interim evaluation, which was carried out by a group of five independent experts who analysed the activities of BBI JU in the period 2014-2016. The evaluation takes place at an early stage, less than three years after the adoption of Regulation (EU) No. 560/2014, which established the BBI JU. It covers five main evaluation criteria: relevance, efficiency, effectiveness, coherence and EU added value.^{4,5} Although at the time point of this interim evaluation none of the research projects funded by BBI JU had been completed, qualitative input in combination with quantitative information, as was available, were used to assess the effectiveness of implementation and the main achievements so far.

How relevant has BBI JU been so far?

The Bio-Based Industries Joint Undertaking (BBI JU) was initiated with the aims to attract more consistent private investment, promote research and innovation along whole value chains, to overcome fragmentation, to avoid duplication and to coordinate better innovation activities of bio-based industries. The institutionalized Public-Private Partnership (PPP) was selected among three policy options with the expectation of mobilizing greater project resources through significant contributions by industry.

1 In addition to the institutionalised PPPs, also the contractual Public-Private Partnerships (cPPPs) have a legal basis in Article 25 of the regulation establishing Horizon 2020. Please note that the assessment of cPPPs is not included in this document but will be part of the overall SWD (Staff Working Document), planned for 2017.

² Council Regulation (EU) No 560/2014 of 6 May 2014.

³ Council Regulation (EU) No 560/2014 of 6 May 2014

⁴ The definitions of criteria are reported in Annex 3.

⁵ Commission Staff Working Document. Better Regulation Guidelines. 19 May 2015.
http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf

BBI JU intends to de-risk in research, demonstration and commercialization of BBI technologies and to respond to the challenge of creating and maintaining a competitive position of Europe in BBI technologies, especially in the light of the growing number of demonstration size facilities being implemented in US and Asia.

Although it is still too early to assess the overall effectiveness of BBI JU in meeting these goals, the JU appears well aligned with the initial aims. The main positive effects of BBI JU in terms of competitiveness of BBI technologies come via encouragement and support of value chain driven cooperation across sectors ('the structuring effect') and via innovation driven mobilization of key stakeholders ('the mobilizing effect').

Flagships projects are one of the distinctive measures of BBI JU: they represent an effort to accelerate commercialization of riskier capital-intensive BBI technologies and bring these to demonstration in the short term, to commercialization in the medium term and to wider market in the long term. Such flagship projects have already mobilized significant amounts of industry investments.

Since its set up, BBI JU has reflected the evolution of the sectors and companies active in BIC, which nowadays embrace sectors not prominently covered in the initial stage, among others, representatives of the food industry and some consumer brand owners. This evolution is expected to have a positive impact on the development of technologies, since a closer involvement of a wider array of downstream sectors should lead to a more effective match with market requirements.

Overall, it is recommended that BBI JU actions continue in the direction of de-risking, by bringing new bio-based value chains to market and by continuing the involvement of brand owners, end-users and sectors at the interface with customers and consumers.

At the same time, it is of key importance that the program activities of BBI JU respond to relevant emerging priorities such as, for instance, resource efficiency, exploitation of CO₂ as carbon feedstock and digitalization.

Achievements and effectiveness

During the period 2014-2016, the project grants were allocated via four calls for proposals, for a total of 65 projects retained for funding. They included 6 Coordination and Support Actions, 20 Demonstration Actions, 6 Flagship Actions and 33 Research and Innovation Actions. In line with the objectives of the JU, the largest share of the operational budget went to actions characterized by high **Technology Readiness Levels** (TRL > 5)⁶: 39.5% to Demonstration Actions (TRL 6-7) and 33.2% to Flagship projects (TRL 8). The Research and Innovation Actions (TRL 3-5) received 25.9% of the funding whereas only 1.4% of the budget was invested in Coordination and Support Actions. As one of the main objectives of BBI JU is to avoid fragmentation and improve coordination, it is of high importance to invest coherently in Coordination and Support Actions in the second phase of the initiative. Such projects could also represent an important instrument for the monitoring and the analysis of the bio-based markets in order to optimize the programming activities and the focus of the future calls.

The **total EC contribution** (in commitment appropriations) to BBI JU operational expenditure over 2014-2016 amounted to EUR 418.29 million and the total financial

⁶Technology Readiness Levels: TRL 1 – basic principles observed; TRL 2 – technology concept formulated; TRL 3 – experimental proof of concept; TRL 4 – technology validated in lab; TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies); TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies); TRL 7 – system prototype demonstration in operational environment; TRL 8 – system complete and qualified; TRL 9 – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

contribution committed by BIC at programme level, for the same expenditure and over the same period, amounted to EUR 0.75 million. Out of the total contributions committed by the two members of the JU, EUR 414.29 million was committed by BBI JU in individual projects selected for funding by the end of May 2017. Moreover, in the signed Grant Agreements signed by 31 December 2016 (i.e. those resulting from calls 2014 and 2015) there was an overall commitment by the private members of EUR 114,621,657.2 for in kind contributions to operational activities (IKOP). In the grant agreements signed later (i.e. those of Call 2016) the commitment by the private members amounts to EUR 81,667,987 for in kind contributions to operational activities.

Work programmes followed the SIRA by supporting the building up of five value chains, characterized, mainly, by their focus on different feedstock: lignocellulose, forestry biomass, agro-based biomass, organic waste. The last value chain aimed at integrating energy, pulp and chemicals biorefineries. So far, six flagship projects were launched to support the value chains characterized by the most mature technologies (lignocellulose, forest-based and agro-based feedstock). Since the first publication of the SIRA in 2013, new value chains are emerging (e.g. marine biomass) and they have attracted the interest of BBI JU. This shows the responsiveness of BBI to the evolving field. Furthermore, from 2016 the annual work programmes have moved from the biomass 'push' based approach and the traditional value chains towards creating a demand for biomass and 'market pull'. This approach translated into a significant number of topics, published in 2016, embracing different value chains. Therefore, further efforts are expected to support the development of technologies in these new areas. On the other hand, the integration of energy, pulp and chemicals biorefineries appears to have decreased its strategic relevance within BBI JU.

Currently, the **share of budget** dedicated to Demonstration projects is significantly higher than originally planned in the Strategic Innovation and Research Agenda (SIRA) at the expense of Research and Innovation Actions and Coordination and Support Actions. This situation should be rebalanced through future work plans. The industrially-driven nature of BBI JU is clearly reflected in the pattern of budget distribution per beneficiary type, since the majority of the funding (70.7%) went to private entities, with a very high participation of SME (35.4% in terms of participants number and 29.1% in terms of funding). As a comparison, SC2 and LEIT biotechnology devoted about 39% of the respective budgets to private entities.

Concerning openness, BBI gone to considerable effort in communicating the BBI JU and its calls to stakeholders in the EU through its events, meetings and website. Overall, the success rate (ratio between applicants and beneficiaries) was 30.9%. The nature of BBI calls is fully open to the participation of any stakeholder. Although the success rate of proposals having BIC coordinators and BIC members is higher than for non-BIC coordinators and non-BIC members, the actual numbers of non-BIC coordinators and non-BIC members in the selected proposals are much higher.

The **geographical distribution of beneficiaries** resembles those observed in the SC2 calls and in LEIT KET Biotechnology programme, since the majority of EC funding (84%) goes to EU15. Although EU13 receives a much lower share of the BBI JU contribution than EU15, it scores better in BBI (7.9%) than in SC2 (5.5%) and in LEIT KET Biotechnology programme (7.2%). The unbalanced geographical distribution is also a consequence of the lower success rates of EU13 (19.7%) as compared to EU15 (32.6%). This situation, which is not specific for BBI JU but rather a common challenge in Horizon 2020, was addressed by BBI JU through a number of initiatives organized locally and aiming at mobilizing the stakeholders of EU13. Nevertheless, future efforts could go toward developing further program strategies that take into account potentials at macro regional level, also in synergy with other EU initiatives (e.g. Smart Specialisation Strategies, S3).

Finally, the **participation of third Countries** in BBI JU calls is negligible, which is unsurprising considering the aim to support competitiveness of EU located industries.

Nevertheless, in the second phase of BBI it would be important to identify some win-win strategies for a larger involvement of third Countries, also in the light of the reported growing interest of some non-EU big players towards European Bio-Based industry and Bioeconomy as a whole. This is a positive signal of the effectiveness of BBI JU in mobilizing and structuring the Bio-Based Industries as an emerging sector and creating a critical mass in Europe able to provide new products, technologies, solutions to customers in the global marketplace.

Main achievements and effectiveness of implementation

BBI JU became **autonomous** on 26 October 2015. The number of running projects has steadily grown from 10 projects in 2014 to 36 at the end of 2016 and to the current 65 ongoing projects in June 2017, thereby extending beyond the formal time limit of this midterm evaluation.

BBI JU has included in its **legal base** seven specific objectives⁷ to be met by the end of the programme period in addition to the general objectives that are common for the whole Horizon 2020. Moreover, there is a set of objectives common to all JUs.⁸ Key Performance Indicators (KPIs), which are regularly monitored and reported in the Annual Activity Reports of BBI JU, measure the progresses towards the achievement of these goals. Six out of seven BBI-specific KPIs are reported already well above the targets, whereas the seventh KPI (number of flagship projects) is well on track. The previous statement is made on the basis of partial data already available and taking into account expected (i.e. projected) results as reported in the signed Grant Agreements (no final reports of projects are yet available). In particular, according to the mentioned projections, BBI JU will establish 146 new cross-sector interconnections, 82 new value chains, 46 new biochemical building blocks, 106 new bio-based materials, 51 new bio-based consumer products. Although at the time this evaluation takes place these KPIs are still 'projected values' because no project has been concluded yet, there are already 6 actual flagship projects that have led to a significant private sector participation and mobilization of private investments. Therefore, further monitoring activity and analysis will be required for the collection of reliable data through a methodological approach making a clear distinction between the actually achieved KPIs at the end of each year and the projected KPIs.

The **performance of BBI JU** against three main Horizon 2020 KPIs – time to inform (TTI), time to grant (TTG) and time to pay (TTP) pre-financing – shows that it currently operates effectively. The 20% target for SMEs has been surpassed, which clearly demonstrates that the BBI JU program is contributing to the development of the bio-based SMEs landscape in Europe. The private sector participation in the funding allocated is very pronounced (71%), which is a cornerstone of the BBI JU.

Concerning the **effectiveness** in living up to the financial and managerial responsibilities, the available documents and interviews with BBI JU stakeholders indicate that during the conception phase of BBI JU and the organization of BBI JU regulation there was an underestimation of the necessity to establish clear criteria and suitable instruments for delivering and reporting the industry contributions. Such inaccuracy in the definition of clear rules led to an incomplete and fragmented picture of the actual financial and in kind contribution of the industry to BBI JU.

Overall, BBI JU has created a stimulating research and innovation environment in Europe. BBI JU has also attracted a satisfactory level of participation of the best European players in the areas of the selected value chains. The development of business models to integrate economic actors along the whole value chain is an achievement: From the supply of biomass to biorefinery plants to customers and consumers of bio-based materials, chemicals and fuels. This is also accomplished by creating new cross-

⁷ With the exception of SESAR JU that is not subjected to a predefined set of KPIs.

⁸ Based on Annex II (PERFORMANCE INDICATORS) to Council Decision 2013/743/EU).

sector interconnections and supporting cross-industry clusters. As the realization of these goals could not be achieved by a single member country, organization or scientific discipline alone, the required common European effort is justified.

Efficiency and performance

BBI JU's mission is to implement the Strategic Innovation and Research Agenda (SIRA) developed by the Bio-based Industry Consortium (BIC) and endorsed by the European Commission on behalf of the European Union (EU).

The Council regulation sets the contributions to be made by EU and BIC for the implementation of BBI JU. The EU's overall contribution to administrative and operational costs shall be up to EUR 975 000 000. BIC shall make a total contribution of at least EUR 2 730 000 000. The latter consist of a financial contribution to the operational costs (of at least EUR 182 500 000), financial contribution to administrative costs and of in kind contributions (IKOP) to operational costs. The total private contribution comprises, also, a minimum of EUR 1 755 000 000 for implementing additional activities outside the work plan of BBI Joint Undertaking contributing to the objectives of BBI Initiative (IKAA).

The two members of BBI JU, namely the EU and BIC, have long-term commitments to contribute both financially and - only in the case of BIC - in kind to the implementations of JU. However, contribution of the some inaccuracy in defining clear and applicable rules for the delivery of private financial contributions to operational activities as well as in confirming the acceptance of such established regulation, led to an insufficient financial contribution from BIC. Although some measures have been designed to address and solve this issue, their implementations will require specific monitoring actions. Moreover, the delay in the drafting and approval of the IKAA plan for 2016 prevented the group of experts to take into account complete and updated figures on the actual delivered in kind contributions by industry in 2016, since the process of certification depends on IKAA Plans approved by the Governing Board.

In general, the **programme office** appears to have implemented its activities in compliance with the applicable rules and procedures to support the appropriate management of public and private funds. The organisation, structure, decision making and reporting of BBI JU are in line with the legal frameworks.

The high TRL levels of demonstration and flagship projects justify, to some extent, the high level of confidentiality applied to most data produced within BBI JU projects. Nevertheless, for implementing any mechanism aiming at better coordinating all initiatives dedicated to the growth of the European Bioeconomy and for searching further leveraging effects at the regional and macro-regional levels, it is important that the relevant EC directorates have prompt access to the projects' deliverables, in compliance with the relevant regulations. Moreover, it is of fundamental importance to benchmark and monitor the effectiveness of such initiatives in assuring the EU leadership in this emerging sector and in implementing continuous process improvements at all levels.

The **visions of members** of a successful bio based industry are well aligned, as should be expected with the input of members into the setting up of the BBI JU. BBI JU is in the process to demonstrate new value chains products and progress against KPIs and has advantages over other intervention modes but evidence gathering for broader environmental, economic and social impacts could be improved. In addition, the whole value chain approach could yet be strengthened by greater participation of end users and customers.

Finally, BBI JU has carried out **dissemination activities** and a consistent number of dedicated events throughout Europe aimed at promoting participation into calls but also at mobilizing local stakeholders. Additionally, the BBI JU web site is effective in spreading information on calls and in organizing partnering activities.

EU added value and leverage effect of BBI JU

For the achievement of the objectives set in the Article 2 of the Council Regulation (EU) No 560/2014, BBI JU relies on a planned budget, which is on a shared costs basis with industry. Every Euro of the EU funds is expected to **leverage** at least 2.8 Euro of private funds during the operation of the Joint Undertaking, which represents the highest leverage target among the seven JUs. Based on the in-kind and financial (in cash) contributions to operational costs of calls 2014 and 2015, the operational leverage effect by 31 December 2016 is 0.50. It must be underlined that the grants from call 2016 have been signed only in May 2017 and the calculations of the leverage effect take into account the cut-off date of 31 December 2016 (i.e. only grant agreements from calls 2014 and 2015). When considering the available data on contributions to additional activities in 2014 and 2015, the additional leverage effect is 1.275. Therefore, the **global leverage effect** by 31 December 2016 is 1.779. However, this calculation does not take into account any private contribution to additional activities related to 2016 since the corresponding IKAA plan had not been approved at the time this evaluation was carried out. Moreover, the process of certification depends on IKAA Plans approved by the Governing Board. Notably, on June 2017 BIC anticipated an amount of certified IKAA for 2016 equal to EUR 185.863 million, which is expected to affect significantly the quantification of the additional and global leverage effect. Based on the certified IKAA for 2016 the additional leverage effect would be 2.1 while the global leverage effect would become 2.6. Consequently, the actual leverage effect should be re-calculated and published once the Governing Board approves the IKAA plan for 2016. Overall, intensifying private sector commitment by in-kind contributions and additional activities while attracting additional investments from third Countries, need to be continued as key tasks.

Looking at the **added value of BBI JU** in a broad perspective, flagship projects with high TRL and their additional private investments (IKAA) would likely not have taken place without the intervention of BBI JU or would have had narrower and less ambitious scope.

The **positive effect** of BBI JU is recognized also by 87.5% of the participants who, in a survey, affirmed that BBI JU contributes to economic growth and job creation in the EU. Indeed, a preliminary statistical analysis of 9 projects financed through call 2014 indicates that a number of 689 staff is employed, with a gender distribution of 58% male and 42% female. As the creation of direct and indirect new jobs, both temporary and permanent, is taking place over extended periods of time, a standardized and constant reporting over the years is needed. This will provide quantitative data to judge the long-term effect on employment in EU member states. While such a standardized and constant reporting can be easily introduced on the level of project coordinators for the duration of projects, it is more challenging to continue after the completion of projects.

An even higher proportion of 93% of participants in the survey judged that BBI JU contributes to the transition from a fossil-based to a bio-based economy, while 91% stated that BBI JU contributes to climate change mitigation by reducing the CO₂ derived from the use of fossil-based products.

As the different stakeholders are fragmented in Europe, the real added value of BBI JU is largely in the creation of new value chains and in the acceleration of bringing together different sectors and industries engaged in supporting the **sustainability** (both environmental and economic) of the existing value chains. One of the main success factors of BBI in 2014-2016 is represented by the structuring and mobilizing effect on research, industry and economy. Members of the BBI, BIC, the BBI Scientific Committee and the BBI State Representatives Group have acted as ambassadors for the initiative in their respective communities thus providing momentum.

Some successful **macro-regional initiatives** boosted by BBI State Representatives Group (e.g. in the Mediterranean region) demonstrate that it is crucial to maximize the structural effect at national, regional and macro-regional levels. Therefore, it would be important to work jointly with regional initiatives on rural development or

reindustrialization of dismissed areas for catalysing revitalization through the bio-based industries.

Coherence of BBI JU, internally and with other (EU) actions

The objectives and activities covered under BBI JU are coherent and well-coordinated with the parts of the Horizon 2020 financing it: SC2 and LEIT 'Biotechnology'. While SC2 and LEIT Biotechnology continue to support research and innovation activities related to the whole Bioeconomy, BBI JU aims to strengthen the bio-based industry sector by industry-driven activities. It mainly finances projects with higher technology readiness levels and market potential than SC2 and LEIT. This is reflected in the distribution of EC funds per different type of action. To guarantee complementarity and support for all beneficiary types, SC2 and LEIT should continue to support preferentially beneficiaries from the academic sector (HES and REC) or request increased contributions from the private sector (PRC) per project. Moreover, the results of CSA projects funded under SC2 should be taken into consideration in planning of future BBI calls.

There is some **overlap** in the topics funded by BBI JU respect to LEIT theme: '*Biotechnology-based industrial processes driving competitiveness and sustainability*' and a better coordination is recommended. It must be noted that, due to the broad nature of the challenges addressed by Horizon 2020, some intersections between the different programmes allow for the development of comprehensive and multidisciplinary approaches. In order to complement the research and innovation focus of BBI JU, many topics covered in recent Bioeconomy-related SC2 calls of Horizon 2020 (ISIB-2014/2015 and BB-2016/17) have been targeting the downstream side of the value chain and aimed at increasing public awareness and supporting markets' development. They also integrate crosscutting activities, such as communication, technology transfer and dissemination activities. Overall, there is evidence that the interlink with other parts of Horizon 2020, such as SC5 'Climate action, environment, resource efficiency and raw materials', are softer.

Pursuing in the efforts towards an **effective coordination** of the programming activities would ensure an improved coherence of BBI JU. For instance, the objectives and activities financed by BBI are closely linked to those of SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) PPP. Notably, particular attention has been put on the sub key action KA 1.4: 'Advancing the role of sustainable biomass/renewables as industrial raw material' to avoid overlap or duplication.

In order to achieve an effective coordination it is crucial that EC directorates and the Scientific Committee are consulted in the earlier phases of the programming activities, which are currently carried out mainly by BIC members. Moreover, it is important that **programming strategies** are fully effective in catching trends and opportunities that will pave the way for EU leadership in new emerging technological areas.

2. INTRODUCTION

2.1. Purpose of the evaluation

This report addresses the interim evaluation of the Joint Undertaking on Bio-Based Industries ('BBI Joint Undertaking'),⁹ a body established under the Treaty on the Functioning of the European Union, and in particular Article 187 and the first paragraph of Article 188 thereof and entrusted with the implementation of a public-private partnership referred to in Article 209 ('Model Financial Regulation for public-private partnership bodies') of Regulation (EU, Euratom) No 966/2012.

According to Article 11 of Council Regulation (EU) No 560/2014 establishing the Bio-based Industries Joint Undertaking (BBI JU), the Commission shall carry out, by 30 June 2017, with the assistance of independent experts, an interim evaluation of BBI Joint Undertaking.¹⁰

The provisions on public-private partnership (Article 25 of Council Regulation (EU) No 1291/2013) comprise a wide range of topics that need to be addressed by the evaluation (e.g. governance structure, contractual arrangements between members, coherence and complementarity with other parts of Horizon 2020, etc.). Moreover, the co-legislator explicitly requires, as part of the Horizon 2020 Interim Evaluation, an in-depth assessment on whether the public-private partnership is implemented in an **open, transparent** and **efficient** way, as stipulated in Article 32(2) of Council Regulation (EU) No 1291/2013. These requirements necessitate the evaluation to cover both the **operations** of BBI JU as well as **organisation** and **outputs** produced by the research projects funded by BBI JU.

The analysis complies with the requirements of the revised evaluation guidelines of the Better Regulation Package¹¹ and covers the five main evaluation criteria - relevance, efficiency, effectiveness, coherence and EU added value.¹²

The **results of this evaluation** will be used to inform the European Parliament and the Council, national authorities, the research community and other stakeholders on the outcome of BBI JU under Horizon 2020. Based on the conclusions of the interim evaluation, the Commission may also act in accordance with Article 4(5)¹³ of Council Regulation No 560/2014 or take any other appropriate action.

⁹ The Bio-Based Industries Joint Undertaking (BBI JU) is a public-private partnership between the European Commission and Bio-based Industries Consortium (BIC). BIC developed the SIRA based on extensive consultation with public and private stakeholders. The SIRA describes the main technological and innovation challenges that need to be overcome in order to develop sustainable and competitive bio-based industries in Europe and identifies research, demonstration and deployment activities to be carried out by a Joint Technology Initiative. Such programmatic content is implemented, although non exclusively, by the BBI JU, which is the object of this evaluation. Concerning Joint Technology Initiatives, in May 2007, the Commission adopted the first proposals for Joint Technology Initiatives. It was the first time that public-private partnerships, involving industry, the research community and public authorities, were proposed at European level to pursue ambitious common research objectives. Joint Technology Initiatives are a mechanism for performing research at EU level and support large-scale multinational research activities in areas of major interest to European industrial competitiveness and issues of high societal relevance.

¹⁰ The Commission shall prepare a report on that evaluation, which shall include conclusions of the evaluation and observations by the Commission. The Commission shall send that report to the European Parliament and to the Council by 31 December 2017. The results of the interim evaluation of the BBI Joint Undertaking shall be taken into account in the in-depth assessment and in the interim evaluation referred to in Article 32 of Regulation (EU) No 1291/2013.

¹¹ Commission Staff Working Document. Better Regulation Guidelines. 19 May 2015. http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf

¹² The definitions of criteria are reported in Annex 3.

¹³ The Commission may terminate, proportionally reduce or suspend the Union's financial contribution to the BBI Joint Undertaking or trigger the winding-up procedure referred to in Article 20(2) of the Statutes if those members or their constituent entities do not contribute, contribute only partially or contribute late with regard to the contributions referred to in paragraph 2 of this Article. The Commission decision shall not hinder the

The results of this evaluation will also be used to improve the implementation of BBI Initiative under Horizon 2020, contribute to the formulation of BBI JU Annual Work Plans 2018-2020 and assessing if industry delivered on its expected contribution.

2.2. Scope of the evaluation

This Interim Evaluation of BBI Joint Undertaking (2014-2016) takes place at an early stage, less than three years after Regulation (EU) No 560/2014 was adopted, which established the Biobased Industries Joint Undertaking.

Although at the time point of this interim evaluation none of the research projects funded by BBI JU has been completed, qualitative input in combination with quantitative information available were used to assess the effectiveness of implementation and the main achievements so far.

The evaluation report covers seven evaluation questions proposed by the 'Terms of Reference for the independent Expert Group set up by the DG RTD of the European Commission in order to carry out the Interim Evaluation of the BBI Joint Undertaking ('Terms of Reference')' and more specifically:

1. *Background to the initiative, objectives and relevance*
2. *Implementation of BBI Joint Technology Initiative*
3. *Main achievements and effectiveness of implementation*
4. *BBI Joint Undertaking's performance in 2014 – 2016*
5. *EU added value*
6. *Coherence*
7. *Synthesis, conclusions and recommendations*

3. BACKGROUND TO THE INITIATIVE

3.1. Description of the initiative and its objectives

Based on the experience acquired with JUs under FP7, BBI JU has been set up by the European Commission as part of a **new generation of public and private partnerships**. The aim was increasing the scale and impact of research and innovation investments on the bio-based industries by combining private sector investment with European public funding.

The objective of BBI Initiative is to implement a programme of **research and innovation** activities in Europe that will support the establishment of sustainable bio-based value chains and assess the availability of renewable biological resources, which can be used for the production of bio-based materials. This objective is to be achieved by supporting **research, demonstration and deployment** activities using resources from the public and private sectors. The objectives of BBI JU are to contribute to the implementation of Horizon 2020 and to the objectives of BBI Initiative through the organisation of calls for proposals for supporting research, demonstration and deployment activities in an **open, transparent, effective and efficient** way.

The **transnational, trans-sectorial and complex nature** of BBI JU builds on a wide range of projects that contribute to the advancement of bio-based industries. These projects have been funded by the EU in the past and now require pooling complementary knowledge and financial resources across sectors and borders.

More specifically, according to Article 1 of BBI JU Statutes, the Undertaking shall carry out the following tasks:

reimbursement of eligible costs already incurred by the members by the time of the notification of the decision to the BBI Joint Undertaking.

- (a) Guarantee the establishment and sustainable management of BBI Initiative programme;
- (b) Mobilise the public and private sector resources needed;
- (c) Establish and develop close and long-term cooperation between the Union, industry and the other stakeholders;
- (d) Ensure the efficiency of BBI Initiative;
- (e) Reach the critical mass of research effort to embark on a long-term programme;
- (f) Monitor progress towards the achievement of the objectives of BBI Joint Undertaking;
- (g) Provide financial support to research and innovation indirect actions mainly through grants;
- (h) Engage in information, communication, exploitation and dissemination activities by applying *mutatis mutandis* Article 28 of Regulation (EU) No 1291/2013, including making the detailed information on results from calls for proposals available and accessible in a common Horizon 2020 e-database;
- (I) liaise with a broad range of stakeholders including research organisations and universities.

The BBI Initiative aims at more resource efficient and sustainable low-carbon economy and increasing economic growth and employment, in particularly in rural areas, by developing sustainable and competitive bio-based industries in Europe based on advanced biorefineries that source their biomass sustainably. A key success factor thereby is **collaboration between stakeholders throughout Europe and along the entire bio-based value chains**, including primary production and processing industries, consumer brands, SMEs, research and technology centres and universities.

For maximum impact, BBI JU should develop **close synergies** with other **Union programmes** in areas such as **education, environment, competitiveness and SMEs**, as well as with the **Cohesion Policy funds, Rural Development Policy** and with the **European structural and investment funds (ESIF)**. Indeed, such synergies can specifically help to strengthen **local, regional and national research and innovation capabilities**.

The background and the initiative itself are described and assessed in more detail in sections 7.1.1-7.1.4 (Evaluation question 1). In addition, an Intervention Logic diagram in line with the 'Better regulation package' is presented there.

3.2. Baseline

The evaluation itself will mainly assess the progress of the BBI JU against its specific targets and KPIs. However, in a wider context it is important to understand the baseline situation of the bio-based industry and its operating environment before the establishment of the BBI JU and how the industry and the operating environment have evolved since the establishment of the BBI JU. For that purpose, the impact assessment preceding the setup of BBI JU gives wider baseline information against which the progress can be reflected when assessing the relevant evaluation questions.

The impact assessment (IA) accompanying the European Commission proposal for a Council Regulation on the BBI JU was published in 2013.¹⁴ During the process for the preparation of the IA, the Commission consulted a wide range of stakeholders representing industry, research communities, Member States, regions and the public. The IA was prepared by DG RTD with the support of other Commission services. A group of

¹⁴ Commission Staff Working Document Executive Summary Of The Impact Assessment Accompanying The Document Proposal For A Council Regulation On The Bio-Based Industries Joint Undertaking. SWD/2013/0248 Final.

external reviewers assisted the Commission with the data collection and analysis of the IA.

In the impact assessment, the baseline situation was assessed, and the following conclusions were drawn:

- The European economy currently heavily relies on petrol and other fossil resources for energy and products, while it is critical that the EU meets its **climate change** targets for 2020 and moves towards a competitive low carbon economy in 2050. Bio-based industries can contribute by partially substituting fossil resources with renewable ones to produce bio-based products and biofuels.
- Bio-based industries currently only represent about 3% of the EUR 2 trillion in annual **turnover** and 1% of the 22 million **jobs** generated by the European Bioeconomy, but bio-based industries are expected to grow more rapidly and substantially than more traditional Bioeconomy sectors. Setting up supply chains for biomass and networks of local and regional biorefineries also creates new jobs and sources of revenue for **rural communities**.
- In view of growing global competition, further investments in research, demonstration and deployment of bio-based industries are needed to strengthen further Europe's **competitive position**.
- New solutions are needed to sustainably increase available **local biomass** (e.g. by using residues, waste). Reliable and cost-competitive supply chains will need to be developed.
- The conversion of non-edible biomass in 'advanced' biorefineries is more difficult than for food crops in 'conventional' biorefineries. New **efficient and cost-competitive processes** must be developed. In addition, **Demonstrating and deploying** advanced biorefineries is crucial to compete with well-established (petro-) chemical industries, which requires rapid up scaling and several technological breakthroughs and cross-sectorial industrial synergies.
- Supporting **demand-side actions** are needed for the uptake of bio-based products: R&I can support the uptake of bio-based products in consumer markets and green procurement, e.g. by developing standards, labels and life cycle assessments.
- Several market failures are currently causing **lack of investment** in R&I for bio-based industries and need to be addressed: High risk and cost of demonstration and deployment, knowledge spillovers, nascent and fragmented industrial sector, transaction cost, policy framework and uncertainty around resource availability.

According to the impact assessment, the **need for EU intervention** was summarised as follows:

- Member States and Regions have supported R&I for bio-based industries with a wide range of Bioeconomy initiatives and cross-border collaborations have been explored, but not to a sufficient extent to attain the **critical mass** needed to attract consistent private investment, promote R&I along whole value chains, avoid fragmentation and duplication, or improve coordination.
- A strong EU level push will be critical to securing long-term investments, mitigating risks and reaching critical mass needed to bring the right partners to the table and resolve the technological and innovation problems bio-based industries face, particularly in the areas of **demonstration and deployment**.

The Impact Assessment discusses three policy options for organising R&I on bio-based industries under Horizon 2020: The 'Business as Usual' (BAU) option based on standard Horizon 2020 instruments only; the 'Contractual PPP' (c-PPP) option based on a contractual agreement between the European Commission and industry; and the

'Institutional PPP' (i-PPP) option involving creating a Joint Technology Initiative (JTI). From these three, the i-PPP was the preferred option based on the impact assessment, especially as it was considered on its stronger capacity to mobilise greater project resources due to the significant contribution by industry.

The situation before setting up BBI JU is described also in Section 7.1.2.

4. EVALUATION QUESTIONS

As stipulated in Articles 32(3) and 25(3) of Council Regulation (EU) 1291/2013, the interim evaluation of the public-private partnerships (thus including BBI JU) should focus on the following main aspects:

- **Openness:** The extent to which the JUs enable world-class research that helps Europe drive in to a leadership position globally, and how they engage with a wider constituency to open the research to the broader society.
- **Transparency:** The extent to which the JUs keep an open non-discriminatory attitude towards a wide community of stakeholders and provide them with easy and effective access to information.
- **Effectiveness:** The progress towards achieving the objectives set, including how all parties in the public-private partnerships live up to their financial and managerial responsibilities.
- **Efficiency** will consider the relationship between the resources used by an intervention and the changes generated by the intervention.

The above evaluation aspects were addressed under different evaluation questions that are integrated in the overall evaluation framework. More specifically, the seven questions addressed by the Expert Group were:

1. *Background to the initiative, objectives and relevance*
2. *Implementation of BBI Joint Technology Initiative*
3. *Main achievements and effectiveness of implementation*
4. *BBI Joint Undertaking's performance in 2014 – 2016*
5. *EU added value*
6. *Coherence*
7. *Synthesis, conclusions and recommendations*

5. METHOD/PROCESS FOLLOWED

5.1. Process/Methodology

The interim evaluation was carried out with the assistance of a group of independent experts¹⁵. This report is based on their findings. The group is composed of 6 external experts, including a Chair and a Rapporteur, selected from a list that is continuously updated through an open call for applications.¹⁶ The independent experts were selected because they have a range of skills in the relevant fields covered by this evaluation.

The experts critically examine the rationale, design and current state of implementation of the programme. The activities carried out by the experts included the **collection**, **analysis** and **evaluation** of data, including both quantitative and qualitative evidence that address the **evaluation questions** articulated in the Terms of Reference.

¹⁵<http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=3456&NewSearch=1&NewSearch=1>

¹⁶ Call addressed to individuals for the establishment of a database of prospective independent experts to assist Commission services with tasks in connection with Horizon 2020 — the Framework Programme for Research and Innovation (OJ C342 of 22 November 2013)

The evaluation questions were designed to respond to a specific set of evaluation issues. The experts formulated their qualitative assessment based on robust evidence and supported by quantitative analysis.

The **overall design of the evaluation** was based on a mixed methods approach comprising:

- Desk research which covered the legal base for Horizon 2020 and BBI JU, work programmes and documents produced as part of the Strategic Programming process, BBI Annual Work Plans and Budgets (2014 to 2017), Annual Activity Reports (2014 to 2015, and draft AAR 2016), minutes of meetings of BBI JU governing and advisory bodies, impact studies etc..
- Composition analysis which entailed a quantitative analysis of CORDA data relating to BBI JU proposals and projects, such as the number and type of participants, contribution, etc..
- Statistical analysis of data stored in the CORDA database and its reliability checks.
- Analysis and interpretation of the results of the survey of BBI JU beneficiaries, which implies a questionnaire proposed by the Commission services.
- Open dialogue and cooperation with EC, BIC and BBI officers for identifying extra sources for specific information and for the continuous updating of new data and documents (e.g. call statistics, draft AAR 2016) delivered by BBI JU and the EC throughout the period of the evaluation activity.
- Sharing information and preliminary findings within regularly scheduled meetings of the experts. Meetings were focused on specific topics (e.g. KPIs, industry contributions to BBI JU) but they also had the objective to discuss the methodology of structuring and collecting data (e.g. identification of relevant sources of information or stakeholders to be interviewed).
- Interviews with stakeholders involved in BBI Initiative, both from EC, BIC and BBI JU itself (e.g. selected project coordinators, project officers, and members of GB). The Expert Group has developed and agreed with the Commission services the procedure and the plan of the interviewees. All questions were forwarded to interviewed persons in advance.
- Comparison, where relevant, with the impact of other EC initiatives as, for instance, SC2 and LEIT.
- Comparison with other JUs, although restricted to the KPIs common for all JUs.

The Rapporteur prepared the **interim drafts** of the report based on all members' written contributions and of relevant documents and material identified by Expert Group members. These drafts were revised following the feedback of the Commission staff, which also supported the production of the report by making available relevant factual evidence and by facilitating the establishment of bilateral contacts with BBI JU and BIC.

The Rapporteur attended, in conjunction with Commission staff, a meeting of the Rapporteurs involved in the interim evaluations of the different Joint Undertakings under Horizon 2020 (7 in total), to ensure to the extent possible consistency between the seven evaluations running in parallel.

Working Approach

The Expert Group had to consider that **no running project** financed by BBI JU had been completed yet at the time of the evaluation activity, but rather most of them had just started. In that respect, the Annual Work Programmes represented a point of relevance, as well as the definition and monitoring of the KPIs. Moreover, the Expert Group collected

relevant quantitative and qualitative information from interviews with BBI stakeholders, combining and linking the different sources of information.

In some cases the necessary data and information were incomplete (e.g. in kind contributions delivered by industry), and the problems were reported to the Commission staff, so that a solution was achieved upon the discussion of the issue.

Attention was paid to the participation to BBI JU (in both proposals and projects), especially in terms of geographical distribution (see section 7.1).

An '**Intervention Logic Diagram**' (method recommended by the 'Better Regulation' package) was drafted to summarise the basis and rationale for the programme intervention, showing also the causal relationships and the expected outcomes and impacts of programme activities.

Modus operandi

The Expert Group executed the requirements specified under each task as mentioned above via a combination of collective and individual work carried out remotely and structured around regular meetings. The evaluation tasks were carried out through a constant sharing and discussion of the work among the experts. A Yammer group for on-web communication between experts was started.

At the **kick-off meeting** (14 November 2016) the Commission, in agreement with the Chair, specified the working methods of the Expert Group with a view to ensuring that the capacities of the Expert Group members are best utilized to allow in-depth analysis of all the areas covered by the Terms of Reference.

More importantly, after the kick off meeting (14 November 2016),¹⁷ a regularly scheduled number of meetings took place, which had, as a first objective, the distribution of specific tasks and responsibilities among experts (22 December 2016). Minutes were made available to the experts and uploaded on Yammer to keep record of decisions and progresses.

The tasks corresponding to questions 1-4 were assigned to **Task Leaders** (TLs), who, however, did not have the single responsibility for the analysis of the assigned question. Rather, all experts contributed to any evaluation question. The TLs were responsible for a preliminary check of the documents available on CORDA and for the identification of further needs in terms of data/documents or contacts to be established with relevant stakeholders (meeting of 18 January 2017).

It must be underlined that since one of the experts **receded** from the assignment due to health reasons, the work that had been originally planned to be addressed by a group of six experts was redistributed by the end of January 2017 within the remaining working group composed of five experts. Nevertheless, the necessary decisions and actions were taken in the due time to minimise the impact, thus allowing the regular delivery of analysis results (meeting of 31 January 2017).

¹⁷

<http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=3456&NewSearch=1&NewSearch=1>

Table 1: Meetings attended by the experts

Date of the meeting	Location	Minutes	Participants
14 November 2016	Kick-off Meeting, Brussels	Available on CORDA	Experts, EC
22 December 2017	Teleconference	Uploaded on Yammer	Experts
31 January 2017	Teleconference	Notes circulated among experts	Experts
9 February 2017	Teleconference	Uploaded on Yammer	Experts
2 March 2017	Rapporteurs meeting, Brussels	EC minutes + I notes circulated among experts	Rapporteur, EC
13 March 2017	Teleconference	Uploaded on Yammer	Experts
27 March 2017	Teleconference	Uploaded on Yammer	Experts
29 March 2017	BBI Interviews, Brussels	Notes circulated among experts	Experts, BBI
30-31 March 2017	Two-day Meeting, Brussels	Available on CORDA	Experts, EC
12 April 2017	Teleconference	Uploaded on Yammer	Experts
2 May	Teleconference	Uploaded on Yammer	Experts
22 May	Teleconference	Uploaded on Yammer	Experts
29-30 May 2017	Final Two-Day Meeting, Brussels	Draft circulated by the EC	Experts, EC, BBI
2 June 2017	Teleconference	Notes via e-mail	Experts

In order to facilitate the experts' work and to provide some common references for the evaluation activity, a workflow was constructed where each question was dissected into articulated sub-questions. The list of documents present on CORDA was translated into a table and each folder/file was labelled for enabling the experts to apply a fast citation mode.

Finally, **cross-references** between different questions were identified and highlighted, since the same documents are often relevant to different questions but from complementary perspectives. The *modus operandi* and the progresses of the evaluation work were shared with EC Officers during the rapporteurs' meeting of 2 March 2017. The Rapporteur created PowerPoint presentations to summarize the discussions held during teleconference meetings of the Experts. Moreover, the same meeting represented the occasion for refining the timeline for the delivery of preliminary drafts of the Mid-term evaluation report and served for coordination, by comparing notes with peer rapporteurs of Expert groups of the other six Joint Undertaking Mid-term evaluations active in parallel.

