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Synthesis report on performance and coverage assessment of existing CE R&I programs

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Summary

This report's objective is to summarize the analyses CICERONE Task 1.4 partners have conducted on existing circular economy research and innovation funding programmes in EU.There are two major trajectories of the analyses: one builds on Deliverable D1.2 and further assesses the funding scope coverage of existing programmes in analogy with the development of the SRIA; the 2nd investigates the operational aspects of CE funding programmes and aims to understand what the key success factors may be.Based on a data validation step ensuring a correct interpretation and consolidation of inputs, the current CE funding programmes are mapped according to the type of activities they fund and per priority themes.The innovation stage and the addressed product life cycle phases are parameters used for detailing this distribution of current CE programmes.An understanding of the influence of programmes not focusing on specific priority themes and indications on current clustering tendencies are also included in this coverage analysis.In order to identify key success factors in the operations of a CE funding programme, including how a programme is defined, how projects are recruited and selected, how projects are monitored and evaluated and how the programme fosters collaboration, a case study approach based on interviews is used.Once representative case programmes are selected, interviews are conducted with the programme owner at the agenda-setting and executional levels, and with project beneficiary.Results of the coverage analysis allowed to show that some trends highlighted in D1.2 are subject to alteration when using a priority theme perspective.It also allowed to reflect the influence of funding programmes with no major focus on those trends and detect current priority themes clustering tendencies.The case studies showed that implementing collaboration requirements during the selection phase is key.While some case studies demonstrated that current CE funding programmes are already integrating CE-related indicators, developing, at programme level, quantitative CE indicators specific for several projects remains a challenge.Due to their long-term impacts, the performance of CE funding programmes is currently evaluated with difficulty.The learnings of this report can be shared with CICERONE stakeholders, in particular programme owners.They can also be used for identifying some gaps with future SRIA objectives and in the design of pilot joint programmes by T2.1 partners.

Approval

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D1.5 Synthesis report on assessment of existing CE R&I programs

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EXECUTIVE SUMMARY

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There are two major trajectories of the analyses: one builds on the CICERONE Deliverable D1.2 and further assesses the funding scope coverage of existing programmes in analogy with the development of the SRIA; the other investigates the operational aspects of CE funding programmes and aims to understand what the key success factors may be.

Based on a data validation step ensuring a correct interpretation and consolidation of inputs, the current CE funding programmes are mapped according to the type of activities they fund and per priority themes. The innovation stage and the addressed product life cycle phases are parameters used for detailing this distribution of current CE programmes. An understanding of the influence of programmes not focusing on specific priority themes and indications on current clustering tendencies are also included in this coverage analysis.

In order to identify key success factors in the operations of a CE funding programme, including how a programme is defined, how projects are recruited and selected, how projects are monitored and evaluated and how the programme fosters collaboration, a case study approach based on interviews is used. Once representative case programmes are selected, interviews are conducted with the programme owner at the agenda-setting level, executional level, and with project beneficiary.

Results of the coverage analysis allowed to show that some trends highlighted in D1.2 are subject to alteration when using a priority theme perspective. It also allowed to reflect the influence of funding programmes with no major focus on those trends and detect current priority themes clustering tendencies.

The findings and learnings from the case studies showed that implementing collaboration requirements during the selection phase is key. While some case studies demonstrated that current CE funding programmes are already integrating CE-related indicators, developing, at programme level, quantitative CE indicators specific for several projects remains a challenge. Due to their long-term impacts, the performance of CE funding programmes is thus currently evaluated with difficulty.

The learnings of this report can be shared with CICERONE stakeholders, in particular programme owners. They can also be used for identifying some gaps with future SRIA objectives and in the design of pilot joint programmes in CICERONE by T2.1 partners.

KEYWORDS

Circular economy, programme owners, SRIA, coverage analysis, performance, success factors, priority themes, interviews

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1 INTRODUCTION

The objective of this report is to summarize the analyses CICERONE Task 1.4 partners have conducted on existing circular economy research and innovation funding programmes in EU. There are two major trajectories of the analyses: one builds on the CICERONE Deliverable D1.2: "Report on the state of the art of R&I funding and legal mechanisms for CE in European countries and regions" (D1.2) and further assesses the funding scope coverage of existing programmes, which can be used for comparison with the SRIA being developed in WP2; the other looks into the operational aspects of CE funding programmes and aims to understand what the key success factors may be.

The analyses were performed jointly with PNO, ENEA, UM and GKZ, and coordinated by VITO. The approach and output were defined in close consultation with IVL and CEA, to ensure usefulness for the SRIA and consistency with the overall methodology.

2 DATA COLLECTION AND VALIDATION

2.1 Scope and approach

The task started with collecting data from existing circular economy research and innovation funding programmes in EU. Transnational, national, regional and private programmes in the EU 28 Member States as well as Switzerland and Norway, are considered.

The data collection process took place between January and March 2019, coordinated by CICERONE Task 1.1: "State of the art & common understanding of the Circular Economy" (T1.1). Data input was provided by 10 CICERONE partners. Each of the 10 partners was assigned one or several countries (Table 1). The partners were asked to identify up to 5 most important circular economy funding programmes per country. A challenge was that many programmes may fund circular economy activities, but are not necessarily named as such, or the funding scope may not be limited to circular economy. Here we rely on the insights and judgement of the CICERONE partners. Furthermore, the rationale behind the programme selection was captured during the data validation step (see 2.3).

Table 1 Data input partners and country assignment

CICERONE partner	Assigned countries for data collection
CEA	FR, ES, PT
ENEA	IT, Eastern Mediterranean
IETU	Central and Eastern Europe
IVL	SE, NO, DK
JULICH	DE, UK, IE, CH, AT
TNO	NL
VITO	BE, LU
VTT	FI, Baltic States
PNO	European level

An Excel questionnaire with data requirements (see 2.2) was distributed to the 10 partners. The partners were instructed to fill in the template to the best of their knowledge, and consult the programme owners on some specified questions and when needed (e.g. questions to which the partner does not know the answer).

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Data inputs on a total of 108 programmes[1] were received.

2.2 Data requirements

Data requirements for Task 1.4 were compiled by VITO, with inputs from all other Task 1.4 partners and CEA. The final questionnaire (see APPENDIX 1) consists of 16 questions, balancing between the data "wish list" and the length of the questionnaire[2]. The questions can be divided into three parts:

1. General profile of the programme. Including programme name, level (transnational, national, regional, private), country, programme owner and contact person, website, budget size, number of projects funded, duration of funded projects and programme, and example projects.
2. Scope focus of the programme. Including resource flows (plastic, food, chemicals, etc.), product life cycle phases (design, manufacture, use, second-life, end-of-life), funded activities (science, technology, business model, policy, etc.), sectors, TRL level, beneficiary types.
3. Performance of the programme, as screening questions for the case selection. KPIs, targets and actuals, willingness to participate in the case study, joint funding.

2.3 Data validation

As mentioned in section 2.2[3], data requirements were expressed by VITO during the development of the questionnaire. In close collaboration with T1.1 partners, the questionnaire resulted in a combination of open and closed questions. Indeed, for some specific questions a predefined list of possible answers was provided to the respondents, see Figure 1 as an illustration.

[1] 104 CE Funding programmes were described in D1.2. Data inputs have later been received for Eastern Mediterranean countries at EU Level: Continental Greece OP – Greece; Interreg Mediterranean - Greece, Croatia, Cyprus, France, Italy, Malta, Portugal, Slovenia, Spain, UK; Interreg V-A – Italy, Croatia; Interreg V-A – Italy, Slovenia.

[2] Those data requirements relate to the cluster "Funding of CE" described in more details in D1.2 (Section 1.2): The complex "Funding for CE" comprises 16 questions and asks for max. five programmes of the most important CE (framework) funding programmes in the various countries to be described in detail along these questions. The cluster is a mixture of open and closed questions.

[3] Also described in D1.2 (Section 1.2).

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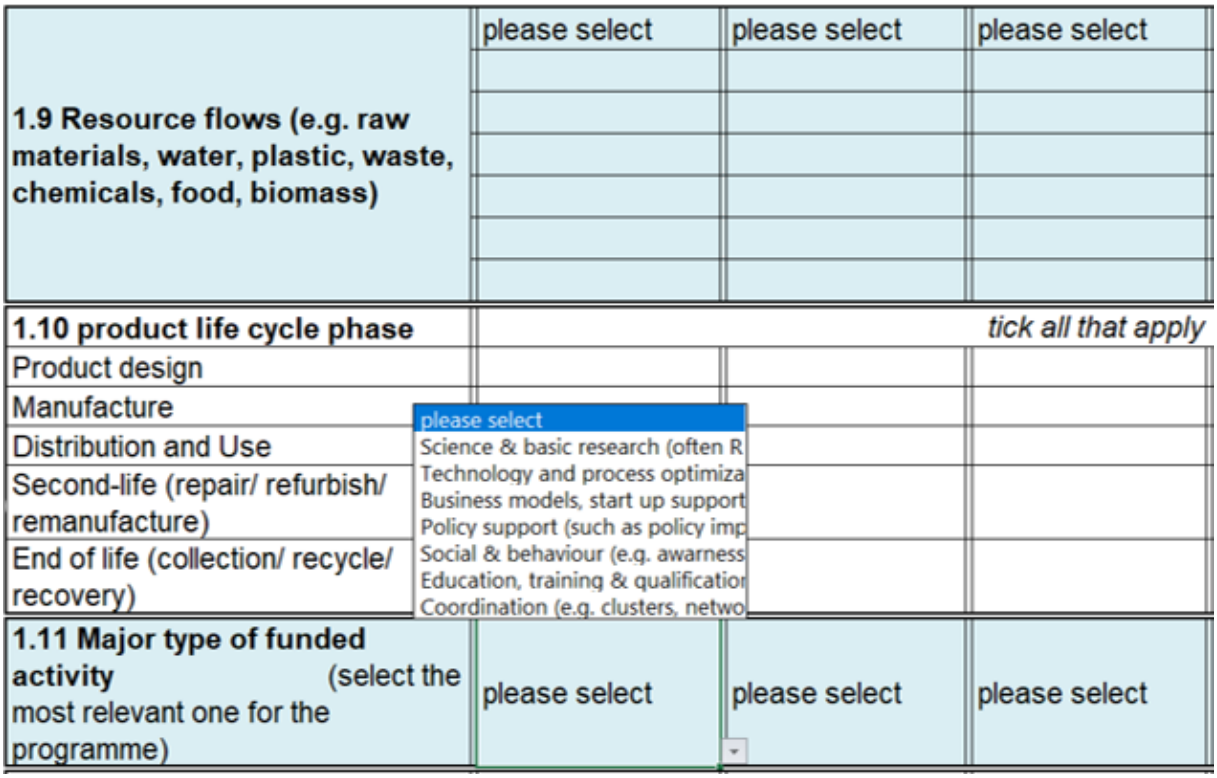

Figure 1 Predefined possible answers for question 1.11 of the distributed questionnaire

In D1.2 (see D1.2, Section 2), T1.1 presented the survey results along the individual questions of this questionnaire. For the analysis of those individual questions, some challenges with regards to the data inputs were faced and described to readers.

In some cases, respondents did not answer all questions. Some cells were left blanks. T1.1 thus mentioned under each figure the number of valid cases and number of missing cases, e.g. see Figure 2.

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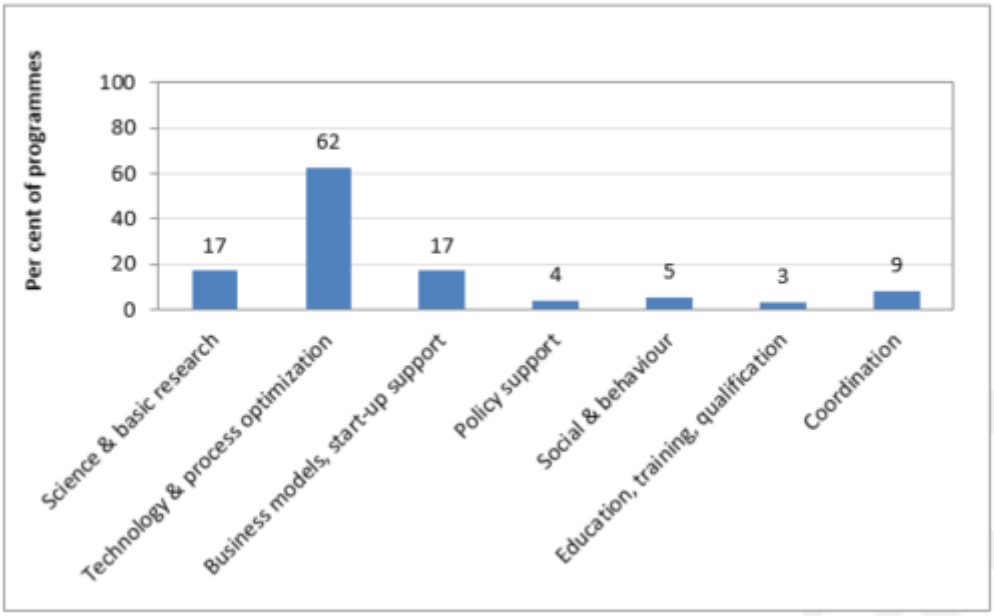
Figure 7: Focus of funding, by activities (in per cent)



valid cases : 93 programmes; missing cases: 11 programmes

Figure 2 Analysis of question 1.11 in D1.2 reflecting a certain number of programmes with non-available answers

In addition to missing answers, an additional challenge faced by T1.1 was related to the format of the questionnaire itself. As expressed in D1.2, for some questions respondents modified the format of the closed questions to provide multiple choices, e.g. some respondents indicated that some programmes may cover several TRL types (CZ, DK, NO, UK) while only one option was provided.

To understand the rationale of programme selection, ensure correct interpretation of the input data, fill in remaining blank fields if possible, and capture insights which can be valuable but may not fit into the questionnaire template, it has been judged essential to conduct 1-to-1 phone calls with CICERONE partners responsible of the assigned countries (see Table 1).

VITO has thus scheduled and conducted those interviews from M6 to M8. The main insights and updates of data inputs are the following:

- For partners assigned to fill in a questionnaire for a country in which they are based, information was more easily accessible and for some, the questionnaire was filled based on their own knowledge. Indeed, some partners are directly involved/play a significant role in some of those programmes. In other cases, mostly desktop research has been performed. Some partners have contacted PO for filling the questionnaire and/or validating some data.
- A challenge faced by respondents relates to the share of the programme allocated to Circular Economy (CE). Some programmes listed by respondents are not only focusing on CE. Information related to the budget specifically allocated to CE was for instance not always easily accessible.
- Respondents indicated that, especially for recent programmes, the number of funded projects, or their duration was not available yet. The same reasoning applies to the example of projects.
- Questions related to the resource flows addressed by the programme was expressed, during the phone calls, by some respondents as a delicate question to answer. 10 response categories were provided to respondents (minerals, metals, biomass, water, plastic, chemicals, food, C&D, waste, others). However only seven cells were provided for respondents for selecting the resources flows addressed by the programme. The phone calls with partners thus allowed to

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interpret the different answers. Some partners modified the format of the questionnaire itself in order to add more than seven answers. When there were no specific focus and that all proposed resources flows could be addressed by the programme, some partners selected 6 options and indicated "Others" as the last answer. For some others, when selecting "Others", they referred to electronic waste or sustainable society for instance, as they considered that proposed options were not applicable. Thus, interviews allowed to interpret the meaning of "Others".

- Phone calls ensured to validate with partners that non-ticked boxes were left blanks on purpose and that the programme principally addresses only ticked life cycle phases.
- For some partners, the question related to addressed industrials sectors was left blank, not because of lack of information but mainly because the programme does not have a specific sectoral focus.
- For some partners, answering the question related to the main type of funded activity was conflicting. Based on insights from performed studies, they expressed that CE programmes are a combination of funded activities. It is why the format of the questionnaire itself was modified to provide multiple answers.
- As mentioned above and described in D1.2, some partners interpreted the question related to the innovation stage as a multiple-choice question. Based on phone calls with partners, it is the parameter which has been the most subject to alteration. Indeed, most partners selected the "most" relevant innovation stage as indicated in the questionnaire. However, most partners expressed that in reality the innovation stage corresponds more to a range (e.g. from Lab Demonstration (TRL 3-4) to Market Introduction (TRL 7-8)) rather than one specific innovation stage. The input data have thus been updated accordingly.

Those phone calls thus allowed to interpret and update relevant data inputs, analysed in D1.2 and providing the basis of the coverage analysis (see Section 3).

3 COVERAGE ANALYSIS

3.1 Objective

The objective of the coverage analysis is to assess the funding scope coverage of existing programmes for CE in analogy with the development of the SRIA.

Key elements for the development of the SRIA

As reminded in CICERONE Deliverable D1.4: "Framework for a circular economy strategic planning" (D1.4) which aimed at developing a framework for a circular economy strategic planning, a strategic research and innovation agenda is primarily about identifying and prioritizing "areas" where specific R&D efforts need to be developed. A reminder of CICERONE concept with **themes** and **challenges** is shown in Figure 3.

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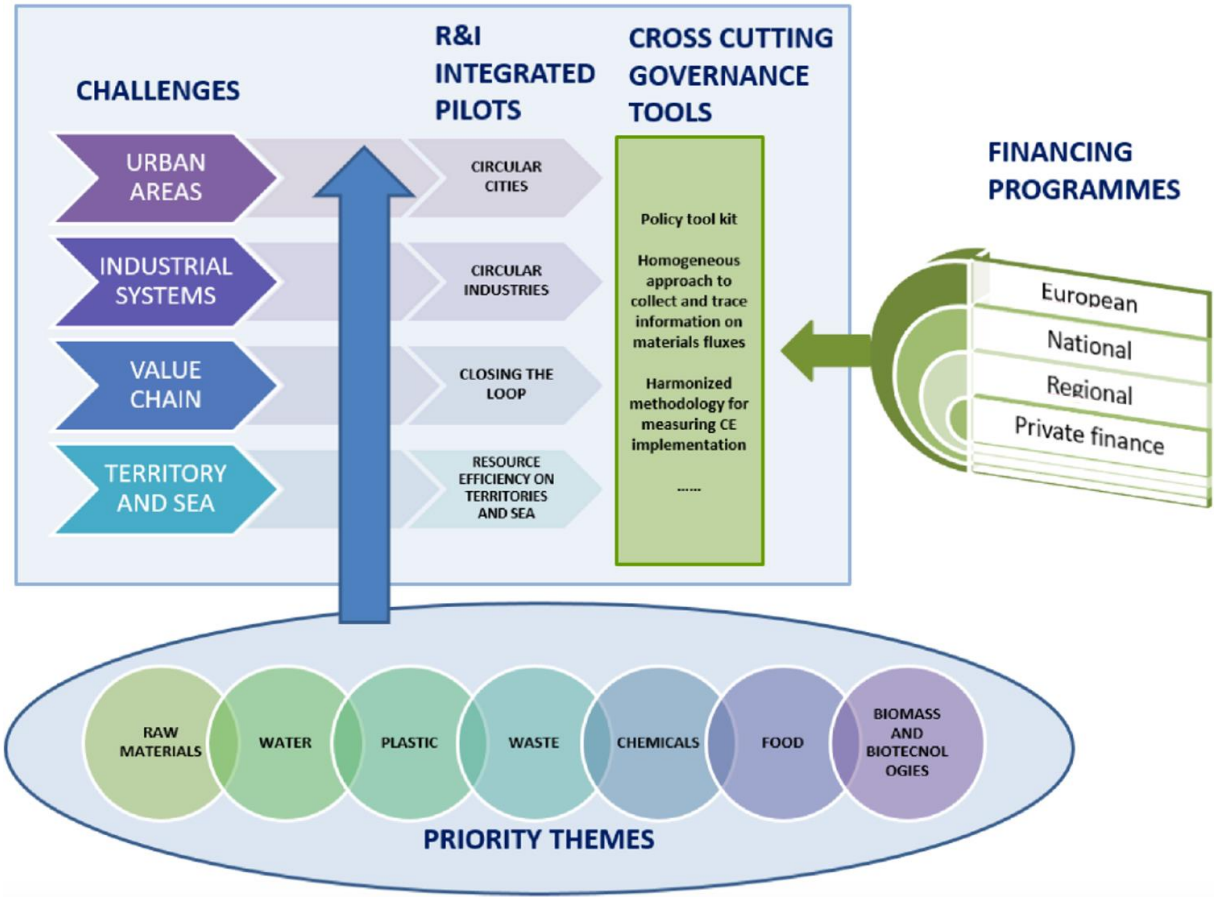

Figure 3 Reminder of CICERONE concept with themes and challenges

As reflected in Figure 3, for all challenge groups (Urban areas, Industrial systems, Value chain and Territory and Sea), it is essential to take all priority themes into consideration because these are composed of complex and interlinked systems and sub-systems.

The synthesis of D1.4 (see D1.4, section 3.3) explained that "the structuration of the CICERONE SRIA will take into account the need that all roadmaps integrate into a coordinated scheme, clearly highlighting links between themes and challenges' roadmaps as well opportunities for Innovation Fields to be part of an integrated pilot or joint programming initiative" and has been conceptualized in Figure 4 below (see D1.4, Figure 25).

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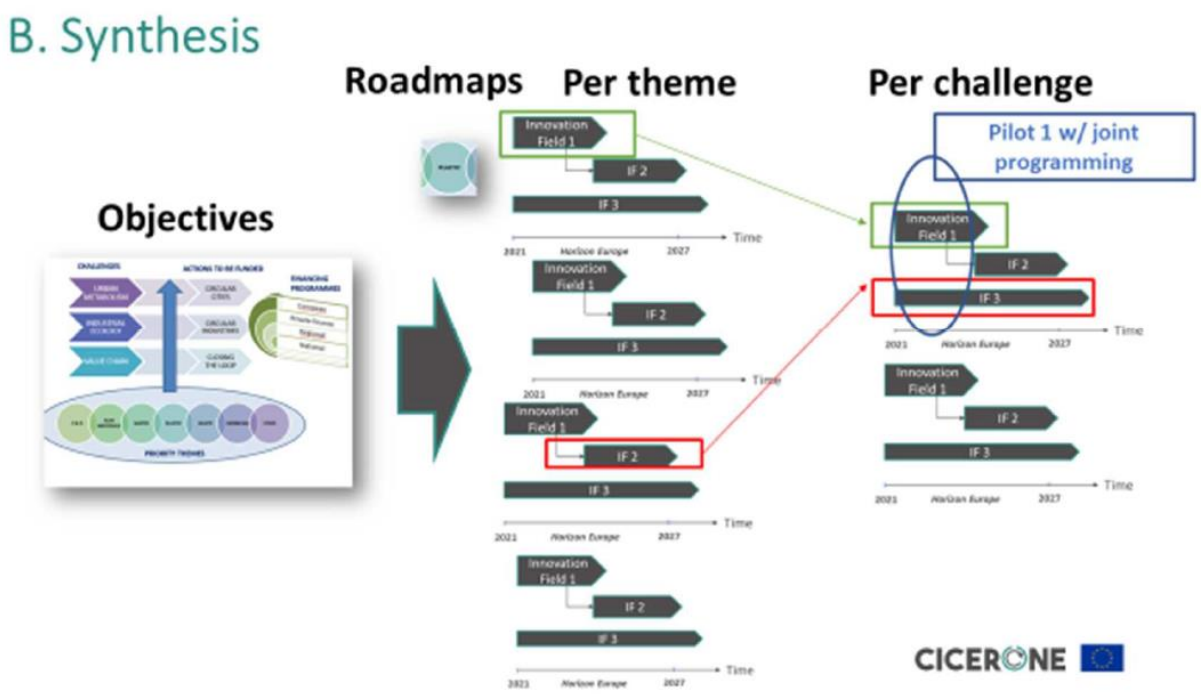

Figure 4 Final integration of roadmaps and related Innovation Fields into pilots, described in D1.4

Still according the developed framework (D1.4) and shown as a first step in Figure 4, T2.1 partners will, based on an in-depth review of relevant sources, identify circular economy objectives applying to each of the challenges and themes. Those objectives will address all **aspects of circular economy** (eco-design, repair, re-use and recycling, sharing economy, material substitution, industrial symbiosis…) as well as all **dimensions** (see D1.4, section 2.3):

- Science & Technology, such as eco-design, recycling processes, ecotoxicology or humanities…
- Business & Innovation, such as circular business models, eco-systemic cooperation…
- Human Being & Society, such as behavioural change or consumption patterns…
- Policy & Finance, such as public procurement, regulations, incentives, standardisation…
- Environmental responsibility, such as corporate social responsibility…
- Education & Training, such as long-life learning or public awareness…

Defined by T1.3 and implemented by T2.1, before being integrated, Innovation Fields will then be prioritized. For that, each priority theme will be plotted with regards to two axes: Circular Impacts and **Innovation Readiness**. An illustration for the Food priority theme is shown in Figure 5.

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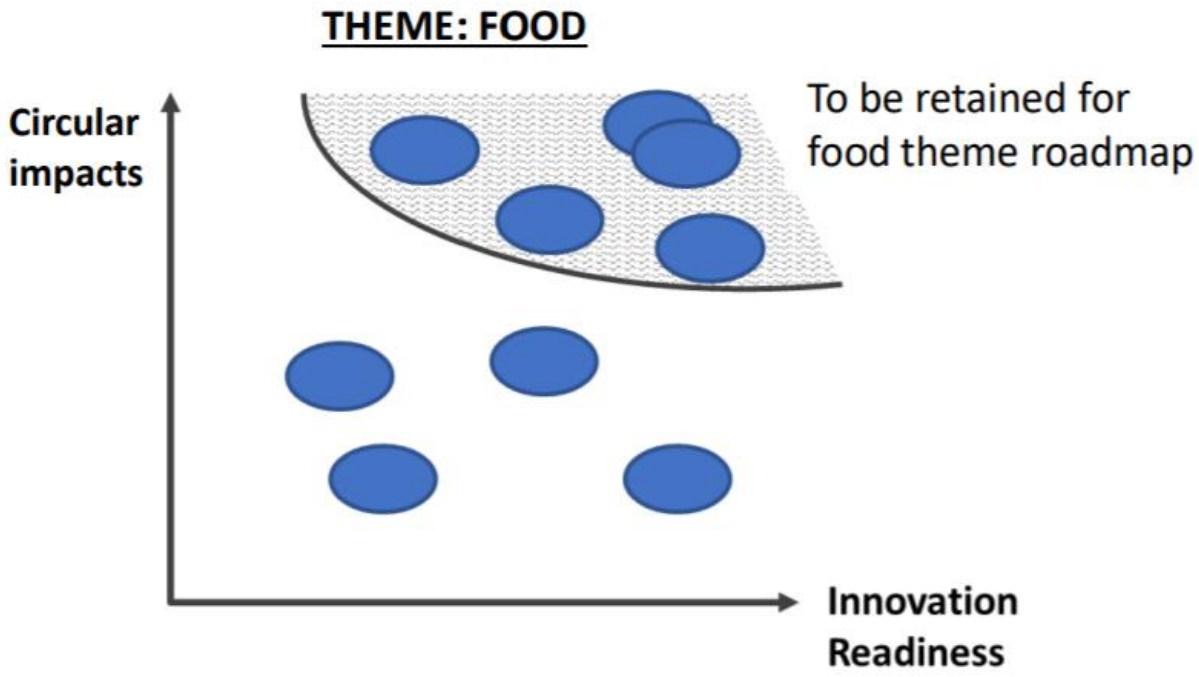

Figure 5 Innovation Field prioritisation process, described in D1.4 (subject to alteration in T2.1)

Linking those key elements to the survey results

Key elements for the development of the SRIA have thus been highlighted in the description of the generic framework (D1.4). In order to assess existing funding programmes in function of those key parameters, their correspondence with the individual survey results analysed in D1.2 is shown in the Table 2.

Necessary parameter for the development of the SRIA (D1.4)	**Relevant corresponding survey result (D1.2)**	**Comment**
Priority themes	1.9 Addressed resources flows	The only discrepancy between the priority themes and the questions related to addressed resources flows refer to the notions of "raw materials" (priority themes) versus "metal" and "mineral" (addressed resource flows)
Aspects of circular economy (eco-design, repair, re-use and recycling, sharing economy, material substitution, industrial symbiosis…)	1.10 Product life cycle phase	While additional notions are included when referring to aspects of circular economy, the survey results to the question 1.10 describe the life cycle phases addressed by the funding programmes
Dimensions (Science & Technology, Business & Innovation, Human Being & Society, Policy & Finance,	1.11 Major type of funded activity	While in the survey, the notion of "Science & Technology" has been divided in "Science & Basic Research" and

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Environmental responsibility, Education & Training		"Technology and process optimisation" and that "Environmental Responsibility" is not proposed, the listed type of funded activities correspond to the mentioned dimensions
Innovation readiness (Research doability, Business readiness, Legal applicability, HR doability, Social acceptability)	1.13 Relevant innovation stage	While results to the question 1.13 only refer to the TRL, at least one aspect of the Innovation Readiness notion is addressed

Table 2 Correspondence between key elements for the development of the SRIA and individual survey results

Those corresponding relevant survey results have individually been analysed for current funding for CE in D1.2. They refer to answers to questions 1.9 Resource flows, 1.10 Product life cycle phase, 1.11 Major type of funded activity, 1.13 Innovation stage, of the questionnaire distributed to partners (see Appendix 1). The individual analysis of those parameters was described (see D1.2, respectively Sections 2.7, 2.8, 2.9 and 2.11) and is shown again respectively in Figure 6, Figure 7, Figure 8 and Figure 9, and use as inputs for the coverage analysis.

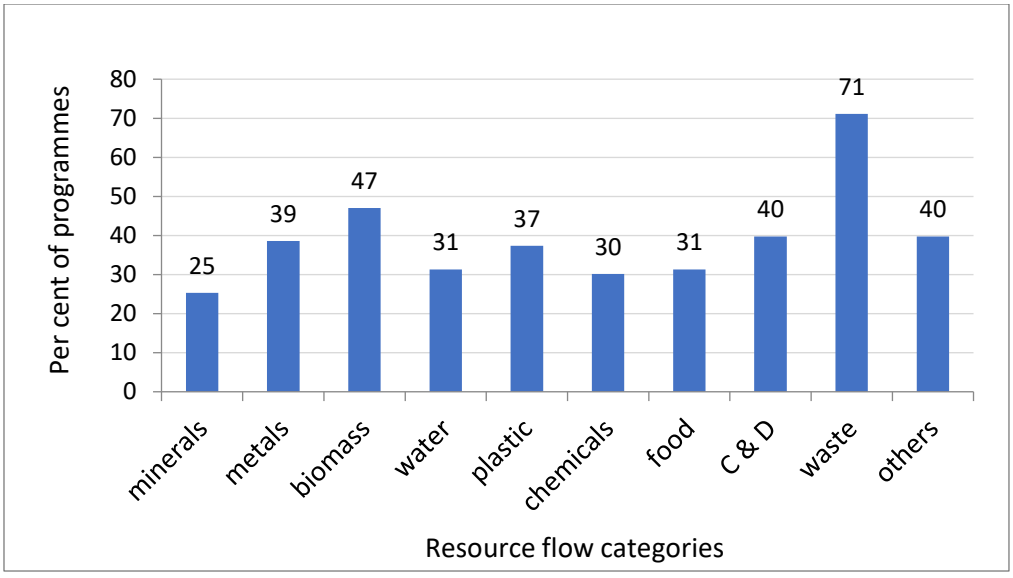

Figure 6 Shares of programmes covering different resource flows, described in D1.2

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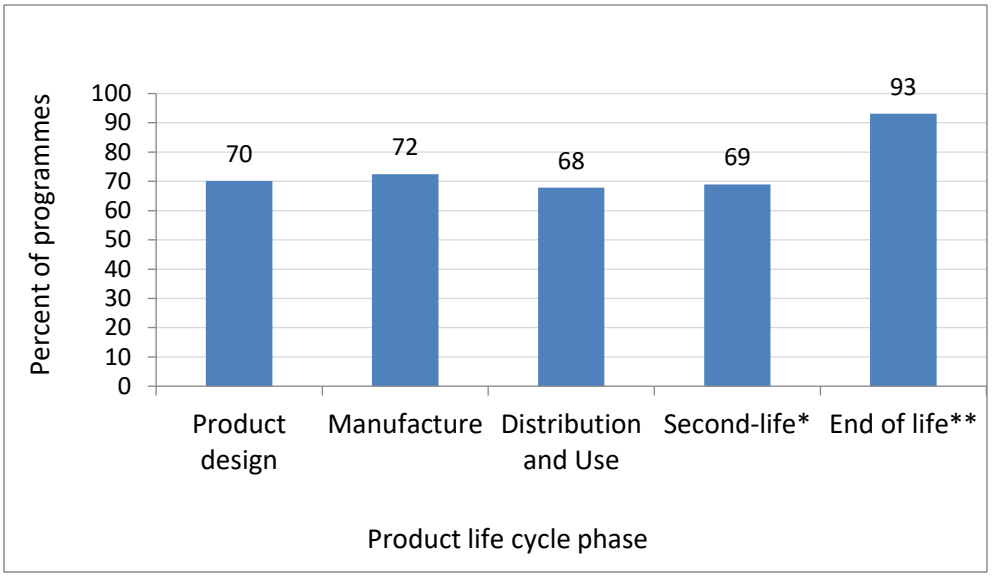

Figure 7 Shares of programmes addressing different phases of the product life cycle, described in D1.2

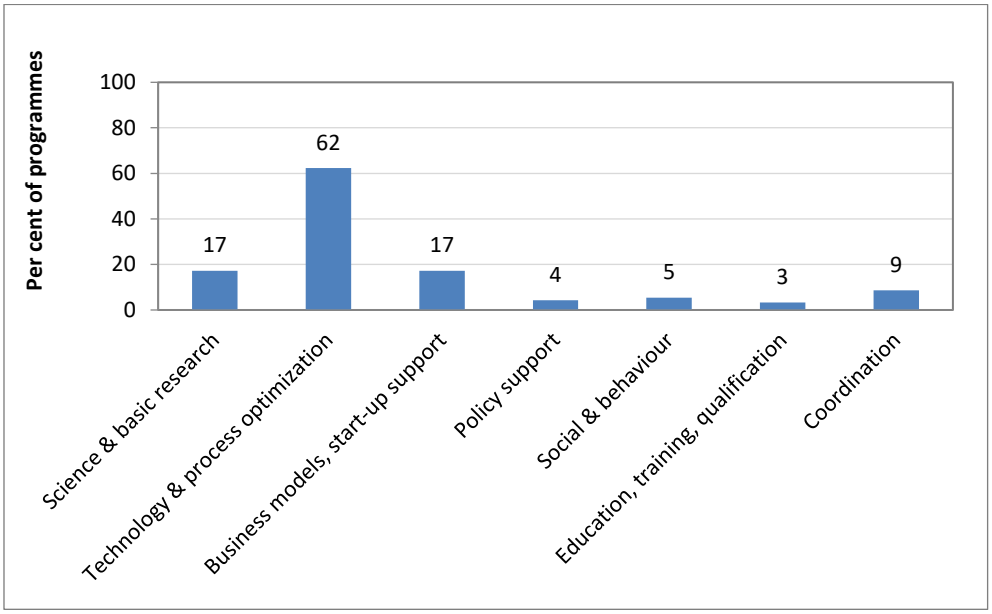

Figure 8 Focus of funding, by activities (in per cent), described in D1.2

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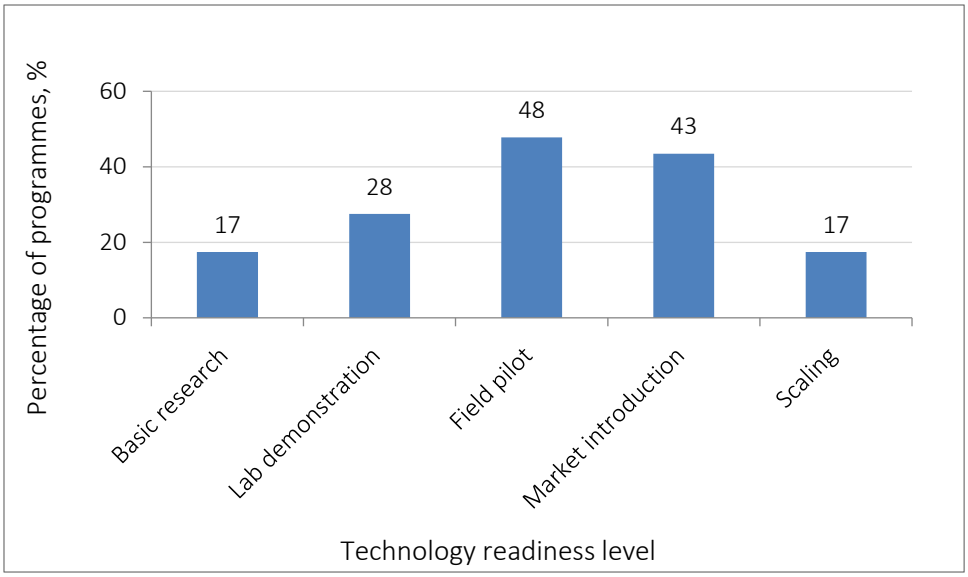

Figure 9 Technology readiness levels of different programmes, described in D1.2

The coverage analysis will thus build on the analysis carried out in D1.2 and use the development of the SRIA as a driver for the mapping.

Figure 6, Figure 7, Figure 8 and Figure 9 allowed to identify "macro"-trends. As the SRIA is **based on an analysis of each priority themes**, the objective is to **combine those identified key elements** in order to obtain **trends at a priority theme level**: eventually confirming the macro-trend but also potentially detecting eventual gaps for specific priority themes.

For instance, and as shown in Figure 7, D1.2 demonstrated that the largest share of funding programmes addresses technology and process optimisation type of funded activity. The coverage analysis will allow to show if this trend is consistent for each priority themes. Indeed, this type of activity might not be the highest type of funded activity for all of them. The same reasoning will be applied to the innovation stage and the product life cycle phases addressed by the funding programmes.

To be noted that according to the data validation step (see section 2.3), for funding progammes with no major focus on specific resource flows/priority themes, some respondents thus indicated that they have listed most resources flows as potentially addressed by the funding programmes. In order to understand the influence of programmes not especially focusing on specific priority themes, an additional "sensitivity" analysis has been performed. As part of this sensitivity analysis, funding programmes addressing more than 4 resources flows/priority themes have been removed from the analyses. For remaining programmes, this sensitivity analysis also includes indications on the priority themes clustering tendency, relevant subsections.

A better understanding of the funding scope coverage of existing programmes per priority themes will thus be provided to T2.1 partners.

All programmes addressing specific priority themes have been listed in Appendix 2[4].

[4] The programmes for which information concerning addressed resource flows were not available have also been listed in Appendix but removed from the analyses

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3.2 Mapping per priority themes

In the following subsections the funding programmes have been mapped according to the type of activities they fund and per priority themes. The innovation stage and the addressed product life cycle phases are two parameters used for detailing the distribution of current programmes per of type of funded activity.

For each type of funded activity, the number of programmes addressing the described priority theme is indicated on the graph. To be noted that concerning the innovation stage some programmes are covering several innovation stages, e.g. TRL 3-8 (see section 2.3). While a data validation step has been performed it has not always been possible to obtain all relevant information, e.g. a programme was listed has addressing Construction & Demolition (C&D) resource flow, but no information was available concerning the main type of funded activity or the addressed product life cycle phases. Programmes listed as addressing metals, and minerals (or both) have been gathered under the priority theme “raw materials”.

The sensitivity analysis is repeating the same approach but taking into consideration only the number of programmes addressing up to 4 priority themes. The results of the sensitivity analyses also include indications on priority themes clustering tendency for current CE programmes.

3.2.1 Construction & Demolition

Within the list of 108 CE funding programmes, 40 of them were indicated as addressing C&D. Figure 10 and Figure 11 show that for C&D, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing C&D are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is reflected for programmes addressing C&D and funding Technology & process optimisation type of activity, see Figure 10. This figure also allows to show that programmes principally funding business models type of activity are addressing a higher innovation stage.

Similarly, the trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing C&D and funding Technology & process optimisation type of activity, see Figure 11. This figure also allows to see that this trend is slightly more balanced for other types of funded activity (e.g. Science & basic research and Business models), for which all product life cycle phases seem to be more equally addressed.

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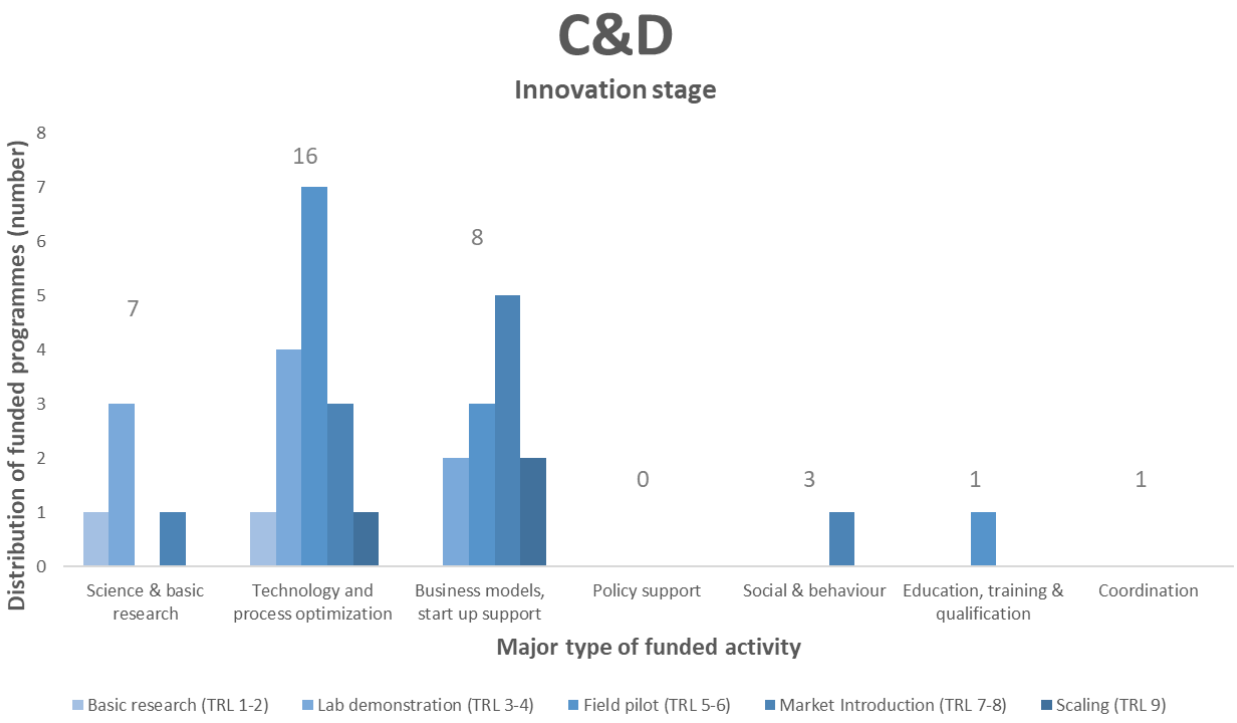

Figure 10 Distribution of programmes per type of funded activity, C&D - Innovation stage

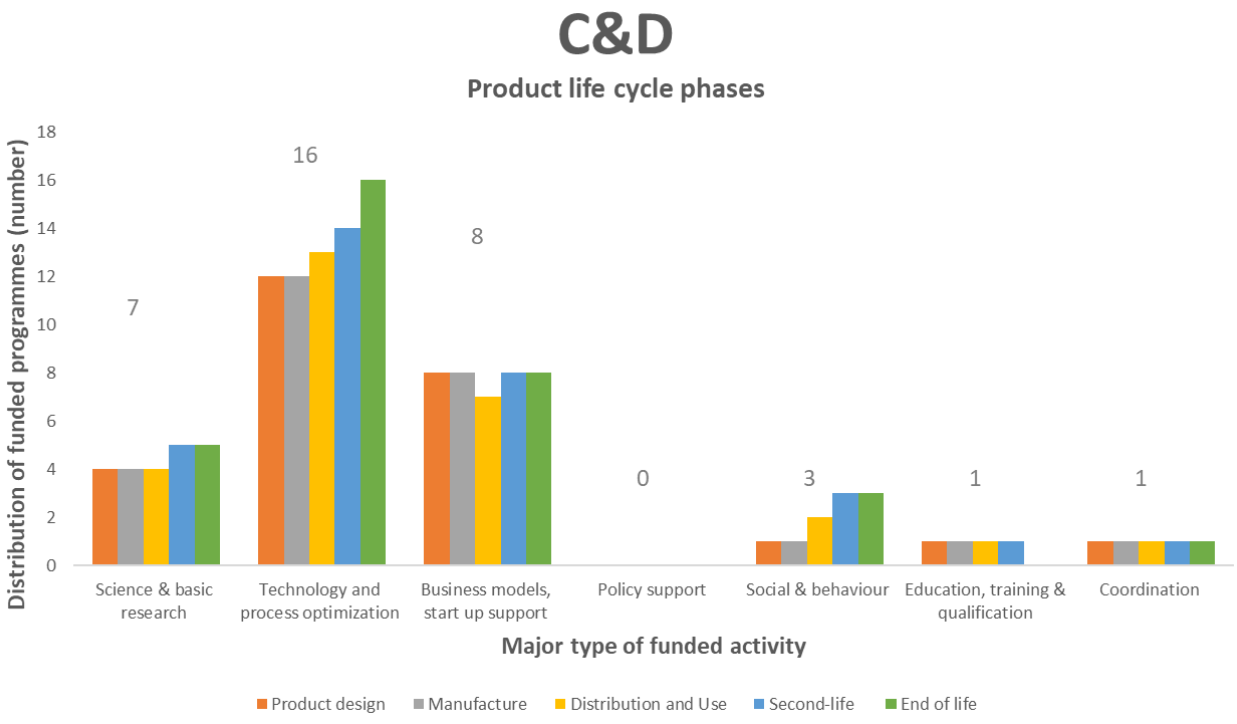

Figure 11 Distribution of programmes per type of funded activity, C&D - Product life cycle phases

Sensitivity analysis

Among the 40 programmes indicated as addressing C&D, 14 of them (35%) seem to have a more specific focus (addressing less than 5 priority themes), see Figure 12. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those

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14 programmes are mostly Waste (36%) and Food (16%). Figure 10 and Figure 11 have thus been plotted again by only representing those 14 programmes, see Figure 13 and Figure 14.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) C&D, Figure 13 shows that the trend reflected in Figure 9 and Figure 10 is less visible. The highest share refers to programmes addressing Science & basic research at a rather low TRL Level.

Concerning the addressed product life cycle phases, Figure 14 is reinforcing trends obtained in Figure 7 and Figure 11: the end of life seems to be the product life cycle phases mostly addressed by programmes funding science & basic research as well as technology & process optimisation, while a more balanced picture seems appearing for programmes funding Business models related type of activity.