5.2. Limitations – robustness of findings

Most of the data not available at the time of the launch of the evaluation activity (14 November 2016) were promptly provided to the experts as soon as made available to the EC (e.g. Draft AAR 2016, IKOP analysis, results of on-line survey, statistical analysis of call 2016) with only few exceptions (e.g. rules for reporting IKOP and IKA Report for 2016, see section 7.3). Regarding evaluation question 2 (section 7.2), statistics analysis on budget and participation patterns according to value chains has been provided by the EC to the Expert group; furthermore, a separate presentation including projects from 2016 call has been delivered by BBI just after the second Expert Group meeting.

Regarding evaluation question 3 (section 7.3), it must be noted that the reported Key Performance Indicators KPI3 and KPI7 represent cooperation and flagship projects achieved already in 2016, whereas the other KPIs are projected to be achieved by 2020, because the projects are not yet completed. In order to provide an actual mid-term picture of the progress already achieved until 2016 also in respect to the second type of KPIs, the Expert Group has selected a number of projects to be analysed in more detail. The experts have put together a list of questions for project coordinators and then they have organized some interviews.

The experts have carried out interviews also with representatives of BBI JU, the European Commission, BIC, the Chair of the States Representatives Group and Chair of the Scientific Committee.

6. IMPLEMENTATION STATE OF PLAY (RESULTS)

After the establishment and initial operation of BBI Joint Undertaking, for which the Commission was responsible according to Article 19 of BBI Council Regulation, BBI JU reached the operational capacity to implement its own budget on 26 October 2015 (see section 7.1). Driven by the multi-annual Strategic Innovation and Research Agenda (SIRA, 2013)¹⁸, describing the main technological and innovation challenges to be overcome in order to develop sustainable and competitive bio-based industries in Europe, BBI JU has set up solid tools for establishing Annual Work Plans. These outline the scope and details of research, innovation, demonstration and deployment activities to be carried out and prioritised for the calls for proposals (see section 7.2), the governance and activities and an annual budget (see section 7.3).

Effectiveness of the initiative on the leverage of investments

BBI JU is expected to leverage private resources by EU funds at a level that cannot be achieved by traditional instruments of Horizon 2020, which lack the strategic long-term approach regarding programming and financing (see section 7.3.2.3). In that respect, the budget of BBI JU reflects very ambitious goals in terms of substantial private investments. The private resources invested by the industry can be in kind contributions and in cash contributions.

In kind contributions¹⁹ are one of the main forms of private contributions used by BBI JU. Similar mechanisms for delivery private contributions are applied in all different JUs

¹⁸http://ec.europa.eu/research/participants/data/ref/h2020/other/legal_basis/jtis/bbi/bbi-sira_en.pdf
http://ec.europa.eu/research/participants/data/ref/h2020/other/legal_basis/jtis/bbi/bbi-sira_en.pdf

¹⁹ In kind contributions consist of the costs incurred by the members other than the Union or their constituent entities in implementing indirect actions less the contribution of the BBI Joint Undertaking and any other Union contribution to those costs (IKOP), or of costs incurred by the members other than the Union or their constituent entities in implementing additional activities outside the work plan of the BBI Joint Undertaking contributing to the objectives of the BBI Initiative (IKAA).

acting within the Horizon 2020 framework. Council Regulation No 560/2014 provides the limits regarding the in kind contributions (see section 7.3) to the operational costs (IKOP)²⁰ as well the in kind contributions consisting of the costs incurred by them in implementing additional activities (IKAA).²¹ Furthermore, a commitment of BIC to contribute also financially ('in cash') to operational costs represents a distinct feature of BBI JU (see Section 7.3).²²

As underlined before, this Interim Evaluation of BBI Joint Undertaking (2014-2016) takes place at a **very early stage**, less than three years after the establishing of BBI JU, when no project has been concluded yet and only preliminary figures are available concerning leverage of investments. Nevertheless, the analysis of the documents provided by both the EC and BBI JU, as well information acquired through the direct consultation of some actors involved in the whole cycle of BBI JU financial and managerial activities, have pointed out that, at the time of this interim evaluation, there are still some difficulties in the interpretation of the regulation and modalities for delivery the different forms of private contribution planned in BBI JU statutes.

One first issue is related to the interpretation of the regulation concerning the delivery of the **financial contribution to operational costs** by BIC. Other difficulties have been found for the establishment of the methodologies for planning, reporting and certification of both IKOP and IKAA, which has led to delays in the adoption of IKAA plans, and to uncertainties related to the reporting and certification of IKOP and IKAA²³. As regards IKOP, the current evaluation bases its assessment on contributions committed not only by BIC or its constituent entities but also by any other participant in BBI JU projects. More detailed analyses of the above mentioned difficulties as well as of the envisaged solutions are reported in sections 7.3 and 7.4.

²⁰ Article 12.3 (c) of BBI JU Statutes.

²¹ Article 4.2 (b) of Council Regulation No 560/2014.

²² Article 12.4 of BBI JU Statutes.

²³ According to Commission Delegated Regulation (EU) No 1268/2012 of 29 October 2012 "The no-profit and co-financing principles should be revised in line with the clarifications and simplification measures introduced in the Financial Regulation. In particular, for the sake of clarity, it is necessary to establish detailed rules on the types of receipts to be retained for the no-profit principle as well [as the forms of external co-financing and in kind contributions.](#) "

7. ANSWERS TO THE EVALUATION QUESTIONS

7.1 Evaluation question 1: Background to the initiative, objectives and relevance

Public-private partnerships are one of the Horizon 2020 implementation modalities, where all involved members commit themselves to support the development and implementation of pre-competitive research and innovation activities of strategic importance to the Union's competitiveness and industrial leadership or to address specific societal challenges.²⁴

BBI JU is one of the several Horizon 2020 public-private partnership initiatives (see section 7.4). In order to assess the background, objectives and relevance of BBI JU both the overall context of public-private partnerships under Horizon 2020 and the specific context of the bio-based industries research and innovation need to be considered. They are included here in the assessment of evaluation question 1 by the expert group.

As defined in Annex 3 of the Terms of Reference for the Expert Group, stakeholder interviews addressed the wider operating environment before and after setting up BBI JU via the following questions.

What is the competitive position of the BBI Technologies in the short, medium and long terms?

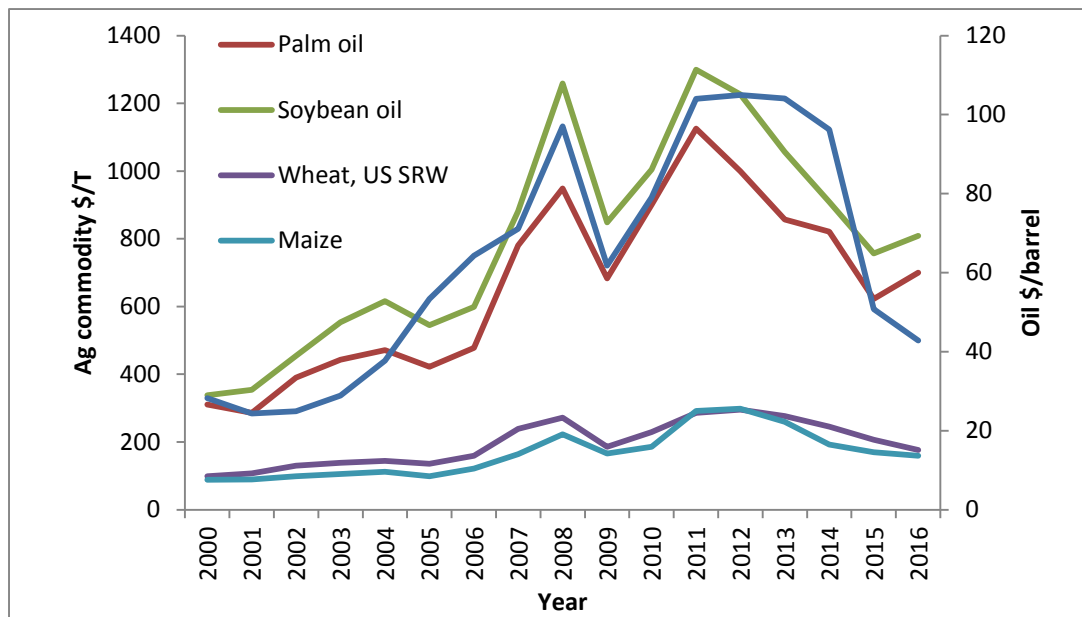
In the stakeholder interviews, the competitive position of BBI technologies, processes and concepts was discussed with representatives of the industry and the Commission officials. The interviewees largely agreed that before setting up of BBI JU the competitive position of Europe in BBI technologies was challenged by many of the demo size facilities being implemented in US and Asia. Well aligned with this initial challenge one of the key focus areas of BBI JU was to de-risk demonstration and commercialization of BBI technologies. The interviewees also largely agreed that the main positive effect of BBI JU in terms of competitiveness of BBI technologies comes via value chain driven cooperation across sectors, which helps scale up the technologies towards market applications. BBI JU is valuable especially for the long-term effect of bringing technologies to market and market replication. It is also an important signal effect for boosting the long-term development. Flagships are one aspect to bring the key BBI technologies to demonstration in the short term, to commercialization in the medium term and to market replication in the long term. In capital-intensive bio-based industries, technology commercialization takes time since it needs to be done with a staged approach.

What changes have occurred from a technology development point of view (e.g. complementary/competitive technology) and in the global economic/financial context of this sector since the initiation of the BBI JU programme and what are their likely effects?

The economic/financial aspects discussed by the interviewees included especially oil prices. Since setting up the BBI JU the oil price has reduced drastically, and the prices of agricultural commodities have somewhat reduced.

²⁴Art 25.1 of the Council Regulation (EU) No 1291/2013 establishing Horizon 2020

Figure 1. Prices of oil and agricultural commodities.



Oil price is affecting competitiveness of BBI technologies indirectly. Reducing oil prices make it harder for the bio-based value chains to be economically competitive. Slightly reduced prices of agricultural commodities can also have an indirect effect. In addition, many of the interviewees brought up sectoral evolution. After setting up the BBI JU the sectors active in BIC have evolved to include also for example the food industry and increasing amount of brand owners. From technology development point of view the BBI technologies can be developed to better match the market requirements and be competitive in the marketplace when a wider array of downstream sectors are closely involved in the development work.

One technological development that has occurred in the recent years is the development of carbon dioxide based chemicals and fuels production to first commercial facilities. If carbon dioxide based chemicals and fuels can be produced in techno economical feasible routes in the future it is likely that those applications will grow rapidly and indirectly affect the competitiveness of the BBI technologies. Based on the concept the effect on competitiveness of the BBI technologies can be positive or negative. If carbon dioxide is produced as a side product from bio-based processing chains, and utilized as a feedstock for chemicals and fuels, it can have a positive effect on overall competitiveness of bio-based technologies. If carbon dioxide based chemicals can be produced in a cost competitive manner from other than bio-based sources, it can affect competitiveness of bio-based production routes negatively.

In addition, digitalization is a mega trend that is transforming whole sectors and industries and needs to be considered also as a direct or indirect aspect affecting the competitiveness of BBI technologies. It can directly improve the competitiveness of bio-based technologies through enabling e.g. better optimization of supply chains and processing concepts. It can also indirectly affect competitiveness of bio-based technologies by changing market demand and consumption patterns.

7.1.1 Policy framework, context and background information

The Bioeconomy Strategy

The Commission Communication 'Innovating for sustainable growth: A Bioeconomy for Europe' aims to pave the way to a more sustainable use of renewable resources for

industrial purposes, while ensuring environmental protection. The Bioeconomy thereby also contributes significantly to the objectives of the Europe 2020 flagship initiatives 'Innovation Union' and 'A Resource Efficient Europe'.²⁵

The Bioeconomy strategy includes an Action Plan with three pillars:

- 1) Investments in research, innovation and skills;
- 2) Reinforced policy interaction and stakeholder engagement;
- 3) Enhancement of markets and competitiveness in Bioeconomy.

Action 10 of pillar 3 is to 'Promote the setting up of networks with the required logistics for integrated and diversified biorefineries, demonstration and pilot plants across Europe, including the necessary logistics and supply chains for a cascading use of biomass and waste streams. Start negotiations to establish a research and innovation PPP for bio-based industries at European level (by 2013).' This sub-action point sets the concrete foundation for setting up BBI JU.

Industrial policy

Concerning industrial policy there are several relevant policy aspects backing up the need for establishing BBI JU. Bio-based products were identified as one key market area already in the Commission Communication of 21 December 2007 entitled 'A lead market initiative for Europe'.²⁶ The Lead Market Initiative, or LMI, firstly identifies **promising emerging markets** to be supported by concerted policy action and then designs a process to better streamline legal and regulatory environments and accelerate the growth of demand. Bio-based products were defined in the LMI as products that are made from renewable, biological raw materials such as plants and trees. The policy elements of the LMI – environmental regulations, standardization, labelling and encouraging Member States to set up **demonstration plants** – were expected to have a role to play, together with the **Common Agriculture Policy**.

Later, the Commission Communication of 10 October 2012 entitled 'A Stronger European Industry for Growth and Economic Recovery' emphasises the strategic importance of bio-based industries for the future competitiveness of Europe.²⁷ Bio-based product markets are included as one priority action line there, and the specific actions for the Commission include:

- Implementation of the Bioeconomy Strategy
- Fostering markets for biobased products;
- Speeding up the development of standards and their international recognition;
- Promoting labelling and green public procurement;
- Working with the industry to develop detailed proposals for a Bioeconomy PPP (2013-14 onwards).

Both key policy aspects from the industrial policy point of view, the LMI and the renewed industrial policy, are in alignment with BBI JU PPP, and support its relevance.

Public-private partnerships

The European Commission has included public-private partnership initiatives under Horizon 2020, supporting the setting up of BBI JU from an institutional point of view (Art.

²⁵ COM(2014) 339 final 10.6.2014, COM(2011)0571

²⁶ COM(2007) 0860 final

²⁷ COM(2012) 582 final, Brussels, 10.10.2012

25 of Council Regulation (EU) No 1291/2013).²⁸ The Innovation Investment Package was proposed in a Communication from the Commission in 2013 and was approved by the EU Member States in 2014.²⁹ The package includes Joint Technology Initiatives that organise their own research and innovation agenda and award funding for projects based on competitive calls.

BBI JU is one of the seven JTIs set up as Joint Undertakings (JUs). JUs are 'Union bodies' under Articles 208 and 209 of the EU Financial Regulation.³⁰ The European Commission, as a co-founding member, is responsible for start up the JUs. Once the JUs have built up their legal and financial framework and demonstrated their operational capacity to implement their own budgets, they are granted autonomy.

Setting up of BBI JU

BBI JU has been established by **Council Regulation (EU) No 560/2014** of 6 May 2014. The background documents setting the scene include the Commission proposal, the impact assessment and the executive summary of the impact assessment.³¹

The members of BBI JU are defined in the **Statutes** (which are annexed to the Council regulation) as the European Union, represented by the Commission, and the Bio-based Industries Consortium Aisbl³² (the 'BIC'). The latter is a non-profit organisation established under Belgium law, with its permanent office in Brussels, Belgium³³, which represents the industry group that supports BBI JU. Its members cover the entire bio-based value chain and consist of large industries, small and medium-sized enterprises (SMEs), regional clusters, European trade associations and European Technology Platforms. Any interested stakeholders along the bio-based value chain may apply for membership.

As described in the Council Regulation on establishing BBI JU, in 2013 BIC developed a vision paper and a **Strategic Innovation and Research Agenda (SIRA)**,³⁴ based on extensive consultation with public and private stakeholders.³⁵ The SIRA describes the main technological and innovation challenges that need to be overcome in order to develop sustainable and competitive bio-based industries in Europe and identifies research, demonstration and deployment activities to be carried out by BBI JU.

The **bodies of BBI JU** are defined in the Statutes set out in the Annex to the Council regulation as the *Governing Board*, the *Executive Director*, the *Scientific Committee* and the *States Representatives Group*. The bodies and their roles are briefly summarised in Table 2.³⁶

²⁸ Regulation (EU) No 1291/2013 final of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC Text with EEA relevance

²⁹ COM/2013/0494 Public-private partnerships in Horizon 2020: a powerful tool to deliver on innovation and growth in Europe (10/07/2013)

³⁰ Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002

³¹ COM/2013/0496, 10/07/2013, SWD/2013/0247, SWD/2013/0248.

³² <http://biconsortium.eu>

³³ upon acceptance of these Statutes, by means of a letter of endorsement.

³⁴ It must be noted that the SIRA was revised in 2017 but only the document published in 2013 was taken into account for the present evaluation.

³⁵ http://ec.europa.eu/research/participants/data/ref/h2020/other/legal_basis/jtis/bbi/bbi-sira_en.pdf

³⁶ Council Regulation (EU) No 560/2014 of 6 May 2014.

Table 2: Bodies of BBI JU

Body	Role
Governing board	Composed of five representatives of the Commission, on behalf of the Union; and five representatives of the members other than the Union (thus of BIC), at least one of which is a Small and Medium Enterprise (SMEs) representative. The Governing Board has overall responsibility for the strategic orientation and the operations of BBI Joint Undertaking and supervises the implementation of its activities. The Commission, within its role in the Governing Board, seeks to ensure coordination between the activities of BBI Joint Undertaking and the relevant activities of Horizon 2020 with a view to promoting synergies when identifying priorities covered by collaborative research.
Executive Director	The Executive Director is the chief executive responsible for the day-to-day management of BBI Joint Undertaking in accordance with the decisions of the Governing Board. The Executive Director is the legal representative of BBI Joint Undertaking, accountable to the Governing Board. The Executive Director implements the budget of BBI Joint Undertaking. The Executive Director sets up a Programme Office for the execution, under his or her responsibility, of all support tasks arising from this Regulation.
Scientific Committee	Advisory body of BBI Joint Undertaking. The Scientific Committee consists of no more than fifteen members. It elects a chairperson from among its members. The members reflect a balanced representation of worldwide-recognised experts from academia, industry, SMEs, non-governmental organisations and regulatory bodies. Collectively, the Scientific Committee members have the necessary scientific competencies and expertise covering the technical domain needed to make science-based recommendations to BBI Joint Undertaking.
States Representatives Group	Advisory body of BBI Joint Undertaking. The States Representatives Group consists of one representative of each Member State and of each country associated to Horizon 2020. It elects a chairperson among its members. The States Representatives Group meets at least twice a year. Its chairperson convenes the meetings. The Executive Director and the chairperson of the Governing Board or their representatives attend the meetings. The chairperson of the States Representatives Group may invite other persons to attend its meetings as observers, in particular representatives of regional authorities within the Union, representatives of civil society or representatives of SME associations.

The **financial contributions** to be made by members of the JU are set in the Council regulation as follows.³⁷ The Union's³⁸ overall contribution to BBI JU to cover administrative costs and operational costs shall be up to EUR 975 000 000. The contribution of the Union shall be paid from the appropriations in the general budget of the Union allocated to the Specific Programme implementing Horizon 2020.³⁹ The

³⁷ Council Regulation (EU) No 560/2014 of 6 May 2014

³⁸ EU contribution including EFTA

³⁹ established by Decision 743/2013/EU, in accordance with point (c)(iv) of Article 58(1) and Articles 60 and 61 of Regulation (EU, Euratom) No 966/2012 for bodies referred to in Article 209 of that Regulation

members of BBI Joint Undertaking other than the Union shall make, or arrange for their constituent entities to make, a total contribution of at least EUR 2 730 000 000. The latter consist of a financial contribution to the operational costs (of at least EUR 182 500 000 at programme level), financial contribution to administrative costs and of in kind contributions (IKOP). The total private contribution comprises, also, a minimum of EUR 1 755 000 000 for implementing additional activities outside the work plan of BBI Joint Undertaking contributing to the objectives of BBI Initiative (IKAA). A more detailed explanation of the budget is available in section 7.3.2. Other Union funding programmes may support the in kind costs in compliance with the applicable rules and procedures. In such cases, Union financing shall not be a substitute for the in kind contributions from the members other than the Union or their constituent entities.

According to the Council regulation the **administrative costs** of BBI JU shall not exceed EUR 58 500 000 and shall be covered by means of financial contributions divided equally on an annual basis between the Union and the members other than the Union. If part of the contribution for administrative costs is not used, it may be made available to cover the operational costs of BBI Joint Undertaking.

Further analysis of roles, financial aspects and other institutional aspects of setting up BBI JU are reported in section 7.3.2.

Expected synergies

As described earlier, this mid-term evaluation will assess how the intervention works within Horizon 2020 between BBI JU and regular Horizon 2020 calls. The synergies, in this context, require good complementarity between the actions undertaken and projects supported, towards implementation of Horizon 2020 and its specific programmes, especially SC2 and LEIT. These aspects are considered in the further sections (evaluation question 2 and onwards).

According to the Council regulation, BBI JU should develop **close synergies** with other Union programmes in areas such as education, environment, competitiveness and SMEs, and with the Cohesion Policy funds and Rural Development Policy. Horizon 2020 should also promote synergies with the European Structural and Investment Funds (ESIF). Therefore, BBI Joint Undertaking is expected to develop close interactions with the ESIF, which can specifically help to strengthen local, regional and national research and innovation capabilities in the area of BBI JU.

As the **procedures for supporting the expected synergies** are not described in detail in the statutes or the other key background documents of BBI Initiative, the expert group assessed this aspect in the interviews of the Commission officials and BBI JU and BIC representatives.

In the **interviews**, it was pointed out that there was a lack of official procedures for implementing the expected synergies with programmes on education, environment, competitiveness, SMEs, cohesion policy funds, rural development policy and European structural and investments funds. However, the work programmes and annual work programmes include references to possible complementary actions. It was also commented that the BBI JU projects are governed by Horizon 2020 rules, making it challenging to have project level support also from structural funds, for example. Therefore, the synergies with structural funds and other funding instruments outside HORIZON 2020 need to be sought by parallel projects or on the multi-project level, or programme level.

7.1.2 Situation before approval and setup of BBI JU

In FP7, **Bioeconomy research and innovation** was funded within Theme 2 'Food, Agriculture and Fisheries, and Biotechnology' (FAFB). It was divided into four main

thematic areas with an overall budget of EUR 1.9 billion, which represents an increase of 46% over the corresponding research in FP6.⁴⁰ The allocations to the thematic areas in FP7 were biotechnology 32%, agriculture 31%, food 27%, fisheries and aquaculture 9%. According to the ex-post evaluation of FP7 in the biotechnology area, which thematically is the closest to BBI JU scope, there was a shift in the later years towards industrial biorefinery projects, and product development away from research on novel sources of biomass, which was emphasised in the first years of FP7.

Within the **biotechnology area**, the main activity areas had similar budget allocations. Primary production and novel sources of biomass and marine and fresh-water biotechnology received over EUR 200 million.⁴¹ Research and innovation projects on biorefinery and industrial biotechnology, which emphasise the middle and end parts of the value chains, received together close to EUR 200 million. The more crosscutting research on policies, emerging trends and environmental technology received together around EUR150 million. The biotechnology area grew very substantially over the life of the programme. Allocated funding more than doubled in absolute terms and increased from 24% of FAFB funding in 2007-2008 to 41% in 2012-2013.⁴²

While the funding of biotechnology research and innovation in Europe has grown significantly, this has not been matched by a corresponding implementation into the relevant industrial sectors in Europe. Therefore, a concerted effort by all stakeholders was envisioned to **mobilise and structure the emerging and promising new sector** of the bio-based industries in Europe towards building up Europe as **the leading house of a future-oriented and sustainable Bioeconomy**.

The shift towards a value chain attitude and a market approach started already in FP7. Then, BBI initiative moved further towards solving the key problems identified in the various strategy and policy documents on development of the bio-based industries. BBI JU intends to increase a holistic value chain approach, to lower the risk for increasing industrial investment, and to shift the **focus** more towards **demonstration and deployment**.

In the interviews with Commission officials and BBI JU and BIC representatives, some aspects of the situation before setting up BBI JU were highlighted. A first relevant aspect was that in 2012-2014, the EU had a more knowledge- and technology-oriented view on the bio-based industries, while the US and Asia were providing market and financial support for deployment, providing ground for production investments. Back at that time, some Member States had developed Bioeconomy strategies already, but also those were mainly focused on knowledge and technology. Furthermore, the political support was mainly for biofuels, whereas for other sectors of the bio-based industries the support focused on R&D level. Thus, there was an identified **gap from knowledge to production**, as reported, for example, in the Key Enabling Technologies report of the European Commission.⁴³

Considering this background, the industry was willing to join forces and develop BBI PPP with a target to move towards increasing deployment, market awareness and regional involvement across sectors and value chains.

⁴⁰ European Commission (2014). An ex-post evaluation of the rationale, implementation and impacts of EU Seventh Framework Programme (2007-2013), Cooperation Theme 2: Food, agriculture and fisheries, and biotechnology. Report to the European Commission.

⁴¹ European Commission (2014). An ex-post evaluation of the rationale, implementation and impacts of EU Seventh Framework Programme (2007-2013), Cooperation Theme 2: Food, agriculture and fisheries, and biotechnology. Report to the European Commission.

⁴² European Commission (2014). An ex-post evaluation of the rationale, implementation and impacts of EU Seventh Framework Programme (2007-2013), Cooperation Theme 2: Food, agriculture and fisheries, and biotechnology. Report to the European Commission.

⁴³ Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions "A Stronger European Industry for Growth and Economic Recovery Industrial Policy" Communication Update. COM/2012/0582 final.

In the interviews, the change of situation before and after creating BBI JU was characterised mainly through two main aspects: BBI JU has provided a **structuring effect**, bringing together the sectors and actors towards deployment of new value chains, and it has mobilised increasing investments on developing innovations for the bio-based industries.

7.1.3 Introduction to BBI JU and the problems it intended to solve

Specific objectives of BBI JU

The specific objectives of BBI JU laid down by Article 2 of Council Regulation (EU) 560/2014 of 6 May 2014 are:

(a) to contribute to the implementation of Regulation (EU) No 1291/2013 and in particular Part III of Decision 2013/743/EU;

(b) to contribute to the objectives of BBI Initiative of a more resource efficient and sustainable low-carbon economy and increasing economic growth and employment, in particular in rural areas, by developing sustainable and competitive bio-based industries in Europe based on advanced biorefineries that source their biomass sustainably, and in particular to: (i) demonstrate technologies that enable new chemical building blocks, new materials, and new consumer products from European biomass which replace the need for fossil-based inputs; (ii) develop business models that integrate economic actors along the whole value chain from supply of biomass to biorefinery plants to consumers of bio-based materials, chemicals and fuels, including by means of creating new cross-sector interconnections and supporting cross-industry clusters; (iii) set up flagship biorefinery plants that deploy the technologies and business models for bio-based materials, chemicals and fuels and demonstrate cost and performance improvements to levels that are competitive with fossil-based alternatives.'

Objectives of BBI JU are in line but also complementary with other parts of Horizon 2020 in particular 'Leadership in nanotechnologies, advanced materials, biotechnology and advanced manufacturing and processing' (LEIT) and 'Improving food security, developing sustainable agriculture, marine and maritime research and the Bioeconomy' (Societal Challenge 2).

Moreover, 15% of the Union contribution to BBI JU is financed by the LEIT program and the remaining 85% is financed by the SC2 program.

Challenges BBI JU intends to overcome

The challenges addressed by BBI JU and the related targets are summarised in Table 3.

Table 3: Challenges addressed by BBI JU

Targets	Challenges intended to be overcome
Improved synergies in innovation	Dispersion of technical competences
	Lacking of critical mass
Reducing risk for private investment	Market failures that discourage private investment into pre-competitive research, demonstration and deployment activities for bio-based industries
	Risk for private research and innovation investment in the development of sustainable and competitive bio-based products and biofuels
Improving reliable knowledge base and	Limited data publicly available on real

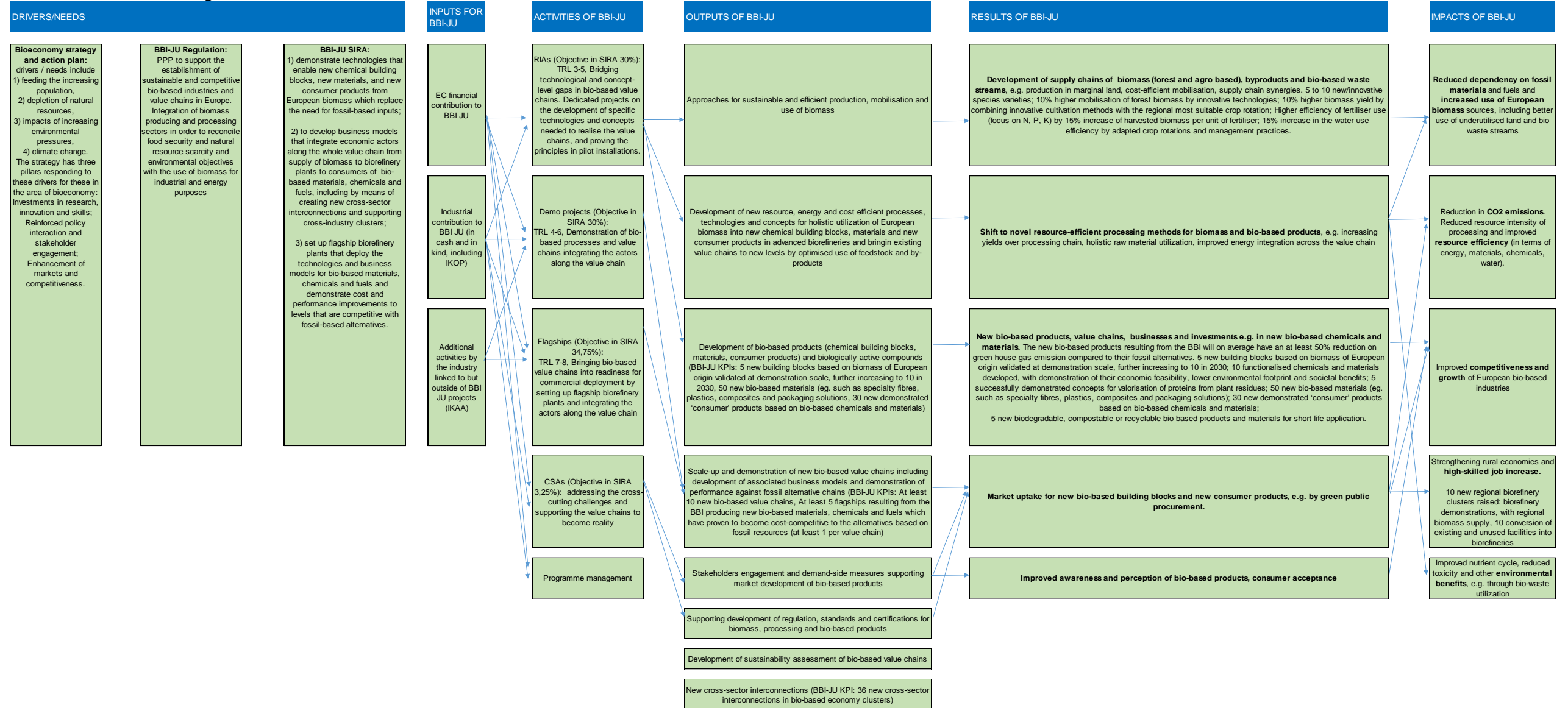
functioning of biomass supply chains	resource availability, considering building sustainable and competitive value chains
	Limited availability of reliable biomass supply considering building sustainable and competitive value chains
Increasing investment in development of the bio-based industry sector	Insufficient investment in the development of a sustainable bio-based industry sector in Europe considering being a key player in research, demonstration and the deployment of advanced bio-based products and biofuels
Establishment of new sustainable value chains	Insufficient collaboration between stakeholders along the entire bio-based value chains, including primary production and processing industries, consumer brands, SMEs, research and technology centres and universities considering being a key player in research, demonstration and the deployment of advanced bio-based products and biofuels

The problems summarised above are aligned with the key policy documents and strategies, the Bioeconomy Strategy and the industrial policy, and the main findings of the impact assessment.

7.1.4 Intervention logic

The intervention logic diagram is presented as defined in the evaluation guidelines of the Better Regulation package, summarising the evaluation work of the expert group on drivers and needs, inputs, activities, expected outputs, expected results and expected impacts of the BBI JU and showing how different measures were expected to interact with each other according to the key background documents, including the Bioeconomy strategy, Council Regulation on BBI JU and BBI JU SIRA.

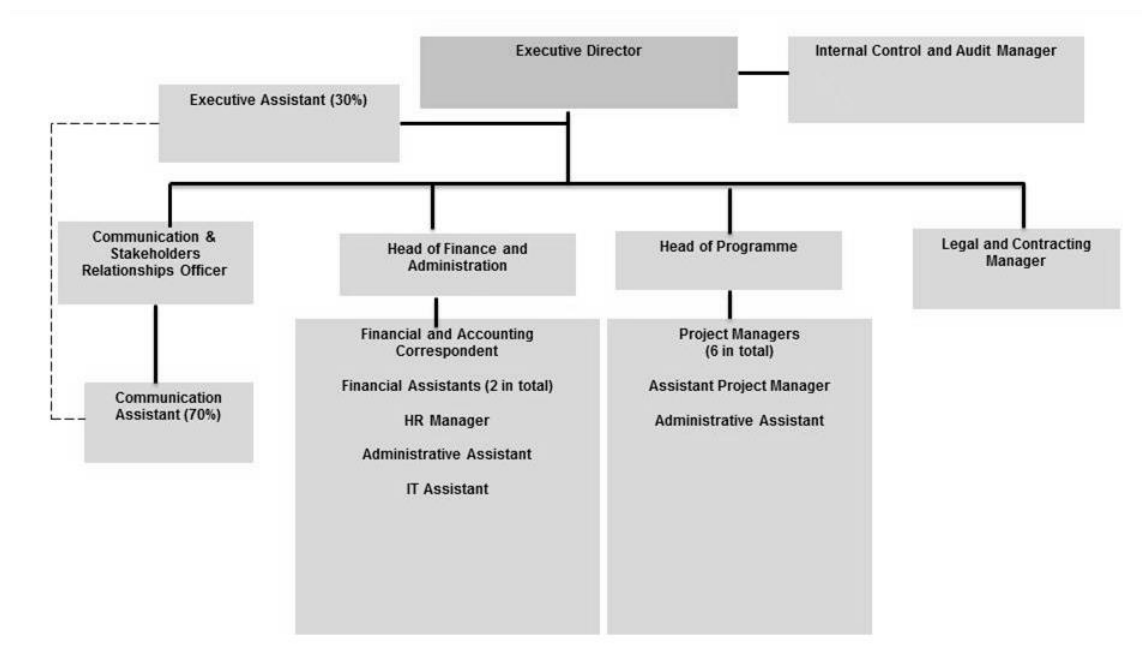
Table 4: Intervention logic.



7.2 Evaluation question 2: Implementation of BBI Joint Technology Initiative⁴⁴

Concerning BBI JU organization, its staff is organized as reported in Figure 2.

Figure 2: Organisational structure of BBI JU.



While the BBI JU full staff complement is as set out in Figure 2, recruitment has been ongoing. Staffing complements reported in annual reports.

- 0 (in start-up phase and initiating recruitment) as recorded in 2014 annual report⁴⁵
- 13 as recorded in 2015 annual report⁴⁶
- 20 as recorded in 2016 annual report⁴⁷

The data analysed in this section reflects the **progresses in the implementation** of BBI JU initiative as of May 2017 concerning the portfolio of projects selected for funding (65 projects in total). The deadline for the last call for proposals from which the portfolio was selected was 8 September 2016. The grant agreements with the projects from this call were signed on May 2017⁴⁸.

The purpose of this section is to provide the **statistical analysis of the state of play** and provide information about different participation patterns and the distribution of funds. Comparison of some participation patterns with those of two other Horizon 2020 programmes:

⁴⁴ The SIRA developed by BIC describes the main technological and innovation challenges that need to be overcome in order to develop sustainable and competitive bio-based industries in Europe and identifies research, demonstration and deployment activities to be carried out by a Joint Technology Initiative. Such programmatic content is implemented, although non exclusively, by BBI JU, which is the object of this evaluation.

⁴⁵ BBI JU Annual Activity Report 2014

⁴⁶ BBI JU Annual Activity Report 2015

⁴⁷ BBI JU Annual Activity Report 2016

⁴⁸ The analysis extends the ToR limit of 31 December 2016.

1) Societal Challenge 2: Food Security, Sustainable Agriculture and Forestry, Marine and Inland Water Research and the Bioeconomy (SC2) (statistics for all calls including SME instrument)⁴⁹; and

2) LEIT KET Biotechnology programme (LEIT) (statistics for all calls including SME instrument)⁵⁰ is presented.

This section provides necessary background information for the evaluation of effectiveness of implementation, BBI performance, EU added value and coherence that follows this chapter.

7.2.1 Presentation of an overview of calls launched and implemented during the period 2014-2016

The analysis presented in this report concerns the calls launched and implemented by BBI JU during the period 2014-2016. In this period, the project grants were allocated via four calls for proposals as listed in Table 5. The calls were launched for **65 call topics**, to which **222 proposals** were submitted in total. The total **success rate** (ratio of all funded to all submitted proposals) **was 29%**. This is significantly higher than the success rate for the main calls in SC2 (21.5)⁵¹ and the success rate in LEIT KET (19.9%).⁵²

The total EC contribution (in commitment appropriations) to BBI JU **operational expenditure** over 2014-2016 amounted to EUR 418.29 million and the total financial contribution committed by BIC at programme level, for the same expenditure and over the same period amounted to EUR 0.75 million. Out of the total contributions committed by the two members of the JU, EUR 414.29 million were subsequently committed by the BBI JU in individual projects selected for funding. BBI JU will use the rest (EUR 4.75 million) of the EU (including EFTA) contribution to BBI JU operational expenditure in 2014-2016 in calls for proposals in subsequent years.

In CORDA statistics, the financial contribution of industry to operational costs is included in the projects' budget (EC net requested project contribution). Therefore, **the total budget in all below presented statistics equals to EUR 414.29 million, which corresponds to EUR 413.54 million of EU (incl. EFTA) contribution plus EUR 0.75 million of industry financial contribution to operational costs at programme level in 2016.**

BBI JU selected 65 projects for funding: 6 Coordination and Support Actions (BBI-CSA), 26 Innovation Actions (IA) (thereof 20 Demonstration Actions (BBI-IA-DEMO) and 6 Flagship Actions (BBI-IA-FLAG)), and 33 Research and Innovation Actions (BBI-RIA) (Table 6). In terms of funding, 72.7% of the BBI JU⁵³ contribution (EUR 301.18 million) was dedicated to Innovation Actions (39.5% to DEMO and 33.2% to FLAG projects); 25.9% (EUR 107.1 million) went to RIAs and 1.4% (EUR 5.85 million) to CSAs (Table 7).

⁴⁹ DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017);

⁵⁰ DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017).

⁵¹ DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (Cut-off 31 March 2017).

⁵² DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017).

⁵³ The BBI JU contribution to calls 2014-2016 of EUR 414.29 million comprises EUR 413.54 million of EU contribution (out of the total EUR 418.29 million that has been committed by the EU) and EUR 0.75 million of industry contribution

Table 5. Calls overview 2014-2016.

Call	Contribution awarded to funded projects (in million EUR)*	No. of topics	No. of submitted proposals	No. of funded projects	Success rate per call (funded/submitted proposals)
H2020-BBI-PPP-2014-1	49.65	16	38	10	26.3%
H2020-BBI-JTI-2015-01	73.74	3	9	3	33.3%
H2020-BBI-PPP-2015-02	105.30	19	73	23	31.5%
H2020-BBI-JTI-2016	185.60	27	102	29	28.4%
Total	414.29*	65	222	65	29.3%

Source: CORDA analysis; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

Table 6. Project numbers per call and per type of action (2014-2016)

Calls	Project types				Grand Total
	BBI-CSA	BBI-IA-DEMO	BBI-IA-FLAG	BBI-RIA	
H2020-BBI-PPP-2014-1	0	2	1	7	10
H2020-BBI-PPP-2015-1-1	0	0	3	0	3
H2020-BBI-PPP-2015-2-1	3	9	0	11	23
H2020-BBI-JTI-2016	3	9	2	15	29
Grand Total	6	20	6	33	65
In percentage					
H2020-BBI-PPP-2014-1	0.0%	20.0%	10.0%	70.0%	100.0%
H2020-BBI-PPP-2015-1-1	0.0%	0.0%	100.0%	0.0%	100.0%
H2020-BBI-PPP-2015-2-1	13.0%	39.1%	0.0%	47.8%	100.0%
H2020-BBI-JTI-2016	10.3%	31.0%	6.9%	51.7%	100.0%
Grand Total	9.2%	30.8%	9.2%	50.8%	100.0%

Source: CORDA analysis.