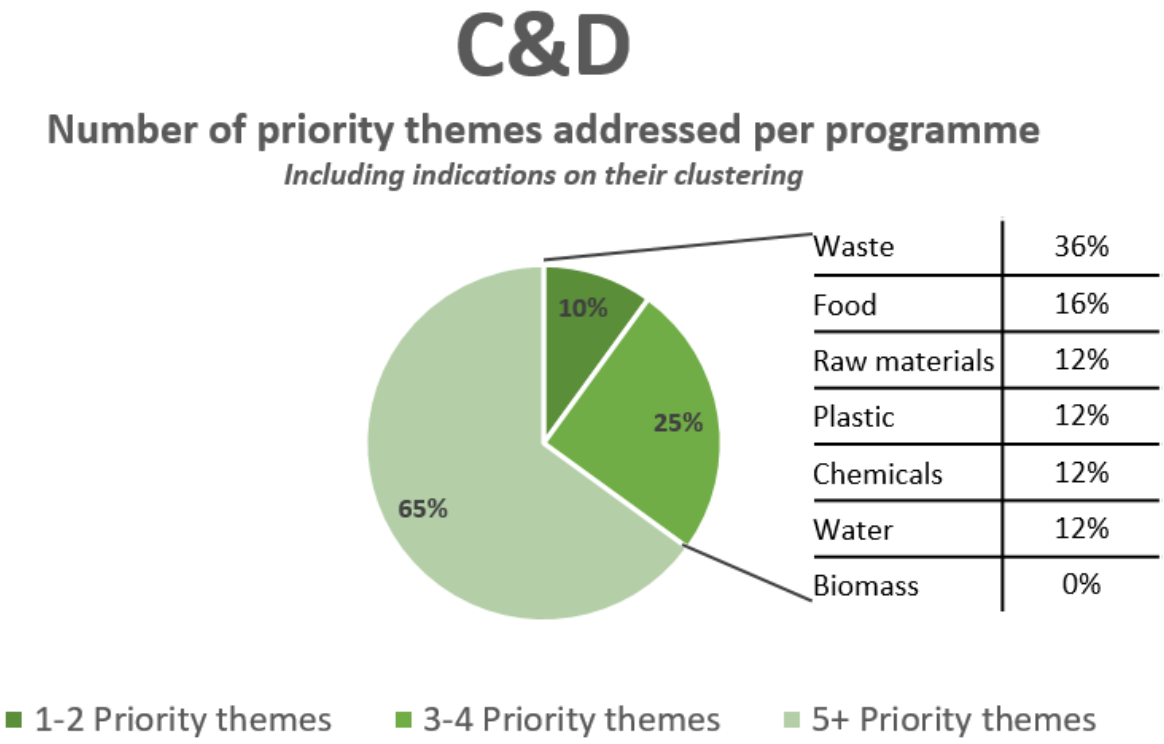

Figure 12 Number of priority themes addressed per programme, C&D

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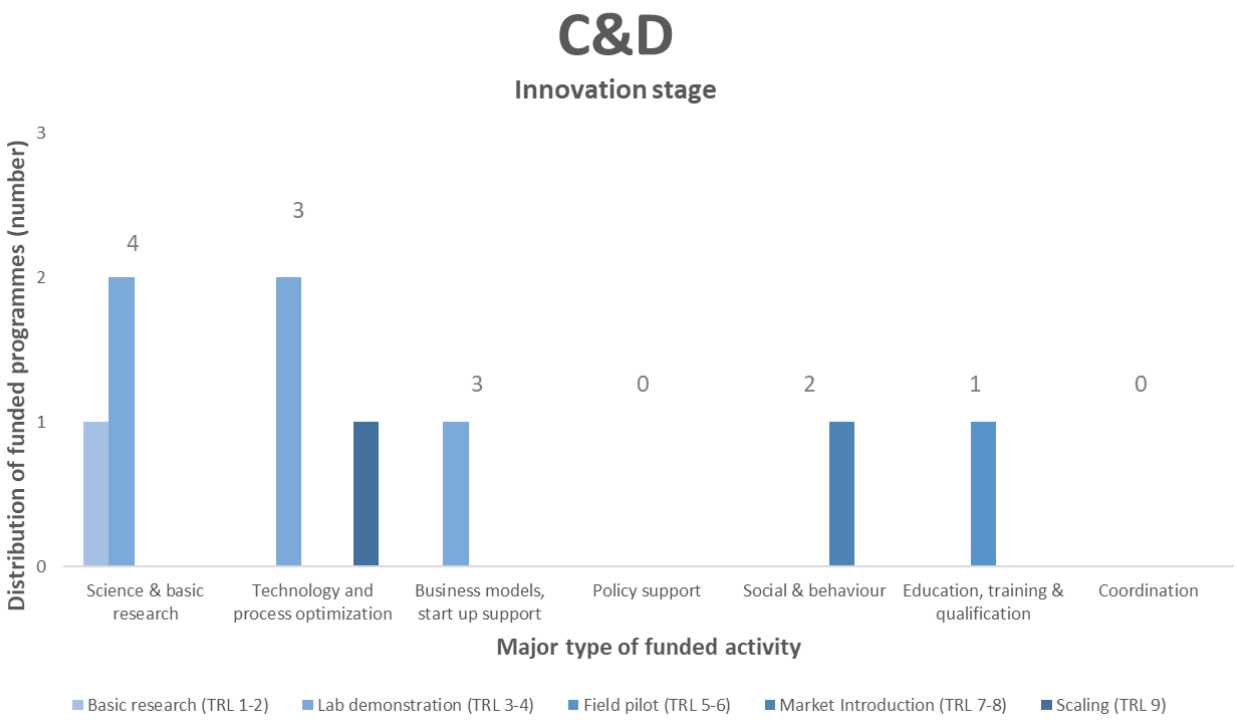

Figure 13 Distribution of programmes per type of funded activity, C&D - Innovation stage, sensitivity analysis

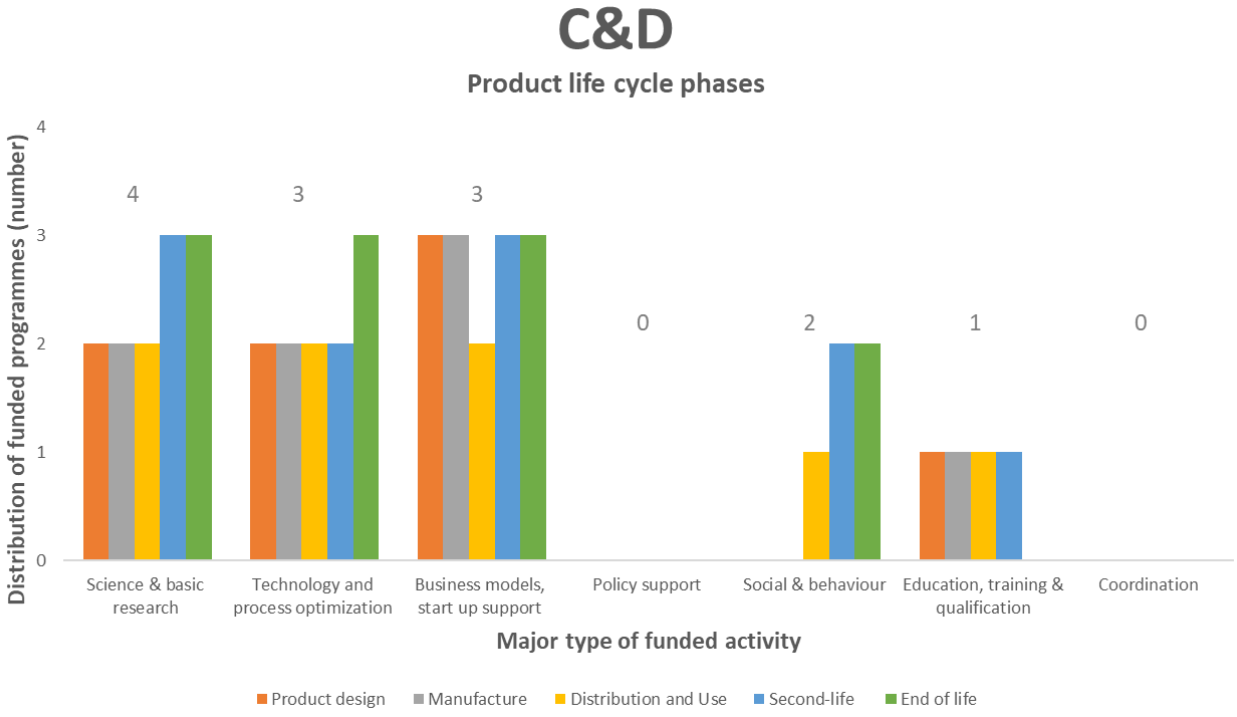

Figure 14 Distribution of programmes per type of funded activity, C&D - Product life cycle phases, sensitivity analysis

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 820707.

3.2.2 Raw materials

Within the list of 108 CE funding programmes, 41 of them were indicated as addressing Raw materials[5]. Figure 15 and Figure 16 show that for Raw materials, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing Raw materials are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is not reflected for programmes addressing Raw materials, see Figure 15. This figure allows to show that programmes principally funding Technology & process optimisation as well as Business model types of activity are addressing a higher innovation stage (market introduction).

The trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing Raw materials and funding Technology & process optimisation type of activity, see Figure 16. This figure also allows to see that this trend is more balanced for other types of funded activity, for which all product life cycle phases seem to be more equally addressed.

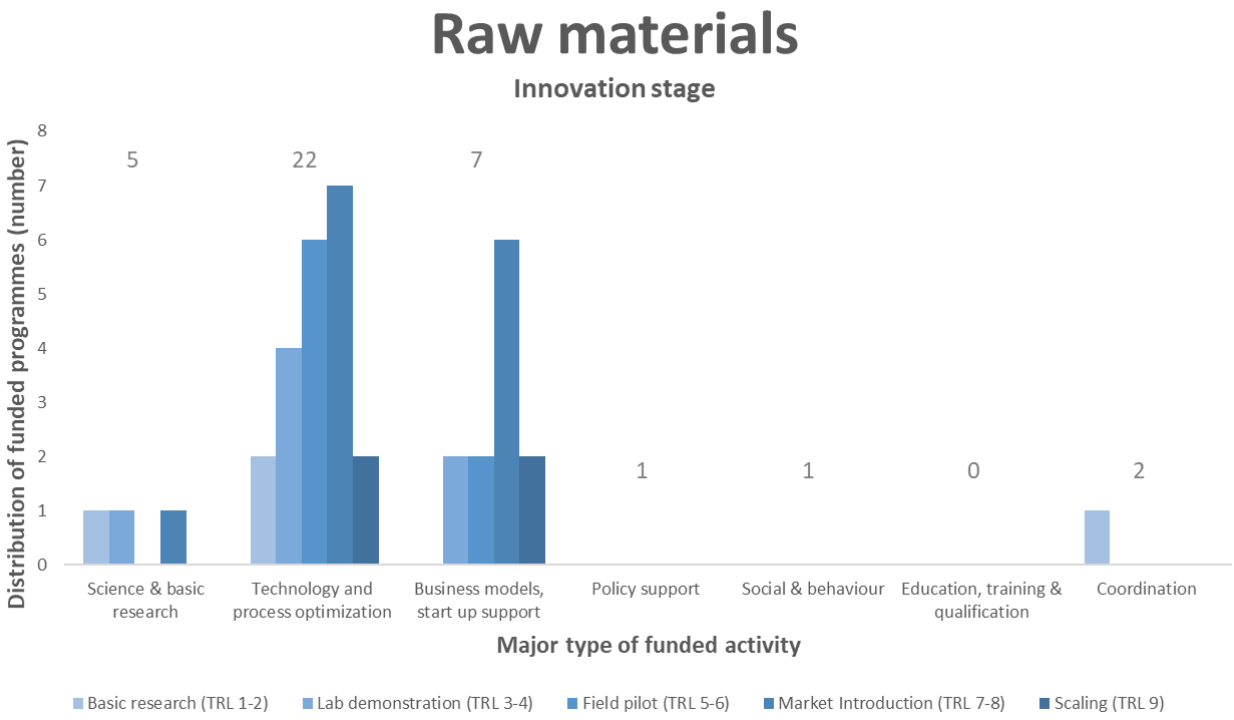

Figure 15 Distribution of programmes per type of funded activity, Raw materials - Innovation stage

[5] Programmes addressing minerals and metals resource flows in the survey results have been gathered under the Raw materials priority theme

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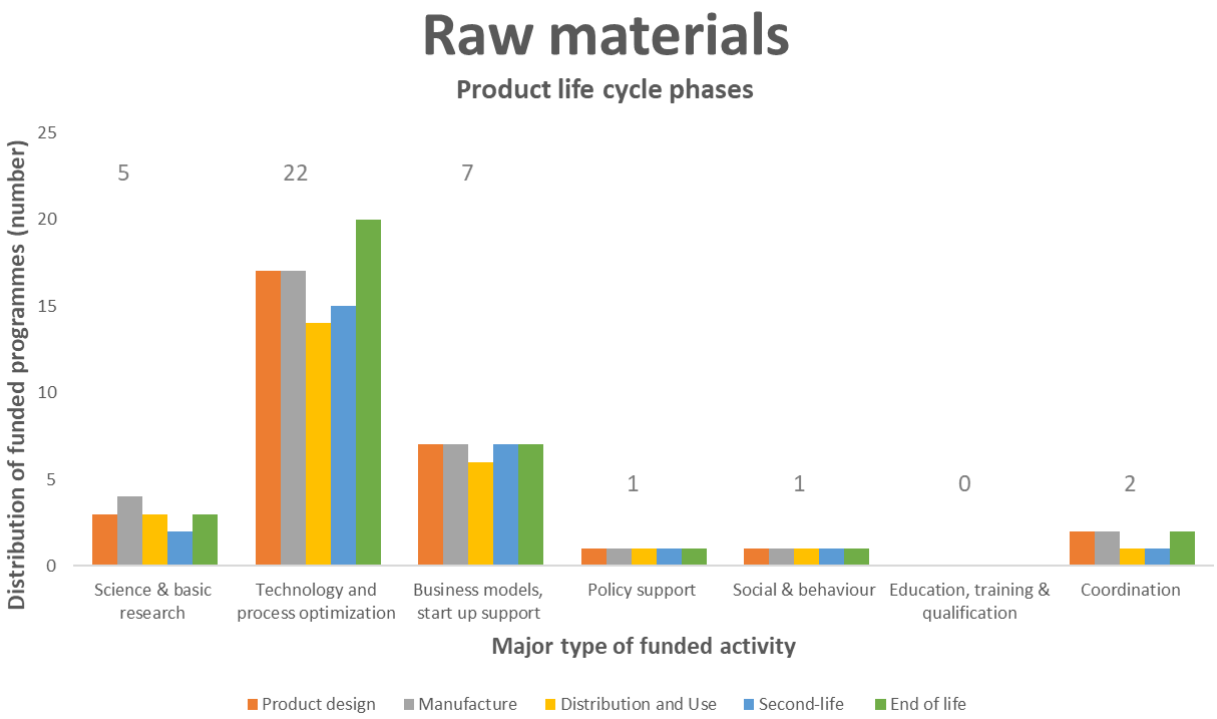

Figure 16 Distribution of programmes per type of funded activity, Raw materials - Product life cycle phases

Sensitivity analysis

Among the 41 programmes indicated as addressing Raw materials, 10 of them (24%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 17. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those 10 programmes are mostly Waste (39%), Chemicals (17%) and C&D (17%). Figure 15 and Figure 16 have thus been plotted again by only representing those 10 programmes, see Figure 18 and Figure 19.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Raw materials, Figure 18 shows that the trend reflected in Figure 9 and Figure 15 is less visible. The highest share not only refers to programmes addressing Technology & process optimisation at field pilot or market introduction innovation stages but equally the scaling innovation.

Concerning the addressed product life cycle phases, Figure 19 is not reflecting trends obtained in Figure 7 and Figure 16: product design and manufacture are product life cycle phases which seems slightly more addressed for Technology & process optimisation type of funded activity.

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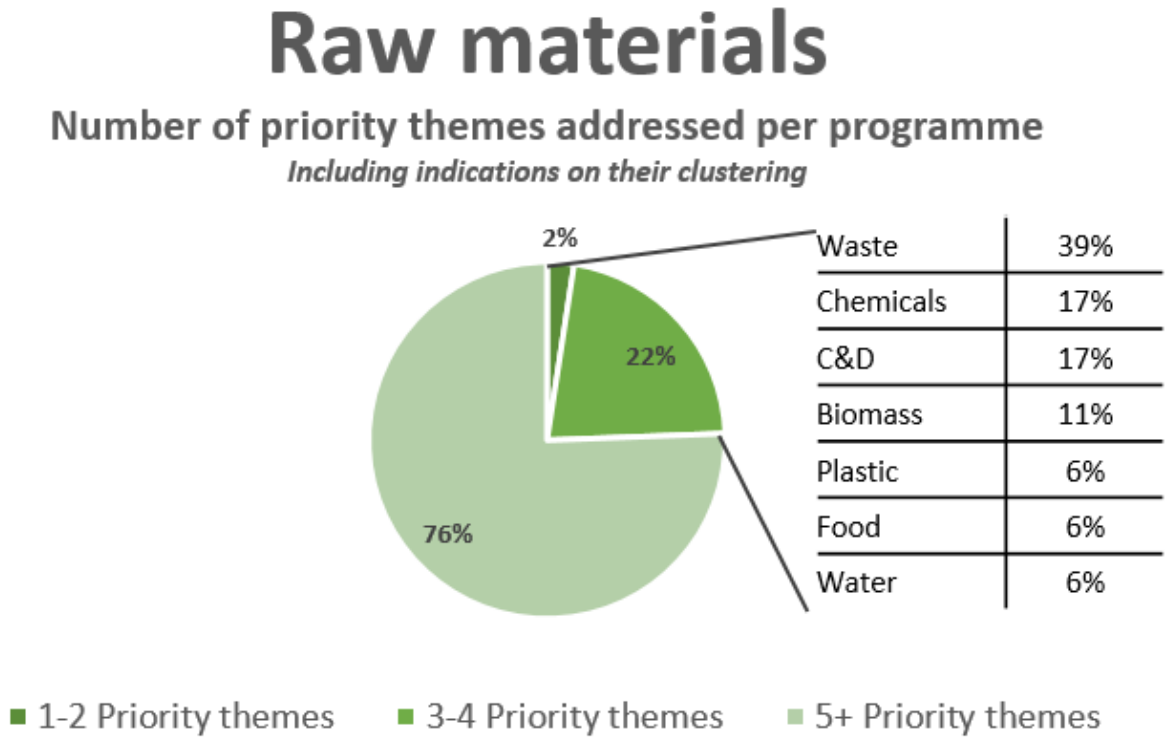

Figure 17 Number of priority themes addressed per programme, Raw materials

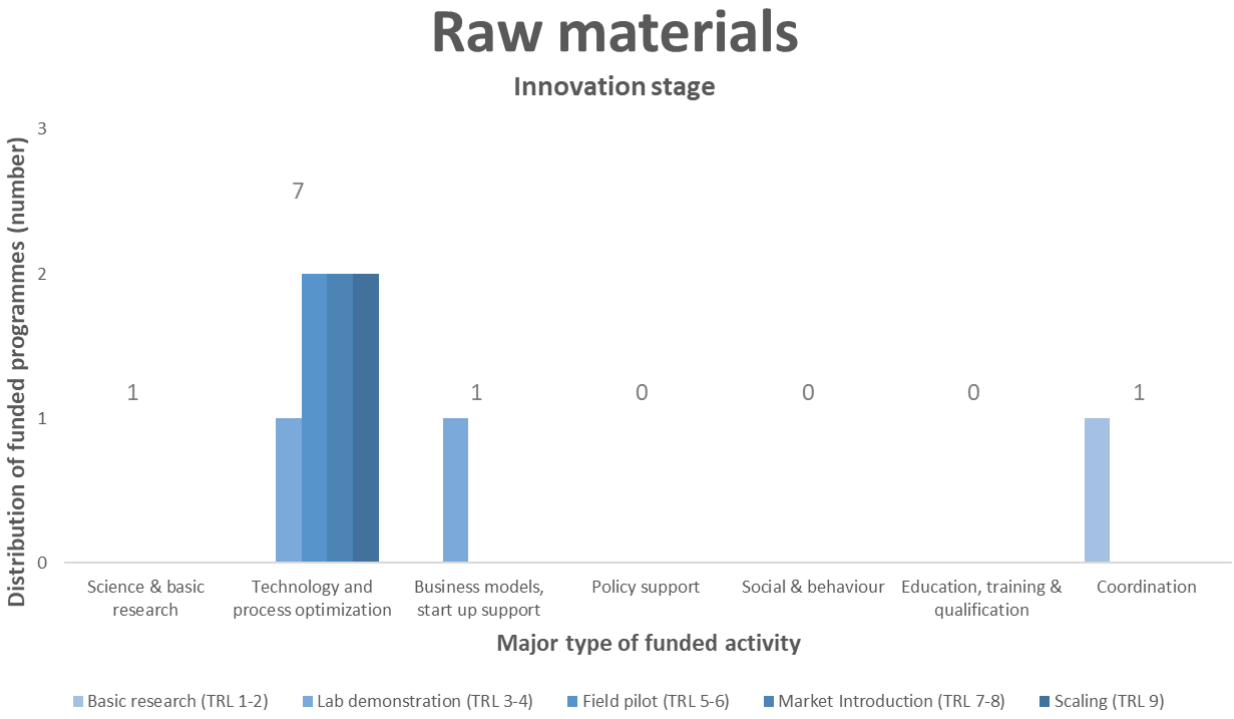

Figure 18 Distribution of programmes per type of funded activity, Raw materials - Innovation stage, sensitivity analysis

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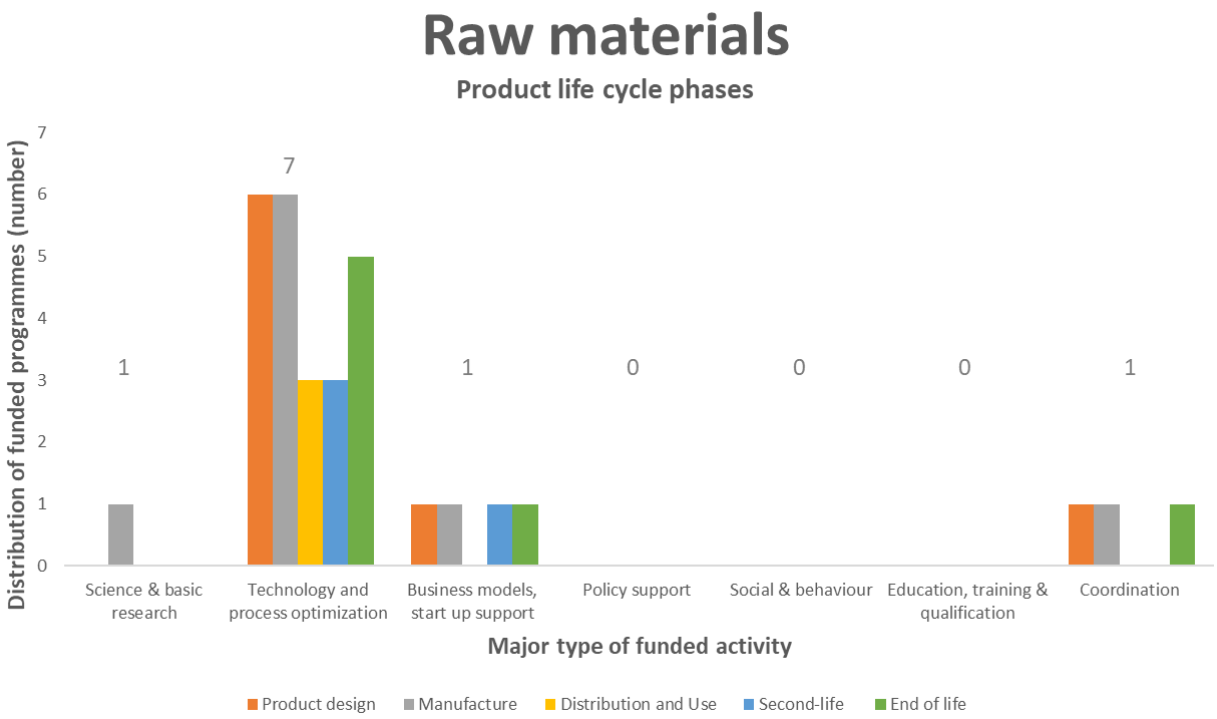

Figure 19 Distribution of programmes per type of funded activity, Raw materials - Product life cycle phases, sensitivity analysis

3.2.3 Water

Within the list of 108 CE funding programmes, 36 of them were indicated as addressing Water. Figure 20 and Figure 21 show that for Water, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing Water are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is reflected for programmes addressing Water and funding Technology & process optimisation type of activity, see Figure 20. This figure also allows to show that programmes principally funding Science & basic research type of activity are addressing a lower TRL level while business models related type of activity are addressing a higher innovation stage.

Similarly, the trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing Water and funding Technology & process optimisation as well as Science & basic research type of activities, see Figure 21. This figure also allows to see that this trend is slightly more balanced for Business models type of funded activity, for which all product life cycle phases seem to be more equally addressed.