Table 7. Contribution per call and per type of action (in EUR million) (2014-2016)

Calls	Project types				
	BBI-CSA	BBI-IA-DEMO	BBI-IA-FLAG	BBI-RIA	Grand Total*
H2020-BBI-PPP-2014-1	0.00	19.72	17.00	12.94	49.65
H2020-BBI-PPP-2015-1-1	0.00	0.00	73.74	0.00	73.74
H2020-BBI-PPP-2015-2-1	2.96	62.67	0.00	39.67	105.30
H2020-BBI-JTI-2016	2.89	81.21	47.01	54.49	185.60
Grand Total	5.85	163.59	137.75	107.10	414.29*
In percentage					
H2020-BBI-PPP-2014-1	0.0%	39.7%	34.2%	26.1%	100.0%
H2020-BBI-PPP-2015-1-1	0.0%	0.0%	100.0%	0.0%	100.0%
H2020-BBI-PPP-2015-2-1	2.8%	59.5%	0.0%	37.7%	100.0%
H2020-BBI-JTI-2016	1.6%	43.8%	25.3%	29.4%	100.0%
Grand Total	1.4%	39.5%	33.2%	25.9%	100.0%

Source: CORDA analysis; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016.

Concerning the **programming procedures**, there is no doubt that inputs from industries in Europe on the work programme are the distinctive feature of JUs. Nevertheless, the dynamic developments in the creation of new bio-based industries offer additional opportunities for shaping the work programmes, including new approaches and new directions which a single member country, organization or scientific discipline could not realize and which require a common European effort. Therefore, a balanced consideration of all dimensions of the EU added value and a more active (in contrast to 'reactive') involvement of the EC could be beneficial to industry, science and society in building the Innovation Union.

7.2.2 Participation patterns by country and region: trends and specificities

A summary of the geographical participation in BBI calls and projects is presented in Tables 8 and 9. The tables are divided by the country groups (EU15, EU13, Associated Countries and Third Countries). The individual countries in each group are listed in alphabetic order.

The countries with the highest funding received and numbers of participations are **Germany** (EUR 71.64 million; 99 participations), **Italy** (EUR 51.07 million; 76), **Netherlands** (EUR 48.09 million; 87), **France** (EUR 36.02 million; 66) and **Spain** (EUR 33.38 million; 85). The same countries score highest in terms of coordinators' numbers (DE: 7, IT: 8, NL: 10, FR: 6 and ES: 12). Interestingly, UK, the country scoring highest in terms of participation and budget received in the main SC2 calls, falls behind in BBI,

with only EUR 18.52 million received and 48 participations. The UK success rate is surprisingly low (only 23.8%) compared to EU15 average (31.3 %). All countries that rank highest in BBI calls belong to **EU15** (Member States of the EU prior to the accession of ten candidate countries on 1 May 2004).

From the **EU13** (Member States that joined the EU in 2004 or later), **Slovakia** (EUR 21.5 million received and 10 participations) and **Poland** (EUR 5.46 million; 11) are the most active. Interestingly, Slovakia is also among the top five countries in terms of success rate (66.7%).

Norway leads in terms of funding received as well as participation numbers among the **Associated Countries** (EUR 29.52 million; 14), followed by Iceland (EUR 2.16 million; 5) and Switzerland (EUR 0.76 million; 12).

Although there was some interest in BBI calls among **Third Countries** (21 applications in total), eventually no applicant from this country group received funding.

EU15 accounts by far for the most participation and the most funding committed in BBI in the period 2014-2016. **EU15** has **671 participations** in total, which account for **89%** of all participations, and this group receives **EUR 348.12 million (84% of the total)**. Most of the project coordinators (**62; 93.9%**) come from this country group. The participants from **EU13** countries account for only **6% (45 participations)** of the total and receive only **7.9% of the EC funding (EUR 32.90 million)**, very similar to the Associated Countries (EUR 33.28 million). So far there is only one project coordinator from EU13 (from Poland), and the **success rate of 19.7%** is far below that of EU15 (32.6%) or even Associated Countries (27.9%).

Table 8. Participation by country: No. of applications, applicants, participations, participants, coordinators, contribution in millions of Euro and success rates (2014-2016).

Country	Total applications	Total applicants	Total participations	Total participants	Total coordinators*	Contribution**	Success rate (participation/applications)
EU15							
AT	92	65	22	21		5.32	23.9%
BE	143	88	59	47	4	26.57	41.3%
DE	278	186	99	80	7	71.64	35.6%
DK	66	40	15	14	1	4.73	22.7%
EL	60	42	8	6	1	3.80	13.3%
ES	266	174	85	65	12	33.38	32.0%
FI	112	63	43	29	6	14.41	38.4%
FR	153	111	66	58	6	36.02	43.1%
IE	50	33	14	12	2	15.92	28.0%
IT	288	172	76	61	8	51.07	26.4%
NL	192	115	87	67	10	48.09	45.3%
PT	80	56	13	13		3.30	16.3%
SE	75	45	36	28	3	15.37	48.0%
UK	202	145	48	41	2	18.52	23.8%
EU13							
BG	8	8					0.0%
CY	8	8	1	1		0.41	12.5%
CZ	20	19					0.0%
EE	7	6	1	1		0.11	14.3%
HR	32	25	9	6		2.52	28.1%
HU	17	15	7	7		1.61	41.2%
LT	10	9	1	1		0.37	10.0%
LV	24	19	1	1		0.33	4.2%
MT	3	2					0.0%
PL	41	32	11	10	1	5.46	26.8%

RO	23	21	3	3		0.46	13.0%
SI	21	17	1	1		0.13	4.8%
SK	15	15	10	10		21.50	66.7%
Associated countries (AC)							
BA	1	1					0.0%
CH	33	26	12	12		0.76	36.4%
FO	2	2	1	1		0.50	50.0%
IL	12	9					0.0%
IS	10	8	5	4	1	2.16	50.0%
ME	1	1					0.0%
MK	2	1					0.0%
NO	37	25	14	12	2	29.52	37.8%
RS	15	13	2	2		0.25	13.3%
TN	5	5					0.0%
TR	14	13	4	4		0.08	28.6%
UA	4	4					0.0%
Third countries							
AR	1	1					0.0%
AU	2	1					0.0%
BR	1	1					0.0%
CA	2	2					0.0%
CL	1	1					0.0%
CN	4	4					0.0%
CR	1	1					0.0%
DZ	1	1					0.0%
EG	1	1					0.0%
KE	1	1					0.0%
KZ	1	1					0.0%
RU	1	1					0.0%
SM	1	1					0.0%
US	2	2					0.0%
VN	1	1					0.0%
Total	2443	1659	754	618	66	414.29**	30.9%

Source: CORDA analysis;

*3 coordinators are in charge of multiple projects; FIBIC (FI): 2 prom., IMECAL (ES):2 project, VTT (FI): 2 projects. duplicates were not removed; 1 project SmartLi has 2 coordinators

* **EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

Table 9. Participation patterns by country group: No. of applications, applicants, participations, participants, coordinators, BBI JU contribution (in million Euro) and success rates (2014-2016)

Country group	Total applications	Total applicants	Total participations	Total participants	Total coordinators*	Contribution**	Success rate (participation/applications)
EU 15	2057	1335	671	542	62	348.12	32.6%
EU13	229	181	45	41	1	32.90	19.7%
EU 28	2286	1516	716	583	63	381.01	31.3%
AC	136	108	38	35	3	33.28	27.9%

Third countries	21	20	0	0	0	0.00	0.0%
Total	2443	1644	754	618	66	414.29*	30.9%
In percentage							
EU 15	84.2%	81.2%	89.0%	87.7%	93.9%	84.0%	
EU13	9.4%	11.0%	6.0%	6.6%	1.5%	7.9%	
EU 28	93.6%	92.2%	95.0%	94.3%	95.5%	92.0%	
AC	5.6%	6.6%	5.0%	5.7%	4.5%	8.0%	
Third countries	0.9%	1.2%	0.0%	0.0%	0.0%	0.0%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Source: *CORDA analysis*

*3 coordinators are in charge of multiple projects; FIBIC (FI): 2 projects, IMECAL (ES):2 projects, VTT (FI): 2 projects; duplicates were not removed; 1 project SmartLi has 2 coordinators

* *EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

7.2.3 Participation patterns broken down by type of beneficiary organisation (universities, research organisations and industry including large companies and SMEs)

Participation patterns broken down by type of beneficiary organisation are presented in Tables 10 and 11.

The selected proposals under BBI JU represent 754 participations, mobilising 618 distinct participants corresponding to an average of 1.2 participations per participant. The majority of participants are private-for-profit entities (PRC) (406, i.e. **65.7%**). PRC include large companies and SMEs. Please note, that CORDA does not distinguish between these two types of organisations, which would be useful in order to better estimate SMEs participation in different programmes.

The percentage of PRC is very high in BBI compared to the main SC2 calls. It is also significantly higher than in LEIT programme (49%)⁵⁴. 15.9% of BBI call participants are Research organisations (REC), and 11.8% are Higher and Secondary Education Establishments (HES). These figures are significantly lower than in the main SC2 calls. In LEIT, HES and REC constitute 24 and 17%, respectively⁵⁵. Public bodies in BBI (PUB) account for 1%, and the remaining 5.7% are other types of actors.

Table 10. Participation patterns by beneficiary type: No. of applications, applicants, participations, participants, coordinators, BBI JU contribution (in million Euro) and success rates (2014-2016).

⁵⁴ DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017).

⁵⁵ DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017)

Type of beneficiary	No. of applications	No. of applicants	No. of participations	No. of participants	Total coordinators	Contribution*	Success rate: participation/application
Higher or Secondary Education Establishment (HES)	538	312	96	73	8	44.80	17.8%
Research Organisations (REC)	459	241	146	98	24	66.30	31.8%
Public bodies (PUB)	29	27	6	6	0	0.63	20.7%
Private for profit entities (PRC)	1311	1003	466	406	29	292.76	35.5%
Other (OTH)	106	76	40	35	5	9.81	37.7%
Total	2443	1659	754	618	66	414.29*	30.9%
In percentage							
Higher or Secondary Education Establishment (HES)	22.0%	18.8%	12.7%	11.8%	12.1%	10.8%	
Research Organisations (REC)	18.8%	14.5%	19.4%	15.9%	36.4%	16.0%	
Public bodies (PUB)	1.2%	1.6%	0.8%	1.0%	0.0%	0.2%	
Private for profit entities (PRC)	53.7%	60.5%	61.8%	65.7%	43.9%	70.7%	
Other (OTH)	4.3%	4.6%	5.3%	5.7%	7.6%	2.4%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Source: CORDA analysis; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

In terms of funding, **70.7% (EUR 292.76 million)** of the contribution goes to **PRC**, 16% (EUR 66.3 million) to REC, 10.8% (EUR 44.8 million) to HES, 0.2% (EUR 0.63 million) to PUB, and 2.4% (EUR 9.81 million) to other organisations. This pattern significantly differs from the main SC2 calls, where the highest percentage of the budget goes to REC (33.1%) and HES (27%), whereas the private sector (PRC) receives only

around 27.2% of the total contribution⁵⁶. In LEIT PRC, receive the highest share of funding (39.2%), followed by HEC (30.6%) and REC (24.6%)⁵⁷

Success rates vary considerably for different types of actors. They also differ from those in the main SC2 calls. 35.5% of private-for-profit entities in proposals are funded in BBI, compared to 17.4% in main SC2 calls⁵⁸ and 15.3% in LEIT⁵⁹. HES success rates (17.8%) are lower than in SC2 (19.4%) and in LEIT (23.4%). REC's success rates (31.8%) are similar to LEIT (33.1%) but higher than in SC2 (26.8%). In contrary, public bodies succeed more often in LEIT (64%) and SC2 (42.3%) than in BBI (20.7%). Total success rates in BBI (30.9 %) are significantly higher than those in SC2 (21.5%) and in LEIT (19.9%).

BBI calls have a very good SME participation (Table 11). **35.4% (219** of the total 618 beneficiaries) participating in BBI projects conform to SME status. 738 SMEs have participated so far in applications (30.2% of total) and had a very good **success rate (36.4%)**, higher than the total success rates in BBI calls (30.9%). They have received so far **EUR 120.35 million**, which corresponds to **29.1% of the total contribution**. It should be noted though, that the share of SMEs is calculated based on applicants' self-assessment done at the proposal submission.

Table 11. Participation patterns of SMEs compared to all other participants (non-SMEs): No. of applications, applicants, participations, participants, coordinators, BBI JU contribution and success rates (2014-2016).

Type of beneficiary	No. of applications	No. of applicants	No. of participations	No. of participants	Total coordinators	Contribution*	Success rate (participation/application)
SMEs**	738	519	269	219	19	120.38	36.4%
Non-SMEs	1705	1140	485	399	47	293.91	28.4%
Total	2443	1659	754	618	66	414.29*	30.9%
In percentage							
SMEs	30.2%	31.3%	35.7%	35.4%	28.8%	29.1%	
Non-SMEs	69.8%	68.7%	64.3%	64.6%	71.2%	70.9%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Source: CORDA analysis; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016.

** Based on the self-assessment done by applicants

Table 12. Participation patterns per project type: No. of applications, applicants, participations, participants, coordinators, BBI JU contribution (in million Euro) and success rates (2014-2016).

⁵⁶ DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017);

⁵⁷ DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017)

⁵⁸ DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017);

⁵⁹ DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017)

Project type	No. of applications	No. of applications	No. of participations	No. of participants	Total Coordinators	EC contribution*	Success rate (participation/application)
CSA	77	52	39	30	6	5.85	50.6%
DEMO	692	457	233	183	20	163.59	33.7%
FLAG	215	163	56	51	6	137.75	26.0%
RIA	1459	987	426	354	34	107.10	29.2%
Total	2443	1659	754	618	66	414.29*	30.9%
In percentage							
CSA	3%	3%	5.2%	4.9%	9.1%	1.4%	
DEMO	28%	28%	30.9%	29.6%	30.3%	39.5%	
FLAG	9%	10%	7.4%	8.3%	9.1%	33.2%	
RIA	60%	59%	56.5%	57.3%	51.5%	25.9%	
Total	100%	100%	100.0%	100.0%	100.0%	100.0%	

Source: CORDA analysis; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

7.2.4 Participation patterns and budget share per value chain

Table 13 outlines the number of projects, participants and distribution of EU funds according to the value chain. Table 14 presents the number of projects according to value chain and type of action whereas Table 15 shows the distribution of funds according to value chain and type of action.

One of the main objectives of BBI JU outlined in SIRA (2013) is accelerating the building of bio-based value chains (VC). Five value chains of very high importance for further development of the Bioeconomy were proposed and were supposed to be strengthened especially by large demonstration and flagship projects:

VC1: From **lignocellulosic feedstock to advanced biofuels, bio-based chemicals and biomaterials**: realising the feedstock and technology base for the next generation of fuels, chemicals and materials.

VC2: The next generation **forest-based value chains**: utilization of the full potential of forestry biomass by improved mobilization and realization of new added-value products and markets.

VC3: The next generation **agro-based value chains**: realizing the highest sustainability and added value by improved agricultural production and new added value products and markets.

VC4: Emergence of new **value chains from (organic) waste**: From waste problems to economic opportunities by realizing sustainable technologies to convert waste into valuable products.

VC5: The integrated **energy, pulp and chemicals biorefineries**: Realizing sustainable bio-energy production, by backwards integration with biorefinery operations isolating higher added value components.

Each VC was supposed to lead to at least one flagship project, covering full value chain, namely demonstrating the feasibility of feedstock supply, market application and market uptake.

So far six flagship projects were launched, three in VC1, one in VC2 and two in VC3 (Table 14). Lignocellulose, forest-based and agro-based value chains existed before BBI and thus it is not surprising that they present the highest technology readiness level and launching of the flagship projects in those areas was possible. However, so far the distribution of projects and funds according to value chain seem to be somewhat unbalanced.

Table 13. Number of projects, participants and BBI JU contribution per value chain (2014-2016).

Value Chain	No. of projects	No. of participations	Contribution (EUR million)*
VC1 (Lignocellulose)	14	171	142.64
VC2 (forest-based)	10	139	64.20
VC3 (agro-based)	11	135	85.43
VC4 (organic waste)	6	74	31.86
across VCs	19	172	68.63
Aquatic Biomass	5	63	21.54
Total	65	754	414.29*
In percentage			
VC1 (Lignocellulose)	22%	23%	34.43%
VC2 (forest-based)	15%	18%	15.50%
VC3 (agro-based)	17%	18%	20.62%
VC4 (organic waste)	9%	10%	7.69%
across VCs	29%	23%	16.56%
Aquatic Biomass	8%	8%	5.20%
Total	100%	100%	100.00%

*Source: CORDA analysis and a table with project distribution according to VC received from BBI office; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016*

Table 16 shows the planned (SIRA, 2013) and actual distribution of funding over the value chain demonstrators. Lignocellulose (VC1) received so far 40% of planned funds for DEMO and FLAG projects compared to 48% planned. Forest based (VC2) has received 17% compared to 15% planned and agro-based (VC3) 24%, while originally only 15% of funds were planned for this sector. Organic waste value chain (VC4) was supported only by 7% of the total budget while SIRA had foreseen 15%. No flagship project in this VC was launched so far. This sector is emerging and it is not as well established as VC1-VC3; however, efforts should be made to support the development of technologies that will convert waste into valuable products.

The integrated energy, pulp and chemicals biorefineries value chain (VC5) apparently has decreased its strategic relevance for BBI, taking account of the activities being financed in other parts of Horizon 2020, in particular to maximise synergies and avoid overlaps with SC2 'Energy'. Thus no funding was dedicated to projects in this VC. On the other hand, new value chains have emerged, such as Aquatic Biomass. Inclusion of new value chains indicates responsiveness of BBI to the emerging market needs. Furthermore, from 2016 the annual work programmes have refocused and moved away from the biomass

'push' based approach and the traditional value chains, towards creating a demand for biomass and 'market pull'. This approach is reflected in the high number of 'across VC' call topics starting in AWP2016 as well as relatively high number of CSA topics in 2016 (4) that are meant to support further development of the biobased sector through clustering, networking and open innovation. It should be noted, that CSA projects have still received lower than planned share of the funds (Table 12: 1.4% compared to planned 3.25% in SIRA). This could be used as an opportunity, and future CSA projects could support market analysis for bio-based products and processes and thus support 'market pull'. Constant monitoring and analysis of the bio-based markets is of extremely high importance for the development of the future calls. Efforts should be made to support development of completely new value chains. Towards the end of the BBI programme, more DEMO and especially FLAG projects demonstrating the feasibility and economic viability of completely new bio-based value chains should be launched.

Table 14. Number of projects according to value chain and type of action (2014-2016).

Value Chain	RIA	DEMO	FLAG	CSA	Total
VC1 (Lignocellulose)	5	6	3		14
VC2 (Forest-based)	6	3	1		10
VC3 (Agro-based)	4	5	2		11
VC4 (Organic waste)	4	2			6
across VCs	9	4		6	19
Aquatic Biomass	5				5
Total	33	20	6	6	65
In percentage					
VC1 (Lignocellulose)	15%	30%	50%	0%	22%
VC2 (Forest-based)	18%	15%	17%	0%	15%
VC3 (Agro-based)	12%	25%	33%	0%	17%
VC4 (Organic waste)	12%	10%	0%	0%	9%
across VCs	27%	20%	0%	100%	29%
Aquatic Biomass	15%	0%	0%	0%	8%
% Total	100%	100%	100%	100%	100%

Source: CORDA analysis and a table with project distribution according to VC received from BBI office

Table 15. Budget share (EC incl. EFTA and industry financial contribution to operational costs *) per value chain and project type (2014-2016).

Value Chain	RIA	DEMO	FLAG	CSA	Total
VC1 (Lignocellulose)	22.36	48.97	71.31	0.00	142.64
VC2 (Forest-based)	13.02	23.74	27.43	0.00	64.20
VC3 (Agro-based)	13.12	33.30	39.00	0.00	85.43
VC4 (Organic waste)	10.22	21.64	0.00	0.00	31.86
across VCs	26.84	35.94	0.00	5.85	68.63
Aquatic Biomass	21.54	0.00	0.00	0.00	21.54
Total	107.10	163.59	137.75	5.85	414.29*
In percentage					
VC1 (Lignocellulose)	21%	30%	52%	0%	34%
VC2 (Forest-based)	12%	15%	20%	0%	15%
VC3 (Agro-based)	12%	20%	28%	0%	21%
VC4 (Organic waste)	10%	13%	0%	0%	8%
across VCs	25%	22%	0%	100%	17%
Aquatic Biomass	20%	0%	0%	0%	5%
% Total	100%	100%	100%	100%	100%

Source: CORDA analysis and a table with project distribution according to VC received from BBI office; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016

Table 16. Comparison of planned and actual distribution of funding over the value chain demonstrators.

Planned in SIRA*		Current state**	
Value Chain	Distribution of funding (DEMO + FLAG)	Value Chain	Distribution of funding (DEMO + FLAG)
VC1 (Lignocellulose)	48%	VC1 (Lignocellulose)	40%
VC2 (Forest-based)	15%	VC2 (Forest-based)	17%
VC3 (Agro-based)	15%	VC3 (Agro-based)	24%
VC4 (Organic waste)	15%	VC4 (Organic waste)	7%
VC5 (Energy, Pulp & Chemicals)	7%	across VCs	12%
Aquatic Biomass	0%	Aquatic Biomass	0%
Total	100%	Total	100%

Sources: *SIRA, 2013 ** CORDA analysis and a table with project distribution according to VC received from BBI office, May 2017;

7.2.5 Competition for funding: success rates in terms of successful proposals, activity types of applicants and budget share

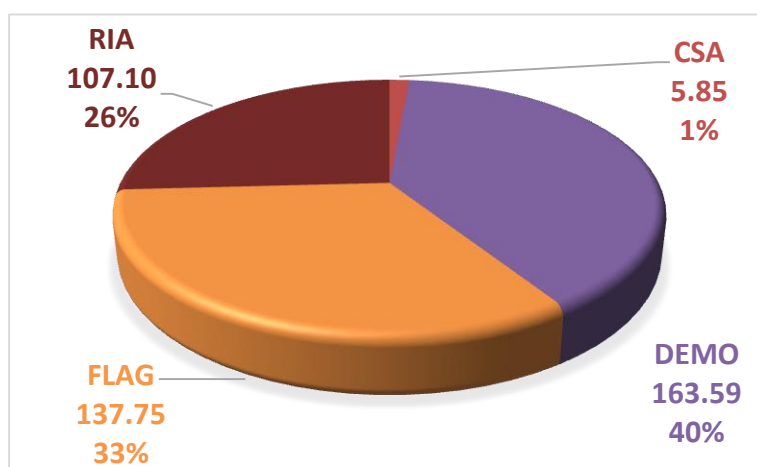
The **global success rate** (total participations/applications) in BBI calls equals to **30.9%** and is higher than in other parts of SC2 and in LEIT (section 7.2.9). In terms of country groups, EU13 (Member States that join EU since 2004) has lower success rate than EU15 (only 19.7% and funding share of 7.9%).

As to **beneficiary type**, private for profit entities (PRC) and other organisations (OTH) have highest success rates, 35.5% and 37.7%, respectively. On the other hand, higher and secondary education establishments (HES) and public bodies (PUB), have rather low success in BBI calls, 17.8% and 20.7%, respectively. Research organisations (REC) succeed in 31.8% of applications. This pattern significantly differs from main SC2 calls, where PRC have lower success rates compared to other organisation types, which may be due to the more applied and market driven nature of the challenge (section 7.2.9).

SMEs have very good success rate in BBI, 36.4%, as well as good share of total funding, 29.1% (please note, the SMEs' share is calculated based on participants' self-assessment).

In terms of **project type** (see Table 12) CSAs have notably higher success rates (50.6%) than all other project types and rather low percentage of total applications (3%). RIAs are evidently the most popular actions and attract 60% of all applications.

Figure 3: BBI JU contribution (EUR million and percentage of total) per project type. Total equals to EUR 414.29 million of which EUR 413.54 million is EU (incl. EFTA) contribution and EUR 0.75 million is industry financial contribution to operational costs at programme level in 2016.



The largest part of the contribution goes to demonstration (DEMO) and flagship projects (FLAG), 39.5% (EUR 163.59 million) and 33.2% (EUR 137.75 million Euro), respectively (Fig. 1). Only 25.9% of the funding goes to research and innovation actions (RIA), although those projects attract 57.3% of participants (354 out of 618). In SIRA 30% of funds were planned for DEMO, 34.75% for FLAG, 30% for RIA and 3.25% for CSA. Currently, the share of budget dedicated to DEMO projects is significantly higher than originally planned at the expense of RIA and CSA projects. This should be taken into consideration in the future work plans.

Overall, 517 out of the 729⁶⁰ beneficiaries taking part in funded projects are non-BIC members, which is a signal of the openness and attractiveness of the JU.⁶¹

In call 2016, the success rates among proposals having a **BIC Coordinator are very high (47.4 %)**, compared to proposals with non-BIC Coordinators (23.8%)⁶². Success rates in projects with at least one BIC member (38.1%) are also higher than in those without a BIC member (24.8%).⁶³

Interestingly, when analysing the type of participation of BIC members in funded projects, the percentage of associated BIC members has increased significantly from 2014 to 2016.⁶⁴ While the percentage of full BIC member taking part in funded projects was slightly higher in 2014 and 2015 calls, in 2016 the associated BIC-member that benefitted from a BBI JU contribution was 64 % of the total BIC members (68 associated BIC members taking part in funded projects by 2016 calls versus 39 full BIC-members). These figures indicate a significant and growing mobilization of non-industrial BIC members.

7.2.6 Average grant size in terms of budget and number of beneficiaries

The average BBI grant size is **6.37 million Euros and an average project includes 11.6 participants**. This varies depending on the project type. CSA projects are the smallest, 0.98 million Euro and 6.5 participants. **FLAG** projects are the **largest in terms of funding** (EUR 22.96 million on average) and **RIA** projects have the **highest average participant number** (12.9).

Table 17. Number of projects, sum of contribution (in million Euros) and average project size, in terms of contribution and participants' number, per project type (2014-2016)

Project type	No. of projects	No. of projects (in %)	Sum of Project BBI contribution *	Sum of Project contribution (in %)	Average Project contribution	Average number of participants
CSA	6	9%	5.85	1.4%	0.98	6.5
DEMO	20	31%	163.59	39.5%	8.18	11.7
FLAG	6	9%	137.75	33.2%	22.96	9.3
RIA	33	51%	107.10	25.9%	3.25	12.9
All projects	65	100%	414.29*	100.0%	6.37	11.6

Source: *CORDA analysis*; * EUR 413.54 million of EU (incl. EFTA) contribution + EUR 0.75 million industry financial contribution to operational costs at programme level in 2016.

⁶⁰ Data provided by BBI JU, cut-off date 31 December 2016. Discrepances with figures reported in tables 7-12 are due to the fact that, as specified in the notes, in those cases duplications of applicants and beneficiaries were not taken into account.

⁶¹ BBI JU statistics.

⁶² BBI, 2016. Results Call 2016. Presentation.

⁶³ BBI, 2016. Results Call 2016. Presentation.

⁶⁴ Data provided by BBI JU through an e-mail by the EC on 23 June 2017.

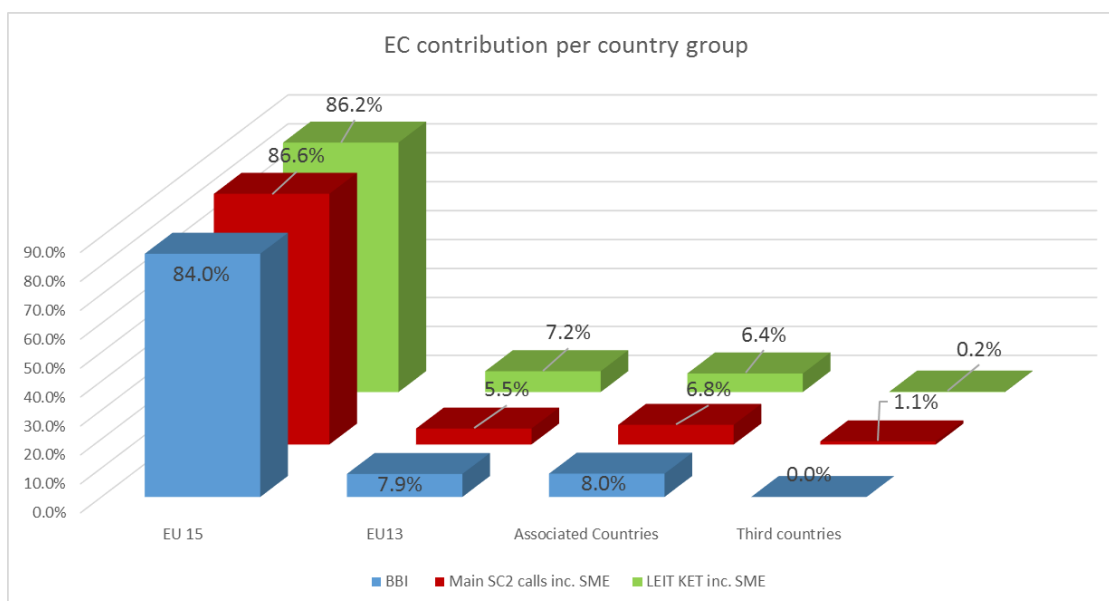
7.2.7 How do these trends compare with the SC2 and LEIT KET Biotechnology programmes?

As presented in Figure 4, the geographical distribution of funds in BBI resembles those in the main SC2 calls and in LEIT KET Biotechnology programme. Similar as in main part of the programme and in LEIT, the majority of EC funding (84%) goes to EU15. Although EU13 receives a much lower share of the BBI JU contribution than EU15, it scores better in BBI (7.9%) than in main SC2 (5.5%) and in LEIT KET Biotechnology programme (7.2%). We also observe a big discrepancy between the success rates of EU15 (32.6%) and EU13 (19.7%) (Fig. 3).

The BBI programme office has made a lot of efforts to reach the audience from less represented **Member States**. This is reflected in a high number of events (e.g. Info Days) organised in EU13 starting from 2015. The trend regarding **EU13** should be further monitored and the correlation between the outreach efforts and participation should be continuously looked at. The fact that EU13 receives higher percentage of the EC funds than in main calls is a good signal. However, it is a cumulative figure: The participation and success rates among different EU13 countries are very uneven. While Slovakia, Poland, Hungary and Croatia already participate (7 to 11 participations) and have good success rates (from 27% Poland to 67% Slovakia⁶⁵), there are countries which have not participated in calls at all yet (Bulgaria, Czech Republic and Malta), or very insignificantly (Cyprus, Estonia, Latvia, Lithuania, Slovenia – only 1 participation each). Success rates in those countries are also very low, from zero to around 14%. Efforts should be made to mobilise potential applicants in all countries that are underrepresented by now. Furthermore, care should be taken that topics relevant for those countries are taken up in the calls.

It should also be noted that overall, the success rates in BBI (30.9%) are much higher than in main SC2 (21.5%) and in LEIT (19.9%) (Fig.3). This could be due to high specificity of the BBI programme, in which the industrial and research community is actively involved (via BIC) in drafting the topics of the AWP, together with the EC. In addition, the BBI calls target technologies with higher TRL than SC2 and LEIT, and the number of potential applicants may thus be lower than in the main calls. Furthermore, the BBI programme is still in the early phase and the bioindustry sector is currently emerging.

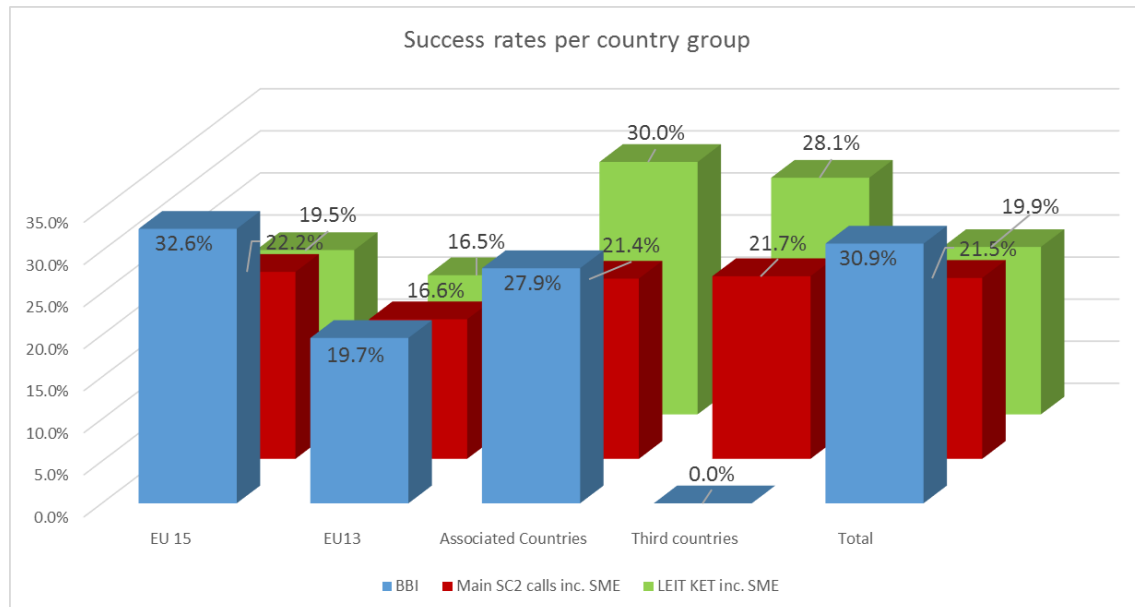
Figure 4: Contribution per country group in BBI, SC2 (including SME instrument) and LEIT KET Biotechnology (including SME instrument) calls as percentage of total.



⁶⁵ Three beneficiaries from Slovakia are members of the BIOSKOH consortium (Flagship project)

Source: **BBI**: CORDA analysis (cut-off May 2017); **SC2**; DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017); **LEIT KET**. DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017)

Figure 5: Success rate per country group BBI, SC2 (including SME instrument) and LEIT KET Biotechnology (including SME instrument).



Source: **BBI**: CORDA analysis (cut-off May 2017); **SC2**; DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017); **LEIT KET**. DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017)

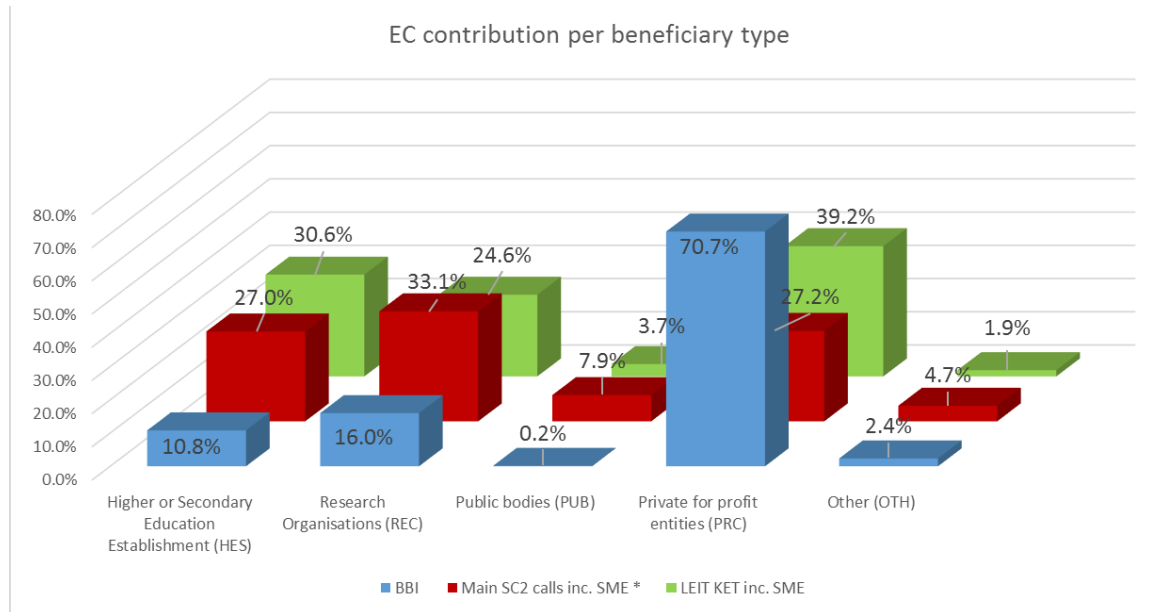
The pattern of budget distribution per beneficiary type significantly differs from that in SC2 and in LEIT. The majority of the EC funding in BBI (70.7%) goes to private entities, (see Fig. 6). In SC2 private entities receive only 27.2%. In LEIT Biotechnology private sector (PRC) is a main beneficiary, however it receives much lower budget share compared to BBI (39.2%) Higher or secondary education establishments and research organisations combined (HES + REC); receive 26.8% of the total contribution in BBI and 55.2 and 60.1% in LEIT KET Biotechnology and SC2, respectively.

HES have also very low success rates in BBI (only 17.8%). The goal of BBI JU was to support an emerging Bioeconomy sector and to stimulate the development of European bioindustries, therefore in BBI the majority of the budget (72.7%) is dedicated to large demonstration and flagship projects with a high Technology Readiness Level. The supported projects should be as close to real market applications as possible. Because of that, the programme is better suited to industrial applicants than to academia. However, there is very high interest in the BBI calls among applicants from research and education (almost 1000 applications received, see Table 10). Participation of research partners is still expected and those partners should be encouraged to participate. Intra-sectorial collaborations, between research and industry are extremely important for the further development of this young sector and the input from scientific partners is needed to generate most innovative solutions. For example, it is expected that synthetic biology, which for the time being is a purely academic domain, will be a very important driver in further development of Bioeconomy. Therefore, care should be taken that in the future calls emerging trends, such as synthetic biology and platform technologies (e.g. bioinformatics), are well covered. The proposed amendment to the Council Regulation,⁶⁶

⁶⁶ The Commission adopted the proposal at the end of February 2017. Proposal of 22.2.2017 for a COUNCIL REGULATION amending the COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking. 2017/0024

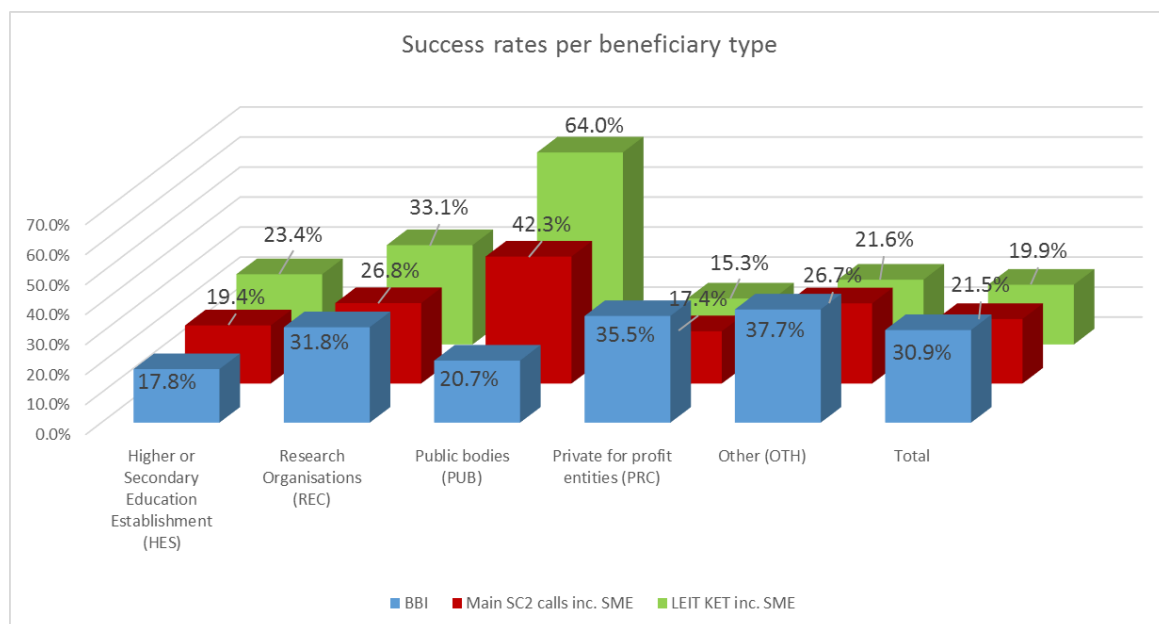
which is expected to allow financial contribution to operational costs at the project level, should facilitate the realisation of such projects, and thus in the second half of BBI more calls for RIAs in emerging trends should be published. BBI is an instrument dedicated to private sector and to avoid duplication of efforts, the support for other beneficiary types, especially academia and other research organisations (HES and REC) should be strengthened in other parts of HORIZON 2020 related to Bioeconomy and biotechnology.