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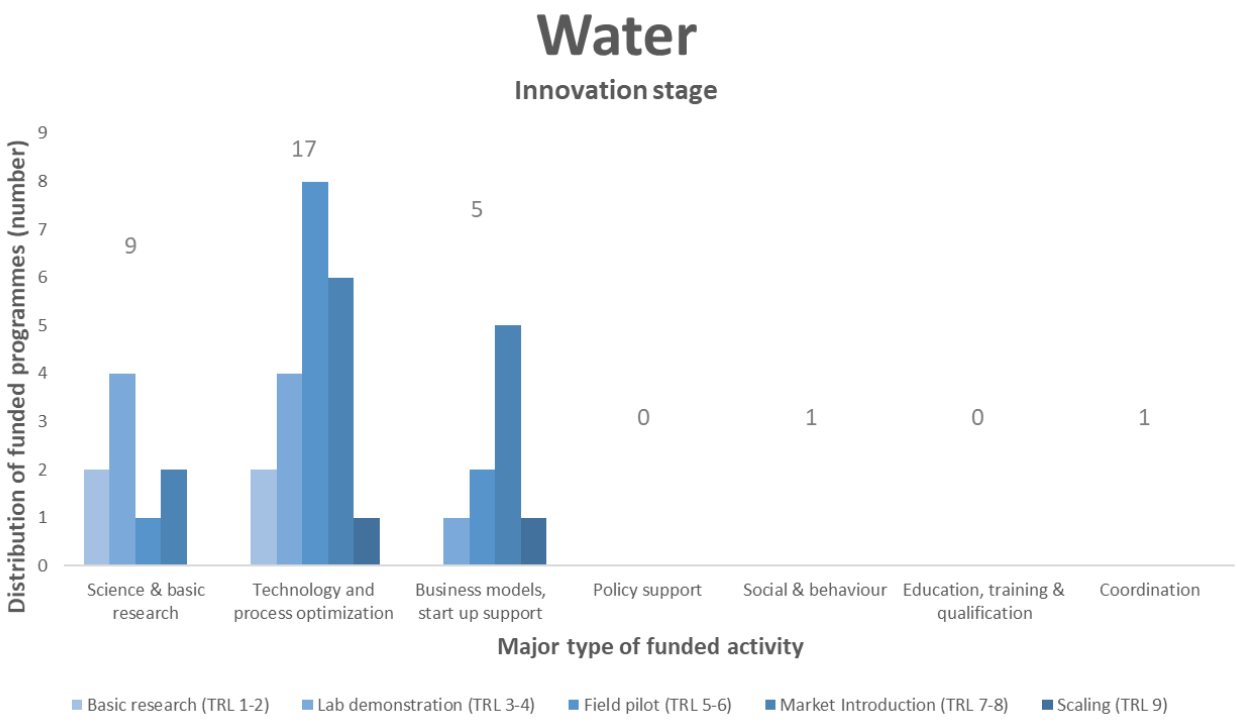

Figure 20 Distribution of programmes per type of funded activity, Water - Innovation stage

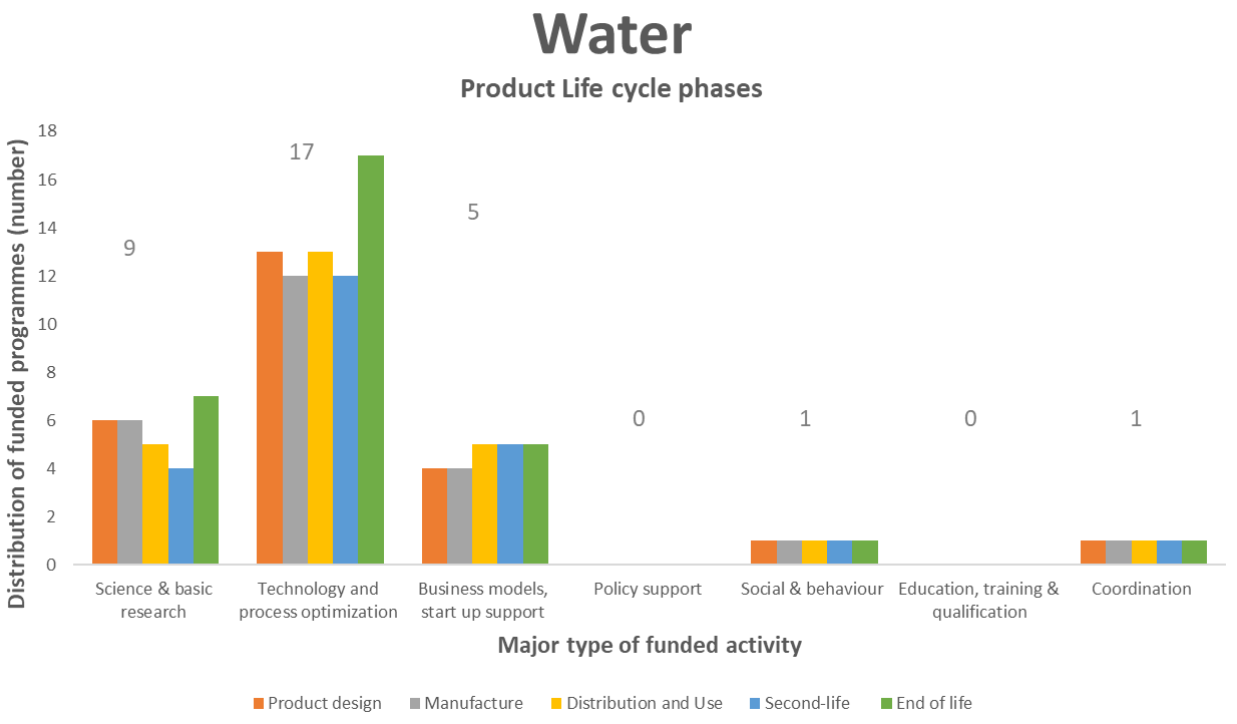

Figure 21 Distribution of programmes per type of funded activity, Water - Product life cycle phases

Sensitivity analysis

Among the 36 programmes indicated as addressing Water, 13 of them (36%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 13. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those

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13 programmes are mostly Waste (31%), Biomass (15%) and Food (15%). Figure 20 and Figure 21 have thus been plotted again by only representing those 14 programmes, see Figure 23 and Figure 24.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Water, Figure 23 shows that the trend reflected in Figure 9 and Figure 20 is less visible. The highest share refers to programmes addressing Technology & process optimisation mainly at the field pilot innovation stage but equally Science & basic research at a rather low TRL Level. Only 1 programme is indicated to fund Business model type of activity.

Concerning the addressed product life cycle phases, Figure 14 is reinforcing trends obtained in Figure 7 and Figure 21: the end of life seems to be the product life cycle phases mostly addressed by programmes funding science & basic research as well as technology & process optimisation.

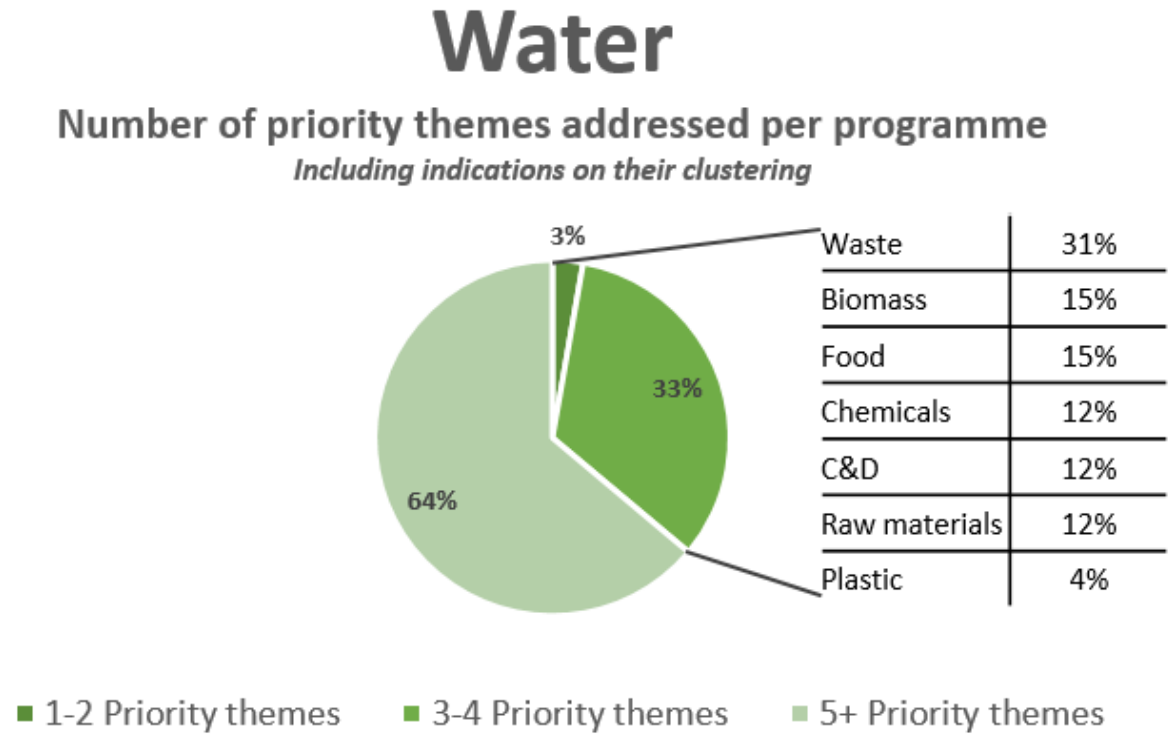

Figure 22 Number of priority themes addressed per programme, Water

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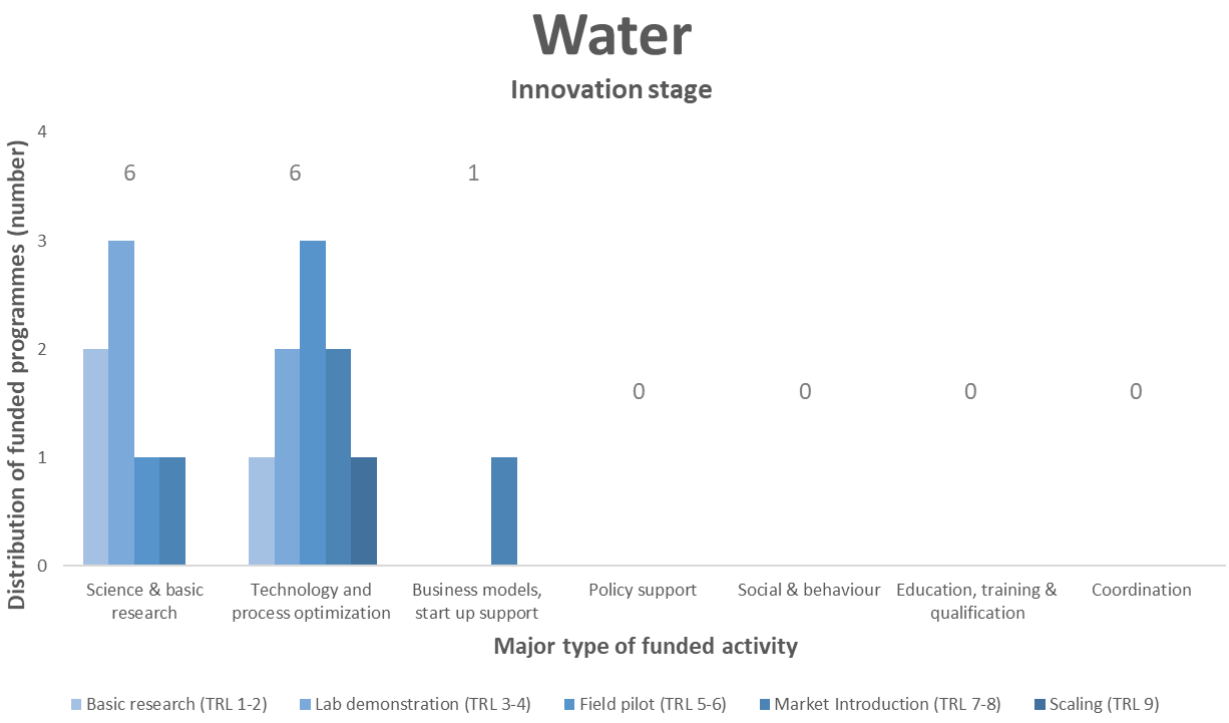

Figure 23 Distribution of programmes per type of funded activity, Water - Innovation stage, sensitivity analysis

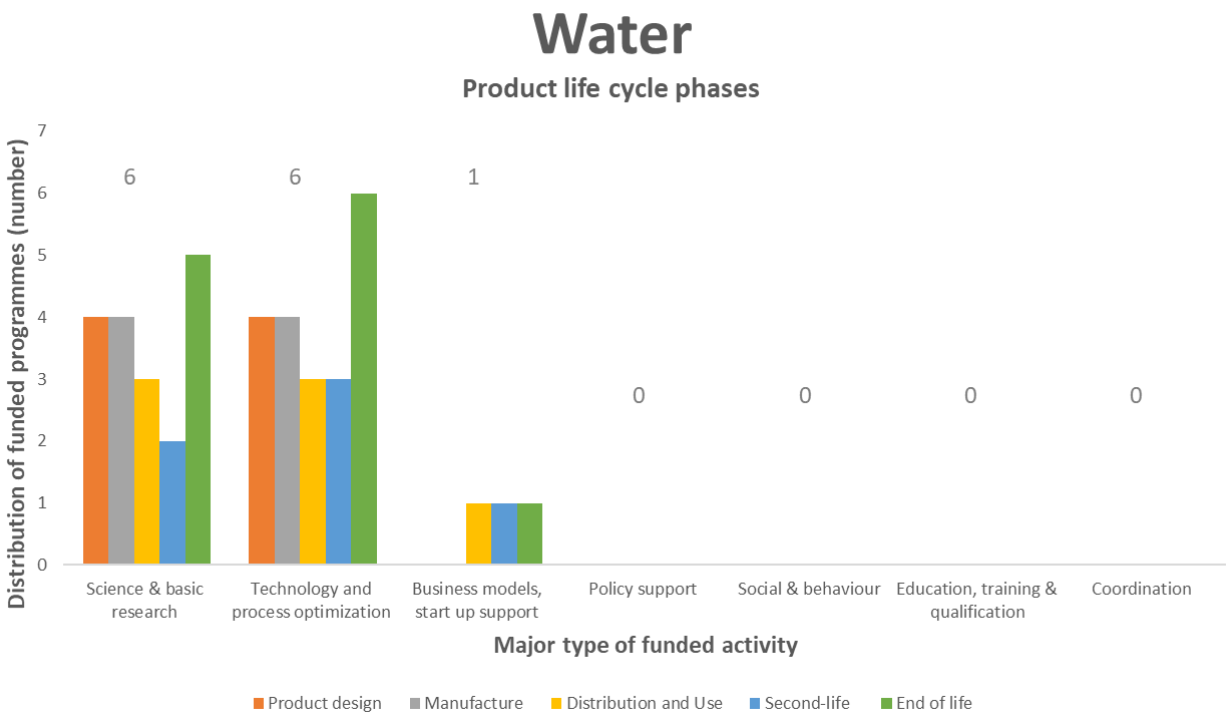

Figure 24 Distribution of programmes per type of funded activity, Water - Product life cycle phases, sensitivity analysis

3.2.4 Plastic

Within the list of 108 CE funding programmes, 37 of them were indicated as addressing Plastic. Figure 25 and Figure 26 show that for Plastic, the trend highlighted in Figure 8 is consistent: the largest share

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of programme addressing Plastic are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is reflected for programmes addressing Plastic and funding Technology & process optimisation type of activity, see Figure 25. This figure also allows to show that programmes principally funding business models type of activity are addressing a higher innovation stage.

Similarly, the trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing Plastic and funding Technology & process optimisation, see Figure 21. This figure also allows to see that this trend is less shown for all other types of funded activity, for which all product life cycle phases seem to be more equally addressed.

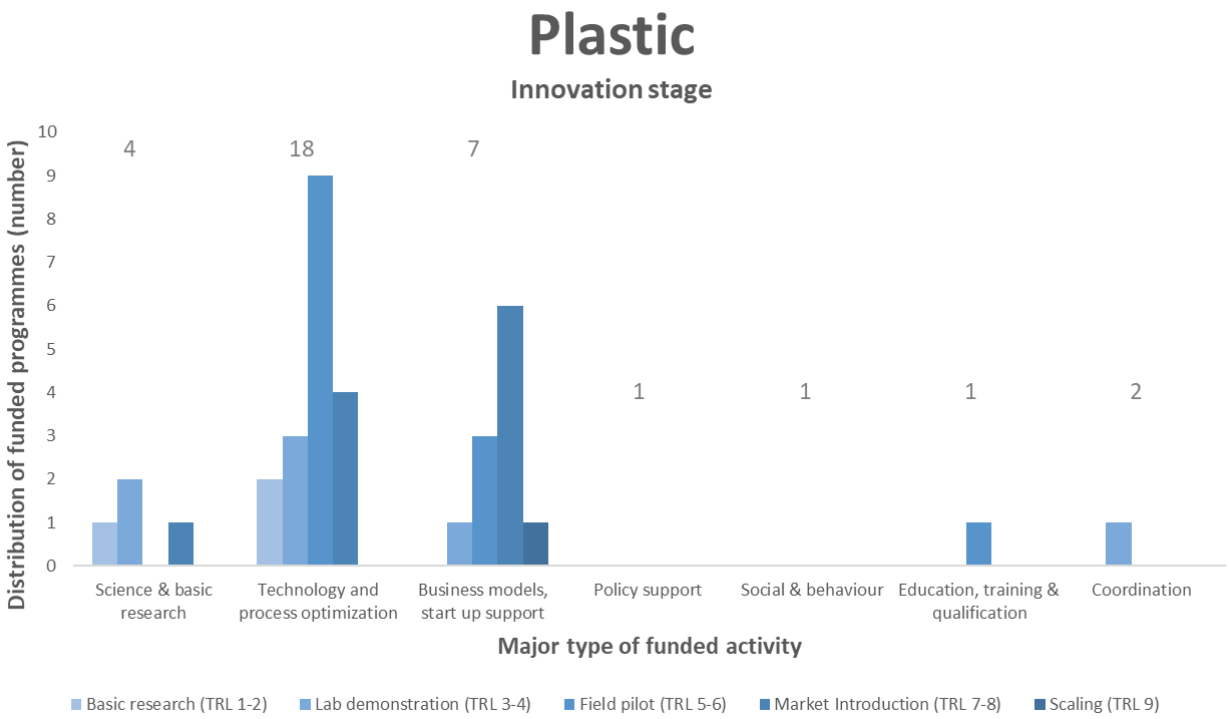

Figure 25 Distribution of programmes per type of funded activity, Plastic - Innovation stage

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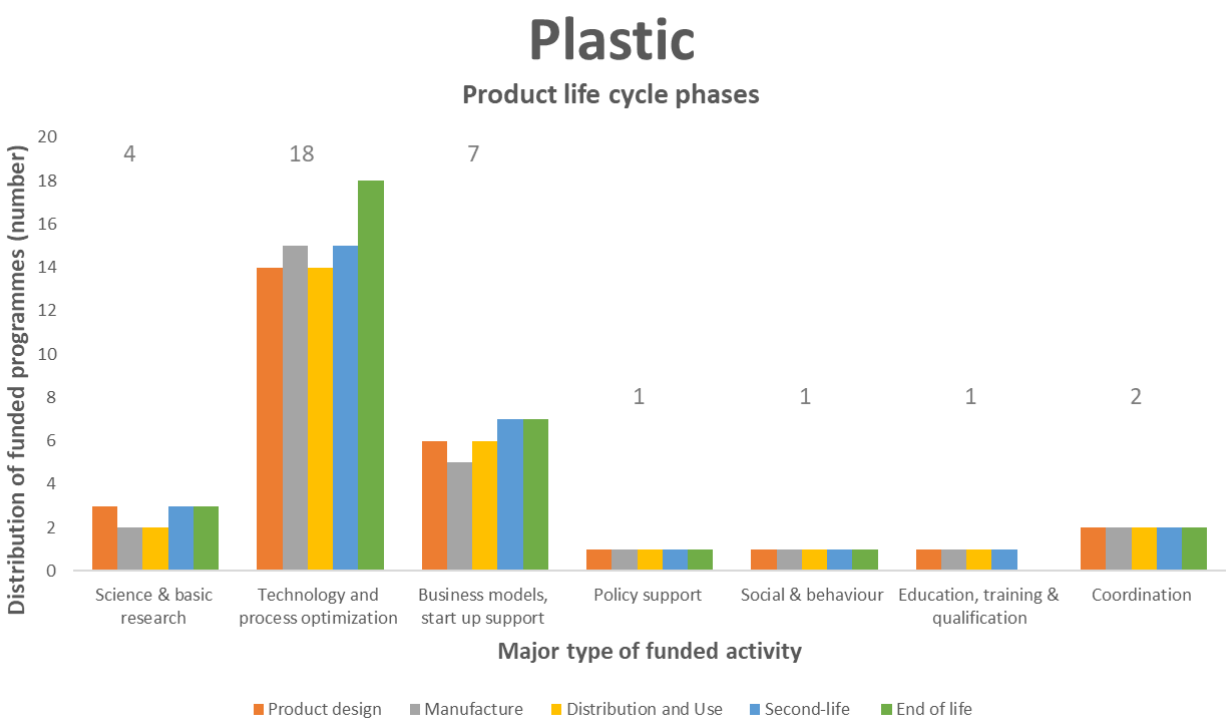

Figure 26 Distribution of programmes per type of funded activity, Plastic - Product life cycle phases

Sensitivity analysis

Among the 37 programmes indicated as addressing Plastic, 10 of them (27%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 27. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those 10 programmes are mostly Waste (33%) and Biomass (19%). Figure 25 and Figure 26 have thus been plotted again by only representing those 10 programmes, see Figure 28 and Figure 29.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Plastic, Figure 28 shows that the trend reflected in Figure 9 and Figure 25 is still visible. The highest share refers to programmes addressing Technology & process optimisation at a field pilot innovation stage.

Concerning the addressed product life cycle phases, Figure 29 is reinforcing trends obtained in Figure 7 and Figure 26: the end of life seems to be the product life cycle phases mostly addressed by programmes funding Technology & process optimisation type of activity.

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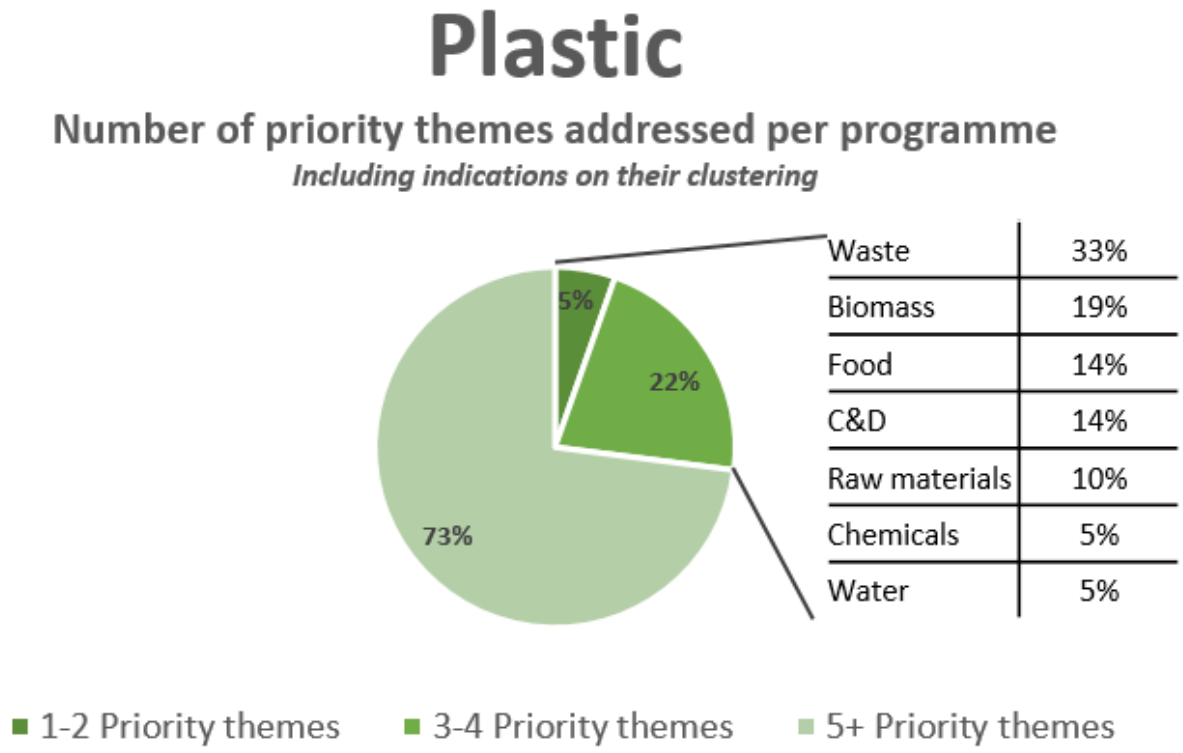

Figure 27 Number of priority themes addressed per programme, Plastic

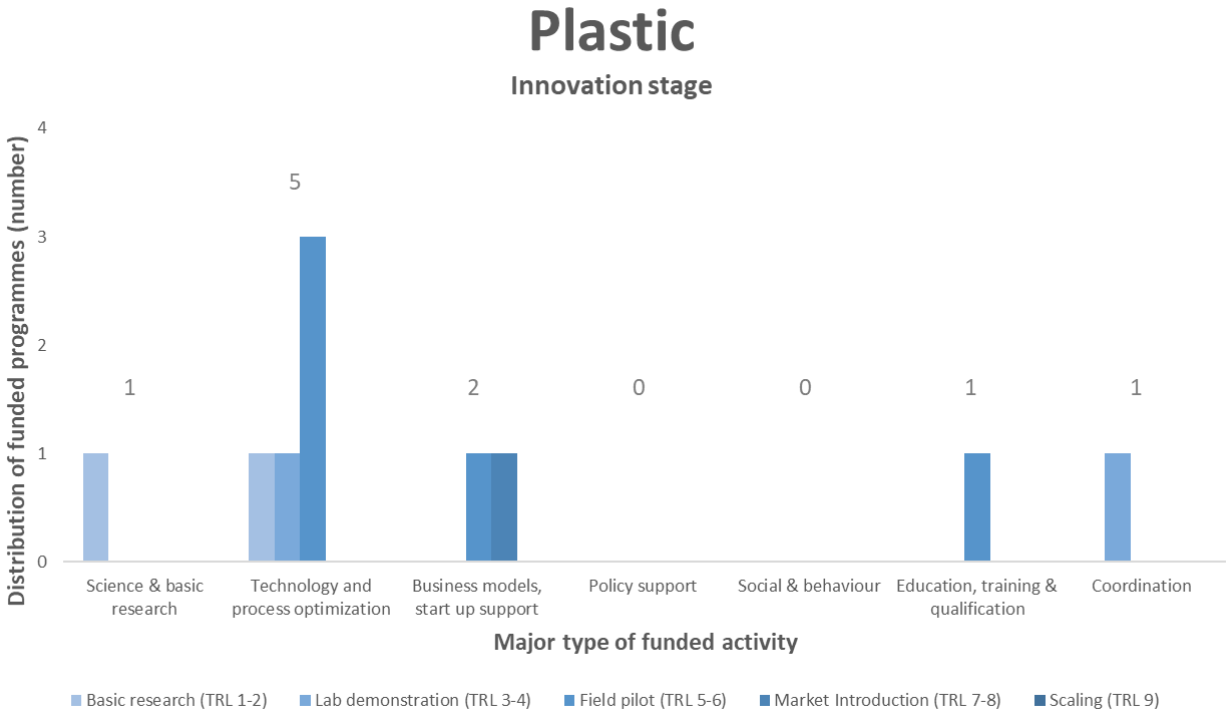

Figure 28 Distribution of programmes per type of funded activity, Plastic - Innovation stage, sensitivity analysis

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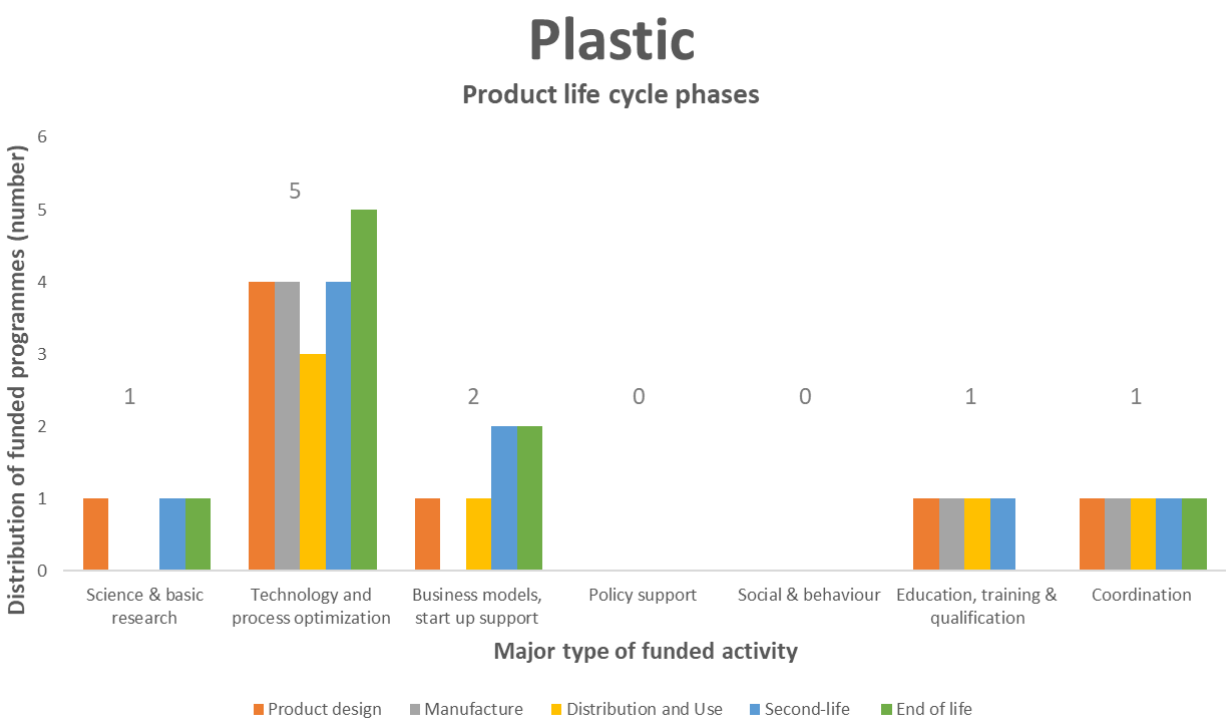

Figure 29 Distribution of programmes per type of funded activity, Plastic - Product life cycle phases, sensitivity analysis

3.2.5 Waste

Within the list of 108 CE funding programmes, 69 of them were indicated as addressing Waste. Figure 30 and Figure 31 show that for Waste, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing Waste are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is reflected for programmes addressing Waste and funding Technology & process optimisation type of activity, see Figure 30. This figure also allows to show that programmes principally funding Science & basic research type of activity are addressing a lower TRL level while business models related type of activity are addressing a higher innovation stage.

Similarly, the trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing Waste and funding Technology & process optimisation type of activity, see Figure 31. This figure also allows to see that this trend is slightly more balanced for other type of funded activity, for which all product life cycle phases seem to be more equally addressed.

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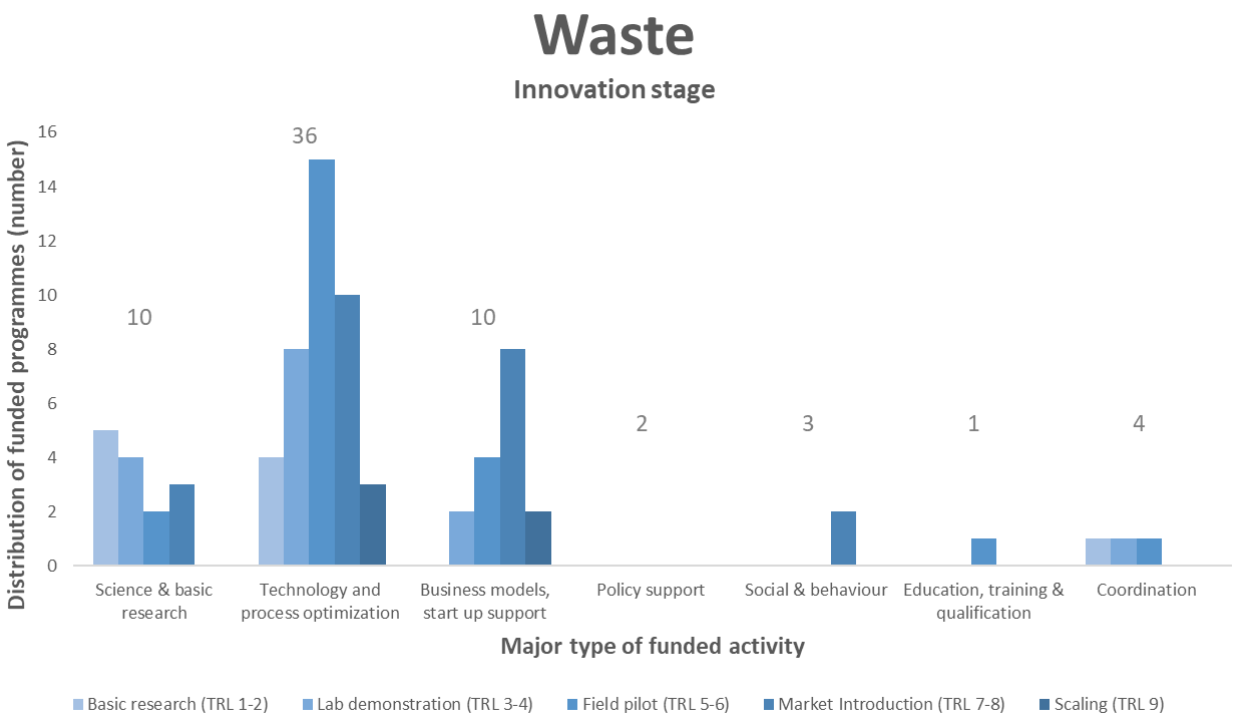

Figure 30 Distribution of programmes per type of funded activity, Waste - Innovation stage

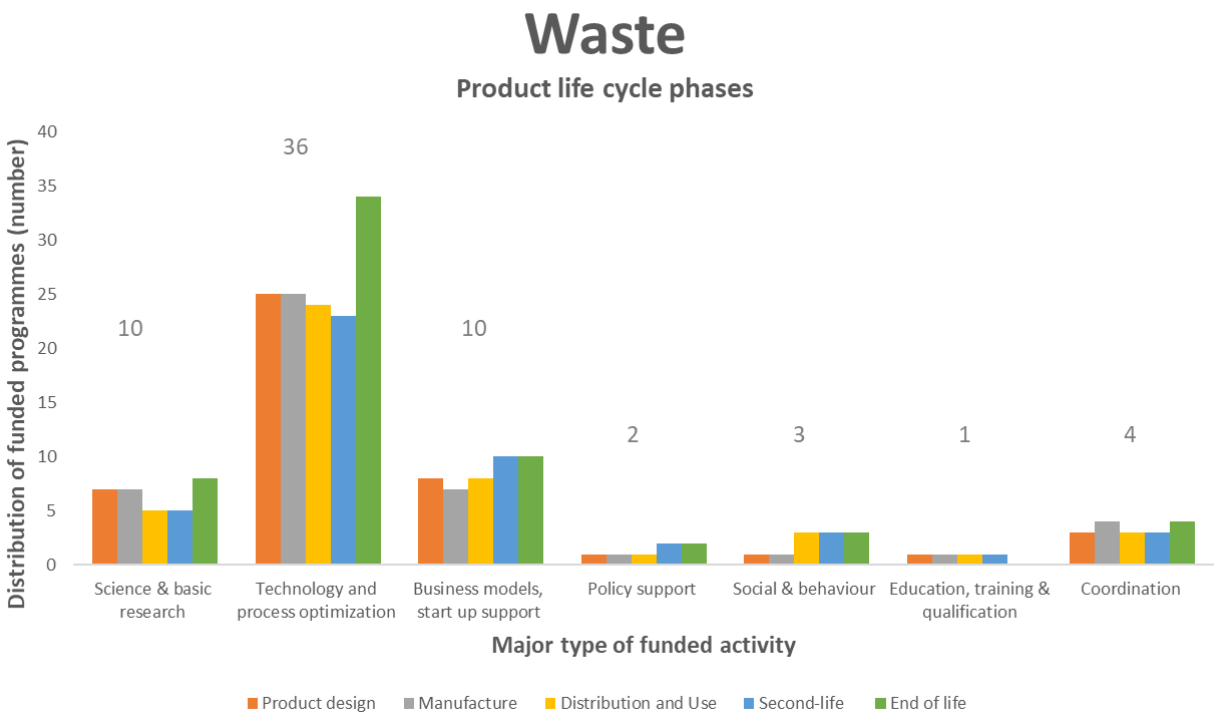

Figure 31 Distribution of programmes per type of funded activity, Waste - Product life cycle phases

Sensitivity analysis

Among the 69 programmes indicated as addressing Waste, 38 of them (55%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 32. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those

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38 programmes are mostly Biomass (20%) and Raw materials (19%). Figure 30 and Figure 31 have thus been plotted again by only representing those 38 programmes, see Figure 33 and Figure 34.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Waste, Figure 33 shows that the trend reflected in Figure 9 and Figure 30 is still visible. The highest share refers to programmes addressing Technology & process optimisation at a field pilot innovation stage.

Concerning the addressed product life cycle phases, Figure 34 is reinforcing trends obtained in Figure 7 and Figure 33: the end of life seems to be the product life cycle phases mostly addressed by programmes funding Technology & process optimisation, while a more balanced picture seems appearing for programmes funding all others type of activity.

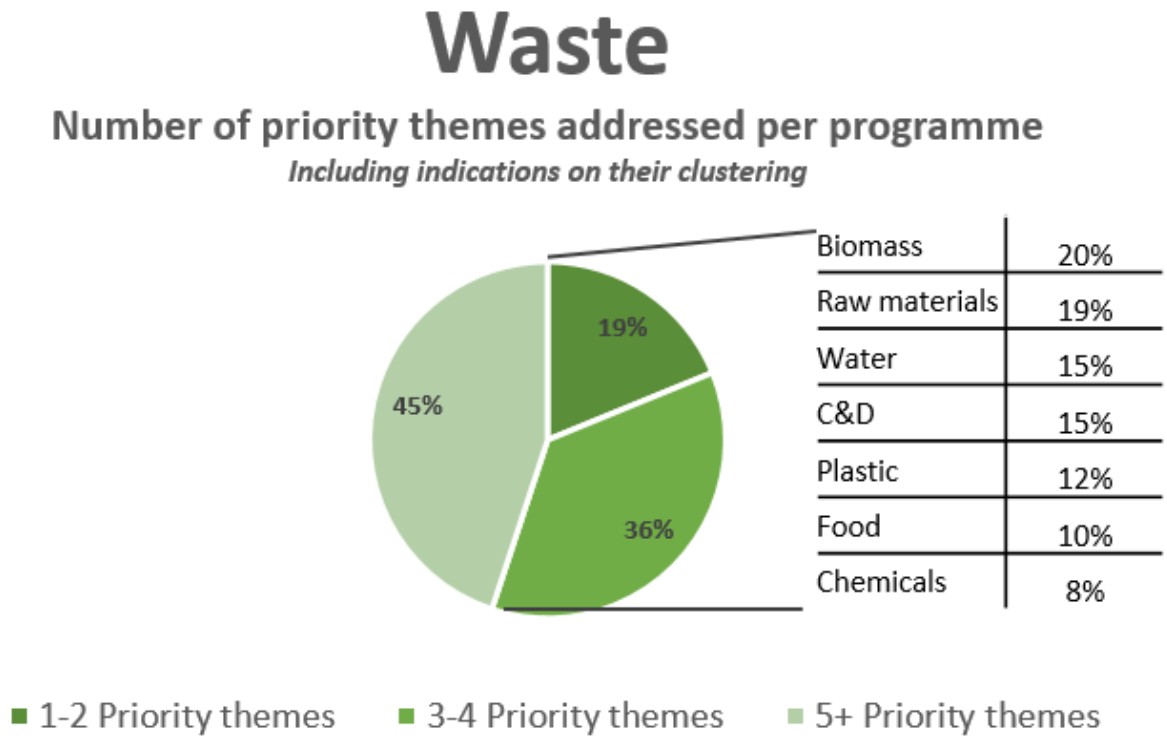

Figure 32 Number of priority themes addressed per programme, Waste

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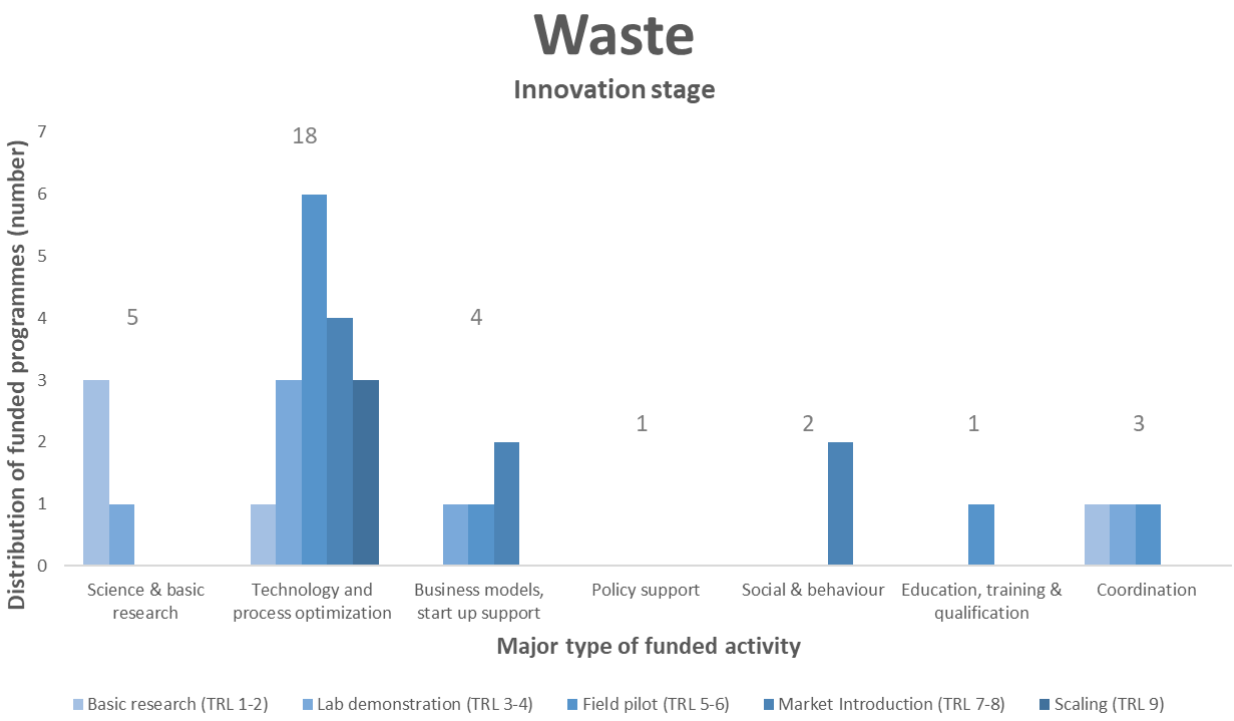

Figure 33 Distribution of programmes per type of funded activity, Waste - Innovation stage, sensitivity analysis

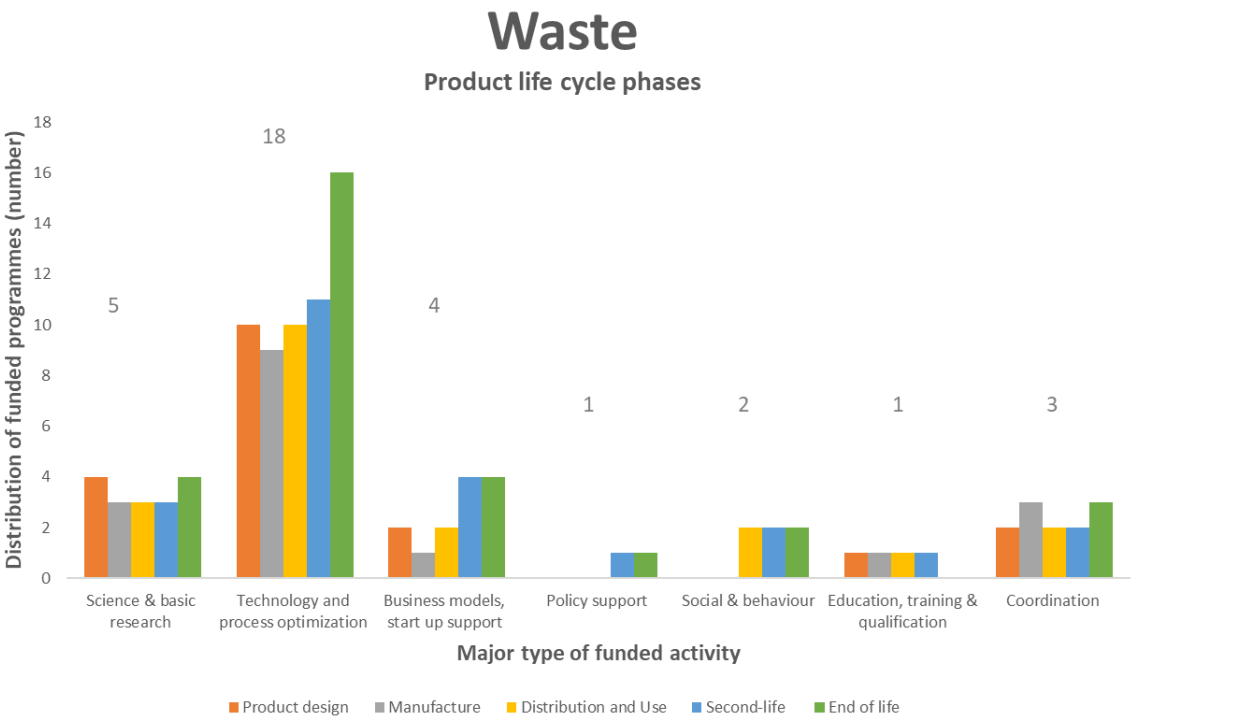

Figure 34 Distribution of programmes per type of funded activity, Waste - Product life cycle phases, sensitivity analysis

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3.2.6 Chemicals

Within the list of 108 CE funding programmes, 33 of them were indicated as addressing Chemicals. Figure 35 and Figure 36 show that for Chemicals, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing Chemicals are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is less visible for programmes addressing Chemicals and funding Technology & process optimisation type of activity, see Figure 30. Indeed, this figure allows to show that programmes funding this type of activity are almost equally present at lab demonstration as well as market introduction innovation stages. This figure also allows to show that programmes principally funding business models related type of activity are addressing a higher innovation stage (market introduction).

The trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected for programmes addressing Chemicals and funding Technology & process optimisation type of activity, see Figure 36. This figure also allows to see that this trend is more balanced for other type of funded activity, for which all product life cycle phases seem to be more equally addressed.

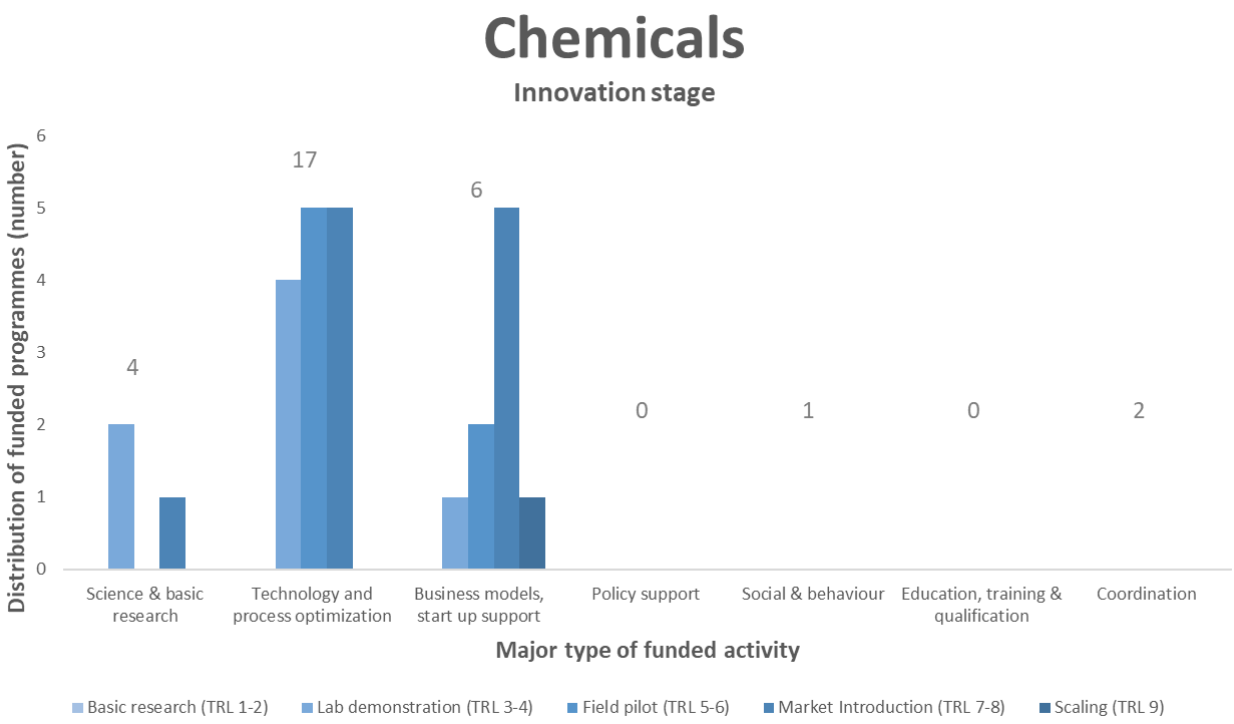

Figure 35 Distribution of programmes per type of funded activity, Chemicals - Innovation stage

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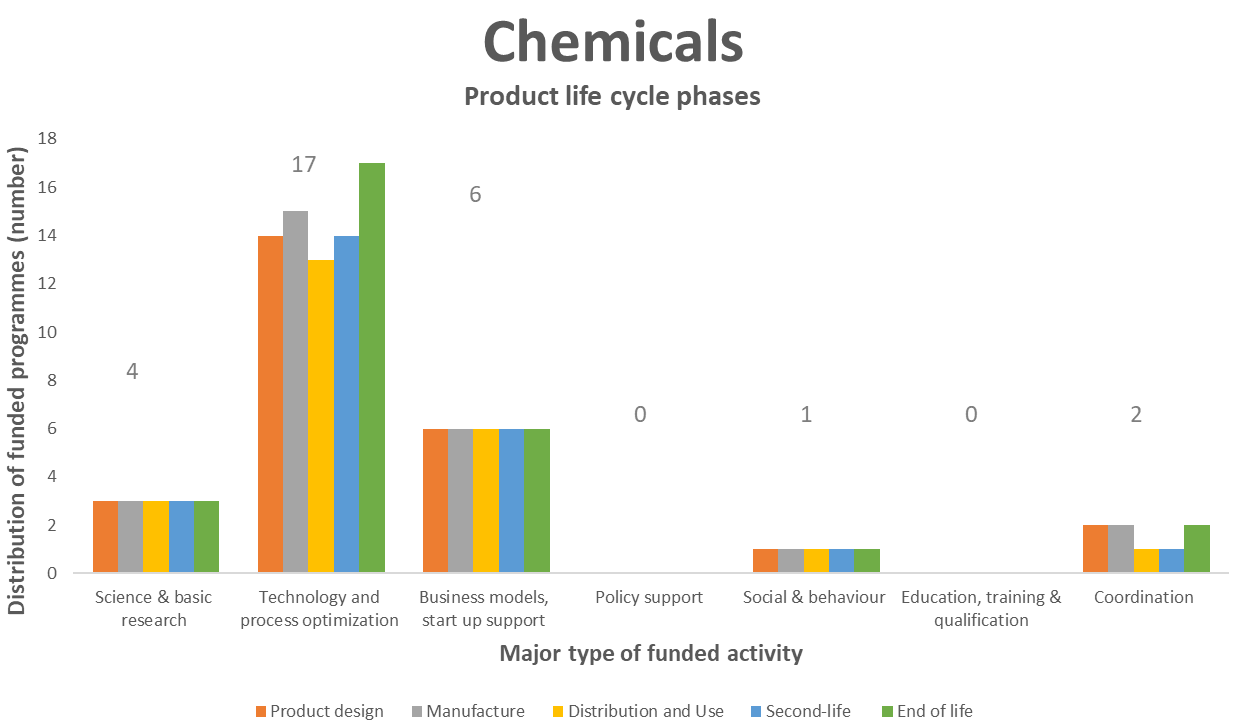

Figure 36 Distribution of programmes per type of funded activity, Chemicals - Product life cycle phases

Sensitivity analysis

Among the 33 programmes indicated as addressing Chemicals, 9 of them (27%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 37. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those 9 programmes are mostly Waste (23%) and Biomass (18%). Figure 35 and Figure 36 have thus been plotted again by only representing those 9 programmes, see Figure 38 and Figure 39.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Chemicals, Figure 38 shows that none of the trends reflected either in Figure 9 or Figure 35 are visible. The highest share refers to programmes addressing Technology & process optimisation at a rather low TRL Level (Lab demonstration).