Figure 6: Contribution per beneficiary type in BBI, SC2 (including SME instrument) and LEIT KET Biotechnology (including SME instrument) calls as percentage of total.



Source: **BBI**: CORDA analysis (cut-off May 2017); **SC2**: DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017); **LEIT KET**. DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017).

Figure 7: Success rate per beneficiary type in BBI, SC2 (including SME instrument) and LEIT KET Biotechnology (including SME instrument) calls.



Source: **BBI**: CORDA analysis (cut-off May 2017); **SC2**: DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017); **LEIT KET**. DG RTD, unit D.2. Statistics on LEIT KET Biotechnology programme including SME instrument, (Cut-off 31 March 2017).

7.3 Evaluation Question 3: Main achievements and effectiveness of implementation

7.3.1 Main achievements

The five value chains, chosen at the beginning of BBI JU and described in the original SIRA, have been described already in section 7.2.4 and are well selected with their respective focus enabling the creation of new value chains.

The number of **running projects** has steadily grown from **10** projects in 2014 to **36** at the end of 2016 and to the current **65** ongoing projects in June 2017.

Various levels and groups of **Key Performance Indicators** (KPIs) have been established to monitor the progresses of BBI JU. The level 1 KPIs assess the contribution to the overall strategic objectives of the bio-based economy in Europe. Monitoring level 1 KPIs does not fall within the scope of this agenda, as the BBI Initiative is one of the instruments supporting Bioeconomy in Europe. It makes only indirect contributions to the level 1 KPIs, especially through its flagship projects. Successfully operating flagship biorefineries may lead to many similar installations springing up across Europe. Further rollout of BBI technological successes also depends on having the right policies, legislation and incentives in place and on factors such as the oil price and CO₂ targets. Level 2 KPIs measure the Initiative's progress towards the specific research and innovation targets for 2020 (output and outcome). The topics in the BBI annual work plans will include expected impacts under the relevant level 2 KPIs. Level 3 KPIs are included in all projects funded by the BBI joint undertaking and monitor their success.

The performance of BBI JU against three main Horizon 2020 KPIs – time to inform (**TTI**), time to grant (**TTG**) and time to pay (**TTP**) pre-financing – operates efficiently well within the Horizon 2020 targets.

The Horizon 2020 20% target for SMEs in LEIT and the Societal Challenges⁶⁷ has been surpassed, as 29% of the EC funding 2014-2016 goes to SMEs. This clearly demonstrates that the BBI JU programme is contributing to the development of the bio-based industry landscape in Europe. SMEs are well represented in projects retained for funding, with a success rate of 31% and with 36% of all beneficiaries in retained proposals being SMEs.

The objectives for **gender** balance,⁶⁸ fostering gender balance in Horizon 2020 research teams and ensuring gender balance in decision-making, are reasonably implemented with respect to BBI JU groups, although there is room for improvement in the Governing Board with only 2 female members out of the 10-member board.

The **private sector** participation, a cornerstone of the BBI JU, is very pronounced in the funding allocated, with 71% of all beneficiaries. Higher education establishments are however represented just with about 12% despite a high mobilisation.

It must be underlined that the seven Key Performance Indicators specific for the BBI JU are defined in the 'BBI Key Objectives' in the current SIRA, in the Commission proposal for the Council Regulation and in the Impact Assessment.

⁶⁷ Article 22(3) Horizon Regulation

⁶⁸ H2020 Programme Guidance on Gender Equality in Horizon 2020, Version 2.0, 22 April 2016

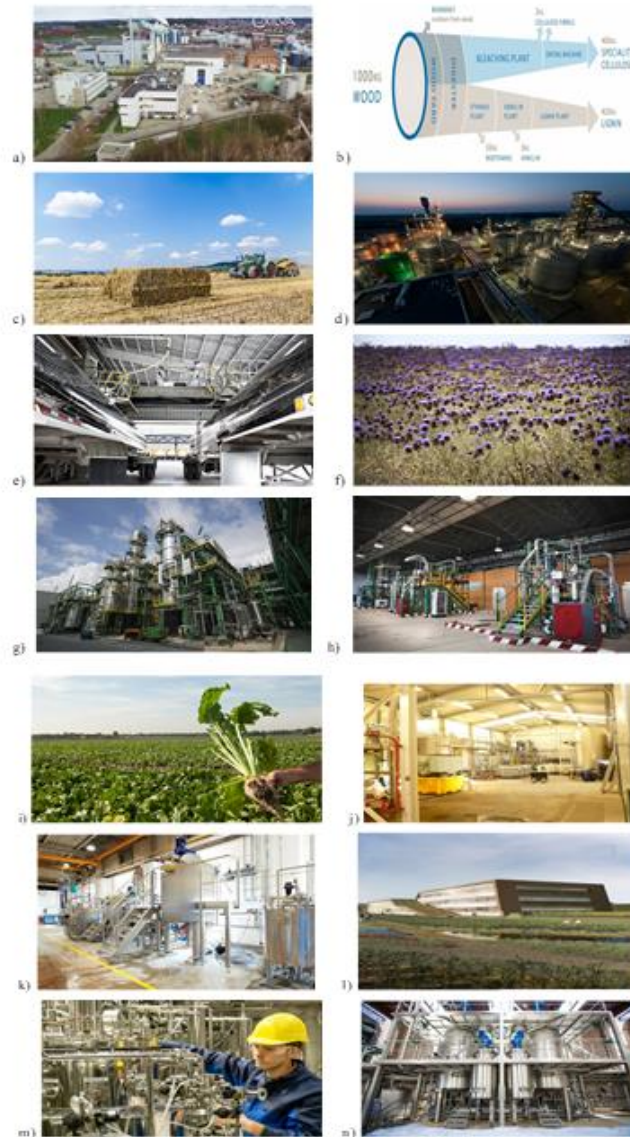
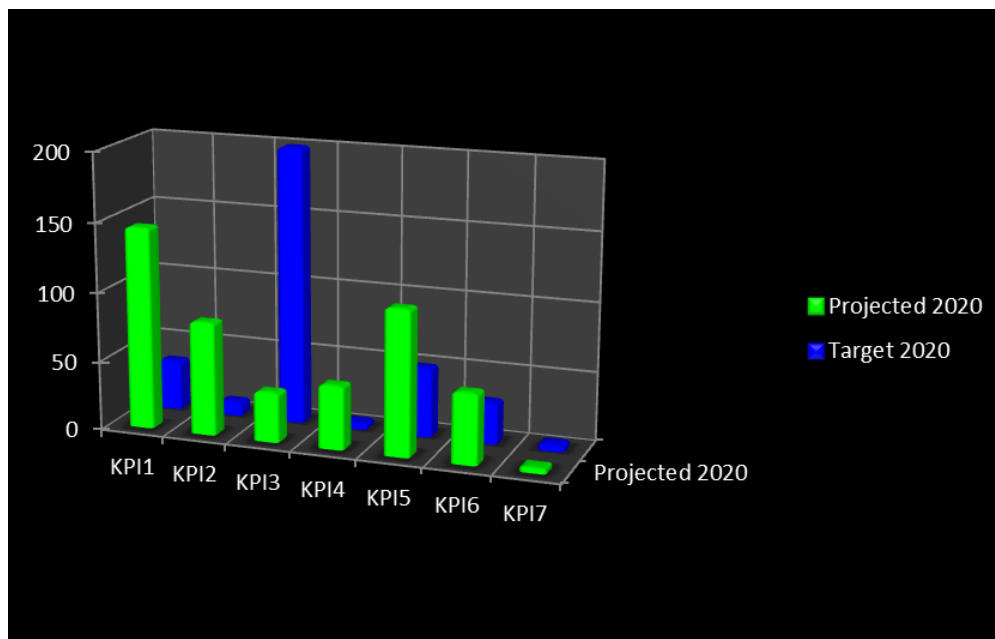


Figure 8: Samples of images provided by some BBI JU projects: a) Exilva factory by Borregard (partner of Flagship Project EXILVA); b) Borregard advanced biorefinery developed within the Flagship project EXILVA; c) Agricultural residues from a Slovakian field to be used as feedstock for the Flagship project BIOSKOH; d) Biochemtex (partner of Flagship Project BIOSKOH) Crescentino biorefinery plant, in northern Italy, where the technology used in the BIOSKOH project is currently demonstrated; e) Novozymes (Partner of Flagship Project BIOSKOH) enzymes production site; f) Cardoon field for Flagship Project FIRST2RUN g) Biorefinery Plant for Flagship Project FIRST2RUN; h) Pilot Plant for Flagship Project FIRST2RUN; i) Processing underutilized low value sugar beet pulp into value added products within the DEMO-project; j) Demo Plant developed, built and operated by Royal Cosun; k) Pilot Plant built by Royal Cosun for supporting activities under DEMO project PULP2VALUE; l) New Royal Cosun Innovation Centre building to support biobased innovations projects such as PULP2VALUE; m) Fermentation at Bio Base Europe Pilot Plant (partner of RIA project CARBOSURF); n) Pilot facility for RIA project CARBOSURF at project partner Bio Based Europe Pilot Plant.

Table 18: Key Performance Indicators specific for BBI JU and as reported in draft AAR2016.

KPI	Target	Comments
1	36	New cross-sector interconnections in BBI JU projects by 2020 has been surpassed with 146 projected for 2020 for new cooperation between companies and other actors from different sectors, which interconnect/ cooperate thanks to BBI JU projects to build new value chains.
2	10	New (or optimised) bio-based value chains created by 2020 have been surpassed with 82 for new value chains (from raw material to product application) projected for 2020 to be realised with BBI JU projects. A value chain is considered new when at least one of its segments is new: the feedstock, the processing, the end product or its application.
3	200	Cooperation projects through cross-industry clusters are being approached in 2016 by 36 grants signed, whereby the differentiation between cross-industry clusters and cross-sectorial clusters is not fully clear.
4	5	New bio-based building blocks based on biomass of European origin by 2020 have not been sufficiently ambitious. It is projected to be easily surpassed in 2020 by 46 new bio-chemical building blocks developed thanks to BBI JU projects. These are either identical to non-renewable building blocks and have not (successfully) been made on (pre)commercial scale yet or are new building blocks that have better performance than fossil-based counterparts in comparable applications or are novel molecule, breakthrough building blocks that have no fossil-based counterparts.
5	50	New bio-based materials by 2020 will also been easily surpassed in 2020 by the expected 106 new bio-based materials developed thanks to BBI JU projects. They will replace fossil-based materials that have proven to have an equal or overall better sustainability by Life Cycle Assessment (LCA), improved material efficiency, and reduced GHG emission, biodegradability, recyclability or other improved functionalities during use or reuse.
6	30	New demonstrated ' consumer ' products based on bio-based chemicals by 2020 will be surpassed in 2020 by the projected 51 new bio-based 'consumer products' that are meeting a clear market demand, fulfil all technical requirements, are economically viable and will have an overall better sustainability score than its current alternative (by LCA, improved material efficiency, reduced GHG emission, biodegradability, recyclability and/or other improved effects during use or reuse).
7	5	Target of 5 for KPI 7: Flagships resulting from the BBI is very well on track, with the 4 grant agreements already signed at 31 December 2016 by the BBI JU on flagships, first of the kind biorefineries operating at a commercial stage and more to be built in Europe with project consortia. By June 2017, the number of signed flagship projects has increased to 6, thus already surpassing the target.

Figure 9: Level 2 KPI Numbers for Targets and Results of BBI JU at 31 December 2016.



Overall, the BBI JU has created a stimulating research and innovation environment in Europe. From the signed Grant Agreements it emerges that the projects are expected to deliver the following 'projected' results: 146 new cross-sector interconnections, 82 new value chains, 46 new bio-chemical building blocks, 106 new bio-based materials, 51 new bio-based 'consumer products'. Moreover, there are already 6 actual grant agreements for flagships that demonstrate a pronounced private sector participation in funding including SME participation well above the target.

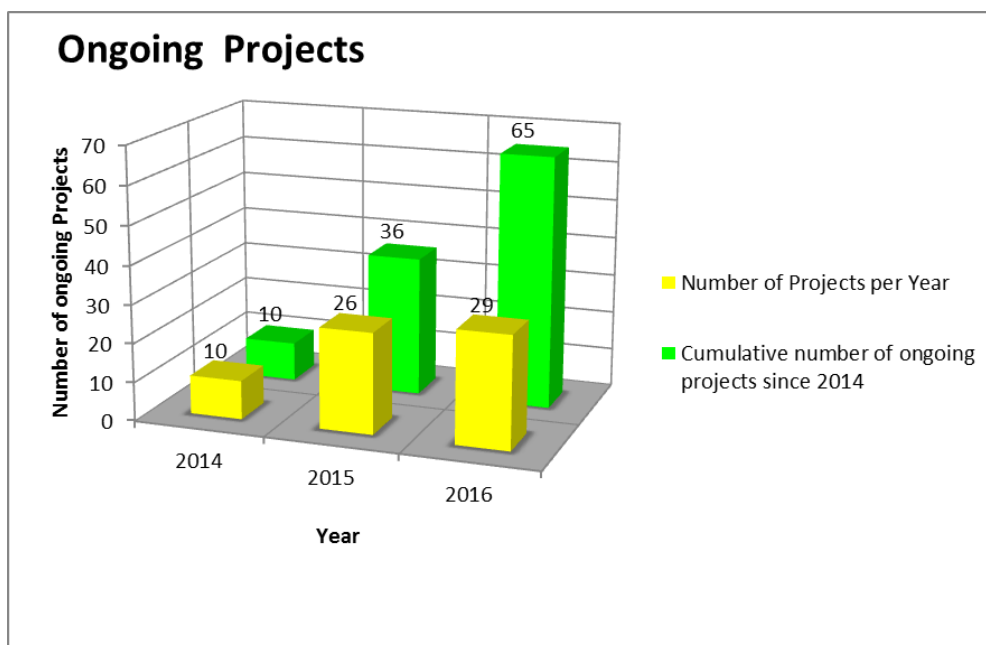
Six of seven level 2 BBI-specific projected KPIs for 2020 are well above the targets and the seventh KPI is showing progress. Further attention and analysis will be needed to include quantitative comparison of data presented in section 7.2 with KPIs. Yearly comparisons to KPIs will be done once the statistics are complete. For a better and quicker data collection and verification, the methodological approach should make use of a clear distinction between the actually achieved KPI at the end of year and the projected KPI after the BBI programme is complete.

7.3.2 Effectiveness of implementation

7.3.2.1 Achievement of the objectives set in Article 2 of the Council Regulation establishing BBI JU

The objective of the BBI Initiative is the development of sustainable and competitive bio-based industries in Europe for a more resource efficient and sustainable low-carbon economy boosting economic and employment growth, in particularly in rural areas. The concepts are very well addressed by the ongoing projects (Figure 10) in the different value chains of the BBI JU and their cross-sectoral growth opportunities.

Figure 10: Cumulative number of ongoing projects since 2014 and per year.



The ongoing projects are well on track towards technologies enabling the preparation of new chemical building blocks, new materials and new consumer products from European biomass, which will overcome the need for fossil-based inputs. The development of business models to integrate economic actors along the whole value chain is, based on the analysis of ongoing projects and interviews, an achievement. BBI JU is connecting stakeholders throughout the value chain up to brand owners and end-users. This includes creating new cross-sector interconnections and supporting cross-industry clusters, e.g. in the DEMO project BIOFOREVER (BIO-based products from FOREstry via Economically Viable European Routes) or MACRO CASCADE (Cascading Marine Macroalgal Biorefinery). They are focussed on lignocellulosic, forest- and agro-based feedstock but they are also organizing new value chains from organic waste. As already indicated from the progresses in KPIs, the setup of flagship projects is very well on track. Based on the analysis of ongoing **projects within the value chains, selections have been carefully done towards technologies and business models** for bio-based materials, chemicals and fuels that aim at demonstrating cost and performance improvements to levels that are competitive with fossil-based alternatives.

7.3.2.2 Assessment of the programme administration lifecycle and setting up a research agenda from definition of the work programme and publication of calls to evaluation, selection, negotiation, contract/ budget engagement

The annual work plans have been set up to address the cross-sectoral challenges and support the value chains to become reality.

The number of topics related to the budget of the call has been growing steadily from 2014 to 2016, as can be seen from the overview of the annual work plans. The scope and details of research and innovation activities, call and project management rules, governance, internal control framework and budget are professionally described.

With the establishment of the BBI offices in Brussels and the launch of the BBI JU staff recruitment, BBI JU has become operational by 26 October 2015. Together with BIC and the EC, BBI JU has managed to publish the annual work programme according to a schedule (the publication of the call in April and the deadline in September) that allows sufficient time for the proposal design and the construction of consortia, thus enabling the mobilization of players in the bio-based industries. In the case of the annual work

plan 2015, the timing was tight as two calls were published in May and August. The two main objectives in 2014 were the preparatory actions for BBI JU autonomy and the implementation of call 2014. The subsequent call in 2015 was launched by the EC but BBI JU, which became autonomous in autumn 2015, carried out its evaluation and Grant Agreement preparation (GAP) independently. Therefore, call 2016 was launched and implemented by BBI JU alone.

The nature of BBI calls is fully open to the participation of any stakeholder. The success rate of proposals having BIC coordinators and BIC members is higher than for non-BIC coordinators and non-BIC members, while the actual numbers of non-BIC coordinators and non-BIC members in the selected proposals are much higher, with the exception of non-BIC coordinators in the flagship call 2015.1.

Table 19: Overview BIC Members versus non-BIC Members in calls 2014-2016

Calls	Applicants, beneficiaries, coordinators	BIC Members	Non-BIC Members	Success Rates
Call 2016	Applicants	20.1%	79.9%	BIC members had a 38.07% success rate in selected proposals non-BIC members had a 24.81% success rate in selected proposals
	Beneficiaries in selected proposals	27.8%	72.2%	
	Coordinators in proposals	18.0%	82.0%	Success rate of proposals having a BIC COO: 47.36% Success rate of proposals having a non-BIC COO: 23.8%
	Coordinators in selected proposals	31.0%	69.0%	
Call 2015.2	Applicants	20.0%	80.0%	BIC members had a 51.5% success rate in selected proposals non-BIC members had a 30.96% success rate in selected proposals
	Beneficiaries in selected proposals	30.0%	70.0%	
	Coordinators in proposals	26.0%	74.0%	Success rate of proposals having a BIC COO: 52.6% Success rate of proposals having a non-BIC COO: 24.07%
	Coordinators in selected proposals	43.5%	56.0%	
Call 2015.1	Applicants	24.0%	76.0%	BIC members had a 36% success rate in selected proposals non-BIC members had a 20% success rate in selected proposals
	Beneficiaries in selected proposals	36.0%	64.0%	
	Coordinators in proposals	55.5%	44.5%	Success rate of proposals having a BIC COO: 60% Success rate of proposals having a non-BIC COO: 0%
	Coordinators in selected proposals	100.0%	0%	
Call 2014	Applicants	18.1%	81.9%	BIC members had a 42.4% success rate in selected proposals non-BIC members had a 23.15% success rate in selected proposals
	Beneficiaries in selected proposals	28.9%	71.1%	
	Coordinators in proposals	no data	no data	Success rate of proposals having a BIC COO: no data

	Coordinators in selected proposals	no data	no data	Success rate of proposals having a non-BIC COO : no data
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Overall, BBI JU has attracted a satisfactory level of participation of the best European players in the areas of the selected value chains and non-BIC members make up the majority of participants and coordinators in the selected proposals. This demonstrates the openness of the BBI JU, while the higher success rate of BIC-members versus non-BIC members is a sign that BIC-membership provides an advantage for the proposal preparation.

7.3.2.3 How all parties in the public-private partnerships lived up to their financial and managerial responsibilities?

The programme office of BBI JU has been responsible for managing the administrative budget since its autonomy was granted at the end of October 2015. For the achievement of objectives set in the Article 2 of the Council Regulation (EU) No 560/2014, BBI JU relies on a planned budget, which is on a shared costs basis with industry, as reported in Table 20.

Every Euro of the EU funds is expected to **leverage at least 2.8 Euro** of private funds during the operation of the Joint Undertaking. A qualitative and quantitative analysis of the effective leverage effect assessed at the time of this midterm evaluation is reported in section 7.5.

Table 20: Expected contributions of the two members to BBI JU budget (in Euro) as from the Council Regulation.

Max EU contribution	Minimum Total Contribution by BIC	Total approximated BBI JU budget ⁶⁹
975 000 000	2 730 000 000	3 705 000 000
Split of BIC contribution		
Contribution by BIC to operational costs	Minimum in kind additional activities (IKAA) by BIC	
975 000 000 ⁷⁰ (of which at least 182 500 000 financial <i>in cash</i> contribution at programme level)	1 755 000 000	

Operational costs should be covered by means of **financial contributions** coming from EU and BIC and by **in kind contributions to operational costs (IKOP)** by BIC and BIC's members, consisting of the costs incurred by them in implementing indirect actions less the contribution of BBI Joint Undertaking and any other Union contribution to those costs.

As shown by Table 20, a large contribution of BIC to BBI JU is in the form of in kind additional activities (IKAA) consisting of the costs incurred outside the work plan of the

⁶⁹ Administrative costs should not exceed EUR 58 500 000 and shall be covered proportionally by EU and BIC on an annual basis.

⁷⁰ The amount of EUR 975 000 000 is extrapolated by subtracting the IKAA contribution (EUR 1 755 000 000) from the total minimum expected private contribution (EUR 2 730 000 000).

BBI JU. These activities may consist, for example, in establishing additional large demonstration and flagship plants, thus contributing to the before mentioned objectives of BBI Initiative.⁷¹ Notably, Article 4 of the Council Regulation specifies that for evaluating the contribution of BIC, in kind costs have to be certified by external independent auditors.

Table 21, reports an overview of BBI JU budget for 2014-2016. Budget 2016 reflects a reactivation equal to about EUR 28 million, which derives from unused operational budget during 2014-15 activities. The table includes also EFTA contribution but does not comprise IKAA,⁷² since such activities are outside the work plan.

Table 21: Annual budget 2014-16⁷³.

Commitment appropriations	Amended Budget 2016	Budget 2015	Effective Budget 2014⁷⁴
EU contribution	158,082,500	201,908,289	50,684,807
of which Administrative	1,946,263	1,412,37	684,807
of which Operational	156,136,237	200,495,917	50,000,000
EFTA contribution	4,315,652	5,941,622	1,500,000
of which Administrative	53,133	47,042	0
of which Operational	4,262,519	5,894,580	1,500,000
Industry financial (in cash) contribution	2,943,315	1,572,886	0
of which Administrative	2,193,315	1,572,886	0
of which Operational	750,000	0	0
Reactivation of unused appropriations (2015 and 2014)	28,954,403	0	0
TOTAL REVENUES	194,295,870	209,422,797	52,184,807

A more detailed picture of the different contributions to operational costs of the two BBI JU partners is reported in Table 22. EU contribution and private IKOP are extracted from the Grant Agreements (GAs) signed by 31 December 2016,⁷⁵ whereas the private financial (in cash) contribution to operational costs was committed at program level according to 2016 budget. Moreover, the table reports the IKAA delivered and certified at 31 December 2016. Notably, IKAA⁷⁶ were already delivered at 31 December 2016

⁷¹ Other Union funding programmes may support those costs in compliance with the applicable rules and procedures. In such cases, Union financing shall not be a substitute for the in kind contributions from the members other than the Union or their constituent entities.

⁷² Costs incurred by private partners in implementing additional activities outside the work plan of the BBI Joint Undertaking but still contributing to the objectives of the BBI Initiative.

⁷³ BBI JU Annual Work Plan and Budget 2015, 2016.

⁷⁴ This budget, which is not the initial adopted BBI JU budget 2014, reflects the contributions that were actually made to BBI JU in 2014 by its constituencies.

⁷⁵ Central database CORDA

⁷⁶ Costs incurred by private partners in implementing additional activities outside the work plan of the BBI Joint Undertaking but still contributing to the objectives of the BBI Initiative.

whereas the other committed contributions will be delivered throughout the duration of the financed projects.⁷⁷ IKAA activities must be set out in an **annual additional activities plan** that has to indicate the **estimated value** of those contributions.

Table 22: Contribution to operational costs of EU and BIC (in EUR) and in kind private contributions for implementing additional activities outside the work plan of the BBI Joint Undertaking but still contributing to the objectives of the BBI Initiative.

Contributions of EU and BIC to operational costs ⁷⁸			IKAA actually delivered by BIC members and certified ⁷⁹
Total EU contribution Committed in the GAs	Total committed IKOP of private partners in the signed GAs ⁸⁰	Committed private financial contribution (in cash) ⁸¹	
228.690.682,1	114.621.657,2	750.000	291.482.000

It must be underlined that Table 22 does not include any IKAA for 2016 because, as mentioned in section 7.3, some difficulties have been found for the establishment of the methodology for planning, reporting and certifying IKAA. Those difficulties have prevented the delivery of the conclusive figures necessary to make a complete quantitative evaluation of the industry's contribution and, conversely, of the leverage effect of BBI JU.⁸² However, as mentioned in section 7.3, in June 2017 BIC anticipated an amount of certified IKAA for 2016 equal to EUR 185.863 million.

BIC has to report each year by 31 January to the Governing Board of the BBI Joint Undertaking on the value of the contributions to administrative, operational (both in cash and IKOP) costs as well as IKAA made in each of the previous financial years.

As already mentioned in section 6, some difficulties were inherited from the legal base and the start-up phase of the organisation:

- a. *The interpretation of the regulation concerning the delivery of financial (in cash) contribution to operational costs by BIC;*
- b. *The lack of methodology for in-kind additional activities (IKAA) planning and reporting;*
- c. *The lack of a documented reporting procedure for in-kind contributions to operational costs (IKOP).*

⁷⁷ At this stage, the latest expected end date of a project is 31 August 2021

⁷⁸ As extracted from data made available to the group of experts by May 2017.

⁷⁹ IKAA Report for 2014-2015 (CIRCA data base). It must be noted that IKAA report for 2016 was not available at the time this analysis was performed. However, in June 2017 BIC anticipated an amount of certified IKAA for 2016 equal to EUR 185.863 million, which, however, was not accounted in the table reported herein.

⁸⁰ Calculated by subtracting the total EU contribution from the total committed costs (EUR 343.312.339,30)

⁸¹ BBI JU Annual Work Plan and Budget 2016, page 96.

⁸² More specifically, the discussion arises in the context of 'traditional' activities (e.g. bio-refinery) which have only a partial 'innovative component'. A typical example could be a traditional bio-refinery which has among its traditional lines of production, one that produces a new bio-based product. In these cases, the EC considers that only a portion of the activity can be considered AA while BIC would prefer that the entire activity is considered AA.

As regards the **financial contribution** by BIC, there is an issue related to the interpretation of the Council Regulation establishing BBI JU. Article 4 of Council Regulation 560/2014, read together with Article 12 of BBI Statutes, implies that the financial contribution from BIC should be entered into BBI JU's operational budget (i.e. delivered at programme level). Although BIC endorsed the current text of the Council Regulation, after its entry into force and following its implementation, its members have explained that delivering financial contributions at programme level would not offer them any guaranteed benefit in exchange (e.g. results of the projects and related intellectual property rights). In addition to this, taking into account the open and transparent nature of the BBI calls for proposals, financial contributions delivered at programme level could benefit competitors participating in projects funded by BBI JU. It must be also underlined that the 'in cash contribution' issue⁸³ is specific of BBI JU among the existing JTIs.⁸⁴

The **consequence** of these difficulties is a lack of financial (in cash) contribution of BIC to operational costs. This made the EC impose a partial suspension of the Union contribution to operational costs for 2017. In line with article 4(5) of the Council Regulation, the EC has taken the steps to suspend EUR 50 million out of the planned EUR 131 million EC contributions to BBI JU operational costs in 2017, leading to a EUR 81 million contributions in 2017. This partial suspension of part of the budget to later stages leaves BIC the possibility of still honouring its financial (in cash) commitments in the course of the initiative.

The EC **proposed** an **amendment to the Council Regulation** (EU) No 560/2014 establishing BBI JU, with the aim to enable the delivery of in cash contributions to operational costs at project level as well, thus making the expected financial resources available in the BBI field. Moreover, the proposed amendment would also allow industry to overcome the concerns mentioned above.

The Council Regulation also requires an **annual additional activities plan** to indicate the estimated value of IKAA, which are BIC's own contributions to the costs incurred in implementing additional activities outside the work plan but still contributing to the objectives of BBI Initiative. A procedure for the planning, reporting and certification of the in kind contribution for the additional activities has been agreed at a working level between services of BIC, the BBI JU and the EC. Due to the fact that the process of **certification of IKAA** is dependent on approved IKAA plans, an IKAA Report of certified value was submitted only for 2014-2015 while for 2016 this was not yet possible. Notably, the group of experts did not have access to data on private contribution to additional activities related to 2016 since the corresponding IKAA plan had not been approved yet at the time this evaluation was carried out. However, in June 2017 BIC anticipated an amount of certified IKAA for 2016 equal to EUR 185.863 million. As such, the timely approval of IKAA plans is of major importance for all monitoring activities as well as for an evaluation of the leverage effect of BBI Initiative.⁸⁵

It must be noted that due to the fact that **additional activities** by the industry are often reported in conjunction with the annual reporting cycle of the projects and that the reported additional activities require a certification process before been taken into account in calculation of the leverage effect, there is always a delay before overall leverage effect can be calculated. Furthermore, as additional activities can often be related to piloting and demonstration activities and they can therefore be realized only more towards the end of the project cycles, the focus of investment on additional activities can naturally be later in the programme cycle than the upfront investments on operational activities.

The reporting of **in kind contributions to operational costs (IKOP)**, which are introduced in the accounts of BBI JU after the signature of each grant agreement,

⁸³ Financial (in cash) contribution to operational costs

⁸⁴ Only IMI JU conceives the possibility that private partners contribute in cash to the implementation of activities, although at both programme and project level.

⁸⁵ Based on the anticipated certified IKAA for 2016 the additional leverage effect would be 2.1 while the global leverage effect would become 2.6.

involves different processes than reporting and certification of IKAA. As regards IKOP, the members other than the EU can choose to report and certify fewer costs than the Council Regulation allows them to (i.e. only non-reimbursed eligible costs rather than total costs). And if they decide to do so, they can use the Certificate on Financial Statements (CFS) for the purposes of certification. An advanced draft guidance for reporting and certification is currently under discussion by the members. It should provide clear guidelines for BIC and its members on how to report and certify their IKOP.

Specific and quantitative evaluation of the contribution of BBI JU members will be included in section 7.4 (Evaluation question 4: BBI Joint Undertaking's performance in 2014 – 2016).

7.4 Evaluation Question 4: BBI Joint Undertaking's performance in 2014 - 2016

7.4.1. BBI JU mission and governance

7.4.1.1 What is the regulatory framework of setting up the BBI JU?

The Council Regulation (EU) No 560/2014⁸⁶ establishing the Bio-based Industries Joint Undertaking was published in the Official Journal of the European Union on 7 June 2014 by the Council of the European Union. It has regard to the Treaty on the Functioning of the European Union, and in particular Article 187⁸⁷ and the first paragraph of Article 188⁸⁸ thereof, to the proposal from the European Commission, to the opinion of the European Parliament and to the opinion of the European Economic and Social Committee.

Relevant precursors are Decision No 1982/2006/EC of the European Parliament and of the Council⁸⁹, Council Decision 2006/971/EC⁹⁰ and Regulation (EU) No 1291/2013⁹¹ of the European Parliament and of the Council for Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020), in short Horizon 2020. Union involvement in those public-private partnerships may, in accordance with Regulation (EU) No 1291/2013, take the form of financial contributions to joint undertakings, which have been established on the basis of Article 187 of the Treaty on the Functioning of the European Union (TFEU) pursuant to Decision No 1982/2006/EC.⁹² Support may be provided to joint undertakings established in the framework of Horizon 2020 in accordance with Regulation (EU) No 1291/2013 and Council Decision 2013/743/EU under the conditions specified in that Decision. The model financial Regulation No 110/2014⁹³ for public-private partnership bodies has been published in the Official Journal of the European Union on 7 February 2014 by the European Commission.

⁸⁶ COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking

⁸⁷ Article 187 'The Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes'

⁸⁸ Article 188 'The Council, on a proposal from the Commission and after consulting the European Parliament and the Economic and Social Committee, shall adopt the provisions referred to in Article 187.'

⁸⁹ Public-private partnerships in the form of Joint Technology Initiatives were initially provided for in Decision No 1982/2006/EC of the European Parliament and of the Council

⁹⁰ Council Decision 2006/971/EC (3) identified specific public-private partnerships to be supported

⁹¹ REGULATION (EU) No 1291/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC

⁹² DECISION No 1982/2006/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)

⁹³ COMMISSION DELEGATED REGULATION (EU) No 110/2014 of 30 September 2013 on the model financial regulation for public-private partnership bodies referred to in Article 209 of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council

The Governing Board of the BBI JU adopted its financial rules⁹⁴ on 14 October 2014, having regard to the Treaty on the Functioning of the European Union, to Council Regulation (EU) No 560/2014 on the BBI JU and in particular Article 5⁹⁵ thereof, to the Statutes annexed to the Council Regulation (EU) No 560/2014 on the BBI JU and in particular Article 7(3)(c)⁹⁶ thereof, to Regulation (EU, Euratom) No 966/2012⁹⁷ of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002, and in particular Article 209⁹⁸ thereof.

As described in the **annual activity reports 2014, 2015 and 2016** and confirmed by interviews with representatives of BBI JU,⁹⁹ the programme office appears to have implemented its activities in compliance with the applicable rules and procedures set out above to support the appropriate management of public and private funds. This was done under the authority of the Executive Directors as Chief Executive responsible for the day to-day management of the BBI JU, and in accordance with the decisions of the Governing Board.

The **management of BBI JU programming** and grant processes is governed by the Horizon 2020 legislation and in particular:

- Council Regulation (EU) No 560/2014 of 6 May 2014, establishing the Bio-based Industries Joint Undertaking;
- Horizon 2020 Framework Programme — Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (OJ 347, 20.12.2013, p. 104);
- Rules for Participation (RfP) — Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 of December 2013 laying down the rules for the participation and dissemination in Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) (OJ L 347, 20.12.2013, p.81);
- Specific programme implementing Horizon 2020 - Council Decision 2013/743/EU of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC.
- COMMISSION DELEGATED REGULATION (EU) No 623/2014 of 14 February 2014,

⁹⁴ FINANCIAL RULES OF THE BIO-BASED INDUSTRIES JOINT UNDERTAKING, October 2014

⁹⁵ «COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking 'Financial rules : Without prejudice to Article 12 of this Regulation, the BBI Joint Undertaking shall adopt its specific financial rules in accordance with Article 209 of Regulation (EU, Euratom) No 966/2012 and Commission Delegated Regulation (EU) No 110/2014'

⁹⁶ COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking 'The Governing Board shall in particular carry out the following tasks: (c) adopt the financial rules of the BBI Joint Undertaking in accordance with Article 5 of this Regulation'

⁹⁷ REGULATION (EU, EURATOM) No 966/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002, Article 209: Model Financial Regulation for public-private partnership bodies 'The bodies having legal personality set up by a basic act and entrusted with the implementation of a public-private partnership shall adopt their financial rules. Those rules shall include a set of principles necessary to ensure sound financial management of Union funds. The Commission shall be empowered to adopt a model financial regulation by means of a delegated act in accordance with Article 210 which shall lay down the principles necessary to ensure sound financial management of Union funds and which shall be based on Article 60. The financial rules of those bodies shall not depart from the model financial regulation except where their specific needs so require and with the Commission's prior consent.'

⁹⁸ COMMISSION DELEGATED REGULATION (EU) No 110/2014 of 30 September 2013 on the model financial regulation for public-private partnership bodies referred to in Article 209 of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council

⁹⁹ Bio-based Industries Joint Undertaking (BBI JU) ANNUAL ACTIVITY REPORTS 2014, 2015 and 2016

7.4.1.2 What is BBI JU mission?

The BBI JU is the body entrusted with the implementation of the public-private partnership established by Council Regulation No 560/2014 between the European Union, represented by the European Commission (EC), and the Bio-based Industries Consortium (BIC).

BBI JU **aims** to bring together all relevant stakeholders to establish innovative bio-based industries as a competitive sector in Europe, ranging from primary production, large industry, small and medium-sized enterprises (SMEs), clusters, trade associations, academia, regional technology offices, research and technology organizations to end-users. This aims to build a better network in the bio based materials and chemicals sector enabling collaborative investments in infrastructure and accelerating adoption of these technologies.

BBI JU's mission is to implement the Strategic Innovation and Research Agenda (SIRA) developed by the Bio-based Industry Consortium (BIC) and endorsed by the European Commission on behalf of the European Union (EU). BBI JU operates its programme as the catalyst to enable the EU and industry to align their strategy and vision while respecting the principles of openness, transparency and excellence required for funding under the Horizon 2020 framework programme, through the annual calls for proposals organised by BBI JU.

The Council Regulation (EU) No 560/2014 of 6 May 2014 establishing the BBI JU defines the following **tasks**:

- Ensure the establishment and sustainable management of the BBI Initiative.
- Mobilise the public and private sector resources needed, establish and develop close and long-term cooperation between the Union, industry and the other stakeholders.
- Ensure the efficiency of the BBI Initiative.
- Reach the critical mass of research effort to embark on a long-term programme.
- Monitor progress towards the achievement of the objectives of the BBI JU.
- Provide financial support to research and innovation indirect actions mainly through grants.
- Engage in information, communication, exploitation and dissemination activities.
- Liaise with a broad range of stakeholders including research organisations and universities and any other task needed to achieve the objectives.

The Bio-based Industries Joint Undertaking shall have the following **objectives**:

- To contribute to the implementation of Regulation (EU) No 1291/2013 and in particular Part III of Decision 2013/743/EU.
- To contribute to the objectives of the BBI Initiative of a more resource efficient and sustainable low-carbon economy and increasing economic growth and employment, in particularly in rural areas, by developing sustainable and competitive bio-based industries in Europe based on advanced biorefineries that source their biomass sustainably, and in particular to:
 - demonstrate technologies that enable new chemical building blocks, new materials and new consumer products from European biomass which replace the need for fossil- based inputs;
 - develop business models that integrate economic actors along the whole value chain from supply of biomass to biorefinery plants to consumers of bio-based materials, chemicals and fuels, including by means of creating new cross-sector interconnections and supporting cross-industry clusters;
 - set up flagship biorefinery plants that deploy the technologies and business models for bio-based materials, chemicals and fuels and demonstrate cost and performance improvements to levels that are competitive with fossil-based alternatives.