Concerning the addressed product life cycle phases, Figure 39 is not fully reinforcing trends obtained in Figure 7 and Figure 36: for none of the funded type of activity the end of life seems to be the product life cycle phase predominantly addressed.

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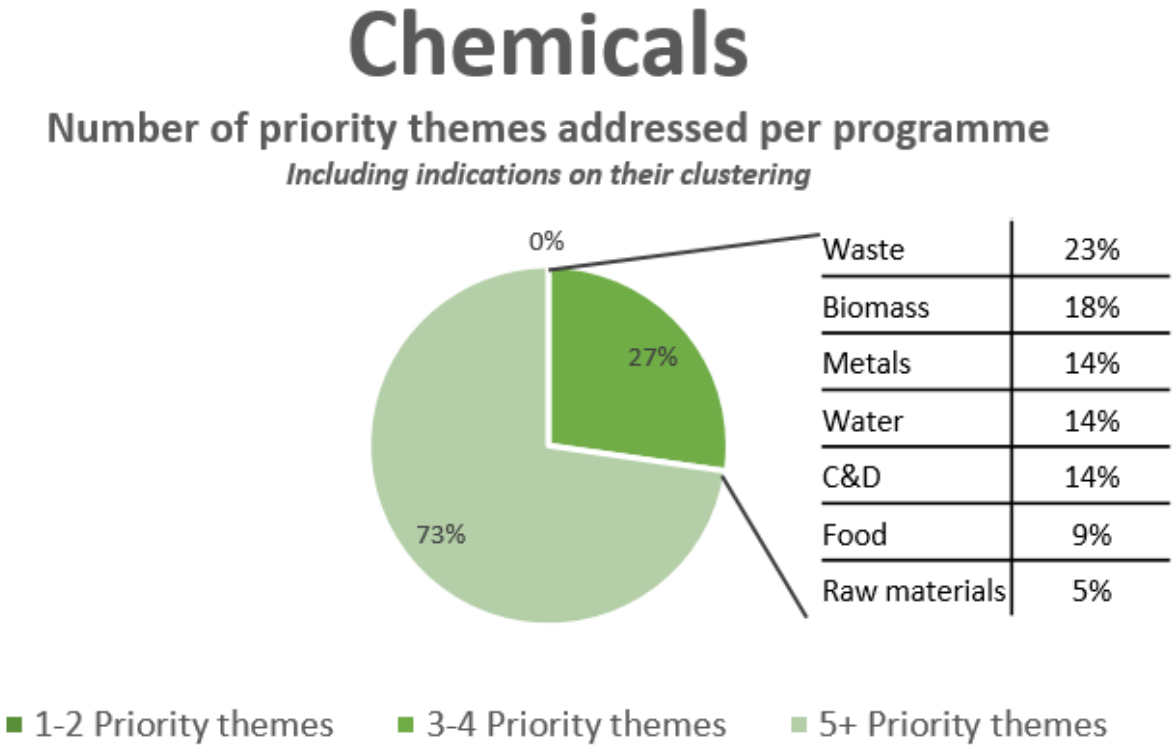

Figure 37 Number of priority themes addressed per programme, Chemicals

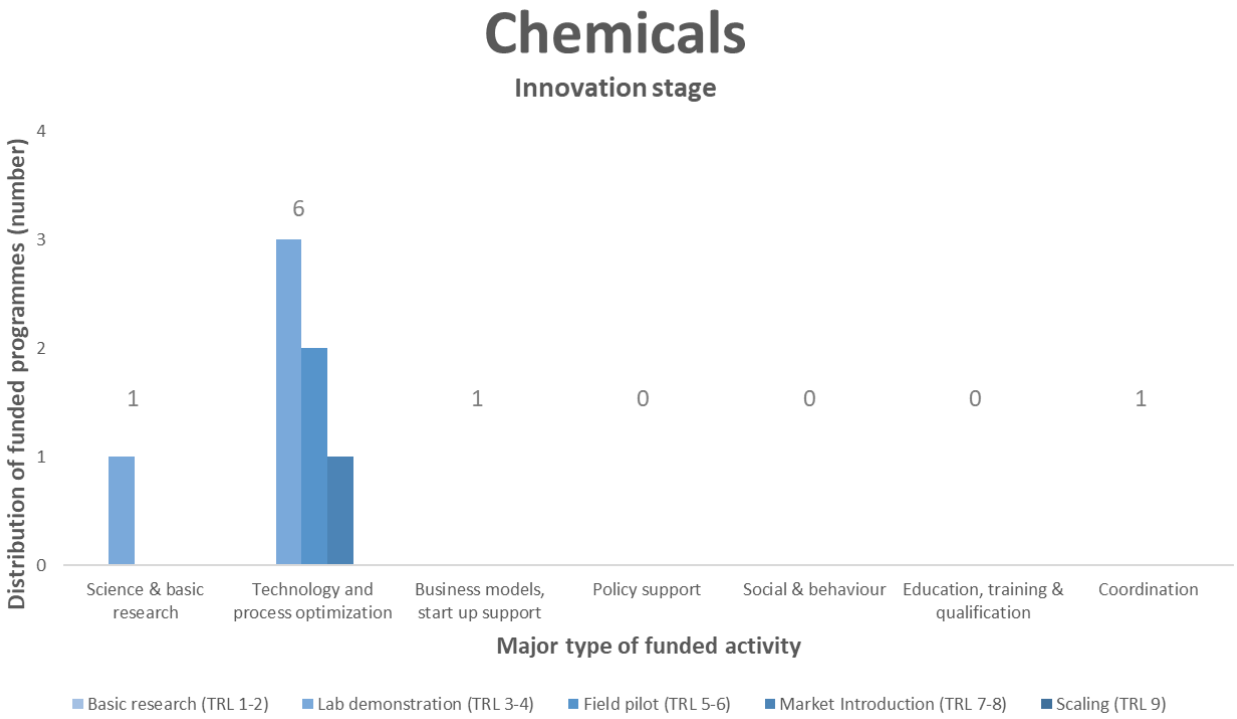

Figure 38 Distribution of programmes per type of funded activity, Chemicals - Innovation stage, sensitivity analysis

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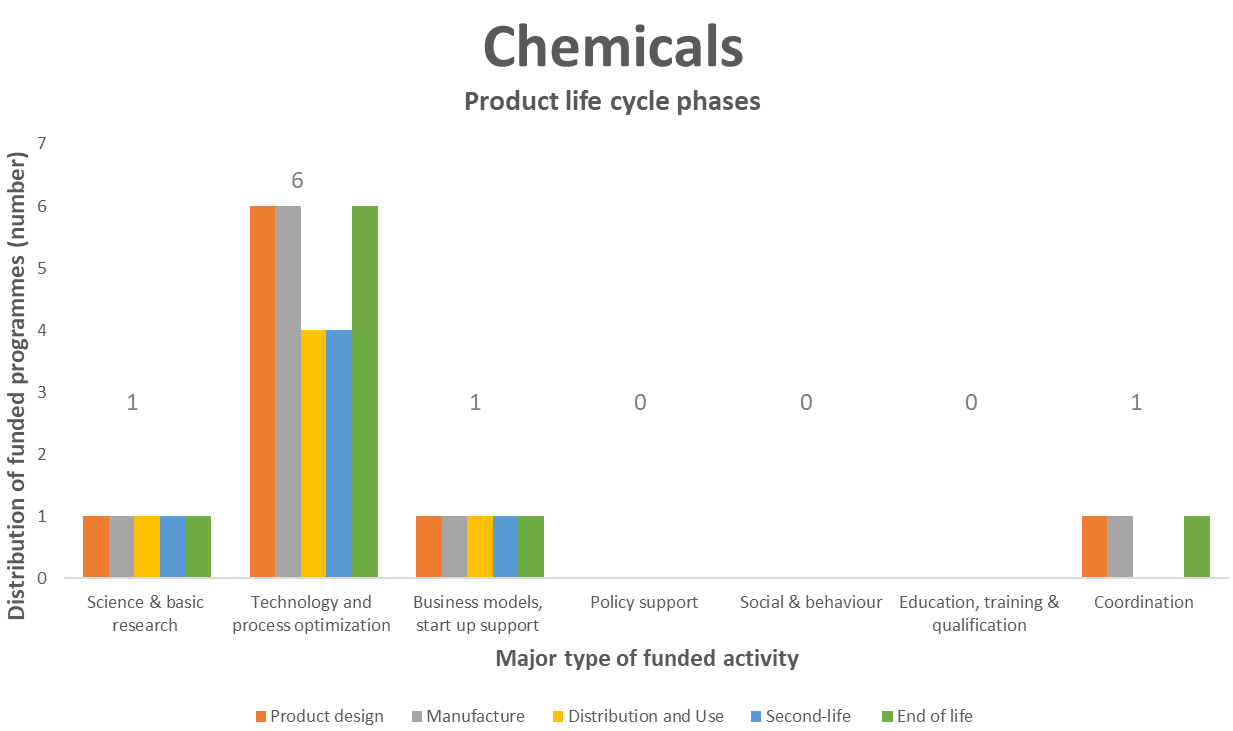

Figure 39 Distribution of programmes per type of funded activity, Chemicals - Product life cycle phases, sensitivity analysis

3.2.7 Food

Within the list of 108 CE funding programmes, 34 of them were indicated as addressing Food. Figure 40 and Figure 41 show that for Food, the trend highlighted in Figure 8 is consistent: the largest share of programme addressing Food are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is not reflected for programmes addressing Food for the different types of funded activity, see Figure 40. Indeed, this figure allows to show that programmes principally funding Technology & process optimisation type of activities are principally at a scaling innovation stage. Programmes funding business models type of activity are also addressing a higher innovation stage (market introduction).

The trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is reflected especially for programmes funding Technology & process optimisation type of activity. It is also consistent with regards to Science & basic research as well as Coordination types of funded activity for which the manufacture phase seems equally addressed, see Figure 41. This figure also allows to see that this trend is slightly more balanced for other type of funded activity (e.g. Business models), for which all product life cycle phases seem to be more equally addressed.

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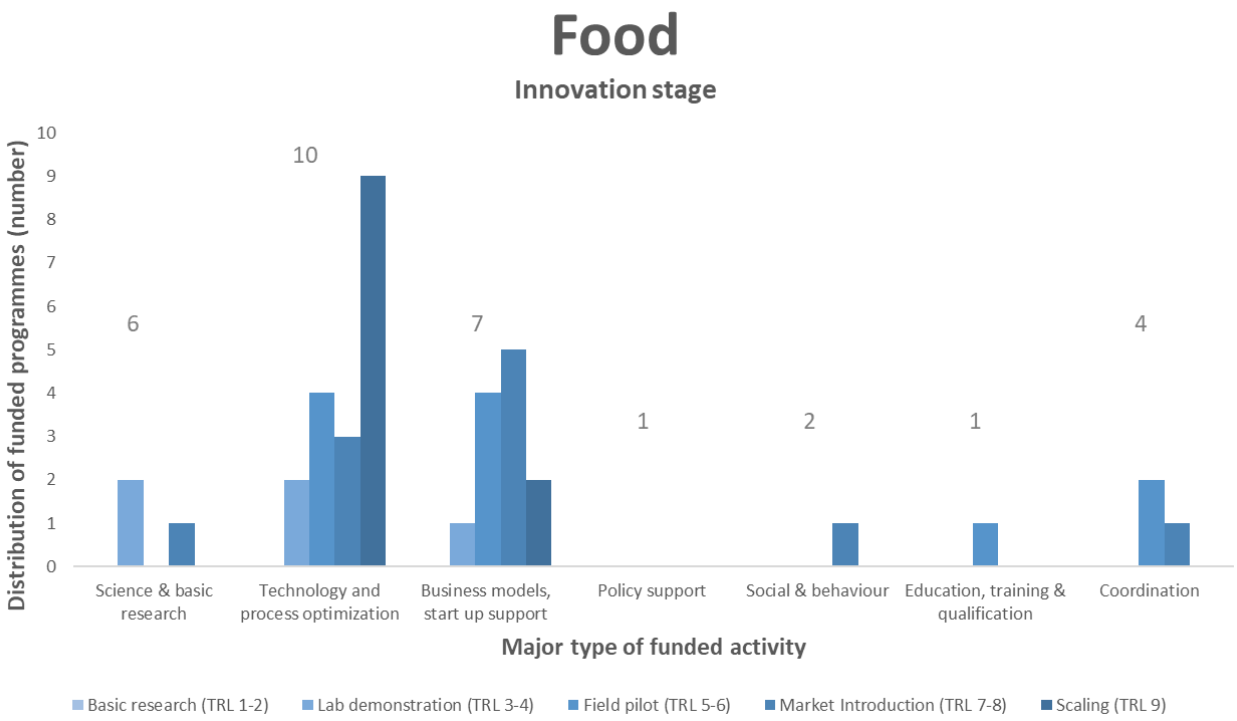

Figure 40 Distribution of programmes per type of funded activity, Food - Innovation stage

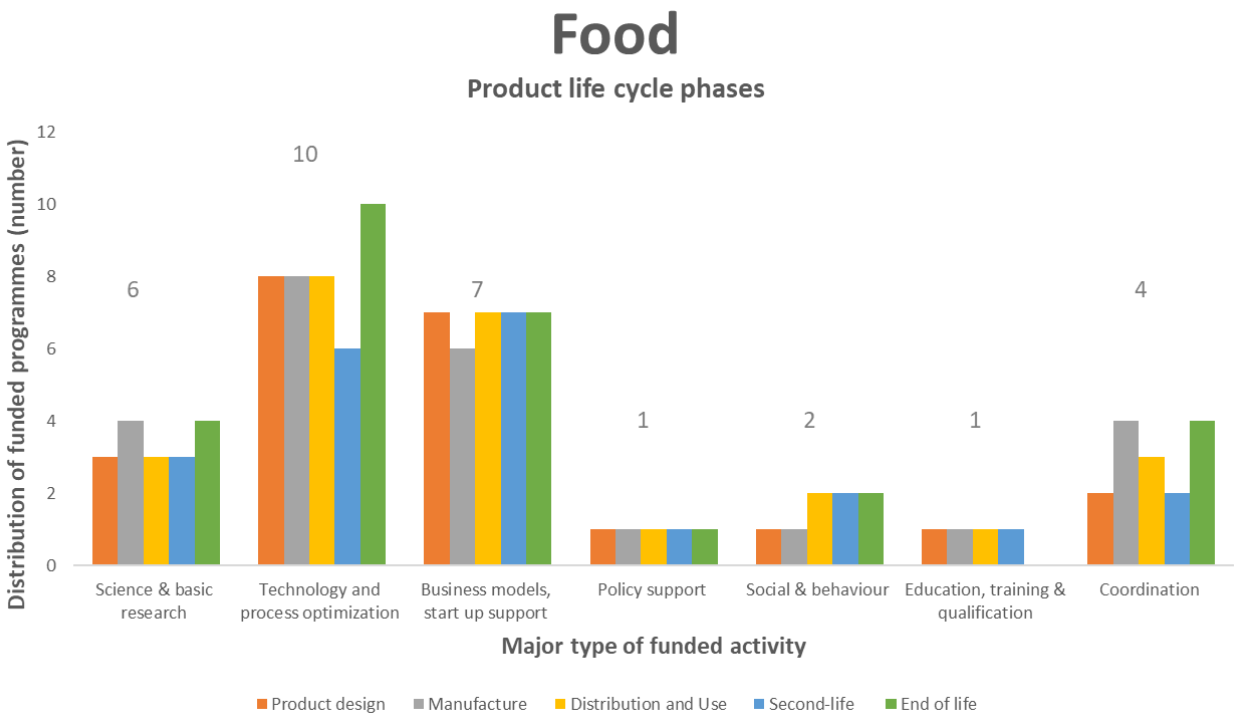

Figure 41 Distribution of programmes per type of funded activity, Food - Product life cycle phases

Sensitivity analysis

Among the 34 programmes indicated as addressing C&D, 14 of them (41%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 42. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those

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14 programmes are mostly Biomass (26%) and Waste (22%). Figure 40 and Figure 41 have thus been plotted again by only representing those 14 programmes, see Figure 43 and Figure 44.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) Food, Figure 43 shows that the trends reflected in Figure 9 and Figure 40 are less visible. While the trend reinforces the fact that programmes funding Food and Technology & process optimisation type of activity are addressing higher innovation stage than field pilot, the highest share refers to programmes addressing Technology & process optimisation at a market introduction innovation stage (not principally scaling as shown in Figure 40).

Concerning the product life cycle phases, Figure 44 is reinforcing trends obtained in Figure 7 and Figure 41: the end of life seems to be the product life cycle phase mostly addressed by programmes funding Technology & process optimisation. Science & basic research as well as Coordination types of funded activities also mostly address the end of life but together with the manufacture life cycle phase.

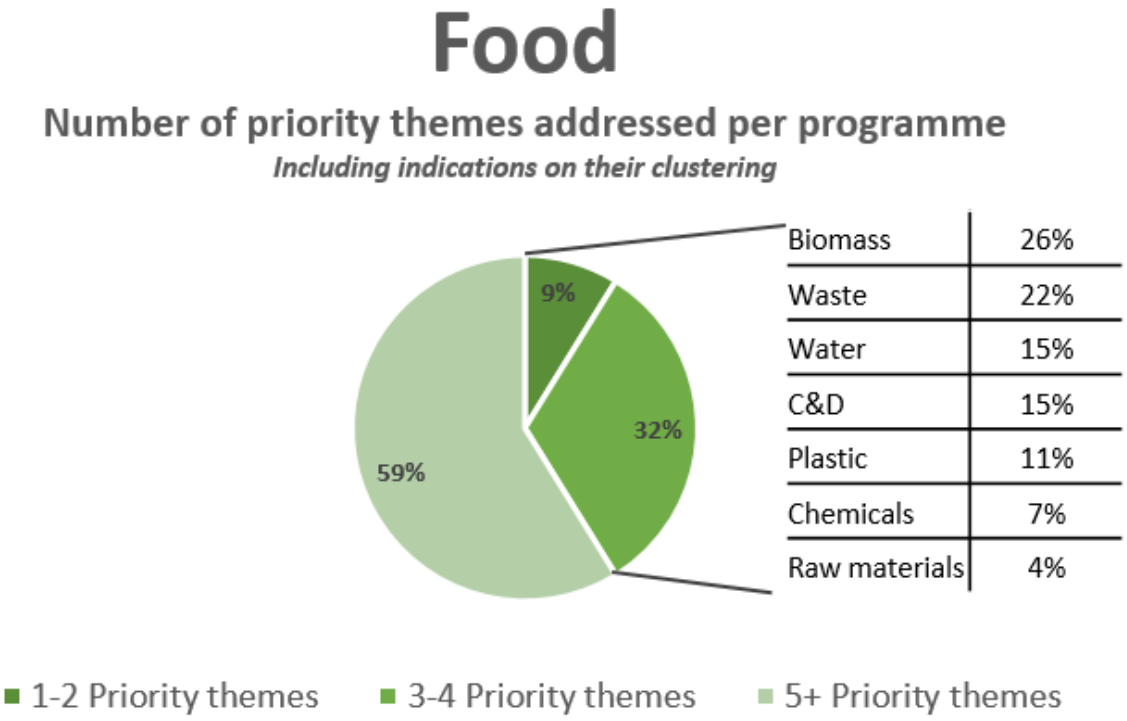

Figure 42 Number of priority themes addressed per programme, Food

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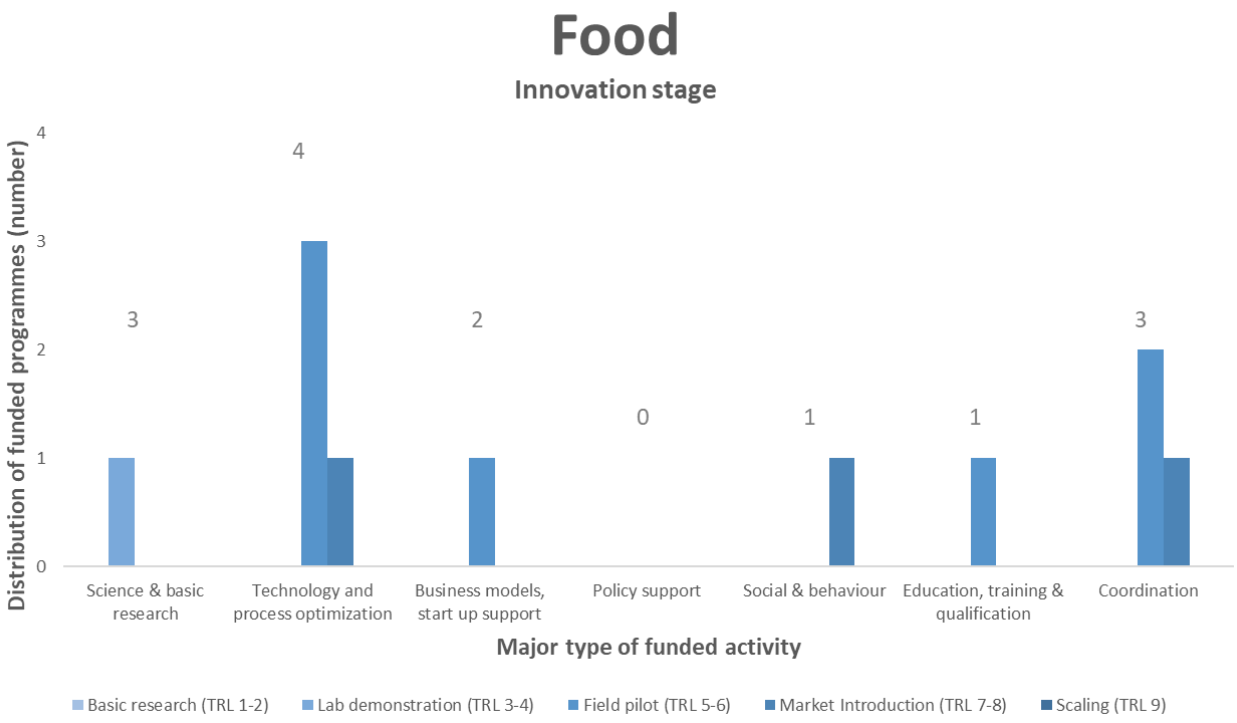

Figure 43 Distribution of programmes per type of funded activity, Food - Innovation stage, sensitivity analysis

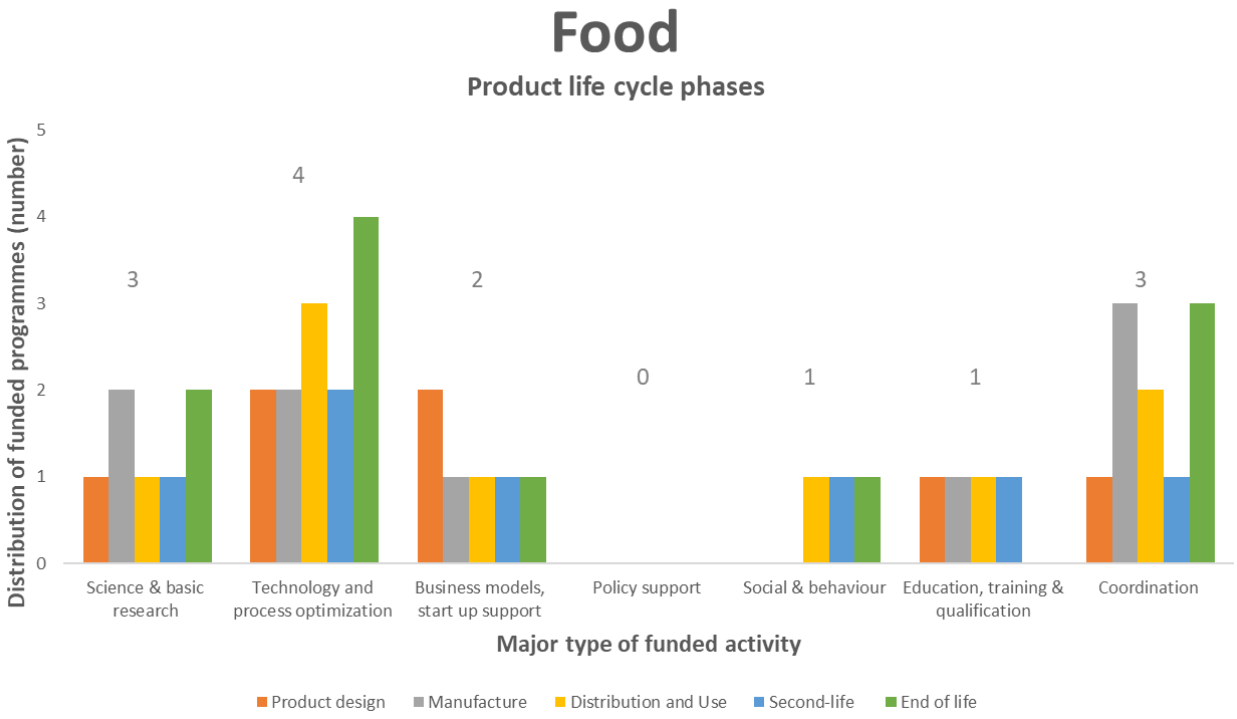

Figure 44 Distribution of programmes per type of funded activity, Food - Product life cycle phases, sensitivity analysis

3.2.8 Biomass and Biotechnologies

Within the list of 108 CE funding programmes, 45 of them were indicated as addressing Biomass. Figure 45 and Figure 46 show that for Biomass, the trend highlighted in Figure 8 is consistent: the largest

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share of programme addressing Biomass are currently funding Technology & process optimisation type of activity.