The specific **objectives** were elaborated based on the technological and innovation challenges and in consultation with the BIC (currently comprising >40 companies, several trade associations and European Technology Platforms (ETPs), research and technology organizations, universities and SMEs.¹⁰⁰ As some aspects of the proposed activities are also supported under other parts of Horizon 2020 and PPPs (e.g. SPIRE) attention was paid to avoid duplication.

Legal authority to act is set out in Delegation agreement¹⁰¹ that from 2015 entrust tasks for the duration of the JU.

7.4.1.3 Does the JU operate in accordance with its intended governance structure?

The BBI JU as described in annual reports and interviews operates with a governing board comprising five representatives of the BIC and five representatives of the European Commission

In detail, the responsible persons since the inception of the BBI JU have been:

Executive Directors:

- Barend Verachtert – Interim Executive Director until 30 September 2015
- Philippe Mengal - Executive Director from 1 October 2015

The Governing Board, which comprises a balance of EC members & BIC members, has been chaired by:

- Rudolf Strohmeier, Deputy Director-General 'Research Programmes', DG RTD (Chairman until 9 December 2015)
- Marcel Wubbolts, Chief Technology Officer, DSM (Chairman from 9 December 2015 until 31 December 2016)

The **BIC industrial board members** are intended to represent not their company but their sector (SME, chemical, biochemical, etc.) providing appropriate input on a neutral basis and not promoting projects benefiting or the interests of their company. BIC members are also consulted through surveys and the general assembly.

Scientific Committee (SC), States Representative Group (SRG) as advisory bodies, supports this organization.

Governing board minutes are recorded while decisions, documents are also documented in the annual reports, which illustrate the incremental process of assembling the JU and organization. These bodies of the BBI JU and composition of the governing board are in alignment with the structure required in articles 4 and 5 of Council regulation 560/2014.¹⁰²

The **Governing Board** adopted the following documents and decisions in 2014:

- Rules of Procedure of the BBI JU Governing Board
- Selection procedure and criteria for the nomination of the members of the BBI JU Scientific Committee
- Work Programme 2014
- Guide for Applicants, Rules for Participation and other call documents
- Model Grant Agreement
- Organisational structure
- Financial Rules
- Annual budget 2014
- Appointment of DG Budget as Accounting Officer for BBI
- Rules on the reimbursement of SRG members

¹⁰⁰ <http://biconsortium.eu/membership/members-full> and <http://biconsortium.eu/membership/associate-members>

¹⁰¹ DELEGATION AGREEMENT BBI JU Bio based Industries Joint Undertaking October 2015

¹⁰² COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014.

- Annual Work Plan, Budget and Staff establishment plan 2015

The **Governing Board** adopted the following decisions in 2015:

- Funding of indirect actions pursuant to the 2014 call for proposals
- Amendment of the AWP 2015
- Adoption of the Annual Activity Report (AAR) 2014
- Second amendment of the AWP 2015
- Appointment of the Executive Director
- Adoption of the Internal Control Standards of the BBI JU
- Approval of the date on which BBI JU will have the capacity to implement its own budget
- Funding of Indirect Actions pursuant to the 2015.1 Call for Proposals
- Adoption of BBI JU AWP and Budget for 2016

The main decisions taken by the **GB** during 2016:

- First amendment of the 2016 Annual Work Plan and Budget to include in the call 2016 the leftover budget from call 2015
- Amendment of the Specific Criteria for the selection of new Scientific Committee members;
- Funding of indirect actions pursuant to the 2015.2 Call for proposals
- Adoption of the Annual Activity Report 2015
- Adoption Call for new Scientific Committee member
- Adoption the of the Mission Charter of the Internal Audit Service of the European Commission in relation to bodies having legal personality set up by a basic act and entrusted with the implementation of a public private partnership
- Decision on the setting up a Staff Committee
- Adoption of the BBI JU Work Plan and Budget for 2017

With gaining autonomy to implement its own budget the BBI JU adopted its Internal Control Framework in September 2015¹⁰³ based on the 16 standards laid down by the European Commission for its own departments¹⁰⁴ in order to provide reasonable assurance to the Governing Board regarding the achievement of its objectives. This framework involves all the measures taken to ensure that:

- Operational activities are effective and efficient - the BBI JU meets its objectives defined in the Annual Work Plan using the adequate human and financial resources and avoiding misuse.
- Legal and regulatory requirements are met – the annual reports state that BBI JU operates fully in accordance with all legal and regulatory requirements. The managing board is supported in this statement by the commission legal advice.
- Reporting is reliable – programme office management produces regular, reliable and easily accessible management information on financial management, use of resources and progress on the achievement of operational objectives.
- Assets and information are safeguarded - programme office management take the necessary measures to ensure the completeness and preserve the integrity of the data on which management decisions are taken and reports are issued.

The **annual activity reports**¹⁰⁵ state that all programme office management processes and functions meet these four objectives of the Internal Control Framework above, meaning that the largest possible preventive, detective and corrective controls are in place. The legal and regulatory framework is defined by the European Commission with a special note made during interview of anti-trust legislation compliance for industrial members through BIC.¹⁰⁶

¹⁰³ BBI JU Internal Control Standards (ICSs)

¹⁰⁴ Ares(2014)1329924 - 28/04/2014 Simplified & Reduced Internal Control Requirements

¹⁰⁵ BBI JU Annual Activity Report 2014, 2015

¹⁰⁶ Interview with Marcel Wubbolts

7.4.1.4 What are the contractual arrangements between all partners and their respective commitments?

Contractual arrangements between public and private partners and their respective commitments were set out in Council Regulation 560/2014¹⁰⁷ with as members the Union, represented by the Commission, and the Bio-based Industries Consortium Aisbl (the 'BIC').

- The commitments of BIC are: Membership of the BBI Joint Undertaking and acceptance of statutes contained in the regulation above by means of a letter of endorsement.
- An agreement to pursue the research activities in the area of the BBI Joint Undertaking within a structure well adapted to the nature of a public-private partnership.
- Those contributions from the members other than the Union should not be limited to the administrative costs of the BBI Joint Undertaking and to the co-financing required to carry out research and innovation actions supported by the BBI Joint Undertaking. Their contributions should also cover to additional activities. In order to get a proper overview of the leverage effect of those additional activities, they should represent contributions to the broader BBI Initiative.
- The members of the BBI Joint Undertaking other than the Union shall make, or arrange for their constituent entities to make, a total contribution of at least EUR 2 730 000 000 over the duration consisting both of contributions to the BBI JU and in kind contributions of at least EUR 1 755 000 000 consisting of the costs incurred by them in implementing additional activities outside the work plan of the BBI Joint Undertaking contributing to the objectives of the BBI Initiative.
- To report each year by 31 January to the Governing Board of the BBI Joint Undertaking on the value of the contributions above made in each of the previous financial years and to also inform the States Representatives Group in a timely manner.

The **commitments** of the Commission are:

- Formulation and adoption of regulations pertaining to and founding membership of the BBI JU
- Financial contribution to the BBI Joint Undertaking, including EFTA appropriations, to cover administrative costs and operational costs shall be up to EUR 975 000 000. The contribution of the Union to be paid from the appropriations in the general budget of the Union allocated to the Specific Programme, implementing Horizon 2020, established by Decision 743/2013/EU, in accordance with point (c) (iv) of Article 58(1) and Articles 60 and 61 of Regulation (EU, Euratom) No 966/2012 for bodies referred to in Article 209 of that Regulation. This may be terminated, proportionally reduced or suspended or may trigger the winding-up procedure if members or their constituent entities do not contribute, contribute only partially or contribute late with regard to their respective contributions.
- The Commission shall by 30 June 2017 carry out, with the assistance of independent experts, an interim evaluation of the BBI Joint Undertaking. The Commission shall prepare a report on that evaluation, which shall include conclusions of the evaluation and observations by the Commission. The Commission shall send that report to the European Parliament and to the Council by 31 December 2017.
- Within six months after the winding-up of the BBI Joint Undertaking, but no later than two years after the triggering of the winding-up procedure referred to in

¹⁰⁷ COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking

Article 20 of the Statutes, the Commission shall conduct a final evaluation of the BBI Joint Undertaking. The results of that final evaluation shall be presented to the European Parliament and to the Council.

- The Commission was responsible for the establishment and initial operation of the BBI Joint Undertaking until it was believed to have the operational capacity to implement its own budget. The Commission designated a Commission official (Barend Verachtert – Interim Executive Director until 30 September 2015) to act as interim Executive Director and exercise the duties assigned to the Executive Director until with gaining autonomy to implement its own budget the BBI JU Governing Board appointed the Executive Director (Philippe Mengal - Executive Director from 1 October 2015).
- The Commission may also assign a limited number of its officials to the BBI JU on an interim basis.

The **tasks** assigned to the BBI JU in this regulation were:

- Ensure the establishment and sustainable management of the BBI Initiative;
- Mobilize the public and private sector resources needed;
- Establish and develop close and long-term cooperation between the Union, industry and the other stakeholders;
- Ensure the efficiency of the BBI Initiative;
- Reach the critical mass of research effort to embark on a long-term programme;
- Monitor progress towards the achievement of the objectives of the BBI Joint Undertaking;
- Provide financial support to research and innovation indirect actions mainly through grants;
- Engage in information, communication, exploitation and dissemination activities by applying mutatis mutandis Article 28 of Regulation (EU) No 1291/2013, including making the detailed information on results from calls for proposals available and accessible in a common Horizon 2020 e-database;
- Liaise with a broad range of stakeholders including research organizations and universities;
- Any other task needed to achieve the objectives set out in Article 2 of this Regulation*

On gaining autonomy to implement its budget, the BBI JU adopted its **Internal Control Framework** in September 2015.¹⁰⁸ This was based on the 16 standards laid down by the European Commission for its own departments¹⁰⁹ in order to provide reasonable assurance to the Governing Board regarding the achievement of its objectives.

The actions, responsibilities and requirements of the Governing Board, executive director, scientific committee, state representative group are similarly set out in Council Regulation 560/2014.¹¹⁰

7.4.1.5 Are the definitions of roles and responsibilities clear for each of the partners?

Roles and responsibilities for public and private partners as described in the proposal for a council regulation on the bio-based industries joint undertaking.¹¹¹

¹⁰⁸ BBI JU Internal Control Standards (ICSs)

¹⁰⁹ Ares(2014)1329924 - 28/04/2014 Simplified & Reduced Internal Control Requirements

¹¹⁰ COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking

¹¹¹ Commission, 2013, Proposal for a COUNCIL REGULATION on the Bio-Based Industries Joint Undertaking. "It will be founded by the EU, represented by the European Commission, and the Biobased Industries Consortium (BIC). The activities of the BBI JU will be jointly funded by its founders. The Commission and BIC will contribute in equal parts to the running costs of the BBI JU. The research and demonstration activities will be funded through contributions by the BIC member companies with monetary and non-monetary resources (staff,

In this document the roles, responsibilities and contributions of partners were clearly set out and then detailed further in Council Regulation 560/2014¹¹², which defines the rules for organization and operation objectives.

From the **interview with BIC's representatives**, it emerged that the roles and responsibilities of the private member of BBI JU are **fully clear**. BIC representatives provided a frank analysis of the problems encountered so far (i.e. delivery of financial contributions at program level and delay in reporting IKOP and IKAA) and presented a critical overview of the options available for overcoming such difficulties. It was pointed out that BBI JU will run till 2024 and, conversely, industry has still a **considerable amount of time** for delivery its contribution to BBI JU. On that respect, it was pointed out that the **bureaucracy** (e.g. certification of in kind contributions) connected to the complex financial rules set by BBI JU represents a heavy burden for some industries.

In addition, during the interviews with some **project coordinators** from industry it became evident that at the time of the drafting of the proposal they found **difficult** to understand the nature and of expected direct or in kind private contributions, since the concepts are described and formulated using quite specific terminology. Overall, there are clear indications that it would be advisable to search for best practices aiming at the simplification of procedures for certification and reporting of industry contributions.

The interviewed recognized and highlighted the supportive attitude and helpfulness of BBI JU staff. At the same time, the point was raised that proposals preparation requires **extended reading and analysis** work of documents and guidelines that must be turned into practice in a short period.

7.4.1.6 Do the partners share the same visions and have clearly defined objectives?

A number of documents and official communications report the visions of the partners at the time of the establishment of BBI JU.

The vision of the European Commission

- The Commission Communication of 13 February 2012 entitled 'Innovating for Sustainable Growth: A Bioeconomy for Europe'¹¹³, and in particular its Action Plan, calls for a public-private partnership to support the establishment of sustainable and competitive bio-based industries and value chains in Europe. The Communication aims to integrate better biomass producing and processing sectors in order to reconcile food security and natural resource scarcity and environmental objectives with the use of biomass for industrial and energy purposes supporting the move towards a more sustainable and post-petroleum society.
- The Commission Communication of 10 October 2012 entitled 'A Stronger European Industry for Growth and Economic Recovery'¹¹⁴ confirms the strategic importance of bio-based industries for the future competitiveness of Europe, as identified in the Commission Communication of 21 December 2007 entitled 'A lead market initiative for Europe', and stresses the need for the BBI Initiative.

equipment, consumables, etc.), and monetary resources from the EU. The level of EU resources will vary, in line with Horizon 2020 rules, depending on the type of activity considered.

¹¹² COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking

¹¹³ http://ec.europa.eu/research/bioeconomy/pdf/bioeconomycommunicationstrategy_b5_brochure_web.pdf

¹¹⁴ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Stronger European Industry for Growth and Economic Recovery <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0582:FIN:EN:PDF>

- The Council Regulation 560/2014 sets out that:
 - *'Bio-based Industries and their value chains are facing complex and substantial technology and innovation challenges. As a nascent sector, bio-based industries have to overcome the dispersion of technical competences and the limited publicly available data on real resource availability in order to build sustainable and competitive value chains. In order to tackle those challenges, critical mass has to be achieved in a focused and coherent way at European level in terms of scale of activity, excellence, and potential for innovation.'*
 - *'The BBI Initiative should mitigate the different types of market failures that discourage private investment into pre- competitive research, demonstration and deployment activities for bio-based industries in Europe. In particular, it should ascertain the availability of reliable biomass supply taking into account other competing social and environmental demands, and support the development of advanced processing technologies, large scale demonstration activities and policy instruments, thus reducing the risk for private research and innovation investment in the development of sustainable and competitive bio-based products and biofuels.'*
 - *'The BBI Initiative should be a public-private partnership aiming at increasing investment in the development of a sustainable bio-based industry sector in Europe. It should provide environmental and socioeconomic benefits for European citizens, increase the competitiveness of Europe and contribute to establishing Europe as a key player in research, demonstration and the deployment of advanced bio-based products and biofuels'*
 - *'The objective of the BBI Initiative is to implement a programme of research and innovation activities in Europe that will assess the availability of renewable biological resources that can be used for the production of bio-based materials, and on that basis support the establishment of sustainable bio-based value chains. Those activities should be carried out through collaboration between stakeholders along the entire bio-based value chains, including primary production and processing industries, consumer brands, SMEs, research and technology centers and universities.'*

The vision of the Bio-based Industries Consortium (the 'BIC')

BIC developed a **vision paper** and a **Strategic Innovation and Research Agenda (SIRA)**, based on consultation with public and private stakeholders. The SIRA sets out technological and innovation challenges that need to be overcome in order to develop sustainable and competitive bio-based industries in Europe and identifies research, demonstration and deployment activities to be carried out by a Joint Technology Initiative on Bio-based Industries (the 'BBI Initiative').

Bio-based Industries vision set out by BIC was:

- In 2030 the European bio-based economy will be flourishing, with biorefineries playing a key role in the re-industrialization of rural Europe. Based on demands of a more conscious and resource efficient society and market, versatile biomass supply chains will feed full-scale, integrated biorefineries and sustainably process biomass into a spectrum of marketable products and energy.

Bio-based Industries objectives for 2030 set out by BIC were:

- Reindustrialize Europe by creating a new rural infrastructure of biorefineries;
- Diversify farmer's income and provide them with additional margins by up to 40% by using available residues
- Enable 30% of overall chemical production to become bio-based. For high added value chemicals and polymers (specialties and fine chemicals), the proportion is more than 50%, while less than 10% of bulk commodity chemicals are derived from renewable feedstock
- Supply 25% of Europe's transport energy needs by sustainable advanced biofuels
- Support the European market for bio-based fiber and polymers such as viscose, carbon fibers, nano-cellulose derivatives and bioplastics to grow rapidly. Traditional fiber products such as paper remain 100% bio-based to create more value out of the same resources
- Realize a new generation of bio-based materials and composites produced in biorefineries, allowing the production of better-performing components for industries including automotive, construction and packaging.
- The aim of the PPP proposed by BIC in their vision document is that the development of value chains and industries resulting from the initial investments will generate at least EUR5 for each public euro spent¹¹⁵.

The BIC website¹¹⁶ sets out their current vision and strategy:¹¹⁷ BIC's vision is to accelerate the innovation and market uptake of bio-based products and to position Europe as a world-leading, competitive bio-based economy where the basic building blocks for chemicals, materials and advanced biofuels are derived from renewable biological resources.

BIC will focus on those sectors of the economy that supply and use only renewable biological resources, and produce bio-based materials, goods and fuels, traversing the entire value-chain from field to biorefinery to end consumer.

To create a society, less dependent on fossil fuels, where economic growth is decoupled from resource depletion, BIC and its members are building an economy based on:

- Local sourcing
- Local production
- Job creation
- Rural development
- Sustainability
- Efficient use of resources

Common vision of BIC and the Union

This Commission initiated but industry-led initiative developed a **joint vision** on how Europe might reach a substantial bio-based economy building on the work done under the seventh EU framework programme for research, member states' national bio-based economy policies and national clusters' activities. In their vision, the founding partners committed to invest more than EUR2.8 billion in research and innovation efforts between 2014 and 2020. Demonstration and flagship plants were explicitly mentioned as playing a key role. This industry commitment was intended to be leveraged as additional partners

¹¹⁵ BIC Vision document BIC_BBI_Vision_web.pdf available at <http://biconsortium.eu/library/bic-documents> Section 1.1 PPP initiative backed by a committed consortium '...The aim of the PPP is to have this investment matched by an equal amount of public funding. Furthermore, the development of value chains and industries resulting from the initial investments will generate at least EUR5 for each public euro spent.'

¹¹⁶ <http://biconsortium.eu/>

¹¹⁷ Biobased Industries Consortium (2012) The Biobased Industries Vision Accelerating Innovations and Market Uptake of bio based products http://biconsortium.eu/sites/biconsortium.eu/files/downloads/BIC_BBI_Vision_web.pdf

join, national strategies come into force and research programs bring in the scientific, academic and research communities and funding sources such as national agencies, research institutions, private foundations or venture capital firms. They expected this to double, at least, the initial investment of the Founding Members.

BBI JU's mission is to implement this **Strategic Innovation and Research Agenda** (SIRA) developed by the Bio-based Industry Consortium (BIC) and endorsed by the European Commission on behalf of the European Union (EU). BBI JU operates its programme as the catalyst to enable the EU and industry to align their strategy and vision while respecting the principles of openness, transparency and excellence required for funding under the Horizon 2020 framework programme, through the annual Calls for proposals organised by BBI JU.

More details on the envisioned total EUR 3.7 billion BBI JU budget and on the financial commitments of the Partners are reported in section 7.3. Their combined financial contributions are required to support the **large-scale commercialization** of high-quality bio-based products, through investment in innovative manufacturing facilities and processes, as well as in biorefining research and demonstration projects.

Indeed, interviews with project leaders¹¹⁸ highlighted the effectiveness of the BBI JU in bringing together project participants, in leading to more coherent and ambitious projects, in de-risking investments, in supporting and creating immediate jobs.

7.4.1.7 Do long-term commitments exist from all partners, including a balanced contribution from all partners?

The analysis of the contributions delivered by EC and BIC to BBI JU so far has been discussed in section 7.3.2.3, which also analysed the difficulties inherited from the start-up phase of the organisation. Measures have been designed and agreed by BBI JU members to address and solve these issue and specific monitoring actions will be required to assess their effectiveness.

Concerning the long-term commitment and contribution of the BBI JU members (i.e. EU and BIC), the unclear definition of rules for the delivery of the financial (in cash) contribution to operational costs by BIC led to a consistent lack of financial contribution from industry. The BIC was expected to deliver around EUR 17.5 million financial contributions (in cash) to operational costs per year at programme level in 2014, 2015 and 2016 to be on track to deliver at least EUR 182.5 million over the duration of the BBI JU initiative. However, only EUR 0.75 million was delivered by BIC at programme level in 2016 (see Table 21), and nothing in 2014 and 2015. This corresponds to a cumulated **non-delivery of financial (in cash) contribution to operational costs in the order of EUR 50 million for the period 2014-2016.**

At the same time, about EUR 10.37 million have been committed at project level (EUR 2.2 million: through calls 2014, 2015; EUR 8.17 million through calls 2016), although this contribution is not counted towards the target of EUR 182 500 000 reported in Article 12(4) of the BBI JU Statutes.¹¹⁹

The group of experts tried to understand the different factors at the basis of the 'in cash contribution issue', by interviewing relevant actors of BIC, BBI and EC. All agreed that there was some inaccuracy in the definition of the delivery mode and in the acceptance of the BBI JU Statutes where the financial (in cash) contribution to operational costs is mentioned in Article 12(4): the **consequences of such clause were underestimated.**

¹¹⁸ See Annex 6

¹¹⁹ According to AAR 2015 « In the course of the year 2015, no in cash contribution has been delivered by BIC to the operational budget of BBI JU. However, following the signature in 2015 of Grant Agreements related to the call 2014, it is expected that an amount of EUR 2 010 000 of financial contribution will be delivered by BIC members in the coming years, directly into call 2014 projects. Under the current legal framework of the BBI JU, the financial contribution delivered at project level is not counted towards the target of EUR 182 500 000 provided for in Article 12(4) of the BBI JU Statutes”.

The possibility to deliver part of the **private contribution in cash** was introduced specifically in the BBI JU Statutes, whereas it is not present in the regulations of the other JUs.¹²⁰ The option was specifically conceived for those industrial sectors – typically the pulp and paper sector – that have scarce in-house R&I facilities. Consequently, such type of partners could not deliver IKOP at a significant extent. Therefore, the industrial partners belonging to those sectors could have contributed financially in cash.

However, BIC members soon realized that **financial contribution at programme level** is commercially unviable, because doing so would not offer them any guaranteed benefit in exchange (e.g. results of the projects and related intellectual property rights). In addition to this, taking into account the open and transparent nature of the BBI calls for proposals, financial contributions delivered at programme level could benefit competitors participating in projects funded by the BBI JU.

Thus, BIC proposed an **alternative mode** for delivering the financial (in cash) contribution: the possibility for its members to deliver it at project level. This delivery mode would encourage BIC members' financial participation, because it would allow them to have access to the results of the projects that are restricted to project participants only.

As reported in section 7.3, the European Commission proposed an **amendment to the Council Regulation** (EU) No 560/2014 establishing BBI JU and, finally, the amendment process is ongoing.¹²¹

On that respect, a Task Force was established in April 2016 to discuss possible ways of implementing the amendment and how to organize future Calls for proposals dedicated to attracting in-cash contributions at project level.

In particular, it is necessary to understand how this **amendment** will be implemented to deliver actually the expected contribution at project level, particularly in respect to article 9.5 of the Rules of Participation in Horizon 2020.¹²²

In the meantime, the European Commission applied Article 4(5) of the BBI Regulation¹²³ and on March 1st 2016, the Chair of the Governing Board was informed by European Commission about the **Partial suspension of the Union contribution to the Bio-based Industries Joint Undertaking operational costs for 2017**. In line with article 4.5 of Council Regulation 560/2014 establishing the BBI JU, the EC has taken the steps to **suspend EUR 50 million out of the planned EUR 131 million EC contributions to BBI JU operational costs in 2017, leading to a EUR 81 million contributions in 2017**.

This **partial suspension and move of budget** to later stages in principle would leave BIC the possibility of still honouring its in-cash commitments in the course of the initiative.

However, from the interviews carried out by the group of experts emerged that BIC considers quite difficult that the industrial partners can deliver the total due 'in cash contribution' within the time left before the end of the programme.

Conversely, some additional measures will be required in order to solve the problem of the unbalanced contributions of EC vs BIC.

¹²⁰ Only IMI JU conceives the possibility that private partners contribute in cash to the implementation of activities, although at both programme and project level.

¹²¹ The Commission adopted the proposal at the end of February 2017. Proposal of 22.2.2017 for a COUNCIL REGULATION amending the COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking. 2017/0024.

¹²² Regulation (Eu) No 1290/2013 Of The European Parliament And of The Council

¹²³ Article 4(5) of the regulation: "The Commission may terminate, proportionally reduce or suspend the Union's financial contribution to the BBI Joint Undertaking or trigger the winding-up if those members or their constituent entities do not contribute, contribute only partially or contribute late with regard to the contributions."

Nevertheless, as mentioned in section 7.3.2.3, it was pointed out that BBI JU will run till 2024 and, conversely, industry has still a considerable amount of time for delivery considerable contributions to BBI JU under different forms.

When analysing the possible impact of the lack of private financial contribution to operational costs on the successful implementation of the BBI JU program and the achievement of its objectives, it must be underlined that BBI JU implements activities through collaboration of stakeholders along the entire bio-based value chains, including collaboration with SMEs, research and technology centres and universities.

In fact, the financial contribution expected from BIC was assigned to be invested in Research and Innovation Actions, where the main beneficiaries are academia and SMEs.

Therefore, the difficulties encountered by BIC in delivering the financial (in cash) contribution might have a **direct adverse effect** on final important drivers of innovation and beneficiaries (i.e. academia and SMEs) which are deprived of a source of financing.

In addition, the delivery of a financial contribution by the private partner is aimed at securing a leverage effect of contributions made by the Union, in financial terms, although the leverage effect is determined by a group of various factors as commented in section 7.5.

7.4.2 Operational effectiveness

7.4.2.1 To what extent does the BBI JU operate according to the legal framework establishing it?

The organisation, structure, decision making and reporting of the BBI JU as described in 7.4.1.3, 7.4.1.4 and 7.4.1.5 are in line with the establishing legal framework.

Concerning the financial commitments set in the Council Regulation (EU) No 560/2014, sections 7.3 and 7.4.1.7 comment in detail the difficulties encountered by the industrial partner to implement the articles concerning the financial (in cash) contribution to operational activities and measures undertaken to overcome such problems.

Access to BBI JU projects' results by the Partners

The rules concerning the access to BBI JU projects' results are the same as for other JUs operating under Horizon 2020 and they can be summarized as follows: The Commission has a **right to access results retained by the JUs**, and in this respect, there are sufficient legal safeguards in place to ensure **proper use and protection of confidential data** accessed by the Commission. Article 49(1) of the Horizon 2020 Rules of Participation (RfP)¹²⁴ gives the Union's institutions the right to enjoy access to the results of a participant that has received Union funding for the duly justified purpose of developing, implementing and monitoring Union policies or programmes; such access is limited to non-commercial and non-competitive use.

This right is embedded into the **JU Model Grant Agreements (MGAs) in Article 31(5) as the obligation by beneficiaries to grant to the JUs and to the Union institutions access to project results for policy purposes.**

Any breach of this obligation by the beneficiaries could lead to a reduction of the grant or other sanctions (Article 31(7) MGA).¹²⁵

¹²⁴ Extract from Article 49 RfP: Access rights for the Union and the Member States

1. The Union institutions, bodies, offices or agencies shall, for the duly justified purpose of developing, implementing and monitoring Union policies or programmes, enjoy access rights solely to the results of a participant that has received Union funding. Such access rights are limited to non-commercial and non-competitive use. Such access shall be granted on a royalty-free basis.

¹²⁵ Article 36(1) in previous versions of the MGA also allowed the disclosure of confidential information by the JU to the EU institutions, but under two cumulative conditions, namely: (a) that this is necessary to implement the

Since beneficiaries have an obligation under Article 31(5) MGA to provide access to results to the Commission, this would mean that information on results provided by beneficiaries to the JUs should also be accessible to the Commission for the purpose of developing, implementing and monitoring policy.¹²⁶

However, the JUs' confidentiality obligations cannot constitute grounds to restrict the Commission's access to results. Article 36(1) MGA (current wording introduced in version 3 MGA) expressly states that the JU may share confidential information with the Union institutions, and there are no additional legal conditions attached.¹²⁷

It is also noted that the Commission does not automatically make available to other Union bodies or Member States information that comes into its possession concerning results of Union-funded actions; it does so upon request and provided that two specific conditions are cumulatively fulfilled (namely, the information concerned is relevant to public policy and the participants have not provided sound and sufficient reasons for withholding the information concerned - see Article 4 RfP). Again, the recipients of such information are also obliged to treat it as confidential.

It must be underlined that the access to project results by the EC is of primary importance for policy development and for maximizing the synergies with the different initiatives aiming at the growth of the bio-based sector and the Bioeconomy as a whole. Therefore, any impediment to the application of the rules and regulations reported above should be removed.

7.4.2.2 To what extent has the JU led to improved management of the programme and better services to the stakeholders and addressees as compared to the alternative options.

As set out in the Impact assessment¹²⁸ three alternative options for action¹²⁸ in delivering services to stakeholders were considered:

- Business as usual
- Contractual PPP
- Institutional PPP

In detail (quoting from the impact assessment) these are:

Option 1 – Business as Usual

Agreement or safeguard the EU's financial interests and (b) that the recipients of the information are bound by an obligation of confidentiality. Regarding the first condition, it can be argued that the need to protect the EU's financial interests includes the need for the officers in charge to be aware of research and innovation that is taking/has taken place to avoid that a programme or policy targets research which already is or has been funded by the EU. As regards the second requirement, this is also fulfilled since, as stated in point 3 above, the Commission and its staff are under a general duty to maintain confidentiality. In any case, for confidentiality issues related to projects which were concluded prior to the introduction of version 3 MGA, it should be ensured that only staff who needs the confidential information to safeguard the EU's financial interests will have access to confidential information disclosed under these grant agreements (to note that both of the abovementioned conditions also applied regarding any disclosure to Commission staff in the Horizon 2020 general model grant agreements before version 3).

¹²⁶ In the opinion of EC Legal Service, on the basis of the principle of sincere cooperation, the JUs, as indirect management structures established by the EU and managing Union funds, cannot justifiably refuse such access. Such a refusal would be ultimately ineffective because the Commission has the right to place request for the same information directly with the beneficiary. In this respect, the EC would also not see any justification for beneficiaries to oppose that information on results collected by the JUs is transmitted to the Commission as long as the same rules and standards apply with respect to the confidentiality of the data.

¹²⁷ The Commission is under a general duty to maintain confidentiality under Article 3 RfP and Article 20 of the respective Delegation Agreements signed between the Commission and the JUs. Furthermore, Commission staff (according to the Staff Regulations and the Conditions of Employment) has an obligation to refrain from any unauthorised disclosure of information received in the line of duty.

¹²⁸ Commission Staff Working Document Executive Summary Of The Impact Assessment Accompanying The Document Proposal For A Council Regulation On The Bio-Based Industries Joint Undertaking. SWD/2013/0248 Final.

The 'Business as Usual' option (BAU) is based on Horizon 2020 only ('zero option').

This implies a continuation of the Collaborative Research model applicable under FP7, integrating Horizon 2020 improvements (e.g. more emphasis on demonstration). Projects will be carried out jointly by several partners in accordance with the conditions and rules for participation set out by Horizon 2020.

Option 2 – Contractual PPP

The 'Contractual PPP' option (c-PPP) implies a contractual agreement between the European Commission and the private partners, who are organized in a dedicated industry group. This option gives a stronger advisory role to the industry group, which proposes a SIRA. As under BAU, standard Horizon 2020 rules and procedures fully apply, also with regard to the preparation of the (bi-) annual work programme, which are subject to approval by the Member States in the Programme Committee.

Option 3 – Institutional PPP

The 'Institutional PPP' option (i-PPP) involves the creation of a Joint Technology Initiative (JTI) established as a Community body under Article 187 of the Treaty on the Functioning of the EU (TFEU). It is foreseen under Article 19 of Horizon 2020 when justified by the scope of the objectives pursued and the scale of the resources required.

As a Community body, the JTI has a dedicated administrative structure with a governance system of its own, the so-called Joint Undertaking (JU). The JU is constituted by the European Commission and the private partners, who are organized in a dedicated industry group. It is in charge of programming and implementing the JTI's activities. Funding rules derogating from the general Horizon 2020 rules can be defined where necessary.

The outcomes of the selected i-PPP option were intended to:

- Allow for a long term EU and industrial budget commitment, providing industrial partners with a stable long-term perspective and an opportunity to adopt a long-term strategic innovation and research agenda (SIRA)
- Offer industry with a stable framework and the opportunity to adopt a long-term strategic vision
- Provide greater scope for financial contributions by the industry as funding rules derogating from the general Horizon 2020 rules can be defined where necessary
- Fund projects that contribute to a strategic long-term objective
- Put more emphasis on demonstration activities (TRLs 4 to 8), paving the way for industry to deploy and commercialize the results
- Attract substantial industrial participation (typically at least 25% in research projects; more than 75% for demonstration projects)

The potential impacts of the actions of the three options were considered in the impact assessment (Table 23)

Table 23: Potential impacts of the three options

Criteria		Business as usual	c-PPP	i=PPP
Input parameters	Critical mass of resources and leverage effect on R&I	=	+	++
	Critical mass of participants	=	+	++

	and addressing fragmentation			
	Efficiency of the governance structure	=	=	+
	Coherence with member state and regional programme	=	=	+
	Innovation impacts	=	+	++
Output parameters	Environmental impact	=	+	++
	Economic impact	=	+	++
	Social impact	=	+	++
	Addressing the technological and innovation challenges	=	+	++

At the current status of these parameters and impact of the i-PPP, the **input parameters** are:

- Critical mass and leverage effect on R&I – as reflected in KPIs the programme has seen active engagement from across value chain and success in flagship projects, value chains and new products.
- Critical mass of participants and overcoming fragmentation – as reflected in KPIs the projects have demonstrated a great number of new discussions and partnerships.
- Innovation impacts – the development of flagship biorefineries and move toward higher TRL levels e.g. development of products rather than concepts appears from KPIs to be progressing well.
- Efficiency of governance structure – there have been issues over interpretation and contributions so while over long run this may offer advantages over other modes of intervention this cannot be yet confirmed.
- Coherence with member state programmes – while more member states now have bio economy strategies and are consulted and informed regarding the BBI JU it cannot be said that the development of these strategies or coherence is better than might have been though other modes of intervention.

Output parameters are:

- Environmental, economic and social impacts: While the use of bio based material may result in reduced environmental impact, increased resource efficiency, support of agriculture and rural economy, job and value creation (these are all set out in the overall vision) there appears to be no meaningful information on the expected impacts and on the success of the pipeline of projects and products.
- While the move toward higher commercialization status/TRL level is evident, the actual impact of this is not yet clear or reflected in the KPIs.

The **progress on implementing the objectives** outlined under Section 3 and the SIRA is monitored by using three levels of quantitative and qualitative Key Performance Indicators:

- KPIs 'Level 1' address the contribution to accomplishment of the general objectives of the JTI with a vision to 2020 and 2030 (outcome and impact). These objectives will, however, not be direct results of the PPP;
- KPIs 'Level 2' aim at monitoring the progress of JTI, measuring how the specific operational objectives/results are met by 2020 (output and outcome), with milestones end of 2016 and 2018;
- KPIs 'Level 3' allow monitoring the success of each project to be funded under the JTI.

The **overall objective** is to:

Contribute a more resource efficient and sustainable low-carbon economy and increasing economic growth and employment, in particular in rural areas, by developing sustainable and competitive bio-based industries in Europe, based on advanced biorefineries that source their biomass sustainably

- The specific objectives (bullet) and associated operational objectives/results envisaged (sub bullet) are that the BBI JU will: Validate at demo scale new chemical building blocks from European biomass
 - By 2020: 5 new building blocks (to be increased to 10 by 2030)
- Develop new bio-based materials
 - By 2020: 50 new bio-based materials
- Demonstrate consumer products from bio-based chemicals and materials
 - By 2020: 30 new consumer products
- Establish new bio-based value chains that integrate players along the whole value chain
 - By 2020: 10 new bio-based value chains
- Set up flagship biorefinery plants producing cost-competitive bio-based materials, chemicals and fuels from the PPP
 - By 2020: At least 5 flagship biorefinery plants (at least one per bio-based value chain, see above)
- Create new cross-sector interconnections in Bioeconomy clusters
 - By 2020: 36 new cross sector interconnections
- Support cooperation projects through cross-industry clusters
 - By 2020: >200 projects

The **technology readiness level** for different activities is set out and it is clearly anticipated that specific objectives 2, 3, 4 and 5 does not imply that these products and value chains progress up to TRL 8 (namely, demonstrated but not yet commercial).

The association between level 1 and 2 KPIs and the process for monitoring has been developed over the duration of the BBI JU:¹²⁹

- Feb 2016, a first draft of KPI questionnaire was discussed with representatives from the 10 Call 2014 projects
- 2016: Consultation processes among the BBI JU advisory bodies, the SC and SRG (State Representatives Group).
- By November 2016, BBI revised the KPI questionnaire, based on received input & changing framework (revised SIRA).

All projects will be asked to report on KPIs on an **annual basis by questionnaire**. For 2016 (first year in effect) 36 running projects were asked to complete questionnaire reporting on both tier 1 and 2 KPIs.

¹²⁹ Presentation supplied by BBI JU Programme Office (May 2017)

While the **KPI survey** is voluntary and completion not a requirement of the grant agreement all but 2 projects provided input. These non-respondents were at the time of reporting in the process of grant agreement amendment or suspension. This process is now complete for these 2 projects and they along with additional projects started in current year will be included in the 2017 survey.

KPI level 2 section asked whether projects could be expected to contribute to:

- Socioeconomic impact
- Environmental impact
- Health and safety
- Standards, regulations and policies
- Other

The **questionnaire** requested a description and where possible a quantitative estimate of items such as knowledge creation, jobs, valorisation of marginal land etc. All projects responding reported that they expect, if successful, to make a positive impact in more than one area of impact with 85% projects (29) reporting that they will have a scientific impact, 74% (25) will have regional & local impact, 71% of projects (24) will create new jobs. Of them, Flagships and DEMO projects reported an overall stronger socio-economic impact, especially regarding job creation and regional impact.

Regarding the **economic impact**, 71% of the projects reported they will have an impact on the creation of new skilled jobs, among them all Flagships, 80% of the DEMOs, 67% of the RIAs and 33% of the CSAs.

On **environmental impact**, all project reported to have positive environmental impact n more than one area: e.g. 71% projects (24) expect to contribute to the production bio-based products with lower GHG emissions versus fossil-based alternatives (all Flagships, 90% of the Demos and 67% of the RIAs).

Some projects, especially Flagships and DEMOs, provided some quantitative data on the **estimated creation of jobs**.

Although positive, this is **not quantitative** and relies on the assumption that projects are successful. While the projects can be said to be contributing toward the overall vision it is not possible to evaluate to what extent. Reliable data can only be collected from the (final) project reports of the projects. More in depth analysis of the socio-economic and environmental impact has been noted as an action point for coming years.

While we can see progress against the operational KPIs, we cannot compare the activity and results against the highly positive expectation of impact on output parameters under BBI JU since, presently, we do not have quantitative data on the expected results

Although limited data on employment effects are available and a number of methodological challenges exist due to the time lag between projects and the creation of new temporary and permanent jobs, an attempt was made in section 7.5 to estimate direct employment effects (689 staff employed) from the available quantitative data on 9 running of projects.¹³⁰

There are still a number of associated issues to be resolved, such as the unknown difference between the employment status of these people before and after the project. No comparison is being made with the situation in other projects outside of BBI. Based on the figure mentioned above, we can make a rough estimate that across the 65 running projects almost 5000 people are employed. A disclaimer needs to be pointed out here that any conclusions have its limitations until actual statistical data on direct and indirect employments effects are collected systematically from the project partners.

7.4.2.3 What is the overall satisfaction of beneficiaries with the services provided by the BBI JU?

¹³⁰ Email communication from BBI JU Programme office (May 2017)

Project coordinator questionnaire¹³¹

A questionnaire to assess the performance of all JUs was carried out with modifications in consultation with the BBI to reflect the specificities of the BBI JU (e.g. no project has yet gone through the reporting and payment phase, so the questions relating to this aspect were removed).