The trend shown in Figure 9 (share of current funding programmes principally addressing the field pilot innovation stage) is reflected for programmes addressing Biomass and funding Technology & process optimisation type of activity, see Figure 45. This figure also allows to show that programmes principally funding business models type of activity are addressing a higher innovation stage.

The trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) seems only reflected for programmes addressing Biomass and funding Business models related type of activity, see Figure 46. This figure thus allows to show that for Science & basic research as well as Technology & process optimisation types of funded activity the manufacture phases seems principally addressed.

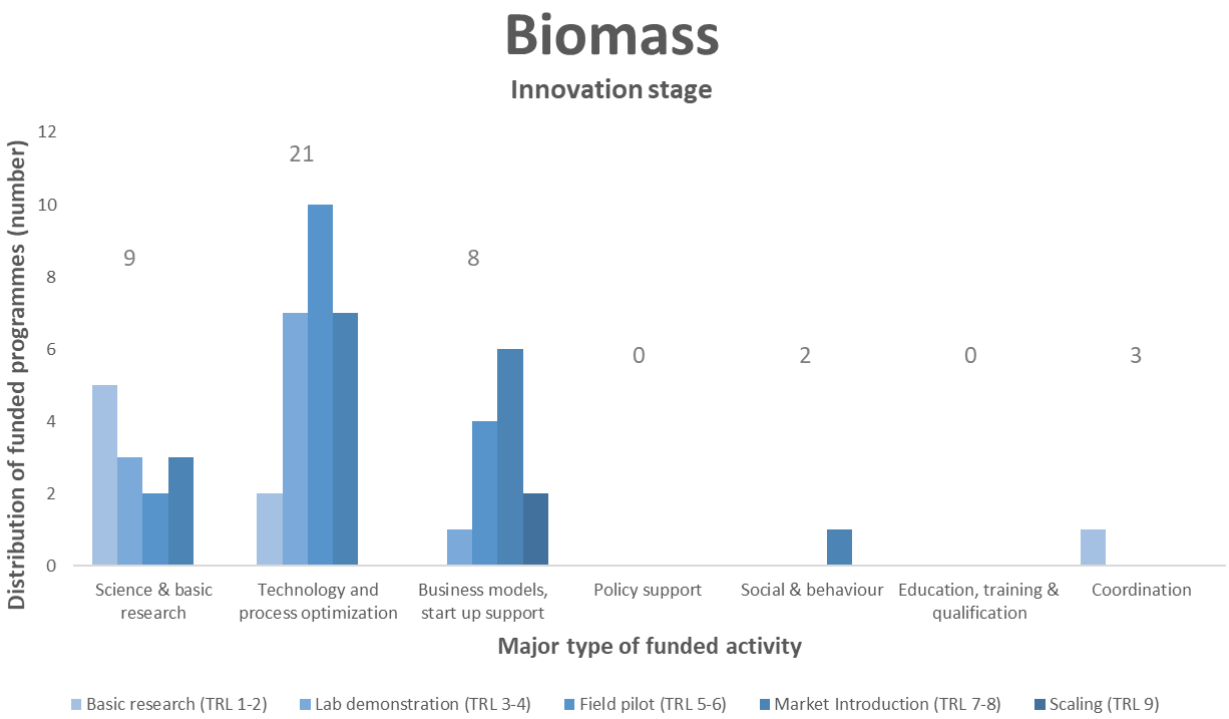

Figure 45 Distribution of programmes per type of funded activity, Biomass - Innovation stage

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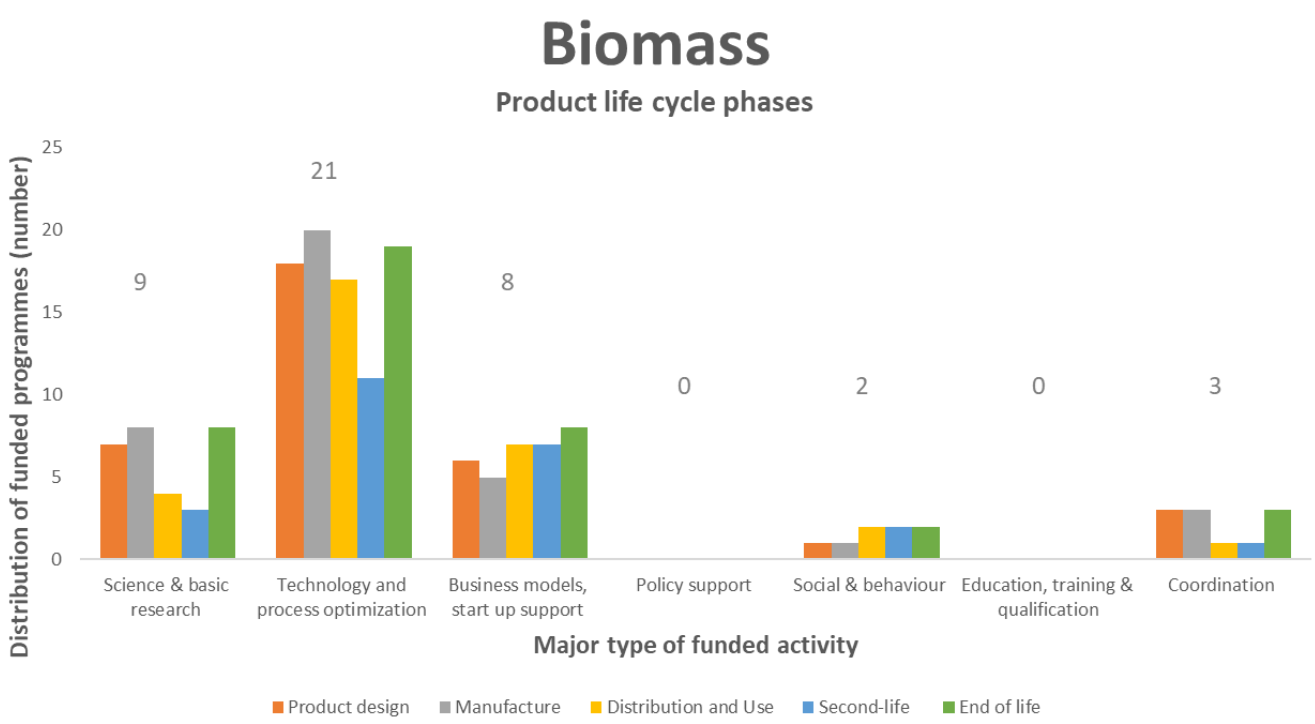

Figure 46 Distribution of programmes per type of funded activity, Biomass - Product life cycle phases

Sensitivity analysis

Among the 45 programmes indicated as addressing Biomass, 20 of them (45%) seem to have a more specific focus (addressing less than 5 priority themes), Figure 47. In order to provide indications on eventual clustering tendency, this Figure also shows that additional priority themes addressed by those 20 programmes are mostly Waste (31%) and Food (19%). Figure 45 and Figure 46 have thus been plotted again by only representing those 20 programmes, see Figure 48 and Figure 49.

By plotting only CE funding programme addressing more specifically (programmes addressing more than 5 resource flows have been removed) C&D, Figure 13 shows that the trend reflected in Figure 9 and Figure 45 is less visible. While the highest share still refers to programmes addressing Technology & process optimisation at a field pilot innovation stage, the share of Science & basic research at a rather low TRL Level is also significant.

Concerning the addressed product life cycle phases, Figure 48 is reinforcing the trend obtained in Figure 46: the end of life seems to be the product life cycle phases only mostly addressed by programmes funding business models related type of funding activity. Concerning Science & basic research as well as Technology & process optimisation, the manufacture product life cycle phase seems at least equally addressed that the end of life phase.

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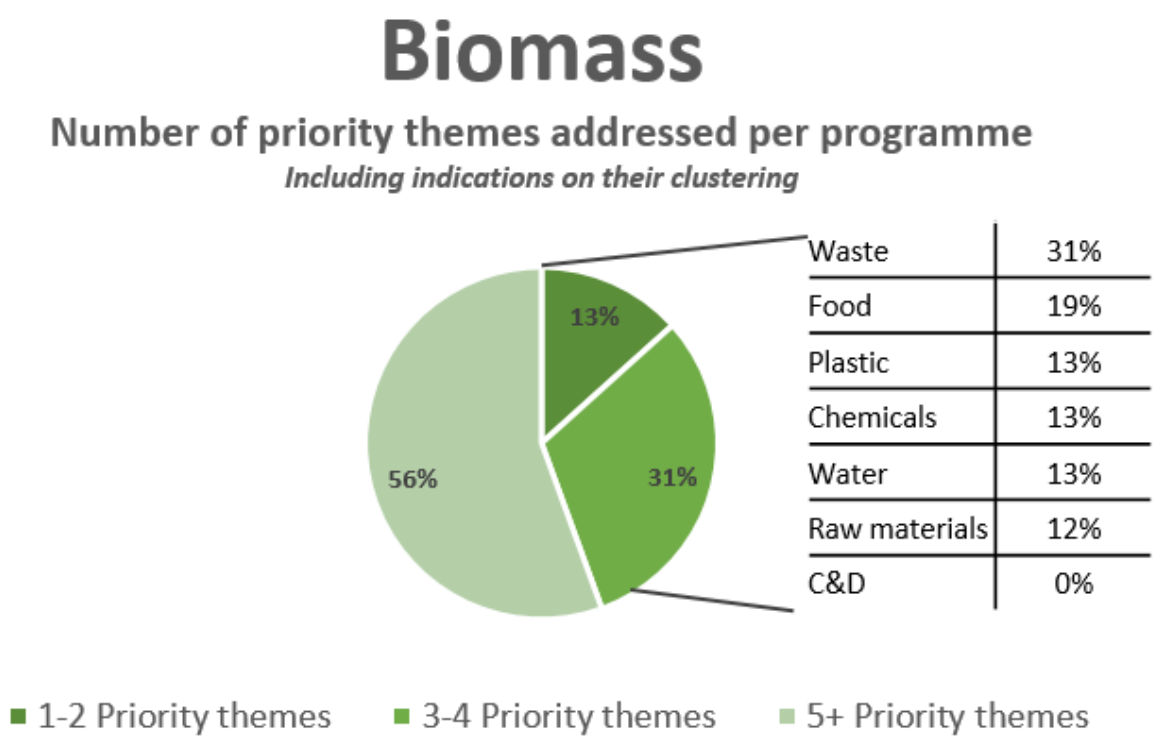

Figure 47 Number of priority themes addressed per programme, Biomass

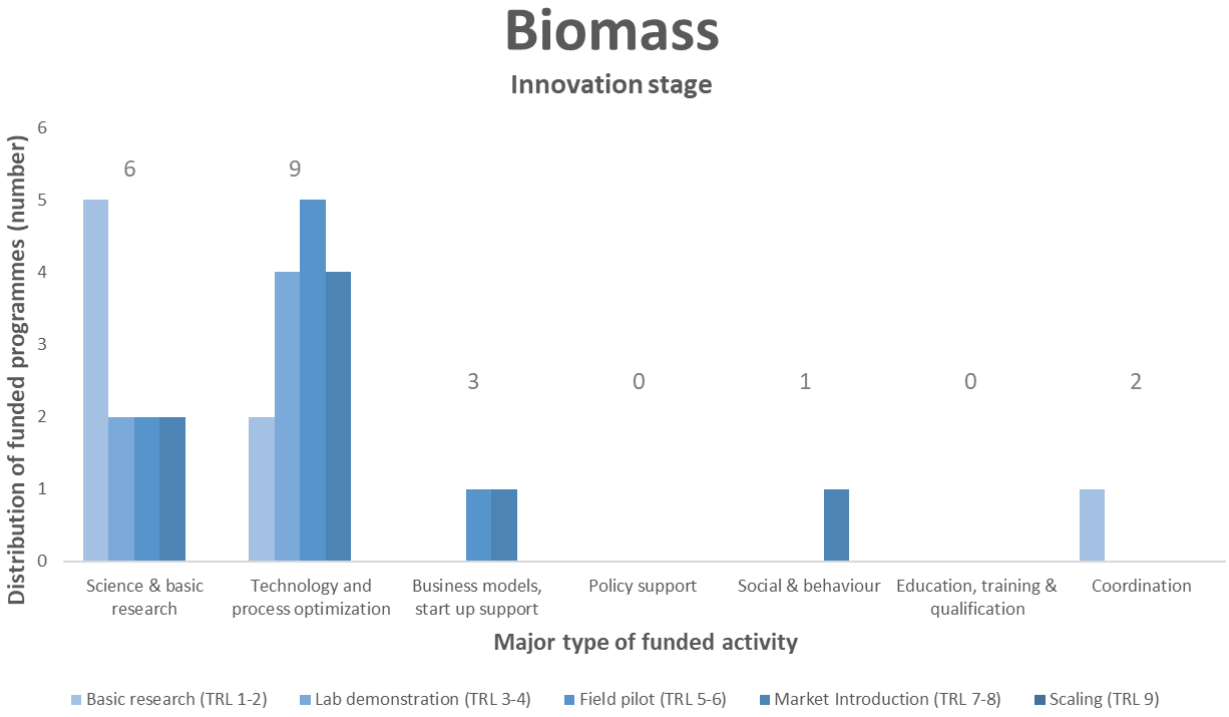

Figure 48 Distribution of programmes per type of funded activity, Biomass - Innovation stage, sensitivity analysis

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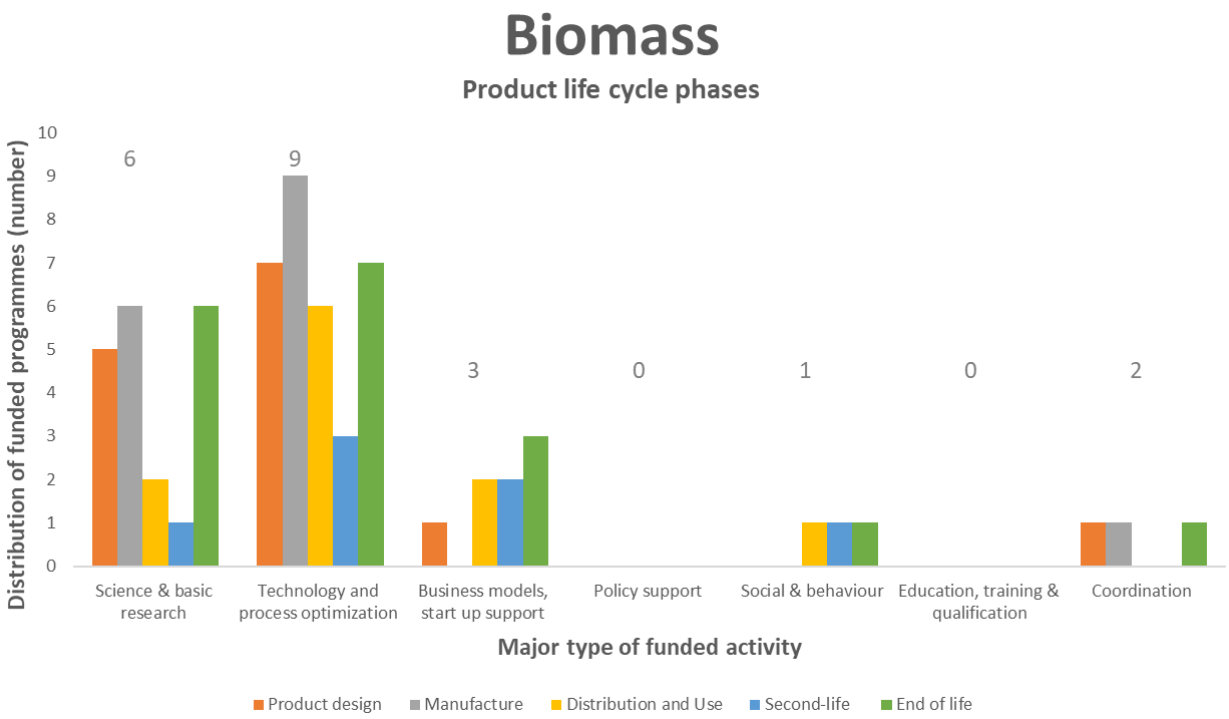

Figure 49 Distribution of programmes per type of funded activity, Biomass - Product life cycle phases, sensitivity analysis

3.3 Findings and learnings for the SRIA

In order to provide useful insights for the SRIA it is important to explain that this coverage analysis is based on the 108 current CE funding programmes gathered by T1.1. Those funding programmes provide a consistent picture of current CE funding programmes but other relevant programmes could have been listed by partners. It is why the notion of trends or highlights is used for deriving potential insights. The data validation step (see section 2.3) also played a significant role in the consistency of data inputs for the coverage analysis.

Insights obtained during those phone calls might also be used as a basis for any future similar exercise. When developing such type of questionnaire, the right combination between open and closed questions needs to be found. Having too many open questions might require additional efforts in the processing of the data in order to obtain comparable data (especially in the same format) for an analysis. On the other hand, restricting too much the respondent's "freedom" with only predefined answer options might result in wrong data interpretations. For this specific questionnaire, an additional section giving the respondent the opportunity to justify her/his answer below a closed question would have been beneficial (but also probably more time consuming for the respondent).

The objective of the coverage analysis was to assess the funding scope coverage of existing programmes for CE in analogy with the development of the SRIA. The 108 current CE funding programmes have thus been mapped per priority theme.

The mapping allowed to understand that the trend shown in Figure 8 (the largest share of programmes is currently funding Technology & process optimisation type of activity) seems consistent for all priority themes. However, the sensitivity analysis also allowed to show that when mapping only the programmes with a major focus (addressing less 5 priority themes), this trend might evolve. For

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instance, programmes mainly addressing C&D or Water priority themes are equally funding Science & basic research type of activity.

The mapping per priority theme also allowed to provide more detailed insights on the current innovation stage of CE programmes. Figure 9 showed that current funding programmes are principally addressing the field pilot innovation stage. For most priority themes, this trend is reflected for programmes funding Technology & process optimisation type of activity. However, the analyses shown that programmes principally funding business models type of activity seems addressing a higher innovation stage (e.g. Plastic, Waste, …). The sensitivity analyses also allowed to reinforce or even sometimes highlight different trends (e.g. concerning Chemicals while programmes seem addressing lab demonstration, field pilot innovation stages in a balanced way, the sensitivity analysis showed that the focus seems more present on the lab demonstration innovation stage).

For most priority themes, the trend shown in Figure 7 (share of current funding programmes principally addressing the end of life product life cycle phase) is consistent for programmes funding Technology & process optimisation type of activity. The mapping also allowed to show a more balanced picture for other types of funded activity for which all product life cycle phases seems more equally addressed. In some cases, the sensitivity analysis allowed to reinforce those highlights (e.g. Waste, see Figure 34) while in other cases it allowed to show that an emphasis on other product life cycle phases is also present (e.g. Biomass, the manufacture phase seems at least equally addressed for programmes funding Science & basic research as well as Technology & process optimisation types of funded activity, see Figure 49).

As mentioned, for all priority themes the mapping of current CE funding programmes allowed to emphasize the trend shown in Figure 8 (the largest share of programmes is currently funding Technology & process optimisation type of activity). Policy support, Social & behaviour, Education, training & qualification as well as Coordination type of funded activities are mainly not currently addressed by CE funding programmes. Based on this mapping and depending on the prioritized “areas” which will be defined by the SRIA clear gaps between current and future CE funding programmes could thus be detected.

The sensitivity analyses also allowed to show that some priority themes, currently addressed by CE funding programmes, are more subject to be addressed in programmes with more specific focus. Indeed, the share of programmes addressing less than five priority themes varies from 24% for Raw Materials to 55% for Waste. For those specific examples it thus seems that Raw Materials is a theme mainly addressed in a combination of several other priority theme while Waste is the core theme of those programmes. The sensitivity analyses also allowed to provide indications on priority themes clustering tendencies.

T2.1 can thus build on this coverage analysis for identifying some gaps with future SRIA objectives. This mapping provides insights on the type of funded activities, product life cycle phases as well as innovation stages per priority themes. It also allowed to provide T2.1 partners insights on the influence of programmes with no main focus as well as current priority themes clustering tendencies.

As no direct questions within the survey results were directly referring to the challenges, priority themes have been used as a driver for the mapping. Current insights on the way challenges are addressed within current CE programmes cannot be retrieved with this coverage analysis.

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4 CASE STUDIES

4.1 Objective

The objective of the case studies is to identify key success factors in the **operations** of a circular economy funding programme, including how a programme is defined, how projects are recruited and selected, how projects are monitored and evaluated, etc. The learnings can be shared with CICERONE stakeholders, in particular programme owners (POs). They can also be used in the design of pilot joint programmes in CICERONE.

4.2 Case selection

The task selected 4 programmes for the case study.

The original plan was to select the programmes based on their actual performance. Performance was defined as how well the programme has achieved its own KPI targets. Therefore, the questionnaire included questions on what the programme's KPIs are, what the (quantitative) targets are, and what the actuals are. However, the received data showed that although 50% of the programmes filled in KPIs, most are actually generic or qualitative objectives. Only about 20% of the programmes listed quantitative targets, and only 10% had measured the actuals. One reason can be that many circular economy funding programmes are relatively new and have not yet been running long enough to measure results. This led to the conclusion that there is too little data on the actual performance to serve as a selection criterion.