This survey was launched on 13th February 2017 and was addressed to BBI JU project coordinators of the 36 ongoing projects and to those of the projects resulting from 2016 call, still under the process of grant agreement preparation, making a total of 63 coordinators. The response rate, with 40 respondents, was the highest among all JUs. The questionnaire addressed the following aspects:

- a.** Information on the respondents
- b.** Application process
- c.** Grant Finalization Phase
- d.** Communication and interaction
- e.** Overall performance of the BBI JU
- f.** Level of satisfaction with the content of the programme.

A document was prepared summarizing the most relevant quantitative aspects resulting from the questionnaire. Responses were highly positive across every aspect and the survey supports the general conclusion that applicants see the programme positively. A very high proportion of the respondents are BIC members but there appeared to be no significant difference between respondent affiliation and how the programme was perceived.

Further feedback during interviews with project coordinators¹³² highlighted the helpfulness, support and constructive discussion with BBI JU staff in answering calls and ongoing management of projects. Points were raised about the volume of information which project coordinators have to read and assimilate in order to be able to respond to calls and concerns over reporting especially in contributions and quantitative answers on outcomes.

Public consultation

In 2017, the BBI carried out a public consultation¹³³ as an online questionnaire to assess the effectiveness of the BBI JU. The BBI received 144 responses. Of the 144 respondents, 95 had applied for BBI JU funding (outcome of these applications not given), while 49 have not. Of the 144 respondents, 67 are directly involved with BBI JU, while 77 are not.

While the responses received were highly positive that the BBI JU makes positive contributions toward the vision of a more sustainable bio based industry the low number of respondents who neither are applicants nor directly involved in the BBI JU mean this cannot be read as a general public consultation or representative of either any wider industry or society.

Relating to **KPIs** the substantial majority of respondents agreed with statements presented that:

- BBI JU contributes to economic growth and job creation in the EU.
- The BBI JU contributes to the climate change mitigation by reducing the CO₂ derived from the use of fossil-based products.

¹³¹ Annex 3

¹³² Expert interviews with selected project coordinators 20 -27 June 2017

¹³³ Annex 5

- The BBI JU contributes to a more sustainable and efficient use of resources, including the recycling, reuse and valorisation of organic residues.
- The BBI JU contributes to the strengthening of a circular economy in Europe.

Responses relating to website showed lower level of agreement with statements presented. About 2/3 of respondents agreed that:

- The BBI JU website provides easy and effective access to information to the public.
- The BBI JU website provides effective access to information and sufficient guidance to interested organizations facilitating their participation in proposals.

The answers around statements on participation and communication were much more ambivalent:

- The current way of defining topics for the calls of proposals is open and inclusive. (63% strongly agree/agree).
- That BBI JU organizes a sound and fair proposal evaluation system based on both scientific and technological excellence and industrial relevance. 51% strongly agree/agree, 43% no opinion/no answer, and 6% strongly disagree/disagree.
- The communication of the evaluation results and the feedback provided to the applicants is effective and meaningful. 52% strongly agree/agree, 42% no opinion / no answer, 6% disagree (no strongly disagree responses).

The **communication of the evaluation results** and the feedback provided to the applicants is effective and meaningful. 52% strongly agree/agree, 42% no opinion / no answer, 6% disagree (no strongly disagree responses) Questions relating to Level 1 KPIs showed respondents supported the statements presented but these were split between broad and emphatic agreement. The majority (>70%) of respondents:

- Agreed that the scientific priorities addressed by the BBI JU are set in Strategic Innovation and Research Agenda (SIRA). Is this document optimal for defining the scope of research and innovation followed by the BBI JU?

Respondents also agreed that the BBI JU as somewhat effective or very effective in:

- Supporting the development and implementation of pre-competitive research and of innovation activities of strategic importance to the Unions in the Bioeconomy sector
- Increasing the number of new cross-sector interconnections in BBI projects
- Developing new bio-based value chains
- Developing new bio-based building blocks
- Developing the bio-based materials
- Developing new bio-based consumer products
- Increasing the numbers of flagship biorefinery plants started based on BBI demonstration projects
- Developing necessary technologies to fill in the gap in the bio-based value chains

This relatively mild expression of support was surprising given the great number of applicants to or participants in BBI JU who were included in the respondents.

The **survey** presented the points below as being the major benefits of participating in a BBI JU project with >80% agreeing:

- Direct financial support for innovative research and development
- Greater visibility across Europe/Reputation
- Greater understanding of the bio-based products development process
- Enhanced access to new markets, business opportunities and funding sources
- Inclusion in open innovation networks, with direct contact to leading researchers in universities and the industry

73% of the respondents also indicated that BBI JU projects have resulted in specific scientific and/or technological successes, despite the early phases of the running projects.

Respondents were less supportive on the question 'To what extent are the activities of the BBI JU coherent with other activities of the Horizon 2020 programme?' This question still saw respondents agree but their answers were split over the two degrees of agreement: 40% very coherent, 35% somewhat coherent.

Applicants to BBI JU calls agreed that:

- The application procedure for funding was straightforward and simple, although there is room for improvement. Nonetheless, 13% strongly disagreed or disagreed on this point.
- The administrative burden for preparing the proposal was acceptable, with again a significant minority of 16% that expressed disagreement.

The question related to the budget (You consider that the BBI JU overall budget - public and private - in relation to its objectives and expected outcomes) led to a mixed picture: 56% of respondents find the budget appropriate, 26% too low and therefore it should be increased, 1% too high and therefore it should be partly used for other types of research and innovation actions in this area, 20% expressed no opinion, whereas 5% gave no answer.

7.4.2.4 Operational efficiency

Timely execution of the functions

As described in the annual reports (see Table 26), time to inform, time to grant, and time to pay have been within target.

Table 26: Time to grant according to AAR 2016

Call	EVALUATION	GRANTS	PAYMENTS
2014	Time to inform (TTI) all applicants: 146 calendar days (target < 153 calendar days) Redress after evaluation: 0 cases	Time to grant (TTG): 240.8 calendar days (target TTG < 243 calendar days)	Time to pay (pre-financing): 14.3 calendar days (target 30 days)
2015.1	TTI all applicants: 86 calendar days (target 153 calendar days) Redress after evaluation: 0 cases	227 days (target 243 days)	66% on time with an average of 16 days (target 30 days)
2015.2	141 days (target 153 days)	239 days (target 243 days)	23 days (100%) (target 30 days)
2016	99 days (target 153 days)	GA signatures target: 8 May 2017 (target 243 days)	PF to be paid in 2017 (after reference date)

Cost-efficiency of the management and control arrangements.

Management efficiency for this purpose is defined as the ratio between inputs (staff) and outputs (the budget managed by the Joint Undertaking). The analysis will cover i) the ratio between the administrative and operational budget (%) and ii) budget 'per head' (million EUR). In addition, calculation of the average project management cost per running project has to be calculated.

Table 27: Administrative and management budget (in Euro). Execution by the BBI JU¹³⁴

¹³⁴ With the EC executing the budget of the BBI JU on its behalf during its pre-autonomy phase (2014 – Oct. 2015).

Year	Total actual spending (budget execution, in commitment appropriations)	Administrative (Titles 1+2) actual spending (budget execution, in commitment appropriations)	Operational (Title 3) actual spending (budget execution, in commitment appropriations) ¹³⁵	% Admin	Number of total running projects at the end of the year	Admin cost/project
2014	50,338,515	684,807	49,653,708	1.4%	0	-
2015	180,961,163	1,924,189	179,036,974	1.1%	10	192,419
2016	188,326,847	3,255,914	185,070,933 ¹³⁶	1.7%	36	90,442
Total		5 864 910				

Administrative and management budget¹³⁷ is modest and proportionate (Table 27) compared to the value and scale of the projects under management. Contributions committed to the Administrative Costs are EUR 5,864,910. Detail of budget execution of commitment and payment appropriations are reported in annual reports for the periods 2015 and 2016¹³⁸ (tables 27-30). The discrepancy between headline figures in table 27 and detail below was ascribed to the moment at which the report on accounts is prepared (estimated versus final execution).

Detailed budget execution is reported below, as presented in the annual reports and in the reference for the Court of Auditors. It is publicly available.

Table 28: Commitment appropriations 2015

Expenditure	Budget EUR	Executed EUR	%
Title 1 – staff expenditure	1500100	616231	41.07%
Salaries and allowances	1243200	553628	44.53%
Expenditure relating to staff recruitment	158300	19061	12.04%
Mission expenses	60000	9402	15.67%
Socio-medical infrastructure	33600	31640	94.17%
Receptions, events and representation	5000	2500	50.00%

¹³⁵ Budget execution excludes here the appropriations that were committed by BBI JU for the call for proposals during the examined year but that were decommitted (became temporarily unused) later on because the total of this call's GAs amounts was in the end smaller than the call's size..

¹³⁶ This executed figure includes reactivations of unused commitment appropriations from 2014 (EUR 1.8 million) and 2015 (EUR 26.0 million)

¹³⁷ As extracted from data made available by the EC to the group of experts by May 2017.

¹³⁸ Received by email from BBI JU staff

Title 2 – Infrastructure and operating expenditure	1532200	1307958	85.36%
Rental of buildings and associated costs	263000	263023	100.00%
Information, communication technology and data processing	158300	127645	80.63%
Moveable property and associated costs	25000	20201	80.80%
Current administrative expenditure	16100	15411	95.72%
Postage/telecommunications	9700	3912	40.32%
Meeting expenses	100300	28812	28.73%
R&D support, evaluations and reviews	759800	75988	100%
Information and publishing	190000	89154	46.92%
Studies	10000	0	0.00%
Title 3 – Operational expenditure	206390497	180390497	87.40%
Total	209422797	182314686	87.06%

Table 29: Payment appropriations 2015

Expenditure	Budget EUR	Executed EUR	%
Title 1 – staff expenditure	1500100	569965	41.07%
Salaries and allowances	1243200	541627	43.57%
Expenditure relating to staff recruitment	158300	13908	8.78%
Mission expenses	60000	6635	11.05%
Socio-medical infrastructure (including training)	33600	5747	17.10%
Receptions, events and representation	5000	2048	40.96%
Title 2 – Infrastructure and operating expenditure	1532200	157464	34.80%
Rental of buildings and associated costs	265000	263023	99.25%
Information, communication technology and data processing	158300	87868	55.51%
Moveable property and associated costs	70000	20201	28.86%

Current administrative expenditure	16100	1776	11.03%
Postage/telecommunications	9700	-	0.00%
Meeting expenses	75300	28279	37.56%
Running costs in connection with operational expenditure	-	-	0.00%
Information and publishing	150000	66447	44.30%
Studies	5000	-	0.00%
R&D support, evaluations and reviews	782800	-	0.00%
Title 3 – operational expenditure	18042892	17713972	98.18%
Total	21075192	18817377	89.29%

Table 30: Commitment appropriations 2016

Expenditure	Budget EUR	Executed EUR	%	Carry over to 2017 EUR	Available for future use EUR
Title 1 – staff expenditure	3357069	1807295	53.84%	88635	1549774
Salaries and allowances	2953523	1555009	52.65%	14529	1398514
Expenditure relating to staff recruitment	150400	114945	76.43%	28000	35455
Mission expenses	118200	54593	46.19%	4117	63607
Socio-medical infrastructure (including Training)	114091	74948	65.69%	41786	39143
Receptions, events and representation	20855	7800	37.40%	204	13055
Title 2 – Infrastructure and operating expenditure	1943753	1448619	74.53%	244323	495134
Rental of buildings and associated costs	273131	263035	96.30%	-	10096
Information, communication technology and data processing	172860	150692	87.18%	45937	22168
Moveable property and associated costs	75300	64218	85.28%	6000	11082
Current administrative expenditure	17100	8439	49.35%	2300	8661
Postage/telecommunications	20400	15850	77.70%	6931	4550
Expenditure on formal meetings	72900	37094	50.88%		35806

External communication information and publishing	462500	366388	79.22%	149015	96112
Studies	121500	34140	28.10%	34140	87360
Experts contracts and evaluations	728011	508763	69.88%	-	219248
Title 3 – Operation expenditure	188995048	185602886	98.21%	335085603	3392162
Previous years' calls	-			149525760	
Addition to call 2015.2	341071		0.00%		341071
Call 2016	188653977	185602866	98.38%	185556843	3051111
Total	194295870	188858800	97.20	335415561	5437070

Table 31: Payment appropriations 2016

Expenditure	Amended Budget EUR	Executed budget EUR	%	Available for future use EUR
Title 1 – staff expenditure	3338335	1747743	52.35%	1590592
Salaries and allowances	2991168	1549151	51.79%	1442017
Expenditure relating to staff recruitment	106139	95585	90.06%	10554
Mission expenses	141913	52501	37.00%	89412
Socio-medical infrastructure (including Training)	91133	61525	67.51%	29608
Receptions, events and representation	7982	7881	98.73%	101
Title 2 – Infrastructure and operating expenditure	2065831	1309625	63.39%	756206
Rental of buildings and associated costs	381871	263035	68.88%	118836
Information, communication technology and data processing	184095	177599	96.47%	6496
Moveable property and associated costs	135081	58218	43.10%	76863
Current administrative expenditure	33174	19773	59.60%	13401
Postage/telecommunications	26757	12831	47.95%	13926
Expenditure on formal meetings	98665	37094	37.60%	61571
External communication information and publishing	384177	232312	60.47%	151.865
Studies	94000	-	0.00%	94000

Experts contracts and evaluations	728011	508763	69.88%	219248
Title 3 – Operation expenditure	61792021	61792021	100.00%	0
Previous years' calls	61792021	61792021	100.00%	0
Addition to call 2015.2	0			
Call 2016	0			
Total	67196187	64849389	96.51%	2346798

7.4.3 To what extent does the BBI JU ensure the visibility of the EU as part of programme promoter?

The Model Grant Agreement¹³⁹ sets out clearly the general obligation for funded projects to disseminate results, process, format and requirements for access and availability for doing so across written materials and publications. In this it is made clear how information on EU funding should be included in such dissemination e.g. obligation and right to use the BBI JU, EU and Bio-based Industries Consortium (BIC) emblems. For publications it is required that bibliographic metadata must be in a standard format and must include all of the following: the terms 'Bio-based Industries'; 'European Union (EU)' and 'Horizon 2020'; the name of the action, acronym and grant number;

The **BBI website**¹⁴⁰ is a principal portal for visibility of the programme. The effectiveness of this site was discussed in section 7.4.2.3 above but further traffic analysis was carried out using Google Analytics (period 1 August 2016 and 23 January 2017). This showed 39,540 visits (22,246 unique visitors) with 107,570 page views (pages per visit 2.72, session duration 2 min 40s, 56.95% returning visits).

The **homepage** was the most visited page of the site, followed by pages on calls for proposals, job vacancies and information about the BBI JU. The visibility of the EU is ensured by prominent positioning of the EU both in text and graphics throughout the site and links to European Commission Bioeconomy pages. The EU flag features on every page of the site.

Table 24: Performance of BBI JU web site

Page	Page Views	Unique Page Views	Avg. Time on Page (min)	Entrances	Bounce Rate	%Exit
http://www.bbi-europe.eu/	28,062	20,714	01:42	19,519	43.39%	43.52%
http://www.bbi-europe.eu/projects	6,359	3,522	00:40	645	35.77%	13.51%
http://www.bbi-	6,246	4,874	01:18	1,169	60.07%	35.11%

¹⁴⁰ <https://bbi-europe.eu/>

europe.eu/about/about-bbi					%	%
http://www.bbi-europe.eu/participate/calls-proposals-2016	3,825	3,224	03:58	1,258	64.29%	58.75%
http://www.bbi-europe.eu/jobs	3,353	2,984	01:54	710	85.77%	62.87%
http://www.bbi-europe.eu/participate/calls-proposals	3,334	2,754	00:53	1,563	28.57%	27.83%
http://www.bbi-europe.eu/participate/calls-proposals-2017	3,010	1,985	02:22	1,134	30.90%	47.08%
http://www.bbi-europe.eu/participate/participate	2,399	1,743	00:45	128	51.56%	15.96%
http://www.bbi-europe.eu/about/scientific-committee	2,160	1,826	04:30	1,346	41.48%	61.06%
http://www.bbi-europe.eu/about/vacancies	1,750	1,524	01:38	856	81.49%	69.60%

Most of the visitors to the site in this period came from EU countries, most notably Belgium, Italy, Spain and Germany. These countries also had a larger number of page views per visit than average. The large share of traffic generated from Belgium may be attributed to visits by staff and other affiliated parties of the European institutions. There were only two non-EU countries in the top 10 list: the United States and Russia. Both of them had a smaller than average number of pages viewed per visit.

It was also noted that users from Germany viewed more pages per visit compared to the average of the site.

Table 25: Visitors of BBI JU web site per Country.

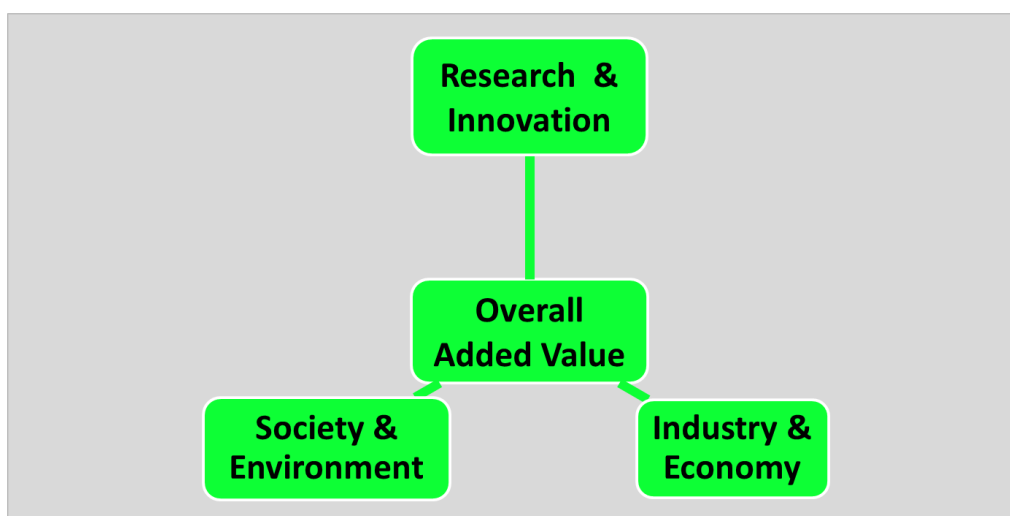
Country	Sessions	Pages / Session	(compared to site average)
	39,540	2.72	
	% of Total: 100.00% (39,540)	Avg for View: 2.72 (0.00%)	
1. Belgium	11,389	-6.62%	
2. Italy	2,588	12.52%	
3. Spain	2,554	18.75%	
4. Germany	2,194	60.13%	
5. United States	1,856	-44.74%	
6. France	1,669	5.56%	
7. United Kingdom	1,648	5.83%	
8. Netherlands	1,533	12.50%	
9. Russia	1,163	-23.96%	
10. Finland	890	10.44%	

80+ Events are listed in the BBI JU events page with about half of these organised by the BBI JU as information days, webinars and briefing sessions. Across these events, the position of the EU as programme promoter is prominent and clear.

7.5 Question 5: EU added value and leverage effect

The BBI JU added value to the EU from 2014 to 2016 is manifested by contributions in the areas of European research and innovation, industry and economy as well as society and environment. Structuring and mobilizing these three value domains in the EU has been one of the main success factors starting from the setup phase of BBI JU. This has taken up momentum by members of the EU Commission, BIC, BBI, the BBI Scientific Committee and the BBI State Representatives Group. They acted as ambassadors for the program by interfacing top-down and bottom-up approaches towards the creation of coherent and robust bio-based industries in their respective communities.

Figure 11: The three value domains contributing to the Overall Added Value to the EU



In research and innovation, a number of new projects, collaborations and value chains have been demonstrated already and led to 6 grant agreements for flagship projects, among others. While it is too early to assess the added value of BBI JU in terms of research and innovation outputs and impacts on society at large, added value can be preliminarily assessed through results of participant surveys and preliminary data on the leverage effect. The overall leverage effect comprises of the direct as well as indirect leverage effect. As it is too early to assess the indirect leverage effect, only the direct leverage effect is here considered, which is the sum of the operational and the additional leverage effects (see also section 7.5.3).

7.5.1 Changes that can be reasonably attributed to an EU intervention

In addition to the **quantified leverage effect**, an important added value of BBI JU is, according to the results of the participants' survey¹⁴¹, the encouragement of entrepreneurship and pioneer spirit in Europe. This leads towards increasing interdisciplinary valorisation of biomass-derived raw materials, e.g. from the agro- and wood sector to higher added value products than traditional products and bringing those to large scale demonstration and to the market.

In order to assess the **long term contribution** of BBI JU in terms of economic, social and environmental beneficial impact it would be useful to have access to quantitative data reporting the sum total and weighted total technical risk of commercial realisation

¹⁴¹ Survey questionnaire of Bio-Based Industries Joint Undertaking (BBI JU) project coordinators: Summary of the results, February 2017

of the projects funded. The de-risking effect of BBI JU in this regard is significant and has led to industry-driven projects, which would not have been possible without BBI JU. This has become evident from the interviews with BBI project coordinators.

Although a stakeholder survey¹⁰² could be biased (considering that a part of its respondents benefit financially from the BBI JU) the results have shown that 73.6% of the participants disagree with the view that the industry would have been able to overcome the barriers which hinder innovation and drive up costs in the bio-based sector at national level and without the involvement of the EU. In the same survey, 94.4% agree with the EU cooperating with industry in the context of a public-private partnership so that the bio-based research brings better results to the society and the market in Europe. The added value of this public-private partnership is seen in a better use of the available funding (77.7%), integration of European research (81.9%), more cross-border collaboration (77.0%), more cross-sector/interdisciplinary collaboration (79.9%), quicker adoption of standards (68.7%) and last but not least, better availability of research results (74.3%) and encouragement of companies to share expertise (73.6%).

The concrete efforts towards strengthening the **EU competitiveness** by setting up the BBI JU and accelerate the discovery, development and delivery of bio-based products have already begun to change perceptions and thinking along established and new value chains within Europe and outside Europe. Historically, the chemical industry developed over a very long period with new unit operations, processes, markets and by exploiting various fractions of fossil raw materials. Presently, the same chemical sector is trying to evolve towards a bio based chemical and material industry.

As the different stakeholders and statistical data on bio-based industries are fragmented in Europe, the real added value of BBI JU is largely in the acceleration of bringing together different sectors and industries. Together they provide not only revitalization along existing value chains but also lead to the creation of new value chains, with different partners working together within a single project. As manufacturing, refining and final product providing companies start working together to satisfy real world customer demands with biobased products, also with other sectors and researchers, Bioeconomy has started to become more visible. In a stakeholder survey,¹⁴² 87.5% of the participants consider that BBI JU contributes to economic growth and job creation in the EU. Although individual project partners have reported direct effects on the creation of new jobs due to BBI JU, there is no systematic annual reporting of the direct and indirect effects on the number of new jobs created by the different activities of BBI JU. In order to assess the direct and indirect impact of BBI JU projects on job creation, a preliminary statistical analysis has been done for the 9 BBI JU projects resulting from call 2014, which indicates 689 staff employed, with a gender distribution of 58% male staff and 42% female staff. Assuming that 2014 statistics for 9 BBI projects can be extrapolated to the total of 65 BBI projects, the creation of about 5000 directly related jobs can be estimated. As the creation of direct and indirect new jobs, both temporary and permanent, is taking place over extended periods of time, a standardized and constant reporting over the years is needed and can give actual quantitative data to judge the long-term effect on employment in EU member states. While such a standardized and constant reporting can be easily introduced on the level of project coordinators for the duration of projects, it is more challenging to continue after the completion of projects

An even higher number as 93% judge that BBI JU contributes to the transition from a fossil-based to a bio-based economy. Further effects of the BBI JU are seen in the contributions to the climate change mitigation by reducing the CO₂ derived from the use of fossil-based products (91% of the participants), to a more sustainable and efficient use of resources, including the recycling, reuse and valorisation of organic residues (91.6% of the participants) and to the strengthening of a circular economy in Europe (91.7%).

¹⁴² Survey questionnaire of Bio-Based Industries Joint Undertaking (BBI JU) project coordinators: Summary of the results, February 2017

7.5.2 Assessment of the scale of resources involved

The overall expected contributions are set in the Council regulation for the whole duration of the BBI JU. Relative to the number of projects, project participants and vision the scale of resources deployed is not unreasonable (see also section 7.4 on project management). As discussed earlier in section 7.3 and 7.4, there have been challenges with the delivery of financial contributions from the industry to cover operational costs and an amendment to the Council Regulation¹⁴³ has been proposed to enable delivery at project level instead of the original approach of program level in-cash contributions.

The years 2014-2016 have clearly been the start-up phase of the BBI JU, with the public and private partners having to match their pace towards a common and harmonized growth. The resources contributed from the public and private sectors have provided important and concerted signals for catalysing and derisking pioneering developments within the EU in a decentralized way, which would not have been possible without the BBI JU. This represents an important EU added value, not only for the future of BBI JU, but also for attracting and creating additional investments and growth in biobased industries, both around the BBI project locations as well as for the regions and states of the EU in general. The resources committed to Flagship, DEMO and RIA projects provide the critical mass to drive the creation, improvement and revitalization of value chains, ultimately leading to the launch of new products and supply chains on the market.

The overall contributions delivered so far are summarized in Table 32, with progress percentages compared to overall target levels, whereas Table 33 reports the types of contribution, cost and contributor. There is a challenge in measuring and comparing these contributions, as some are based on global commitments made by the EU towards the BBI JU (i.e. EU contributions), others on contributions committed at the time of signature of grant agreements (i.e. industry in kind contribution to operational activities) and some on actual realized delivery. This explains why the progress percentage of the EU contribution is currently higher than for the industry contributions. As soon as the GB adopts the BBI JU budget for a given year, the contribution of the EU to BBI JU in commitments for the examined year is considered as having been made available by the EU to the BBI JU. Therefore, it is not because the BBI JU would only use part of this commitment appropriations during the examined year that this implies that the EU contribution should be considered as equal to this part only. The EU contribution is equal to what has been voted in the BBI JU budget. Indeed, on its side, the EC commits during the examined year the full contribution mentioned in such budget (so that this commitment in EC book can be consumed in subsequent years by money transfers to the BBI JU that the JU will use to pre-finance projects). The only 'money transfers from the EU and the JU are for payment appropriations, not for commitment appropriations. Payment appropriations are considered as being made available by the EU as soon as the BBI JU budget is adopted.

Table 32: Progress of contributions by 31/12/2016

	Overall Contributions 2014-2016 (Euro) [in brackets: target]	Progress towards target (%)
EU contributions committed through the voted budgets towards the BBI JU	418 289 253 + 4 143 617 = 422 432 870 [≤ 975 000 000]	44 %
Industry in cash	750 000	0.4 %

¹⁴³ The Commission adopted the proposal at the end of February 2017. Proposal of 22.2.2017 for a COUNCIL REGULATION amending the COUNCIL REGULATION (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking. 2017/0024

	[≥ 182 500 000]	
Industry additional activities (2014-2015)	291 482 000.00	17 %
(2016)	185 863 000.00 ¹⁴⁴ [≥ 1 755 000 000]	11 %
Industry in kind (operational activities in signed GAs)	114 621 657.20 [no target given]	n.a.
Industry to administrative costs	3 766 201.00 [≤ 29 250 000.00]	13 %
Industry total	596 482 858.20 [2 730 000 000]	22 %

Table 33: Progress of contributions 2014-2016 per type of contribution, cost and contributors

Type of Contributions	Contributions 2014-2016 (Euro)	Progress (%)
EU Contributions committed to the operational costs committed in individual grant agreements.	418 289 253.00	
EU Contributions committed to the Administrative Costs	4 143 617	
Total EU Contributions committed	421 932 870.00	44%
Industry Financial Contributions to the Administrative Costs	3 766 201.00	
Industry Financial Contributions to the Operational Costs	750 000.00	
Total Industry Financial Contributions	4 516 201.00	
Industry in kind contribution for Additional Activities (2014-2015)	291 482 000.00	17%
Industry in kind contribution for Additional Activities (2016) ⁶	185 863 000.00	
Industry in kind (operational activities in signed GAs)	114 621 657.20	14%
Total Industry Contributions	596 482 858.20	22%
Total PPP Contributions	1 018 415 728.20	

¹⁴⁴ As anticipated by BIC in June 2017. The actual amount should be updated once the Governing Board is officially informed about the amount covered by the IKA Report 2016 (certified value).

7.5.3 Assessment of the BBI JU's ability to leverage additional investments in research and innovation

The direct leverage effect, i.e. the scale of overall contributions made by the industry compared to the EU contribution, is one of the main direct components of EU added value. Target level for the leverage effect in the Council regulation is 2.8.¹⁴⁵

It must be underlined, that the target leverage effect of BBI JU is the highest among the seven JUs operation under Horizon 2020.¹⁴⁶

The major problem encountered by the group of experts was the delay in receiving information on IKAA delivered in 2016. Therefore, the group of experts could not take into account any private contribution to additional activities related to 2016 for the calculation of the leverage effect, since the corresponding IKAA plan had not been approved at the time this evaluation was carried out. However, in June 2017 BIC anticipated an amount of certified IKAA for 2016 equal to EUR 185.863 million, which, however, was not accounted in the calculation reported herein.

Based on the in-kind and financial (in cash) contributions to operational costs only of calls 2014 to 2015 as well as on the signed grant agreements of calls 2014-2015, the operational leverage by 31 December 2016 is 0.50.

Operational leverage = $(114\,621\,657 + 750\,000) / 228\,690\,682 = 0.504$

which accounts the industrial in-kind and financial (in cash) contributions to operational costs declared in the signed agreements.

It must be noted that the grants from call 2016 have been signed only in May 2017, whereas the calculations of leverage take into account the cut-off date of 31 December 2016, which means that only grant agreements from calls 2014 and 2015 are taken into account.

When considering the reported contributions to additional activities (certified value) - not the IKAA plan - delivered in 2014 and 2015 the additional leverage effect by 31 December 2016 is 1.275.

Additional leverage = $291\,482\,000 / 228\,690\,682 = 1.275$

¹⁴⁵ Under the Horizon 2020 indicators, leverage in an Art. 187 PPP is defined as the total amount of funds leveraged through the initiative, including additional activities, divided by the EU contribution, and it requires knowing the funding made by the private actors. To guarantee a similar approach in the seven Interim evaluation reports, it is proposed to calculate the leverage effect on the basis of two possible contributions:

$$\text{Total leverage} = \text{Operational leverage} + \text{Additional leverage}$$

The Operational leverage only refers to Private contributions to the activities mentioned in a signed GA for an indirect action (e.g. a project or CSA) receiving EC contribution. It can be calculated on the basis of committed eligible IKOP, of non-eligible overheads which have been certified (also part of the IKOP) and of established Private Financial Contributions to the operations (allowed for IMI 2 and BBI).

$$\sum \text{IKOP of private partners in signed GA (+Private FC)}$$

$$\text{Operational leverage} = \frac{\sum \text{IKOP of private partners in signed GA (+Private FC)}}{\sum \text{EU contribution (*) committed in the signed GA}}$$

$$\sum \text{EU contribution (*) committed in the signed GA}$$

In the case of CS2, S2R, FCH and BBI, the Regulation allows an additional term:

$$\sum \text{IKAA of members}$$

$$\text{Additional leverage} = \frac{\sum \text{IKAA of members}}{\sum \text{EU contribution (*) committed in the signed GA}}$$

$$\sum \text{EU contribution (*) committed in the signed GA}$$

(*) EU contribution as committed in the GA. For ECSEL it makes sense to consider alternative leverages which take a joint public contribution of EU and Participating States

¹⁴⁶ Target leverage effects of the seven Jus according to the respective legal acts. FCH2: 0.57; CS2: 1.25; IMI2: 1; BBI: 2.8; ECSEL: 2.4; S2R: 1.04; SESAR: 1.41

Therefore, the global leverage effect by 31 December 2016 is 1.779.

Total leverage = 0.504 + 1.275 = 1.779

The lower leverage effect (1.779) as compared to the target of 2.8 set in the Council Regulation is clearly connected to the delay in the communication of the certified IKAA. Therefore, the actual leverage effect should be re-calculated and made public once the IKAA plan for 2016 is approved by the Governing Board, since the announced 2016 IKAA (EUR 185.863 million), would significantly affect the quantification of the additional and, more importantly, the total leverage effect. Indeed, based on the certified IKAA for 2016 the additional leverage effect would be 2.1 while the global leverage effect would become 2.6.

Notably, taking into account only data for 2014-2015, i.e. only projects awarded from the call 2014, the leverage effect appears to be 6.53. This considerably high value is based on a total EU contribution of EUR 49 653 707, as committed in the grant agreements, a total IKOP of private partners of EUR 32 819 114 for the projects of calls for proposals 2014 in signed grant agreements, a total private financial contribution of EUR 0 and a total private IKAA of EUR 291 482 000.

The financial contribution committed by BIC by end 2016 should have been EUR 52.5 million (according to the financial statement annexed to the BBI proposal where on page 47 financial contributions are foreseen of EUR 17.5 million for each of the years 2014-2016).

Appropriate monitoring measures should be implemented for collecting comprehensive evidence of the actual private and public contributions to BBI JU delivered so far as well as of the contribution expected from the two members over the next years.

7.6 Question 6: Coherence

Coordination of the programming activities is necessary for ensuring coherence of BBI JU respect to the other parts of Horizon 2020. However, the broad nature of the challenges addressed by Horizon 2020 implies that some intersections exist at the level of topics and calls published by the various programmes. That complements the approaches and the specific perspectives of each initiative active within the frame of Horizon 2020.

7.6.1. Internal coherence of the actions

Budget distribution in SC2, LEIT and BBI

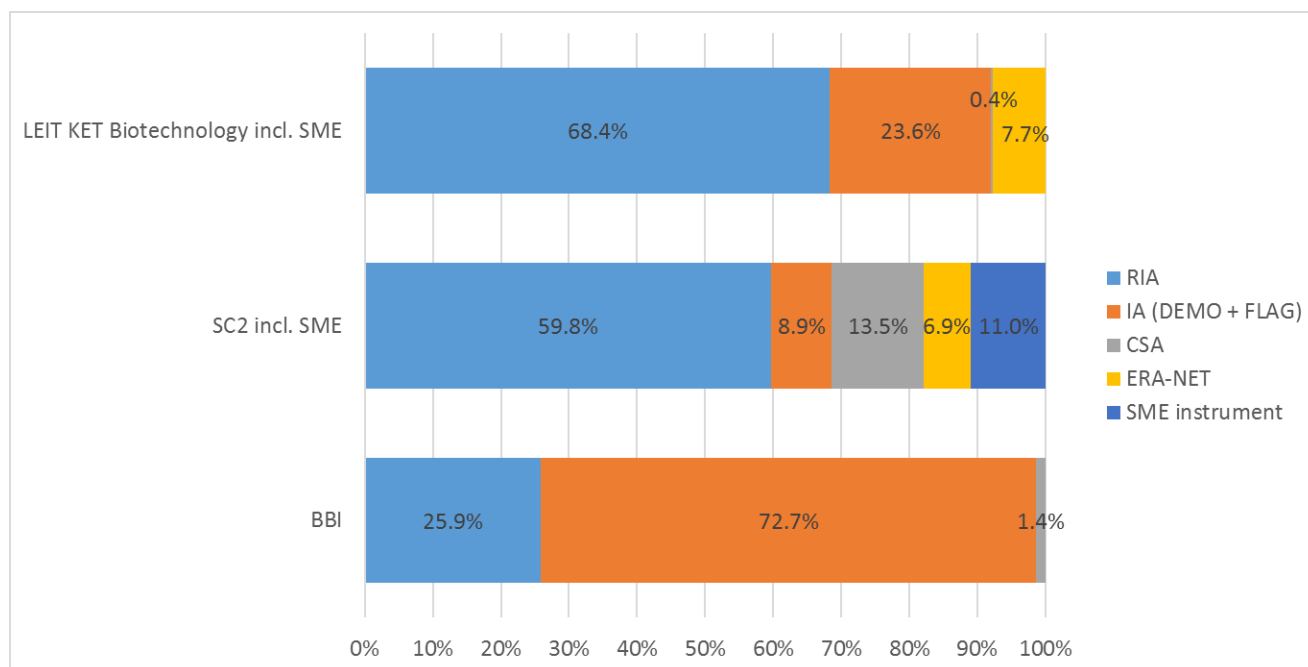
Objectives of BBI JU are in line but also complementary with other parts of Horizon 2020 in particular 'Societal Challenge 2: food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bio-economy' (SC2) and 'Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing' part of LEIT programme (LEIT) which finance BBI JU. 85% (EUR 828.75 million) of EC contribution in BBI comes from SC2 and 15% (EUR 146.25 million) from LEIT programme.

The development of sustainable bio-based economy requires an integrated approach and an array of instruments addressing various research and innovation needs. Horizon 2020 work programmes put in play a wide range of instruments such as research and innovation activities, demonstration and flagship projects, SME instrument and coordination and support actions. The use of those instruments varies between different parts of the programme. While SC2 and LEIT keep on supporting research and innovation activities related to bio-economy, BBI aims to strengthen the bio-based industry sector and it mainly finances the projects with much higher technology readiness level and market potential compared to SC2 and LEIT.

This is reflected in the distribution of EC funds per different type of action presented in Figure 12. Majority of contribution in SC2 and LEIT is dedicated to research and innovation activities (RIA), while majority of BBI funds goes to innovation actions (IA), namely to demonstration (DEMO) and flagship (FLAG) projects.

As discussed in section 7.2.7 the distribution of funds per beneficiary type also significantly differs in SC2, LEIT and BBI (see Fig. 3). The majority of the EC funding in BBI (70.7%), goes to private entities, while in SC2 to academia (HES: 27%) and research organisations (33.1%).

Figure 12: Distribution of contribution in LEIT KET Biotechnology, SC2 (including SME instrument) and BBI by project type.



Source: **BBI**: CORDA analysis (cut-off May 2017); **SC2**: DG RTD, unit F.1. Statistics on SC2 programme including SME instrument, (cut-off January 2017); **LEIT KET Biotechnology**: DG RTD, unit D 2. Statistics on SC2 programme including SME instrument, (cut-off January 2017);

Coherence with SC2

BBI JU is currently a main programme supporting the development of the bio-based industry – within the greater framework of the bio-economy – and it represents a major investment in this area. It covers the whole value chain from the development of innovative feedstock, its conversion in next generation biorefineries, and supporting markets for bio-based products; its emphasis is placed on the development and demonstration of next generation biorefineries.

Though, SC2 still complements the BBI activities in this area. In the years, 2014-2016 two bio-economy related SC2 calls were launched:

- 1) **Sustainable and Inclusive Bioeconomy (HORIZON 2020 -ISIB-2014/2015)** with the budget of EUR 86.5 million;

Majority of projects funded under this call were ERA-NETs and CSAs. ERA-NETs addressed the challenges such as sustainable and resilient agriculture, sustainable livestock production, biomarkers for nutrition and health and monitoring and mitigation of agricultural and forestry greenhouse gases (GHG). These areas are beyond the scope of BBI. On the other hand CSA calls proposed a variety of topics which were supposed to foster public engagement in Bioeconomy, reach end users and policy makers, bridge research and innovation gaps and overall prepare various stakeholders groups and member states for the launch of BBI. A few RIAs funded under ISIB addressed the issues

of forest management practices; enhanced governance and social innovation for growth in rural areas and provision of public goods by EU agriculture and forestry. These topics are also complementary and coherent with those covered under BBI. One early (2014) topic shows slight thematic overlap with BBI:

- ISIB-05-2014: Renewable oil crops as a source of bio-based products

2) **Bio-based innovation for sustainable goods and services (HORIZON 2020 -BB-2016/17)** with the indicative budget of EUR 37.5 million.

BB 2016/17 was a call with very modest budget and 8 topics open for funding. Three of them were CSAs supporting the regional dimension of bio-based industries; mutual learning for bio-based products and strategies for improving the Bioeconomy knowledge of public. There was one IA topic for Plant Molecular Factory and three RIAs for sustainability schemes for bio economy, statistical data collection method on bio-based industries and finally one project for tree breeding strategies for resilient forest production systems.

The activities proposed in the ISIB and BB calls are complementary to those undertaken by the BBI JU and target the supply side (upstream) of the biomass to bioproducts value chain through the development of innovative feedstock, research and innovation on next generation biorefineries using CO₂ as direct feedstock, and supporting markets for bio-based products (downstream).

The ISIB and BB calls also integrate crosscutting activities, such as communication, technology transfer and dissemination activities, seeking to foster citizens' engagement and promote participative governance of the Bioeconomy, respecting a Responsible Research and Innovation; and supporting National Contact Points for SC2. These calls also support actions seeking to bridge the activities and projects under different pillars of Horizon 2020, and help the uptake of research results along the innovation chain.

Coherence with LEIT Biotechnology

Leadership in enabling and industrial technologies (LEIT) part of Horizon 2020 focuses on new opportunities for industrial leadership in Key Enabling Technologies (KETs), ICT and Space.

Biotechnology is considered a key enabling technology and it is supported under 'Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing' part of LEIT programme.

In the years, 2014-2016 two LEIT calls addressing biotechnology were launched:

1) **Call for Biotechnology HORIZON 2020 -BIOTEC-2014/2015** with a budget of around EUR 88 million.¹⁴⁷

The main themes of this call were:

- *'Cutting-edge biotechnologies as future innovation drivers'* : within these theme the call for synthetic biology and bioinformatics were launched and two RIA projects were founded
- *'Innovative and competitive platform technologies'* : one open call on metagenomics (RIA)
- *'Biotechnology-based industrial processes driving competitiveness and sustainability'*: under this theme two IA and one SME projects were funded. The topics were very close to the ones proposed under BBI programme, namely:
 - o BIOTEC 3 – 2014: Widening industrial application of enzymatic processes

¹⁴⁷ EC (2016): Maximising the impact of KET Biotechnology" Workshop report. November 2016.

- BIOTEC 4 – 2014: Downstream processes unlocking biotechnological transformations (TRL5-7) => similar issues are covered by many BBI projects
 - BIOTEC 5 – 2014/2015: SME-boosting biotechnology-based industrial processes driving competitiveness and sustainability => SMEs have good participation and receive a good share of funding in BBI
- 2) **Call for Biotechnology HORIZON 2020 -BIOTEC-2016/2017** with a budget of around EUR 95 million¹⁴⁸.
- '*Cutting-edge biotechnologies as future innovation driver*' and '*Innovative and competitive platform technologies*', further contributed to developing new technological platforms related to biocatalysis and bio design. Three RIA calls covered the system biology, microbial platforms for CO2 reuse and new plant breeding techniques. These topics are coherent and complementary to BBI activities.
 - ERA- NET project with a goal to better align current EU and national biotechnology initiatives and to improve synergies and coherence of current research funding activities was launched under this call; two CSA projects, one on 'biotechnology foresights and identifying gaps and high-value opportunities for the EU industry' and the second one on 'enhancing and demonstrating the impact of KET Biotechnology projects' are very complementary to BBI projects and the results of those projects could also be taken into consideration while designing future BBI calls.
 - under '*Biotechnology-based industrial processes*' theme, the calls addressed the challenges such as improving resource efficiencies and overall process sustainability, as well as improving product yields, recovery and quality in this area. The calls:
 - BIOTEC-02-2016: Bioconversion of non-agricultural waste into biomolecules for industrial applications (RIA); and
 - BIOTEC-06-2017: Optimization of biocatalysis and downstream processing for the sustainable production of high value-added platform chemicals (IA) show some overlap with the calls launched under BBI. Attention should be paid to ensure the complementarity of the approaches, since it is in the remit of the KET Biotechnology to focus on the optimization of the biotechnological process.

Interestingly, many projects funded under BIOTEC calls address very important challenge of **biopharmaceuticals** (e.g. vaccine) production and downstream processing (e.g. nextBioPharmDSP and DiViNe, MycoSynVac). These projects are of high value, as such topics are not covered at all under 2014-16 BBI calls. On the other hand, there are a few projects that cover the themes which are already **well addressed** under BBI, e.g. FALCON 'Fuel and chemicals from lignin through enzymatic and chemical conversion', VOLATILE 'Biowaste derived volatile fatty acid platform for biopolymers, bioactive compounds and chemical building blocks' and DAFIA 'Biomacromolecules from municipal solid bio-waste fractions and fish waste for high added value applications'. The calls under '*Biotechnology-based industrial processes driving competitiveness and sustainability*' challenge should be better aligned with BBI.

Coherence with other parts of LEIT

Eco-Design and New Sustainable Business Models

These activities focus on new concepts and methodologies for knowledge-based, specialised production, which can fulfil the requirements of sustainability, globalised value chains, changing markets, and emerging and future industries. They are not

¹⁴⁸ EC (2016): Maximising the impact of KET Biotechnology” Workshop report. November 2016.

focused on the bio-based industries, but the selected projects may cover that area as well.

Example of the calls complementary to BBI:

NMBP-21-2016: ERA-NET on manufacturing technologies supporting industry and particularly SMEs in the global competition

NMBP-22-2017: Business models and industrial strategies supporting novel supply chains for innovative product-services

Coherence with crosscutting activities¹⁴⁹

Industry 2020 in the Circular Economy call (HORIZON 2020 -IND-CE-2016/17)

The objective of this part of the call is to foster economic, social and environmental prosperity – 'living well, within the limits of our planet'. A systemic approach to eco-innovation is intended to promote new modes of production and consumption, triggering a disruptive transformation for a resource efficient society.

Many open topics launched under this call are highly complementary and coherent with BBI objectives, e.g.:

- CIRC-01-2016-2017: Systemic, eco-innovative approaches for the circular economy: large-scale demonstration projects
- CIRC-03-2016: Smart Specialization for systemic eco-innovation/circular economy
- CIRC-05-2016: Unlocking the potential of urban organic waste

BBI could try to establish synergies with this part of the programme as well as collaborations with selected projects if they are relevant to BBI activities.

Coherence with SC5 'Climate action, environment, resource efficiency and raw materials'

The objective of the Societal Challenge 'Climate action, environment, resource efficiency and raw materials' (SC5) is to achieve a resource – and water – efficient and climate change resilient economy and society, the protection and sustainable management of natural resources and ecosystems, and a sustainable supply and use of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources and eco-systems.

The objectives of the call – **Waste: A Resource to Recycle, Reuse and Recover Raw Materials Towards a near-zero waste society (HORIZON 2020 -WASTE-2014/2015)** are highly complementary to those of BBI, especially to Value Chain 4: 'From waste problems to economic opportunities by realizing sustainable technologies to convert waste into valuable products.

Many topic are well aligned and coherent with BBI and here the synergies and collaborations should be sought, e.g.

WASTE-1-2014: Moving towards a circular economy through industrial symbiosis

WASTE-4-2014/2015: Towards near-zero waste at European and global level

WASTE-5-2014: Preparing and promoting innovation procurement for resource efficiency

WASTE-6-2015: Promoting eco-innovative waste management and prevention as part of sustainable urban development,

While in the others show some overlapping goals and activities, e.g.:

WASTE-2-2014: A systems approach for the reduction, recycling and reuse of food waste

¹⁴⁹ Horizon 2020. Work Programme 2016-16. Cross-cutting activities.

WASTE-7-2015: Ensuring sustainable use of agricultural waste, co-products and byproducts

Evidently, BBI is closely linked with SC5 with many complementary objectives and activities; therefore, BBI should establish close collaborations with this part of the programme. Such linkage should be of benefit of both parts of the programme and should serve the society and foster further development of Bioeconomy.

Coherence with other Public Private Partnerships (PPP) – SPIRE

SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) is a Public Private Partnership (PPP) between the process industry and the European Commission aiming for optimal valorisation and utilization of existing, alternative and renewable feedstock. In this last regard, this relates very closely to the BBI JU. The six components of SPIRE include:

- Feed: Increased energy and resource efficiency through optimal valorisation and smarter use and management of existing, alternative and renewable feedstock.
- Process: Solutions for more efficient processing and energy systems for the process industry, including industrial symbiosis (e.g. cross-sectorial application of technologies).
- Applications: New processes and materials for market applications that boost energy and resource efficiency throughout the value chains.
- Waste2Resource: Avoidance, valorisation and re-use of waste streams within and across sectors, including recycling of post-consumer waste streams and new business models with the ambition to closing the loop.
- Horizontal: Accelerated deployment of the R&D&I opportunities identified within SPIRE through e.g. robust sustainability evaluation tools, skills and
- Education programmes, as well as enhanced sharing of knowledge and best practices.
- Outreach: Reach out to industry (especially SMEs), policy makers, investors and citizens to support the realization of impact through awareness, stimulating societal responsible behaviour.

It is in the first and third aspects that particular attention should be paid especially in sub key action *KA 1.4: Advancing the role of sustainable biomass/renewables as industrial raw material* to avoid overlap or duplication and that potential for economic impact, jobs and carbon footprint savings are not counted twice.

During the last experts' meeting with EC and BBI JU (May 2017), it was pointed out that Joint BBI and SPIRE Working Group was established in June 2016. The goal of this group is to search for synergies and collaborations between the two partnerships and to avoid redundancies in the work programmes and projects. Formal group's meetings are held twice a year. In addition, upon need, the informal meetings are organized. The work of the group should help in addressing before mentioned concern.

Coherence with European Technology Platform Suschem

SusChem is an industry led stakeholder organization launched in 2004 as a European Commission supported initiative to revitalize and inspire European chemistry and industrial biotechnology research, development and innovation in a sustainable way. SusChem is organized as a European Technology Platform (ETP) with the aim to develop a long-term R&D agenda for implementation at national and European level.

SusChem was founded by six European bodies to represent the main stakeholders from academia and industry in the chemical sciences sector:

- Cefic – European Chemical Industry Council
- DECHEMA – German Society for Chemical Engineering and Biotechnology
- ESAB – European Federation of Biotechnology Section of Applied Biocatalysis
- EuropaBio – the European Association for Bioindustries
- GDCh – the German Chemical Society

- RSC – Royal Society of Chemistry (UK)

Priorities of SusChem are:

- significantly cut emissions of carbon dioxide and other pollutants
- develop sustainable and renewable energy sources
- find alternatives to scarce raw materials
- embrace the concept of a circular economy and increase our recycling and reuse of waste
- ensure the quality of our water supplies
- improve our quality of life without compromising that of future generations

SusChem is focused on the move toward a sustainable low-carbon economy and now has a supporting network of National Technology Platforms in 14 European countries. These platforms work on national sustainable chemistry initiatives, support national engagement in EU collaborative projects and programmes and contribute to transnational collaborations. SusChem has played a significant role in developing, implementing and coordinating the European Public-Private Research and Innovation Partnerships, both the Biobased Industries Joint Undertaking (BBI JU) (as its associated BIC member) and the Sustainable Process Industry through Resource and Energy Efficiency (SPIRE). SusChem's working group in this area analyses the current and future programmes of these two PPPs to identify areas of complementarity and common interest and to develop opportunities for new programme content that will be implemented by the two PPPs. The working group also identifies project content for biobased materials applications and biotechnological processes that are implemented via SusChem's own Innovation and Research Agenda (SIRA). SusChem is also invited to the meetings of before mentioned Joint BBI and SPIRE Working Group.

7.6.2 External coherence of the actions

Coherence and alignment with initiatives and strategies addressing Bioeconomy

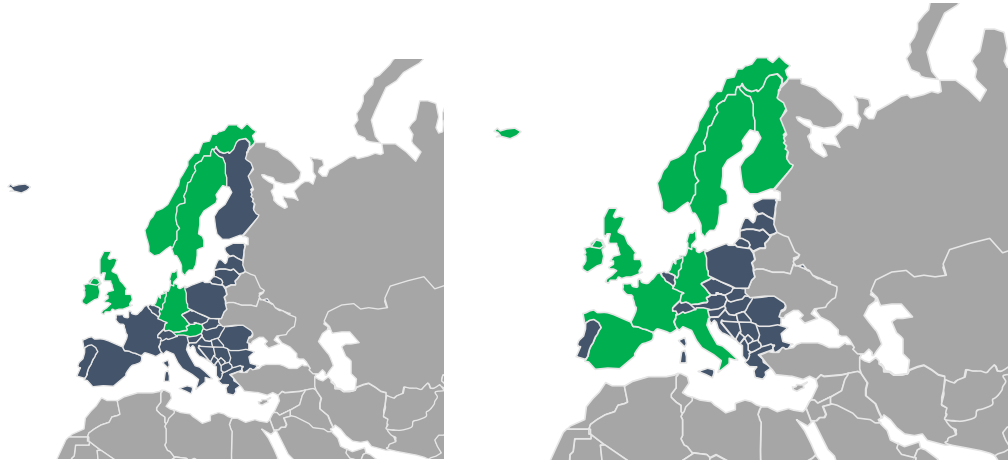
Although it must be noted that bio-based industry represents only one segment of the wide scenario of the Bioeconomy, BBI JU appears well aligned and coherent with different national and macro-regional strategies addressing Bioeconomy. That was evident from a number of interviews and from presentations made available by the Member State Representative during specific events aiming at promoting both BBI JU but also at illustrating the Bioeconomy situation in different member states.¹⁵⁰

Some of the member states have their own Bioeconomy strategies. The focus of the strategies is however in some countries in a wider context, including also green economy or other renewable resources than biomass. Some countries have only regional strategies, like Belgium. Under half of the member states, altogether 12 member states or associated countries currently have a dedicated Bioeconomy strategy or position paper: Austria, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, the Netherlands, Norway, Spain, Sweden and UK.

Maps showing the countries with Bioeconomy strategies before and after setting up BBI JU are shown below in Figure 13. The focus areas of the national Bioeconomy strategies vary to some extent, but they all share a common trait of having a strong focus on promoting research and innovation in the area of Bioeconomy. This is generally well in line with the targets of BBI JU.

Figure 13. Countries with Bioeconomy strategies before (left) and after (right) setting up BBI JU. Member states in dark blue, Member states and associated countries with Bioeconomy strategies in green.

¹⁵⁰ ECOMONDO 2016, 9 November 2016, Rimini. <https://www.bbi-europe.eu/events/ecomondo-2016-green-technologies-expo-italy>



BBI JU appears to have a **relevant impact and leverage effect** by mobilizing national and macro regional stakeholders in the field of Bioeconomy. Three different MS (Italy, France, and Spain) developed a national Bioeconomy strategy, which, according to the interviews with some of the stakeholders involved, would not have happened without the aggregating and mobilizing effect of BBI JU.

More specifically, as the development of National Bioeconomy Strategies requires the involvement of a number of different ministries and policies, the role of industry is essential to interface and promote this type of broad initiatives.

The SRG chair has underlined that the positive action of BBI JU can be already perceived from the response of different MS to surveys and consultations. At the starting of BBI JU, only five Countries were considerably responsive regarding the Bioeconomy issue, whereas nowadays most of European Countries are expressing their active interest towards Bioeconomy and BBI JU as well.

This has been cross-fertilized also by the initiatives organized by BBI JU at national level (e.g. launching of WP, informative days) and by the coordinated action of the MS representatives.

Furthermore, the Chair of the SRG provided the indication that BBI JU has a remarkable potential for boosting Bioeconomy not only at National but also at Macro-Regional level. Such positive impact has been observed during the launch of PRIMA initiative,¹⁵¹ which was promoted also thanks to the coordinated actions of some Member State Representatives inside BBI JU. The general objective of PRIMA is to reinforce cooperation in Research and Innovation in Mediterranean countries in order to contribute to the challenges of sustainable food production and water provision in the Mediterranean region. As reported in the Strategic Research and Innovation Agenda (SRIA) of the PRIMA initiative, Bioeconomy is among the policies in synergy with PRIMA priorities.¹⁵²

Following the positive experience of PRIMA, a similar initiative is about to be launched for Northern European Countries. One positive consequence of such initiatives is the involvement of partners from non-EU Countries, sharing common problems in the context of primary production that might also lead to an increased attention of non-EU stakeholders towards BBI JU initiative. Indeed, as reported in section 7.2, the participation of non-EU partners to BBI JU calls has been, so far, insufficient.

The activities of BBI JU are also coherent with a series of initiatives on going throughout Europe.

Coherence with industrial initiatives and platforms

¹⁵¹ <https://ec.europa.eu/research/environment/index.cfm?pg=prima>

¹⁵² <http://4prima.org/sites/default/files/publication/PRIMA%20SRIA.pdf>

Since BIC's mission is to build innovative bio-based value chains by developing new biorefining technologies, optimizing feedstock use and creating a favourable business and policy climate to accelerate market acceptance of bio-based products, BIC was among the promoters and the founder members of the European Bioeconomy Alliance (EUBA)¹⁵³ inaugurated February 2015. This organization includes:

- **BIC** - Bio-based Industries Consortium
- **CEFS** - European Association of Sugar Producers
- **CEPF** - Confederation of European Forest Owners
- **CEPI** - Confederation of European Paper Industries
- **COPA - COGECA** - European Farmers and European agro-cooperatives
- **ePURE** - European Renewable Ethanol Producers Association
- **EuropaBio** - The European Association for Bioindustries
- **EUBP** - European Bioplastics
- **FEDIOL** - The EU Vegetable Oil & Proteinmeal Industry
- **FTP** - Forest-based Sector Technology Platform
- **PFP** - Primary Food Processors
- **Starch Europe** - European Starch Industry Association

As a further stakeholder group of which BIC are a founder member EUBA's **aim is to bring into the mainstream and realise the potential of the Bioeconomy in Europe** advocating for a favourable and coherent policy and investment framework, with a common vision¹⁵⁴:

- The production and use of renewable resources as feedstock for making innovative, value-added everyday products and materials
- The commitment to maximise the unused potential of European renewable resources to encourage the production of bio-based products and materials 'Made in Europe'
- Resource efficiency and sustainability as driving business principles

¹⁵³ <http://bioeconomyalliance.eu/>

¹⁵⁴ <http://bioeconomyalliance.eu/about-bioeconomy>

7.7 Evaluation question 7: Synthesis, conclusions and recommendations

7.7.1 Relevance

BBI Joint Undertaking was initiated first to attract consistent private investment, promote R&I along whole value chains, avoid fragmentation and duplication and improve coordination in innovation activities of bio-based industries. The impact assessment concluded that a strong EU effort is critical to ensuring long-term investments while mitigating their inherent risks. Moreover, reaching critical mass is needed to bring the right partners to the table and resolve the technological and innovation problems that the bio-based industries face, particularly in the areas of demonstration and deployment. On that respect, the institutional PPP was selected among the three policy options especially for its capacity to mobilise greater project resources due to the significant contribution by industry.

The specific tasks given to BBI JU in the Council regulation are well aligned with these initial long-term objectives of the BBI JU, which are still highly relevant in order to keep EU competitive and at the forefront of the global Bioeconomy development. The motivations for the selection of i-PPP as a policy option are also still relevant, since the objective of mobilizing investments from industry remains crucial. Although it is still too early to assess the overall effectiveness of i-PPP in meeting these goals, significant amounts of industry investment have already been mobilized, as described earlier in sections 7.4 and 7.5.

Based on the interviews carried out before the setting up of BBI JU, the competitive position of Europe in BBI technologies was challenged by many of the demo size facilities being implemented in US and Asia. Well aligned with this initial challenge, BBI intends to solve one of the key focus areas of BBI that was to de-risk demonstration and commercialization of BBI technologies. The interviewees carried out within the context of this mid-term evaluation also largely agreed that the main positive effect of BBI JU derives from the value chain driven cooperation across sectors ('the structuring effect'), which helps scale up the technologies towards market applications. BBI JU is valuable especially for the long-term effect of bringing technologies to market and it represents an important signal effect for boosting the long-term development of the emerging BBI. After setting up the BBI JU the sectors active in BIC have evolved to include also, for example, the food industry and increasing amount of brand owners. Consequently, BBI technologies can be developed to match better the market requirements when a wider array of downstream sectors is closely involved in the development work.

In capital-intensive bio-based industries, technology commercialization takes time since it needs to be done with a staged approach. On that respect, flagship projects are the main instrument that is expected to bring the key BBI technologies to demonstration in the short term, to commercialization in the medium term and to market replication in the long term.

Taking into account technological developments that have occurred in the recent years, the conversion of carbon dioxide into chemicals and fuels production appears as emerging trends and first commercial facilities have already established. If carbon dioxide based chemicals and fuels will be produced in techno, economical feasible routes in the future it is likely that those applications will grow rapidly and they will indirectly affect the competitiveness of the BBI technologies. In addition, digitalization is a trend that is transforming whole sectors and industries and needs to be considered also as a direct or indirect aspect affecting the competitiveness of BBI technologies.

Recommendations

- To continue focus on de-risking bringing new bio-based value chains to market
- To include increasingly brand owners and sectors at the interface with consumers with synergies with the existing ones
- To respond to important emerging trends through future calls that could consider conversion of biogenic CO₂ into chemicals and materials as well as digitalization (including big-data analysis and exploitation) as one aspect in Bioeconomy value chains.

7.7.2 Implementation (open, transparent, effective and efficient)

The analysis presented in this report concerns the calls launched and implemented by BBI JU during the period 2014-2016. In this period, the project grants were allocated via four calls for proposals.

The total EC contribution (in commitment appropriations) to BBI JU operational expenditure over 2014-2016 amounted to EUR 418.29 million and the total financial contribution committed by BIC at programme level amounted to EUR 0.75 million. EUR 414.29 million were subsequently committed by the BBI JU in individual projects selected for funding. Moreover, in the signed Grant Agreements there was a global commitment by the private partners of EUR 114,621,657.2 for in kind contributions to operational activities (IKOP).

BBI JU selected 65 projects for funding: 6 Coordination and Support Actions (BBI-CSA), 26 Innovation Actions (IA), 20 Demonstration Actions (BBI-IA-DEMO), 6 Flagship Actions (BBI-IA-FLAG) and 33 Research and Innovation Actions (BBI-RIA). In terms of funding, 72.7% of the contribution was dedicated to Innovation Actions (39.5% to DEMO and 33.2% to FLAG projects) while 25.9% went to RIAs and 1.4% to CSAs. Notably, Strategic Innovation and Research Agenda (SIRA) for Bio-Based Industries consortium (2013)¹⁵⁵ had earmarked 30% for DEMO, 34.75% for FLAG, 30% for RIA and 3.25% for CSA. Currently, the share of budget dedicated to DEMO projects is significantly higher than originally planned. This should be taken into consideration in the future work plans that should deserve more attention to RIA and CSA projects.

The geographical distribution of funds in BBI resembles those in the SC2 calls and in LEIT KET Biotechnology programme, where the majority of EC funding (84%) goes to EU15. This is also connected to a big discrepancy between the success rates of EU15 (32.6%) and EU13 (19.7%). Although EU13 receives a much lower share of the contribution than EU15, it scores better in BBI (7.9%) than in SC2 (5.5%) and in LEIT KET Biotechnology programme (7.2%).

The countries with the highest funding received and numbers of participations are Germany Italy, Netherlands, France and Spain. Notably, these Member States have already developed and adopted some kind of national bio-economy strategies at national level.

The pattern of budget distribution per beneficiary type significantly differs from that in SC2 and in LEIT. The majority of the EC funding in BBI (70.7%) goes to private sector. In LEIT Biotechnology and SC2, academia and research organisations receive the major part of the budget. HES and REC combined receive 55.2 and 60.1% in LEIT KET Biotechnology and SC2, respectively, while in BBI only 26.8%. BBI calls have a very good SME participation (35.4%) with 219 of the total 618 beneficiaries involved in BBI funded projects.

So far six flagship projects were launched, three in VC1, one in VC2 and two in VC3. So far, the distribution of projects and funds according to value chain seems to be somewhat

¹⁵⁵ Bio-based Industries Consortium (2013). Strategic Innovation and Research Agenda (SIRA). Bio-based and Renewable Industries for Development and Growth in Europe.

unbalanced. Lignocellulose, forest-based and agro-based value chains existed before BBI and thus it is not surprising that they present the highest technology readiness level and launching of the flagship projects in those areas was possible. Efforts should be made to support the development of technologies in new value chains and flagship projects in new value chains should be launched. On that respect, new value chains have emerged, such as aquatic biomass and this shows flexibility and responsiveness of BBI towards customers and market needs. At the same time, the integrated energy, pulp and chemicals biorefineries value chain (VC5) has apparently decreased its strategic relevance within BBI JU, taking account of the activities being financed in other parts of Horizon 2020, in particular to maximise synergies and avoid overlaps with SC2 'Energy'. Furthermore, the 2016 work programmes have moved from the biomass 'push' approach and the traditional value chains, towards a new focus: the creation of biomass demand connected to 'market pull'. This approach is reflected in the high number of 'across VC' call topics funded by 2016 calls.

Concerning the openness, BBI has done great efforts in communicating the BBI JU and its calls to stakeholders in the EU through its events, meetings and website. The nature of BBI calls is fully open to the participation of any stakeholder. Although the success rate of proposals having BIC coordinators and BIC partners is higher than for non-BIC coordinators and non-BIC partners, the actual numbers of non-BIC coordinators and non-BIC partners in the selected proposals are much higher, with the exception of non-BIC coordinators in call 2015.1.

Recommendations

- CSA projects have still received lower than planned share of the funds (1.4% compared to planned 3.25% in SIRA). This could be used as an opportunity: future CSA projects could support market analysis for bio-based products and processes and thus support 'market pull'.
- Constant monitoring and analysis of the bio-based markets is of high importance for the development of the future calls.
- The results of CSA projects funded under SC2 should be taken into consideration in the planning of future BBI calls
- Efforts should be made to support development of completely new value chains and cross-value chains products and processes. Towards the end of the BBI programme, more DEMO and especially FLAG projects demonstrating the feasibility and economic viability of completely new bio-based value chains should be launched.
- In the future BBI calls should complement rather than repeat emerging trends covered in LEIT BIOTEC or exploit the results of LEIT BIOTEC to move to higher TRL and greater involvement of the industry.
- To improve the participation of EU-13 MS and Third Countries through a more open programming strategy, which should take into account potentials for growth at macro regional level, also in synergy with other EU initiatives (e.g. Smart Specialisation Strategies, S3).
- To analyse cases of success in terms of national participation and deliver 'best practices' for Member States, offering also mentoring support.
- To identify win-win strategies for a larger involvement of Third Countries while ensuring the protection of EU industry's interests.

7.7.3: Main achievements and effectiveness of implementation

BBI JU has become operational on 26 October 2015. The number of running projects has steadily grown from 10 projects in 2014 to 36 at the end of 2016, and has reached 65 ongoing projects by May 2017.

Well-chosen and highly relevant value chains of the BBI JU very well address the objectives of the BBI Initiative. Although value chain 5 appears to have decreased its strategic relevance, cross-sectoral growth opportunities enabled the creation of new value chains. The development of business models to integrate economic actors along the whole value chain - namely from supply of biomass to biorefinery plants to consumers of bio-based materials, chemicals and fuels - is an achievement. This includes creating new cross-sector interconnections and supporting cross-industry clusters.

The performance of BBI JU against three main Horizon 2020 KPIs – time to inform (TTI), time to grant (TTG) and time to pay (TTP) pre-financing – operates efficiently. The 20% target for SMEs has been surpassed, with a 29.1% of contribution delivered to SMEs taking part in funded projects, which clearly demonstrates that the BBI JU programme is contributing to the development of the bio-based SMEs landscape in Europe. The private sector participation in the funding allocated is very pronounced, with 70.7% of the overall contribution given to private for profit entities (PRC), which is a cornerstone of the BBI JU. This leads to a pronounced participation of industry and SMEs well above the target, whereas higher education institutions received only 10.8% of the allocated contributions despite a large mobilization.

BBI JU has started in 2014-2016 to attract and motivate the participation of the best European players in the areas of the selected value chains, as demonstrated by the fact that non-BIC members make up the majority of participants and coordinators in the selected proposals. This demonstrates the openness of the BBI JU, while the higher success rate of BIC-members versus non-BIC members indicates that BIC-membership provides an advantage in terms of proposal preparation.

Overall, the BBI JU has created a stimulating research and innovation environment in Europe since, according to the grant agreements signed so far, the financed projects will deliver 146 new cross-sector interconnections, 82 new value chains, 46 new bio-chemical building blocks, 106 new bio-based materials, 51 new bio-based 'consumer products'. Moreover, 6 grant agreements for flagships projects were already signed so far by 22 June 2017. Consequently, six out of the seven Key Performance Indicators (KPIs) specific for BBI JU are reported well above the targets (projected figures) and the seventh KPI is well on track. Future analysis should include quantitative comparison between actual achievements reported by projects and the targets set in the regulations for each KPI. On that respect, the high TRL levels of demonstration and flagship projects justify, to some extent, the high level of confidentiality applied to most data and intellectual property produced within BBI JU projects. Nevertheless, for building in the EU a long-term innovation space from fundamental to applied research supporting such advanced industrial projects and for avoiding and overcoming fragmentation, disconnection and duplication, it is important that the relevant EC directorates have clearly regulated and prompt access to the projects' deliverables, in compliance with the relevant regulations. This will be crucial for implementing any mechanism aiming at better coordinating all initiatives dedicated to the growth of European Bioeconomy and also searching for further leveraging effects in the science and technology as well as the geographic dimensions, e.g. at the regional and macro-regional levels. Moreover, it is important to benchmark and monitor the effectiveness of such initiatives in promoting and supporting EU leadership in this emerging sector and in implementing continuous process improvements at all levels.

Concerning the effectiveness in living up financial and managerial responsibilities, the available documents as well the interview of BBI JU stakeholders, indicate that during the organization of BBI JU regulation there was an underestimation of the necessity to establish clear criteria and suitable instruments for delivery and reporting the contributions of the industry. Such inaccuracy in the definition of clear rules led to an incomplete and fragmented picture of the actual financial and in kind contributions of the industry to BBI JU, as commented in 7.7.4 and 7.7.5.

Recommendations

- To monitor further progress of BBI JU by an annual comparison between BBI-specific KPIs projected, achieved and accumulated in the corresponding year.
- To increase the involvement of educational and research institutions in BBI JU programs and projects in medium to long-term precompetitive industrial innovation topics to be defined by all stakeholders.
- To search for best practices aiming also at the simplification of certification procedure for IKOP and for the reporting of IKAA.
- To improve coordination among all EU initiatives boosting the Bioeconomy and maximize their effect by i) assuring prompt access to project deliverables by the EC and ii) catching the emerging trends in innovation for promoting long term competitiveness, also by a procedure involving associated public research partners of BIC in the programming activities at an early stage.
- To monitor the practice developed between EC, BBI JU and BIC services with regard to the planning of additional activities, with the objective of delivering an updated picture of the actual private vs public contribution to BBI JU.
- To avoid programming strategies aiming at short term benefit of BIC's specific sectors but rather invest resources in topics able to create wider and long lasting benefits both at multi-sectorial and macro-regional levels.

7.7.4: Performance: mission and governance, operational effectiveness, operational efficiency

As already mentioned, flagship projects represent an actual achievement of BBI JU, with collaborations throughout the value chain towards consumer products. Nevertheless, the link between the operational KPIs and overall goal of the BBI JU is not completely clear at this stage of the programme, since it is not evident how these actions and strategies will translate into the economic, social and environmental benefits envisioned by BBI JU and its supporting partners. The revision of a KPI survey is a positive step in demonstrating this link but the qualitative nature of responses leaves ambiguity. Strengthening this link, reporting real achievements in contrast to expected outcomes and adding quantitative data could improve the management of programme, identify new opportunities and show to a wider audience of stakeholders the value of the BBI JU. In particular, the consultation that was carried out to monitor the progress against the KPIs involved only marginally respondents not directly involved in the BBI JU as applicants or beneficiaries. There is no demonstration that government, brand owner, NGO or consumers responded in sufficient numbers to demonstrate that the full value chain was represented or that the program is perceived as delivering real value for these stakeholders.

Although feedstock owners and several value chain players are well represented, the downstream value chain to market requires the strengthening of the position of brand owners and public bodies in defining challenges and, conversely, calls.

Concerning the long-term commitment and contribution of the BBI JU members (i.e. EU and BIC), the unclear definition of rules for the delivery of the financial (in cash) contribution to operational costs by BIC led to a consistent lack of financial contribution from BIC. Although some measures have been designed to address and solve this issue, at the time of this evaluation it is not completely clear whether they will be fully effective in rebalancing the situation in terms of contributions from the two Partners, as also underlined by some BBI JU stakeholders. Therefore, the implementations of such measures will require specific monitoring actions.

Moreover, the delay in the approval of clear guidelines for reporting IKOP and for planning IKAA prevented the group of experts to have access to complete data, reflecting

the actual in kind contributions delivered by industry so far. Therefore, some monitoring actions are advisable on annual basis.

Recommendations

- To strengthen the whole value chain approach by a greater participation of end users and customers.
- To monitor the effectiveness of the measures implemented for solving the problems related to industrial financial contributions to operational costs and consider possible complementary measures to assure a balanced contribution of the Public and Private members to BBI JU.
- To start planning different scenarios in case the operational budget, which was originally approved at the time of BBI JU set up, is not fully spent by the end of the initiative.
- To monitor the effectiveness of the guidelines for reporting and certification of IKOP and IKAA.
- To deliver reports that provide comprehensive description of the actual private and public contributions to BBI JU delivered so far as well as the detailed plan for the delivery of the contribution of the two Partners over the next years.

7.7.5: EU added value and leverage effect

The main success factor of BBI JU in 2014-2016 has been the structuring and mobilizing action on research and innovation, industry and economy as well as society and environment in the EU. The interviews with BBI JU project coordinators made evident that the consortia of projects with TRL > 7-8 would have not taken place without the support of BBI JU. Conversely, the industrial investments in additional actions (IKAA) would not have delivered. Notably, the different elements of the bio-based industry are fragmented in Europe. Therefore, the significant added value of BBI JU is largely in this acceleration of bringing together different sectors and industries towards the creation of new value chains, with different partners working together within a single project. The expected consequence is a revitalization of rural areas in different European regions, which can benefit from the already existing value chains but also from the novel ones. On that respect, members of the BBI, BIC, the BBI Scientific Committee and the BBI State Representatives Group have acted as ambassadors for the initiative in their respective communities, thus providing momentum.

One further effect of BBI JU is that the bio-based industry has started to become more visible since researchers, manufacturing, refining and brand owners have started working together to satisfy real world customer demands with bio-based products. In a survey, 87.5% of the participants considered that BBI JU contributes to economic growth and job creation in the EU. In order to assess the direct and indirect impact of BBI JU projects on job creation, statistics of the staff employed have been extracted from the reports provided by the BBI projects selected from call 2014. The number of staff employed by 9 BBI JU projects was 689, with a gender distribution of 58% male staff and 42% female staff. Depending on the respective bio-based value chain, this will also lead to a number of indirectly related jobs. As the creation of direct and indirect new jobs, both temporary and permanent, is taking place over extended periods of time, a standardized and constant reporting over the years, also after the completion of projects, can give an actual quantification of the long-term effect on employment in EU member states. Therefore, a systematic annual reporting of the direct and indirect effects on the number of new jobs created by the different activities of BBI JU needs to be established.

In the same survey mentioned above, an even higher proportion of respondents (93%) judged that BBI JU contributes to the transition from a fossil-based to a bio-based

economy. Together with the expected contributions to climate change mitigation by reducing the CO₂ derived from the use of fossil-based products (91% of respondents), this further strengthens the global impulse of the BBI JU.

The leverage effect is one of the main quantitative components of EU added value, with the target level for the leverage effect of BBI JU set to 2.8. Notably, this is the highest leverage target value among the seven JUs operating under Horizon 2020. Based on the in-kind and financial (in cash) contributions to operational costs of calls 2014-15 the operational leverage by 31 December 2016 is 0.50. Taking into account the available contributions to additional activities in 2014 and 2015, the additional leverage effect is 1.275. Therefore, the global leverage effect by 31 December 2016 is 1.779. The lower global leverage effect (1.779) as compared to the target of 2.8 set in the Council regulation is clearly connected to the delay in reporting the certified values for 2016 IKAA, since the corresponding IKAA plan had not been approved at the time of this interim evaluation. Consequently, the actual leverage effect should be re-calculated and published once the IKAA plan for 2016 is approved by the Governing Board and the IKAA report 2016 has been certified. BIC has announced an amount of IKAA for 2016 equal to EUR 185.863 million. Based on the certified IKAA for 2016 the additional leverage effect would be 2.1 while the global leverage effect would become 2.6.

As part of the mobilizing and structuring effect, intensifying private sector commitment by in-kind contributions, additional activities and by attracting additional investments needs to be continued as key tasks to ensure a balanced contributions from the BBI JU

Recommendations

- To introduce a systematic and constant annual reporting of the direct and indirect effects on the number of new jobs created by the different activities of BBI JU. This must be established on project coordinator level for the duration of BBI JU projects along with reporting tools for systematic reporting on long-term follow-up.
- To increase and intensify private sector commitment by in-kind contributions and contributions to additional activities.
- To re-calculate the actual leverage effect once the IKAA plan for 2016 is adopted by the GB and the IKAA report 2016 has been certified.
- To build up metrics and statistical data on the bio-based industries in the EU with annual reporting on economic growth
- To catalyse the growth of novel sustainable value chains able to connect bio-based excellent science to bio-based industry
- To set up a task force within the EC for maximizing the structural effect at National, Regional and Macro regional level, also by analysing BBI JU project deliverables (in compliance with all confidentiality rules)
- To reach out to EU member states and regions with rural or deindustrialized areas for catalysing revitalisation through bio-based industries

members.

7.7.6: Coherence

The objectives and activities covered under BBI JU are coherent and well-coordinated with the parts of the Horizon 2020 financing it: SC2 and LEIT 'Biotechnology'. While SC2 and LEIT Biotechnology keep on supporting research and innovation activities related to the whole Bioeconomy, BBI aims to strengthen the bio-based industry sector. It mainly finances projects with much higher technology readiness levels and market potential than SC2 and LEIT. This is reflected in the distribution of EC funds per different type of action.

Majority of EC contribution in SC2 and LEIT is dedicated to research and innovation activities (RIA), while majority of BBI funds goes to innovation actions (IA), namely to demonstration (DEMO) and flagship (FLAG) projects.

Apparently, there is some overlap of BBI calls with the topics under LEIT theme: '*Biotechnology-based industrial processes driving competitiveness and sustainability*' and the BBI calls should be better aligned with this part of LEIT programme. There is much less coordination with the other parts of Horizon 2020 such as SC5 'Climate action, environment, resource efficiency and raw materials' or Circular Economy (crosscutting activities). For example, the objectives of the 'Waste Call' (HORIZON 2020 -WASTE-2014/2015) are highly complementary to those of BBI, especially to Value Chain 4, and some synergies and joint actions could be considered. The same applies to the Circular Economy call (HORIZON 2020 -IND-CE-2016/17).

Many topics covered by the recent Bioeconomy-related calls (ISIB-2014/2015 and BB-2016/17) have been targeting the downstream side of the value chain and aimed at increasing public awareness and supporting markets' development. They also integrate crosscutting activities, such as communication, technology transfer and dissemination activities. Many CSA projects were funded under those calls, which is very positive since the output of such projects could be used as input for future BBI JU calls. On the other hand, in BBI only 6 CSA projects with a total budget of EUR 5.85 million were funded (1.4% of total BBI JU contribution), although the SIRA earmarks 3.25% for those projects.

Finally, the objectives and activities financed by BBI are closely linked to those of SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) PPP. Notably, a joint BBI and SPIRE Working Group were established in June 2016 with the aim of developing synergies and collaborations and avoiding redundancies between the two partnerships.

Recommendations

- To finance more CSAs projects in the following BBI JU work programmes
- To publish more topics for RIA, in order to enlarge the participation of REC and HES
- To cover emerging trends, such as synthetic biology and platform technologies (e.g. bioinformatics), in the future BBI work programmes
- To coordinate programming activities of BBI JU, SC2 and LEIT in order to guarantee complementary in terms of financial support for all beneficiary types and to achieve a balanced share of contribution dedicated to REC and HES.

ANNEX 1: EXPERT GROUP SHORT BIOGRAPHIES

Dr Roland WOHLGEMUTH (male, Swiss), Chair

Roland Wohlgemuth is an active and distinguished expert from the industrial sector (Sigma – Aldrich). He studied chemistry and biology at the University of Basel in Switzerland and obtained his Ph.D. with Prof. Joachim Seelig in 1979 at the Biocenter of the University of Basel. He did postdoctoral work at the Lawrence Berkeley Laboratory and UC Berkeley with a Swiss National Science Foundation Award in 1980 and a US Department of Energy employment with Prof. Melvin Calvin from 1981-1983. From 1983 on Roland Wohlgemuth has been working at Fluka, which in 1989 became part of the Sigma-Aldrich corporation, which in November 2015 has become member of the Merck Group. His main interests are in industrial innovation at the biology-chemistry interface, biocatalysis and biotransformations, glycobiology, metabolomics and bioanalytical technologies. He is author of several important scientific publications with focus on biotechnological/bioprocesses, enzymatic methods, and industrial applications. He has been involved in evaluations of projects under FP7 KBBE programme.

Professor Lucia GARDOSI (female, Italian), Rapporteur

Prof. Gardossi is an active and distinguished scientist employed by University of Trieste, Italy. Her speciality is organic chemistry, biotransformation/bioprocesses, enzyme science, bioinformatics etc. She has been assisting the European Commission as an expert member of several committees linked with the area biotechnologies and bio-based industries, and generally bioeconomy, such as being a member of the Advisory Group of H2020 Societal Challenge 2, participating in workshops on Enabling Technologies (biotechnology), and especially on industrial biotechnology. She has ample experience in EU-funded programmes as coordinator of projects under FP7, as well as in the projects financed by private and public sources. She has been active in past project-level evaluations (FP7 KBBE programme, People Marie Curie actions, research programmes from IT, CH, FR, HU, as well as for several scientific journals). She is an author of an extensive body of scientific literature (90+ articles) and author of four European and Italian patents. Prof. Gardossi's professional experience includes engagements at private bio-based industry (DSM, SPRIN, Poly-Tech companies).

Dr Alistair REID (male, British), Member

Dr Reid has a Ph.D. in Chemistry from Durham University and is an expert from private industry (Akzo Nobel Group) with a focus on renewable new materials, value chains, sustainability assessment, R&D strategy etc. He started his employment at Akzo Nobel in 2002, occupying various positions with increasing responsibility, including being active as a scientist (unit Marine and Protective Coatings, Akzo Nobel International Paints), research chemist (Technology Centre – Powder Coatings, Akzo Nobel Powder Coatings), Community of Practice Leader (Akzo Research, Development and Innovation), Project Leader (R&D&I and Sourcing, White Biotech Strategy, Akzo Nobel Supply Chain) and since 2012, as Manager Innovation Partnerships and Bio-based Materials (Akzo Nobel Supply Chain, Research and Development). He is active on the UK Innovate Industrial Biotechnology panels, and as reviewer of EU funded calls related to Biotechnology and sustainability.

Tiina PURSULA (female, Finnish), Member

Tiina Pursula obtained her MSc degree at Helsinki University of Technology in 1997. She was a research scientist at the Finnish VTT Technical research centre (1997 – 1998) and held several positions eg. as a Senior Scientist and Research Engineer at the KCL Science and Consulting (1998 – 2007, focus on biorefineries and wood processing). Between 2007 and 2008 she became the Research Director at KCL Science and Consulting, moving to a consultancy Gaia Consulting Oy since 2008, where she has the position of Business Director. The focus of her work is Bio-based economy, and in this capacity she has been active in the EU evaluation of projects under FP7 KBBE programme, as well as participated in the Expert group in preparation of the EU Bioeconomy Strategy (2011).

She was a member of the Ex-post expert group evaluating FP7 KBBE Biotechnology programme (2014), and at present is a member of the Horizon 2020 Societal Challenge 2 (Bioeconomy) Mid-term evaluation group (focusing on bio-based area, including BBI JU).

Professor Erick VANDAMME (male, Belgian), Member until 31 January 2017

Professor Vandamme received M.Sc. (1967), Ph.D. (1972) and D.Sc. degrees (1976) at Ghent University in molecular biology, fermentation science and industrial biotechnology, respectively. He has been a postdoctoral fellow at the Sir William Dunn School of Pathology, Oxford University, UK (1973), at the Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, USA, (where he obtained the MIT-Certificate in Fermentation Technology (1974-1975)), and at Queen Elisabeth College (now King's College), University of London, UK (1976). Since 2008, he is Emeritus Senior Full Professor at the Laboratory of Industrial Biotechnology and Biocatalysis, Department of Biochemical and Microbial Technology, Faculty of Bioscience Engineering, Ghent University, Belgium. He has acted as director of this department for over 20 years. He was Visiting Scientist at the Weizmann Institute of Science, Rehovot, Israel (1980) and Visiting/Invited Professor at several universities in Europe, UK, North and Central America, South-East Asia, China, Japan, S. Korea, South-Africa and Australia. He is (co)-author of over 430 research papers and review articles (SCI: > 3300 ; h-index: 23) in the field of antibiotic, bacteriocin, enzyme, fine and bulk chemical fermentations and bioconversion processes (i.e. speciality (oligo)sugars, chiral synthons) and holds several patents. He has received several scientific awards (national and international) including the S. Waksman Outstanding Educator Award (USA) and is an Elected Fellow of the American Academy of Microbiology (USA) and of the Society for Industrial Microbiology and Biotechnology (SIMB). He received the degree of Doctor *Honoris causa* at the Technical University of Lodz, Poland (2008), and at Hubei University of Technology, China and at South Central University of Nationalities, Wuhan, China (2007). He is serving on the Editorial Boards of several scientific journals and learned societies.

Dr Danuta CICHOCKA (female, Polish), Member

Dr Cichocka has obtained her MSc in 2004 in Environmental Protection at the Warsaw University (Warsaw, Poland) and her PhD in Environmental Microbiology in 2008 at the Freiberg Technical University/Helmholtz Centre for Environmental Research (Leipzig, Germany). She followed her career as a post-doctoral researcher at the Catholic University of Leuven (Belgium) (2008-2009) and between 2009 and 2012 was a Research Programme officer at the European Commission, Research and Innovation Directorate General, at the biotechnologies programme responsible for the FP7 projects related to environmental biotechnology and 'emerging trends in biotechnology' areas. Since 2012 Dr Cichocka is a senior researcher at the University of Applied Sciences and Arts Northwestern Switzerland, at the School for Life Sciences, at the Institute for Ecopreneurship (Muttens, Switzerland). Dr Cichocka is author or co-author of several peer-review journals, book chapters and conference presentations.

ANNEX 2: LIST OF ACRONYMS

AAR	Annual Activity Report
AWP	Annual Work Plan
BBI JU	Bio-Based Industries Joint Undertaking
BIC	Bio-based Industries Consortium
CAS	Common Audit Service
CSA	Coordination and Support Action
CSC	Common Support Centre
DEMOS-IA	Innovation Action for demonstrators
DG AGRI	Directorate-General Agriculture & Rural Development
DG GROW	Directorate-General Internal Markets, Industry, Entrepreneurship and SMEs
DG RTD	Directorate-General Research and Innovation
EC	European Commission
ECA	European Court of Auditors
EESC	European Economic and Social Committee
EFTA	European Free Trade Association
FR	Financial Regulation of the European Union
EFIB	European Forum for Industrial Biotechnology and the Bioeconomy
ETP	European Technology Platform
GAP	Grant Agreement preparation
GB	Governing Board of BBI JU
H2020	Horizon 2020
IA	Impact Assessment
IAS	Internal Audit Service
IAs	Innovation Actions
ICF	Internal Control Framework
ICS	Internal Control Standard
ICT	Information and communication technology
IFIB	Italian Forum on Industrial Biotechnology and Bioeconomy
IKAA	In-kind contributions to additional activities
IKOP	In-kind contributions to operational costs
JTI	Joint Technology Initiative
JU	Joint Undertaking
KPIs	Key Performances Indicators
LEIT	Leadership in enabling and industrial technologies
LMI	Lead Market Initiative
LISO	Local Informatics Security Officer
MGA	Model Grant Agreement
NCPs	National Contact Points for Horizon 2020
PA	Payments
PPP	Public-Private Partnership

REA	Research Executive Agency
RfP	Rules for Participation in Horizon 2020
RIA	Research and Innovation Actions
R&D	Research and Development
SC	Scientific Committee of BBI JU
SC2/3/5	Societal Challenge
SIRA	Strategic Innovation and Research Agenda
SOP	Standard Operating Procedures
SLA	Services Legal Agreement
SMART	Specific, Measurable, Accepted, Realistic and Time-related
SMEs	Small and Medium-Size Enterprises
SRG	States Representatives Group of BBI JU
SPIRE	Sustainable Process Industry through Resource and Energy Efficiency
SWD	Staff Working Document
TL	Task Leader
TTG	Time to Grant
TTI	Time to Inform
TTP	Time to Pay
EG	Expert Group

ANNEX 3: KEY CRITERIA USED FOR THE EVALUATION

The evaluation is an evidence-based judgement of the extent to which BBI JU has met the following criteria, as defined by the Better Regulation Guidelines:¹⁵⁶

a) Effectiveness:

Analysis of the progress made towards achieving the objectives of the intervention, looking for evidence of why, whether or how these changes are linked to the EU intervention. Besides evaluating if the intervention is on track, the analysis should seek to identify the factors driving or hindering progress and how they are linked (or not) to the EU intervention.

Effectiveness analysis considers how successful EU action has been in achieving or progressing towards its objectives. The evaluation should form an opinion on the progress made to date and the role of the EU action in delivering the observed changes. If the objectives (general, specific, operational) have not been achieved or things are not on track, an assessment should be made of the extent to which progress has fallen short of the target and what factors have influenced why something was successful or why it has not yet been achieved. Consideration should also be given to whether the objectives can still be achieved on time or with what delay. The analysis should also try to identify if any unexpected or unintended effects have occurred.

Typical examples of effectiveness questions are:

- To what extent have the objectives been achieved?
- What have been the (quantitative and qualitative) effects of the intervention?
- To what extent do the observed effects correspond to the objectives?
- To what extent can these changes/effects be credited to the intervention?
- What factors influenced the achievements observed?
- To what extent did different factors influence the achievements observed?
- For spending programmes, did anti-fraud measures allow for the prevention and timely detection of fraud?

b) Efficiency

The evaluation should always look closely at both the costs and benefits of the EU intervention as they accrue to different stakeholders, identifying what factors are driving these costs/benefits and how these factors relate to the EU intervention. The answer to this question should provide evidence on the actual costs and benefits, making it clear what can be linked to the EU intervention and what cannot. Efficiency analysis is a key input to policy making, helping both policy makers and stakeholders to draw conclusions on whether the costs of the EU intervention are proportionate to the benefits.

Efficiency considers the relationship between the resources used by an intervention and the changes generated by the intervention (which may be positive or negative).

Differences in the way an intervention is approached and conducted can have a significant influence on the effects, making it interesting to consider whether other choices (e.g. as demonstrated via different MS) achieved the same benefits at less cost (or greater benefits at the same cost).

Efficiency analysis can differ depending on the type of intervention being evaluated.

¹⁵⁶ Commission Staff Working Document “Better Regulation Guidelines”, may 19 2015. http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf

Typical efficiency analysis will include an examination of administrative and regulatory burden⁷⁴ and look at aspects of simplification – these are important for ALL evaluations, but particularly those identified under the REFIT programme. Where appropriate, evaluation findings should pin-point areas where there is potential to reduce inefficiencies particularly regulatory burden and simplify the intervention.

The full efforts to support and perform an intervention can be broken into different categories such as: staff, purchases made, time and/or money spent, fixed costs, running costs, etc. These costs can be associated to different aspects of an intervention and judged against the benefits achieved.

Good evaluations should make strong efforts to go beyond a qualitative description of the different costs and benefits of the EU intervention and seek to quantify them. While assessing costs and benefits may be (methodologically) easier for spending programmes, such assessment in policy areas may be a challenge since obtaining robust, good quality data is difficult, particularly across Member States which may have implemented legislation in a variety of different manners.

Typical examples of efficiency questions are the following:

- To what extent has the intervention been cost effective?
- To what extent are the costs involved justified, given the changes/effects which have been achieved?
- To what extent are the costs proportionate to the benefits achieved? What factors are influencing any particular discrepancies?
- What factors influenced the efficiency with which the achievements observed was attained?
- How affordable were the costs borne by different stakeholder groups, given the benefits they received?
- If there are significant differences in costs (or benefits) between Member States, what is causing them?

c) Relevance

The evaluation must look at the objectives of the EU intervention being evaluated and see how well they (still) match the (current) needs and problems. The answer to this question should identify if there is any mismatch between the objectives of the intervention and the (current) needs or problems. This is key information that will assist policy makers in deciding whether to continue, change or stop an intervention.

Relevance looks at the relationship between the needs and problems in society and the objectives of the intervention. Things change over time - certain objectives may be met or superseded; needs and problems change, new ones arise. Relevance analysis is very important – because if an intervention does not help to address present needs or problems then it does not matter how effective, efficient or coherent it is – it is no longer appropriate. This is why there is a strong link between relevance analysis and the criteria of EU added value – which assesses whether action continues to be justified at the EU level.

Typical examples of relevance questions

- To what extent is the intervention still relevant?
- To what extent have the (original) objectives proven to have been appropriate for the intervention in question?
- How well do the (original) objectives (still) correspond to the needs within the EU?
- How well adapted is the intervention to subsequent technological or scientific advances? (N.B. could include issues related to the specify policy here e.g. social, environmental)
- How relevant is the EU intervention to EU citizens?

d) Coherence: The evaluation should look at how well the intervention works: i) internally and ii) with other EU interventions.

The answer to this question should provide evidence of where and how EU interventions are working well together (e.g. to achieve common objectives or as complementary actions) or point to areas where there are tensions (e.g. objectives which are potentially contradictory, or approaches which are causing inefficiencies).

There are many different actors involved in many different interventions, both inside and outside the EU. Even small changes in how one intervention is designed or implemented can trigger improvements or inconsistencies with other on-going actions. The evaluation of coherence involves looking at how well or not different actions work together.

Checking internal coherence means looking at how the various internal components of an EU intervention operate together to achieve its objectives. Similar issues can arise externally at different levels: for example, between interventions within the same policy field (e.g. a specific intervention on drinking water and wider EU water policy) or in areas which may have to work together (e.g. water policy and chemicals policy, or chemicals and health and safety). At its widest, external coherence can look at compliance with international agreements/declarations (for example EU labour market initiatives might be looking into coherence with ILO conventions).

The focus on coherence may vary depending on the type of evaluation and is particularly important in Fitness Checks, where coherence analysis will look for evidence of synergies or inconsistencies between actions in a related field which are expected to work together. Even when evaluating an individual intervention, it can be important to check coherence with (a limited number of) other interventions.

Typical examples of coherence questions:

- To what extent is this intervention coherent with other interventions which have similar objectives?
- To what extent is the intervention coherent internally?
- To what extent is the intervention coherent with wider EU policy?
- To what extent is the intervention coherent with international obligations?

e) Added value

The evaluation should consider arguments about the value resulting from EU interventions that is additional to the value that would have resulted from interventions initiated at regional or national levels by both public authorities and the private sector.

The answer to this question should, where applicable, respond to the subsidiarity analysis conducted in any related IA. For spending programmes, EU added value may result from different factors e.g. co-ordination gains, improved legal certainty, greater effectiveness or complementarity. The analysis of EU added value is often limited to the qualitative, given the stated difficulties to identify a counter-factual.

EU-added value⁷⁶ looks for changes which it can reasonably be argued are due to EU intervention, rather than any other factors. In many ways, the evaluation of EU added value brings together the findings of the other criteria, presenting the arguments on causality and drawing conclusions, based on the evidence to hand, about the performance of the EU intervention and whether it is still justified.

The sources and nature of this additional value vary from intervention to intervention. It is, in particular, useful to distinguish the European added value of an EU policy measure in general (like an EU regulation to foster the single market) and that of an EU spending programme per se. In both cases, European added value may be the results of different factors: coordination gains, legal certainty, greater effectiveness, complementarities etc.

In all cases, measurement is a challenge and the final judgement on whether expected added value would justify an EU intervention is ultimately the result of a political process. In areas where the EU has exclusive competence, the appropriate answer to the question of EU added value may simply involve re-stating the reasons why the EU has exclusive

competence or may already be answered by the efficiency and effectiveness analysis. Sometimes it may be necessary to question if the assumption of exclusive competence still holds or whether the needs have changed (see also common tool on subsidiarity/EU added value). In such instances, the evaluation may focus more strongly on consideration of the relevance and efficiency of the intervention. Where there is little evidence of the EU added value of an intervention, consideration should be given to its repeal.

Typical examples of EU added value questions:

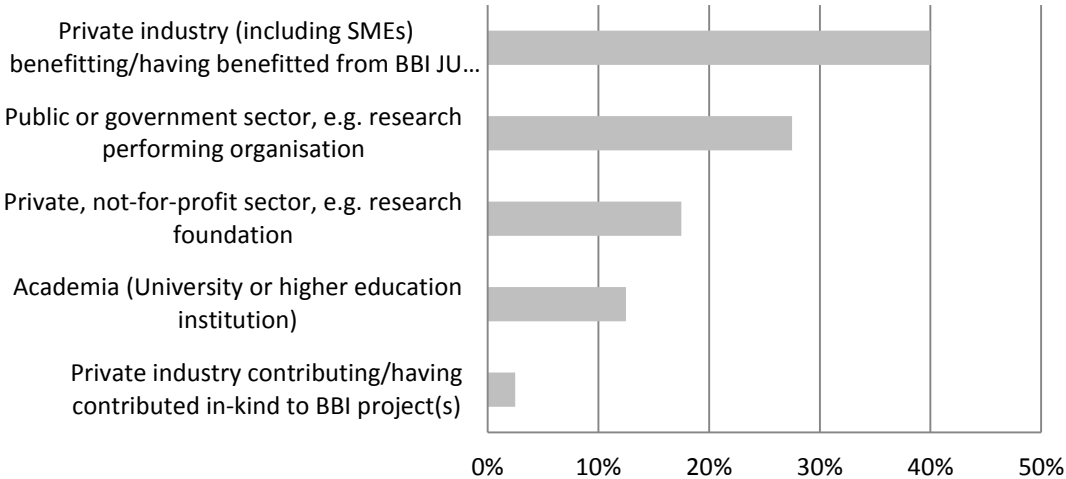
- What is the additional value resulting from the EU intervention(s), compared to what could be achieved by Member States at national and/or regional levels?
- To what extent do the issues addressed by the intervention continue to require action at EU level?
- What would be the most likely consequences of stopping or withdrawing the existing EU intervention?

ANNEX 4: PROJECT COORDINATOR QUESTIONNAIRE

a. Information on the respondents

The total number of respondents is 40. Most of them are private industry (including SMEs) (40%), followed of public bodies (27.5%), Private, not-for-profit sector (17.5%) and academia (12.5%). Among them, 72.5 % are BIC members.

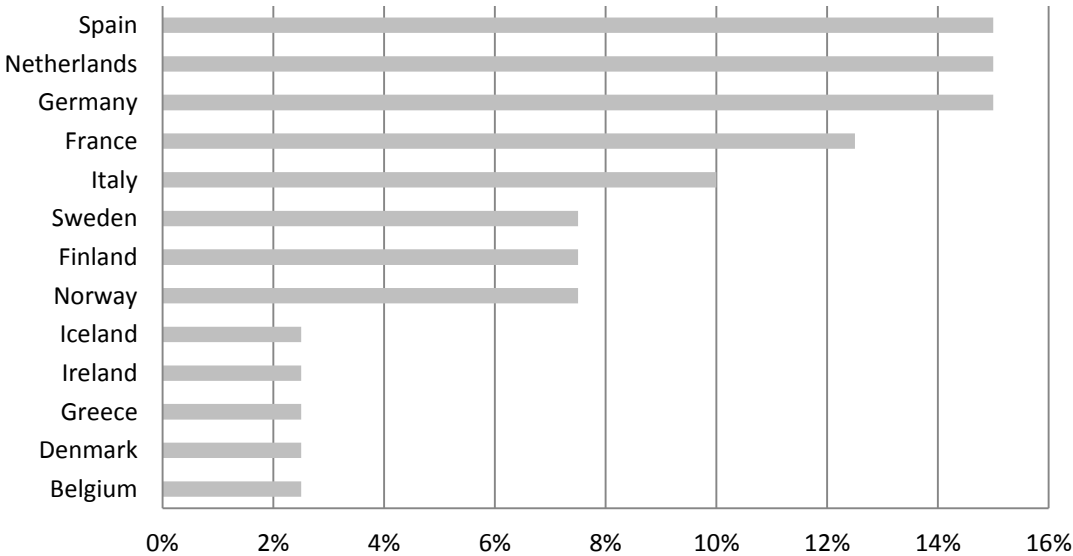
Chart: Coordinators' type of organization



The most important channels for information on BBI opportunities were reported to be: European Commission website (indicated by 60% of the respondents), BIC (40%), EU/BBI info days (32.5%), NCP (32.5%), among others.

The answers indicate that most of the researcher teams are based in Germany (15%), Netherlands (15%), Spain (15%), France (12.5%) and Italy (10%).

Chart: Countries where the research team is located as reported by Coordinators.

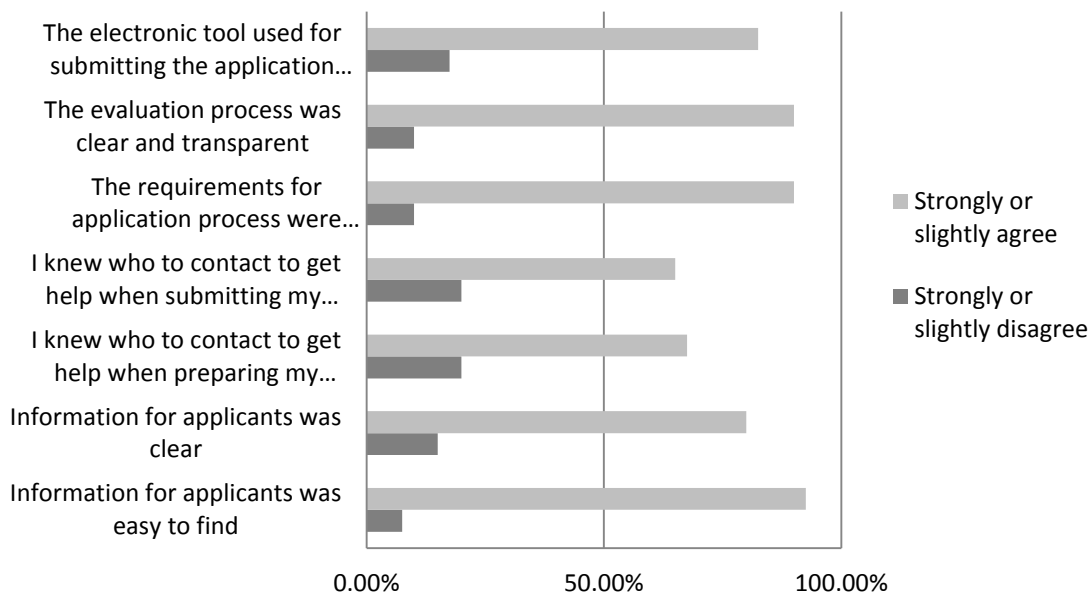


b. Application process

The overall satisfaction with the overall application process is very high, with 92% reporting satisfaction with the clarity of the information and the transparency of the evaluation process

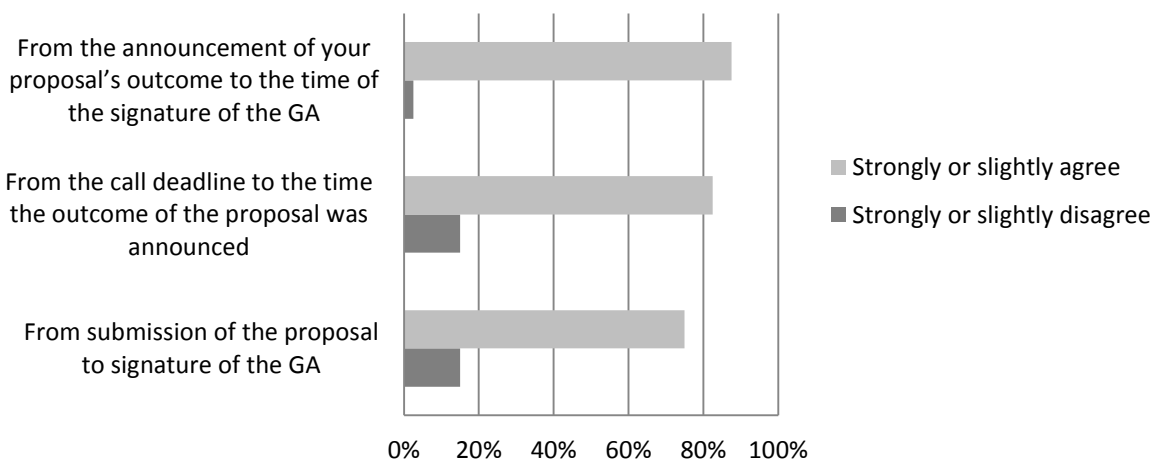
The respondents report that they agree that the information is easy to find (92%) and clear (80%); that the requirements for application process were reasonable and proportionate (90%); the evaluation process was clear and transparent (90%) and the IT tools friendly (82%). 67.5 % of them indicate they knew how to contact when preparing and submitting the application.

Chart: Coordinators satisfaction with the application process



The timelines of the processes were very positively assessed: 82.5 % agree with the time period from the call deadline to the time the outcome of the proposal was announced to you; 87.5% are satisfied with the time period from the announcement of your proposal's outcome to the time you signed the grant agreement and 75% agree with overall time period from submission of the proposal to signature of the grant agreement.

Chart: Satisfaction with the timing of the processes

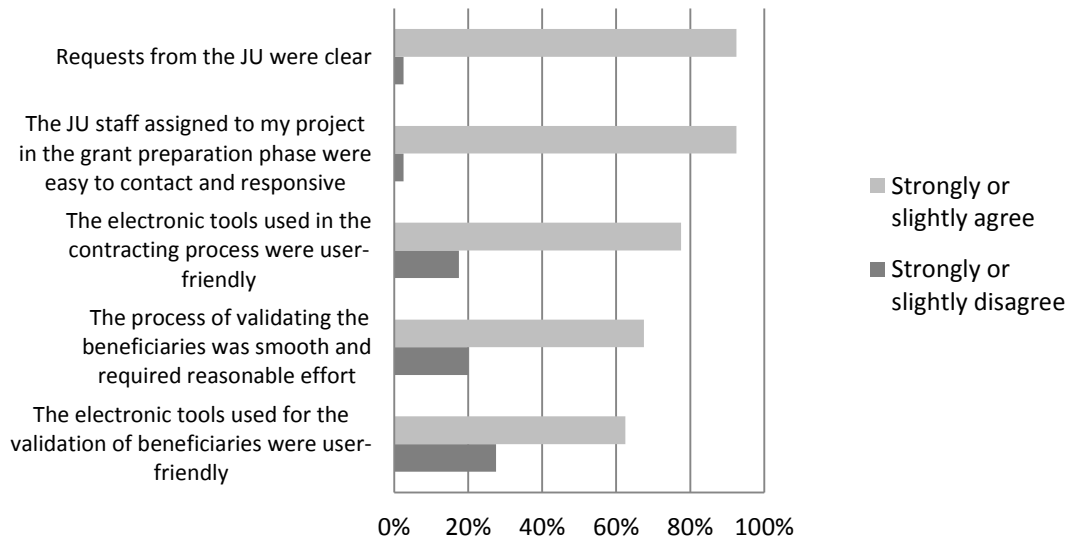


c. Grant Finalization Phase

The satisfaction of the coordinators with the BBI staff and processes during the GAP phase is very high, being 93% of them satisfied with the BBI JU staff and the clarity of the BBI JU requests

The respondents agree that the BBI JU staff assigned to the project in the grant preparation phase were easy to contact and responsive (92.5%), their requests were clear (92.5%), the electronic tools were friendly (77.5%) and the process of validating the beneficiaries was smooth (67.5%).

Graph: Satisfaction with the Grant Preparation Phase



d. Communication and interaction

The respondents are very satisfied with the communication and interaction with the BBI.

The respondents found very useful or useful the communication through email (95%), the telephone contact (70%), and the information available at the website (72.5%) and the face-to-face contact (62.5%).

The respondents consider very important/slightly important the following aspects when dealing with the BBI JU: Clarity about the JU's procedures (75%/25%), Accessibility and clarity of information provided by the JU (77.5%/22.5%), The JU's willingness to help you and provide personal attention (72.5%/ 20%), The willingness to help, courtesy and cooperation of the JU's employees (75%/17.5%) and the JU's ability to perform the service promptly, accurately and transparently (62.5%/37.5%).

77.5 % of the respondents would definitely consider applying again for a BBI JU grant and 22.5% would possibly do it.

e. Overall performance of the BBI JU

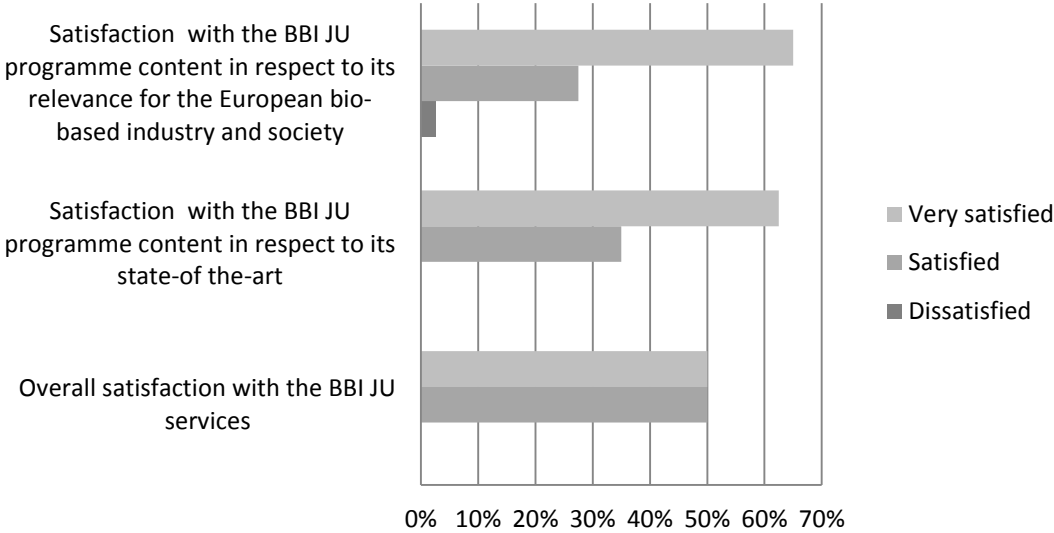
The overall satisfaction of the coordinators with the BBI is 100%, being 50% of them very satisfied and 50% satisfied

f. Level of satisfaction with the content of the programme

The satisfaction of the respondents with the BBI JU programme content in respect to its relevance for the European bio-based industry and society is 97%: 67.5 % of the coordinators report to be very satisfied or 27.5% satisfied.

In response to the question *How satisfied are you with the BBI JU programme content in respect to its state-of the-art?*, 62.5 % indicated they were very satisfied and 35% slightly satisfied.

Chart: Overall satisfaction with the BBI JU



ANNEX 5: PUBLIC CONSULTATION QUESTIONNAIRE

All 144 respondents answered Questions E1-E3 relating to the application process despite many not actually applying for funding resulting in artificially low agreement rates. Response rates from the 95 who made an application give a more accurate response to the process.

The responses summarized (those applicants and non-applicants responded in similar proportion so are not broken out separately):

Level 1 KPIs

Do you consider that BBI JU contributes to economic growth and job creation in the EU?

- 87.5% strongly agree/agree

Do you consider that the BBI JU contributes to the transition from a fossil- based to a bio-based economy?

- 93% strongly agree/agree

Do you think that the BBI JU contributes to the climate change mitigation by reducing the CO₂ derived from the use of fossil-based products?

- 91% strongly agree/agree

Do you think that the BBI JU contributes to a more sustainable and efficient use of resources, including the recycling, reuse and valorisation of organic residues?

- 92% strongly agree/agree

Do you think that the BBI JU contributes to the strengthening of a circular economy in Europe?

- 92% strongly agree/agree

Website, management and organisation of the BBI JU

Do you consider that the BBI JU website provides the general public and potential participants with easy access to information?

The BBI JU website provides easy and effective access to information to the public

- 78% strongly agree/agree

The BBI JU website provides easily accessible and sufficient information about its funded projects

- 74% strongly agree/agree

The BBI JU website provides effective access to information and sufficient guidance to interested organisations facilitating their participation in proposals

- 65% strongly agree/agree

Do you consider that the BBI JU encourages the participation of SMEs?

- 75% strongly agree/agree

Do you consider that the current way of defining topics for the calls of proposals is open and inclusive?

- 63% strongly agree/agree

Do you consider that BBI JU organises a sound and fair proposal evaluation system based on both scientific and technological excellence and industrial relevance?

- 51% strongly agree/agree
- 43% no opinion/no answer
- 6% strongly disagree/disagree

Do you consider that the communication of the evaluation results and the feedback provided to the applicants is effective and meaningful?

- 52% strongly agree/agree
- 42% no opinion / no answer
- 6% disagree (no strongly disagree responses)

Level 1 KPIs

The scientific priorities addressed by the BBI JU are set in Strategic Innovation and Research Agenda (SIRA). Is this document optimal for defining the scope of research and innovation followed by the BBI JU?

- 76% strongly agree/agree

In your view how effective has BBI JU been in terms of:

Supporting the development and implementation of pre-competitive research and of innovation activities of strategic importance to the Unions in the Bioeconomy sector

- 49% very effective
- 36% somewhat effective
- 3% not at all effective
- 12% no opinion/no answer

Increasing the number of new cross-sector interconnections in BBI projects

- 52% very effective
- 33% somewhat effective
- 1% not at all effective
- 11% no opinion/no answer (only 141 responses?)

Developing new bio-based value chains

- 59% very effective
- 32% somewhat effective

Developing new bio-based building blocks

- 49% very effective
- 32% somewhat effective
- 1% not at all effective
- 17% no opinion/no answer

Developing the bio-based materials

- 53% very effective
- 28% somewhat effective

Developing new bio-based consumer products

- 35% very effective
- 45% somewhat effective

Increasing the numbers of flagship biorefinery plants started based on BBI demonstration projects

- 45% very effective
- 26% somewhat effective
- 5% not at all effective
- 23% no opinion/no answer

Developing necessary technologies to fill in the gap in the bio-based value chains

- 44% very effective
- 33% somewhat effective

Which would you consider as major benefits of participating in a BBI JU project?

Direct financial support for innovative research and development

- 95% strongly agree/agree

Greater visibility across Europe/Reputation

- 86% strongly agree/agree

Greater understanding of the bio-based products development process

- 88% strongly agree/agree

Enhanced access to new markets, business opportunities and funding sources

- 83% strongly agree/agree

Inclusion in open innovation networks, with direct contact to leading researchers in universities and the industry

- 88% strongly agree/agree

Do you consider that BBI JU projects have resulted in specific scientific and/or technological successes?

- 73% yes
- 21% no
- 6% no answer

To what extent are the activities of the BBI JU coherent with other activities of the Horizon 2020 programme?

- 40% very coherent
- 35% somewhat coherent
- 1% not at all coherent
- 25% no opinion/no answer

Application process and budget

All 144 respondents answered Questions E1-E3, with the results shown in Response rates per question spreadsheet supplied – these results include those who did not actually apply for funding, therefore give artificially low agreement rates. Response rates from the 95 who made an application give a more accurate response to the process.

When you applied for funding from the BBI JU, did you think that the application procedure was straightforward and simple?

ALL respondents:

- 51% strongly agree/agree
- 8% strongly disagree/disagree
- 3% no opinion
- 38% no answer

APPLICANT ONLY responses:

- 78% strongly agree/agree
- 13% strongly disagree/disagree

When you applied for funding, was the administrative burden for preparing the proposal within acceptable limits?

ALL respondents:

- 50% strongly agree/agree
- 10% strongly disagree/disagree

APPLICANT ONLY responses:

- 75% strongly agree/agree
- 16% strongly disagree/disagree

Can you make any suggestions for improvements or simplifications to the application procedure?

ALL respondents:

- 14% yes
- 44% no
- 42% no answer

APPLICANT ONLY responses:

- 21% yes
- 66% no
- 13% no answer

You consider that the BBI JU overall budget (public and private) in relation to its objectives and expected outcomes is:

- 56% appropriate
- 26% too low and therefore should be increased
- 1% too high and therefore it should be partly used for other types of research and innovation actions in this area
- 20% no opinion
- 5% no answer

ANNEX 6: LIST OF INTERVIEWS WITH BBI JU STAKEHOLDERS

Kevin O'Connor, Chair of the BBI JU Scientific Committee

John Bell, Director Bioeconomy, DG RTD/F, European Commission

Peter Dröll, Director, Industrial Technologies, DG RTD/D, European Commission

Jose Manuel Gonzalez Vicente, Chair of the BBI JU States Representative Group

Philippe Mengal, Executive Director of BBI JU

Pilar Llorente Ruiz De Azua, Project Officer BBI JU

Dieter Brigitta, Project Manager, BBI JU

Marcel Wubbolts, BIC, former Chair of BBI JU Governing Board

Waldemar Kütt, Head of Unit Strategy, Bioeconomy Directorate, DG RTD/F, European Commission

Barend Verachtert, Head of Unit Agro-food Chain, Bioeconomy Directorate, DG RTD/F, European Commission

Dirk Carrez, Executive Director of BIC

Carmen de Vicente, Research Programme Officer, Industrial Technologies, DG RTD/D, European Commission

Lieve Hoflack, Project Coordinator, BBI-RIA Project CARBOSURF

Stefania Pescarolo, Project Coordinator, BBI-Flagship Project BIOSKOH

Peter Röger, Project Coordinator, BBI-RIA Project VALCHEM

Javier Brañas Lasala and Antonio Moran, Project Coordinator, BBI-RIA Project NewFert

Hans Henrik Øvrebø and Jarle Wikeby, Project Coordinator, BBI-Flagship Project EXILVA

Cecilia Giardi, Project Coordinator, BBI-Flagship Project FIRST2RUN

Gerald van Engelen, Project Coordinator, BBI-DEMO Project PULP2VALUE

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The Council Regulation (EU) No 560/2014 establishing the Bio-based Industries Joint Undertaking stipulates in Art.11(1) that by 30 June 2017 the Commission shall conduct an interim evaluation of the BBI JU with the assistance of independent experts.

The current interim evaluation of the operation of the BBI JU covers the period from July 2014 to 31 December 2016. Its main objective is to assess the performance of the BBI JU and its progress towards the objectives set out in the Council Regulation (EU) No 560/2014.

The evaluation was carried out by a Commission Expert Group registered in the EC Register of Expert Groups under Nr E03456, from November 2016 to June 2017.

Le règlement du Conseil (UE) N° 560/2014 portant établissement de l'entreprise commune Bio-industries stipule au paragraphe 1 de l'Article 11 que la Commission procède, avec l'aide d'experts indépendants, à une évaluation intermédiaire de l'entreprise commune BBI au plus tard le 30 juin 2017.

L'évaluation intermédiaire actuelle du fonctionnement de l'entreprise commune BBI couvre la période allant de juillet 2014 au 31 décembre 2016. Son principal objectif est d'évaluer la performance de l'entreprise commune BBI et ses progrès vers les objectifs énoncés dans le règlement du Conseil (UE) N° 560/2014.

L'évaluation a été effectuée par un 'Groupe d'Experts de la Commission' enregistré dans le registre des groupes d'experts de la CE sous le N° E03456, de novembre 2016 à juin 2017.

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