Therefore alternative selection criteria and process were developed. The principle of representativeness was used: the 4 cases were selected to be as representative as possible. The selection process and rationale is explained as the following:

First of all, TRL/IRL focus and programme level were identified as parameters with high relevance to programme operations. TRL and IRL stand for Technology Readiness Level and Investment Readiness Level respectively. They were divided into 3 groups: Research (TRL/IRL 1-3), Demonstration (TRL/IRL 4-6), and Investment (TRL/IRL 7-9). The rationale was that different TRL/IRL focus may have potential impact on the operations of a funding programme, such as target beneficiary types, funded activity, funding rate, KPI setting, selection process, monitoring and follow up, etc. Programme level is also divided into 3 groups: transnational, national and regional (regions within a country). Programme level is also expected to have an impact on the operations of the programme. The operations of a programme are expected to be less dependent on other parameters, such as sectoral focus or resource flow focus.

Next, the 102[6] programmes were clustered along these two parameters in a 3x3 matrix. Both parameters were already included in the questionnaire, so clustering could be done using the collected data. As shown in Figure 50, about 60 programmes fitted into the 3x3 matrix, though some appeared in more than one cell (e.g. they may cover a wide range of TRL/IRL). About 40 programmes were outside of the matrix, due to missing input on one or both parameters in the questionnaire[7]. Based on the distribution of the programmes in the matrix, it was decided that the cases will be chosen with the four following representative profiles, one case each:

- Transnational programme with a low-medium TRL/IRL focus;
- National programme with a low-medium TRL/IRL focus;

[6] Number of programmes gathered when the case study selection has been performed
[7] Which might have been updated later based on the data validation step, see Section 2.3.

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- National programme with a medium-high TRL/IRL focus;
- Regional programme with a medium-high TRL/IRL focus.

	Research	Demonstration	Investment	Unknown
Unknown	1	2	1	3
Transnational	0	2	2	8
National	26	25	23	17
Regional	0	4	8	7

Figure 50 Clustering of funding programmes

Furthermore, geographic representativeness was incorporated for the national and regional cases, to include one case from northern-western Europe, one from southern Europe and one from central-eastern Europe.

Last but not least, programme owner consent and engagement level were used to reach the final selection.

Figure 51 shows the four selected programmes for case study:

- Horizon 2020
- MatRessource (Germany)
- Incentives for research, development and innovation projects (RRI) (Slovenia) [8]
- Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region (Italy)[9]

[8] Resource efficiency of companies (Estonia), was firstly selected. While the consent from the PO was obtained and that the first interview was conducted, the full case study method (see Section 4.3) could not be applied (answers from additional interviewees concerning their willingness to participate have not been received). T1.4 partners judged consistent to identify and select a programme fitting within the same representativeness criteria. While not listed among the 108 programmes in D1.2, UM established contacts and conducted the interviews with RRI PO and project beneficiary.

[9] While not listed among the 108 programmes in D1.2, ENEA had the opportunity and judged consistent to conduct an additional interview with the PO of the ERDF Operational Programme of the Region of Umbria as it is a programme considered active and representative of Italian current programmes related to CE.

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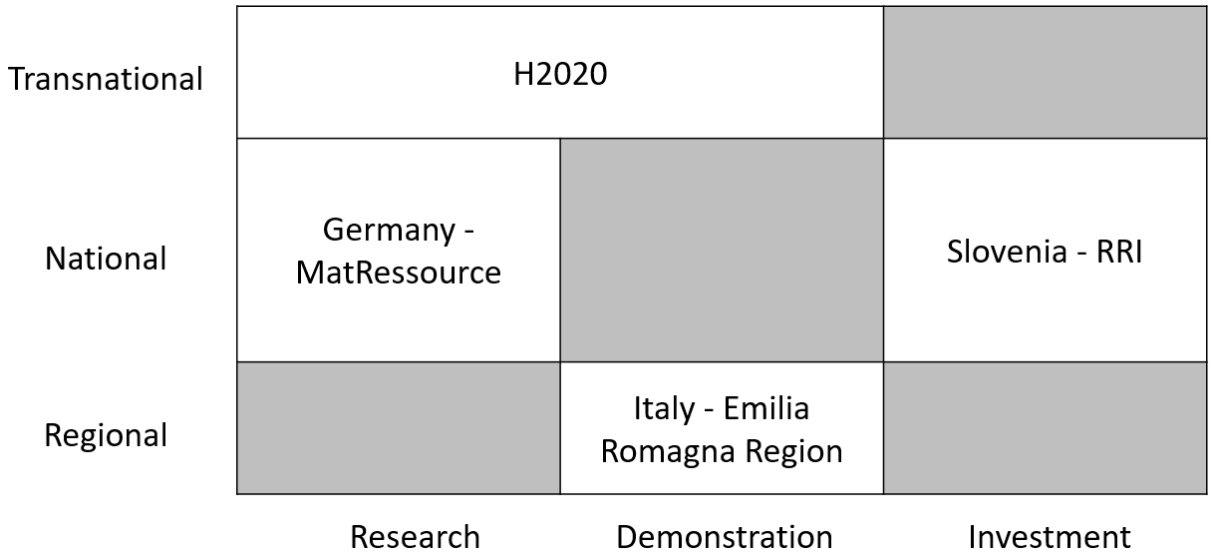

Figure 51 Selected programmes for case study

4.3 Case study method

The case studies were conducted with interviews (phone or face-to-face). For each case programme, at least three interviews were foreseen: one with the programme owner at the agenda-setting level, one with programme owner at the executional level, and one (or more) with project beneficiary.

The case studies sought answers to two major research questions:

1. Collaboration (value chain; societal; cross-functional) is of particular importance to circular economy. How does the programme foster collaboration?
2. Indicators. How are indicators used in the selection, monitoring and evaluation phases of the programme?

An interview guide was developed (see Appendix 3), with a list of questions for each interviewee group, in different phases of the programme (initiation, selection, monitoring, evaluation and follow-up. The T1.4 partners responsible, see Table below, of the case studies could adapt the questions as needed for their interviews.

CICERONE partner	Case study responsible
PNO	H2020
GKZ	MatRessource
UM	Incentives for research, development and innovation projects (RRI)
ENEA	Emilia Romagna Region

Table 3 Assignment of case studies for CICERONE T1.4 partners

4.4 Cases study results

4.4.1 Case 1: H2020

Brief description of the programme:

Introduction:

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Horizon 2020 (H2020) is the largest Research, Development and Innovation programme in the EU ever implemented. For the period 2014-2020, the total budget of H2020 is almost EUR 80 billion. The general aim of the Horizon 2020 programme is to drive economic growth and create jobs across the EU by taking great ideas from the lab to the market. With its emphasis on excellent science, industrial leadership and tackling societal challenges, it should enable discoveries and breakthroughs. Horizon 2020 aims to improve the collaboration between private and public entities by setting up consortia, which will lead to faster and more efficient innovation.

General characteristics of the programme:

Funding opportunities (through calls for proposals) under Horizon 2020 are built around three pillars:

- Societal Challenges
- Industrial Leadership
- Excellent Science

Horizon 2020 supports both projects at the beginning of the innovation chain focused on research activities via so-called Research and Innovation Actions (RIAs), as well as projects closer to market implementation via so-called Innovation Actions (IAs). Also, Coordination and Support Actions (CSA) are supported focusing on standardization, dissemination, awareness raising and communication, networking, coordination, support services, policy dialogues, mutual learning exercises or studies. All calls for projects related to either RIA, IA or CSA aim at one of the three pillars (i.e. tackling a specific societal challenge, fostering industrial leadership, or supporting excellence science).

Besides, resulting from the Enhanced European Innovation Council pilot, five extra funding instruments are established within H2020: the SME Instrument, the Fast Track to Innovation (FTI), Future and Emerging Technologies (FET), Open and Horizon Prizes.

What is the relevance for circular economy?

In the period of 2014-2020, three work programmes have been drafted, i.e. for the periods 2014-2015, 2016-2017 and the currently active work programme 2018-2020. Since the first work programme, H2020 has funded circular economy projects, ranging from research focused RIAs to IAs focusing on piloting or demonstration of new circular concepts. Moreover, in the final work programme, four focus areas have been established with one of them focusing on "Connecting economic and environmental gains – the Circular Economy." This focus area comprises calls about research, innovation and financing of projects and initiatives that will support circular economy related projects.

Within this focus area, calls for proposals are organised related to the following topics:

- ❖ Leadership in enabling and industrial technologies – Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing, and Biotechnology (LEIT-NMBP)
- ❖ Societal Challenge 2: Food security sustainable agriculture and forestry, marine and maritime and inland water research, and the Bio-economy (EUR 252 million)
- ❖ Societal Challenge 3: Secure, clean and efficient energy (EUR 2006 million)
- ❖ Societal Challenge 5: Climate action, environment, resource efficiency and raw materials (EUR 433.5 million)

Format and date of the interviews:

Three interviews were conducted in the context of this case study:

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Date:	Format:	Interviewee	Occupation
Thursday 20 June 2019	Telephonic interview	Anonymous	Project advisor EASME
Wednesday 10 July 2019	Telephonic interview	Anonymous	Head of a specific sector, European Commission's DG Research and Innovation
Friday 20 September 2019	Telephonic interview	Anonymous	Project beneficiary/ coordinator, mechanics department of an RTO

Table 4 Format and date of conducted interviews for H2020

Findings and learnings:

Key findings concerning collaboration and indicators in the H2020 programme are presented below.

COLLABORATION:

- *Collaboration is a requirement for projects applying for funding under H2020*

Collaboration is an eligibility requirement for all projects applying for funding under the Horizon 2020 programme. Collaboration (value chain; societal; cross-functional) is of particular importance to the circular economy, and call topics addressing CE might include specific collaboration requirements, such as inclusion of partners from different parts of the value chain or from different academic disciplines. It is important to note, however, that collaboration as a requirement in the H2020 programme does not originate from ideas on CE, but rather from the idea to stimulate collaboration between EU Member States and European organisations. Collaboration is seen as a means to stimulate knowledge diffusion and innovation.

- *Gradually a more holistic view on CE was adopted resulting in a focus on value chain collaboration*

The interviewees remarked a shift in focus and interpretation of the CE between the first and the later work programmes. Initially, CE was primarily interpreted from a technical point of view which gradually changed towards a more holistic view. As a consequence, the call topics started to emphasize collaborations that include entire value chains taking into account citizens and civic organisations, and collaboration among different academic disciplines (including social sciences and humanities).

- *Quality of consortia rather than their size is important to collaboration under H2020*

The interviewees indicate that there appears to be a maximum to the number of participants in consortium for a fruitful collaboration. However, there is no rule of thumb on what the optimum number is as this is very context/content dependent. To deliver excellence in the project, it is deemed important that all required roles are covered by partners that complement each other.

- *No additional support for sustaining consortia after project life under H2020*

No additional support is provided to ensure that collaborations sustain after the project life time. However, starting from the proposal phase, consortiums are stimulated to develop strong exploitation plans.

- *Project beneficiary experiences constructive and efficient collaboration, also with the PO*

Whether collaboration is actually effectively and efficiently organised across all H2020 projects was not mapped in the interviews. The one project beneficiary that was interviewed, however, stated that in his project, there was a high degree of interaction and discussion among partners and with the PO's project which was successful.

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INDICATORS:

Indicators are in place to monitor and evaluate funded projects as well as to monitor and evaluate the H2020 programme as a whole.

1. Project indicators
   - *Project consortia should draft their own specific CE indicators since none are set from top-down*

The programme has a bit of a hybrid organization approach, i.e. on the one hand it has top-down elements (especially in formulating the call topics), but also clear bottom-up characteristics. The top-down indicators are in place to measure the progress and impact of the project on how well they meet the requirements of the work programme and the specific call.

No top-down indicators exist specifically on CE, but consortia have the opportunity to draft CE indicators for their projects themselves. As a result, some projects compile interesting sets of criteria that might be useful for other projects, e.g. the SCREEN project[10] and the C-SERVEES project[11]. Whereas the SCREEN project focused on the CE transition in regions, covering all sectors, the C-SERVEES project has a narrower focus on delivering CE products and services (such as ICT based) for the Electric & Electronic sector. C-SERVEES is currently still ongoing and the criteria are not available yet, but the criteria developed in SCREEN are available and are listed in Table 5. More information on what those criteria actually involve and how to measure and assess them can be found in their report[12].

Thematic area	Assessment criteria
Production	1. Circular Design
	2. New production process accepting "secondary raw material"
Consumption	3. Re-Use, Re-Manufacturing, Refurbishment, Repair
	4. Waste reduction
Disposal	5. Industrial Symbiosis: mass of waste resources recovered and re-introduced in a production cycle as secondary raw material
	6. Project promoting waste recycling
Climate	7. "Net Energy balance respect to the previous system" or "Amount of energy recovered"
	8. Reduction of emissions
Employment	9. Net balance of jobs

Table 5 CE assessment criteria drafted in the SCREEN project

The interviewed project beneficiary states that within their projects, they usually compile two sets of KPIs; one technical set and one set focused on the economic aspects of the project. In his project, all partners are required to draft their own KPI sets and are responsible for their own business case. This way, all KPIs in the project are well understood by the people in charge which is believed to contribute to effective project progress. Also, the partners have to provide starting values and target values for all of their indicators at the start of the project.

- *Economic KPIs are deemed important for (CE) impact measuring*

[10] Project website, http://www.screen-lab.eu/overview.html
[11] Project website, https://c-serveesproject.eu/index.php
[12] Project report, http://www.screen-lab.eu/deliverables/Table-rev4.pdf

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Effective economic KPIs are believed to be crucial for assessing CE projects. The technical KPIs are very project and context specific, but the economic KPIs can be generic for many different types of projects. The interviewed project beneficiary furthermore argues that those economic KPIs are in general most important when evaluating and communicating the impact and replication potential of the project. Without effective business case, economic viability is low and successful market implementation and replication would rely on legislation.

2. Programme indicators

- *To monitor and evaluate the programme as a whole, no specific CE indicators are in place*

For the programme as a whole, an impact assessment is conducted to monitor and evaluate its contributions to scientific, societal and economic impact[13]. There are no overarching indicators that apply for all 3 pillars, but for societal challenges there is a set of KPIs which, however, does not include indicators specific for CE. The sectors and topics that are covered in the societal challenges of H2020 are so diverse that drafting specific CE KPIs that are representative for all projects is a very difficult task. For example, the number of publications and patents can be good indicators for sectors that are at the beginning of their CE transition, but for more mature sectors such as energy, they would make less sense.

- *Suggestions to include more specific CE indicators to evaluate and monitor future programmes and projects*

Important to note is that since July 2018 overall policy monitoring indicators[14] on CE are in place for the EU. This monitoring framework consists of 10 indicators divided into four thematic areas which are listed in the table below. These indicators could be considered when developing KPIs for future CE funding programmes. Yet, it must be kept in mind that assessing the progress and impact of CE projects remains difficult; for example, because research and innovation takes longer to reveal results.

Thematic area	Circular Economy indicators
Production and consumption	EU self-sufficiency for raw materials
	Green public procurement
	Waste generation
	Food waste
Waste Management	Recycling rates
	Recycling / recovery for specific waste streams
Secondary raw materials	Contribution of recycled materials to raw materials demand
	Trade in recyclable raw materials
Competitiveness and innovation	Private investment, jobs and gross value added related to CE sectors
	Number of patents related to recycling and secondary raw materials

Table 6 EU policy indicators on CE that could be used in future funding programmes[15]

[13] Latest publication on impact monitoring of H2020, https://publications.europa.eu/en/publication-detail/-/publication/cbb7ce39-d66d-11e8-9424-01aa75ed71a1/language-en/format-PDF/source-78275165

[14] https://ec.europa.eu/eurostat/web/circular-economy/indicators

[15] https://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework.pdf

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Transcriptions of the conducted interviews for the H2020 case study can be retrieved in Appendix 4.

4.4.2 Case 2 : MatRessource (Germany)

Brief description of the programme:

MatRessource – Materials for a Resource-Efficient Industry and Society is a funding initiative of the Ministry for Education and Research (BMBF) centring on material for resource efficiency for the duration of 2012/20. The overall budget size is 70 million euro. Until now, there are in total 44 collaborative projects funded through three calls. MatRessource is within the BMBF framework programme WING – Material Innovations for Industry and Society.

Resource efficiency in MatRessource is interpreted as the sustainable use of resources while at the same time reducing of environmental impacts. MatRessource supports projects where an increase in resource efficiency is achieved through one of the following strategies:

- Substitution
- Increasing energy and material efficiency
- Recycling for circular economy
- Extension of lifespan and optimisation of chemical processes

The increase in resource efficiency can be achieved by various measures:

- Reducing the use of resources (input)
- Reducing of material emissions (output)
- Increasing of utility productivity of deployed resources

The priorities of the funding measures are noted as follows:

- Substitution and material efficiency: many future technologies rely on high-tech metals and other strategic industrial raw materials which do not occur/occur limitedly as mineral resources in Germany. To reduce reliance on such critical raw materials, the development of new materials is necessary:
    - Reduction of the specific demand for critical raw materials
    - Replacement of critical raw materials by other, less critical raw materials
- Corrosion protection: when the application of new innovative corrosion protection measures reduces the material damage caused by corrosion, it does not only reduce the economic loses, but also the need of replacing metal products:
    - Increasing the lifespan of components, production facilities and power stations,
    - Improving the efficiency, safety and environmental compatibility.
- Catalysts and processes optimisation: more than 80% of all products in our daily lives are based on materials produced with the help of catalytic processes. As a key technology, catalysis can make a significant contribution to secure the supply of raw materials:
    - New processes for producing basic products from crude oil, natural gas, coal or alternative raw materials
    - Increasing material efficiency in the production process itself.

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Format and date of the interviews:

Date:	Format:	Interviewee	Occupation
Thursday 08 August 2019	Telephonic introduction and answering the interview questions via writing	Dr. Karen Otten	Head of the department "Materials Technology for Energy and Mobility" in the field of "New Materials and Chemistry" at Projektträger Jülich, Forschungszentrum Jülich GmbH.
Thursday 05 September 2019	Telephonic introduction and answering the interview questions via writing	Dr. Wolfram Palitzsch	CEO of Loser Chemie GmbH, a SME from Germany – 17 employees in the company, but 240 in the group under the umbrella of L´fficiency Holding

Table 7 Format and date of conducted interviews for MatRessource

Only two interviews were conducted as Dr. Karen Otten is occupying both the function of PO at agenda-setting and execution level.

Findings and learnings:

Key findings concerning collaboration and indicators in the MatRessource programme are presented below.

COLLABORATION:

Cooperation is the prerequisite of funding but Projektträger Jülich, Forschungszentrum Jülich GmbH (PtJ) itself did not involve in the formation of consortia and its continuation. The interdisciplinary cooperation was particularly appreciated by Loser Chemie GmbH and was regarded as a success factor. Loser Chemie GmbH indicated that most of the project partners work further together in business-to-business (B2B) and in some cases, in new projects. In the funding programme, activities such as networking events between projects, contacting other comparable research activities, information disseminations to public, developing the aforementioned guideline and survey were carried out by an accompanied scientific coordination project (i.e. MaRKT[16]). PtJ regards the accompanied scientific coordination as one of the key factors of success as it strengthens the understanding of resource efficiency, the topic of the funding initiative, and networking.

INDICATORS:

The funding procedure of MatRessource has two-stages. At the first stage, the projects are selected through comparing project outlines against a pre-defined criteria by both internal and external experts. The programme beneficiary, Loser Chemie GmbH, believes it is important to take the proposed target and content into consideration during the selection process. In addition, they found it is preferable to have multilingual coordinators.

[16] MaRKT's introductory webpage on MatRessource website : https://matressource.de/de/projekte/projekte-alphabetisch/markt/

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The projects are monitored through the interim reports. There is neither a benchmark for measuring the progress due to diverse topics and type of research projects nor a KPI in place. On the other hand, a guideline was provided to projects for creating an accepted basis for the evaluation of resource efficiency through material innovations. According to Loser Chemie GmbH, supports for monitoring progress mainly came from project coordinators. Loser Chemie GmbH found it helpful to have a contact person and reminders for reports, meetings, etc.

For final evaluation, projects were to provide numerical evidence describing the results achieved and planned exploitation. An additional survey was conducted to assess the most important results of the projects and to be able to present an estimated resource efficiency potential of all projects. However, no criteria was clearly defined from the outset for the evaluation at end of the funding period. If one has defined a clear criteria used for the final evaluation from the beginning, it would be easier to draw conclusions and evaluate the success of the funding initiative. In the case of MatRessource, no clear resource efficiency criteria were defined in the call for tenders. Hence, it was very difficult to evaluate them later according to the relevant criteria. After projects end, there is no follow-up actions from PtJ.

OTHERS:

While Loser Chemie GmbH found that the uncomplicated and sufficient promotion enables a functional demonstration. Regarding possible improvement of the funding programme, Loser Chemie GmbH thinks there is still a lack of funds for implementing higher TRL level or for constructing pilot plants. It would be better if more support for upscaling and industrial applications is provided.

Transcriptions of the conducted interviews for the MatRessource case study can be retrieved in Appendix 5.

4.4.3 Case 3: Incentives for research, development and innovation projects (Slovenia)

Brief description of the programme:

The aim of the programmes connected with circular economy are to encourage companies to implement circular economy into their practice, to speed up development of the companies in circular economy directions and to encourage companies to integrate their processes in a way to reduce energy and material use with a goal to raise the efficiency. There are many areas, covered by the programme like water, waste management, chemicals, food and others. CE indicators used are connected with effects to water, energy use and environment- especially environmental aspects of energy consumption and increase in resource efficiency.

Format and date of the interviews:

Date:	Format:	Interviewee	Occupation
Tuesday 24 September 2019	One on one interview	Anonymous	Responsible for preparing of programme tenders at Slovenian Ministry of economic development and technology
Monday 7 October 2019	One on one interview	Anonymous	Director at ECHO d.o.o. company[17], which received funds from RRI

[17] ECHO d.o.o. is specialised in consulting and performing measurements of physical and chemical parameters regarding environmental impacts. They are developing sensors and measurement techniques, instruments, etc. The company has twelve employees, who are mostly PhDs in electrical engineering, IT, chemistry and other. They

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			program (research, development and innovation program in the priority Circular Economy)

Table 8 Format and date of conducted interviews for Incentives for research, development and innovation projects

Findings and learnings:

Key findings concerning collaboration and indicators in the RRI programme are presented below.

COLLABORATION:

Collaboration is encouraged within the programs already in selection phase- companies that collaborate with others get more points, which encourages added value of supply chain and connects elements of specific supply chain – the Ministry also wants to increase with this programme an added value via the supply chains, initiating new partnerships/collaboration.

The programme does not provide support connecting different selected project "alumni" to enhance knowledge sharing and collaboration. The programme does also not offer possibility to extend deadlines, or at least there has not yet been such case.

According to the project beneficiary, collaboration was important part of the project, as they are strongly cooperating with the company, who produces algae- without them their product could not carry out the results. Interviewee indicated the importance of cooperation, especially the global ones, as if you cooperate globally, you do not depend on local economic crisis. He also indicated, that collaboration could be improved within the program, if administrative processes would be simplified, as sometimes there is not a high enough transparency in the system.

INDICATORS:

The criteria for selection, indicators are different, those focusing on the circular economy:

- How well is project integrated with the principles of CE and smart specialization as well as strategic goals of S4 (smart specialization)
- The technology/research excellence
- The level of integration of the following elements: eco-design, process innovations, innovations in business models, innovations regarding marketing
- One of the evaluation criteria is: how well the project contributes to circular economy (based on the ReSOLVE methodology[18])
- Collaboration with other companies in terms of supply chain added value
- Location of the project/companies – those in the Eastern part of Slovenia got more points, as this part is way underdeveloped comparing to the EU average.

do not own production area their patents or plans for products are outsourced and being produced from suppliers or business partners.

[18] Assessment criteria, based on ReSOLVE methodology and used by the reviewers, are following:
- the contribution of the project to the conservation of ecosystems;
- the contribution of the project to fully exploit/use of products, processes in services, and extending their life;
- the contribution of the project to reduce energy consumption of raw materials and downstream products;
- the contribution of the project to the circulation of substances in the materials at the end of their use;
- the contribution of the project to the reduction of raw material and energy consumption via digitalization (virtualization);
- the contribution of the project to the replacement of old technologies, materials with new ones.

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Project beneficiary interviewee considered that the criteria used in the selection process were suitable, but there is a need for objective criteria in finance area. Still based on the interview, as credit assessments are not objective by all the companies, who carry them out, so company could lose points on unrealistic basis. Project beneficiary felt the programme was flexible, clarifications were possible, there was also possibility to improve a proposal in terms of additional documents and clarifications. The points were clearly explained and the deadline for the application (3 months) was long enough, as the company usually has the idea before the program is tendered. They would only suggest a possibility to add pictures in applications, as sometimes there is hard to describe the product only in words. A sample application would also be helpful.

The monitoring phase lasts for two years, in which three reports have to be carried out (first after six months, second after fourteen months and third after twenty-four months. The goals are evaluated through timelines, where certain activities have to be executed. Finances are also monitored. Monitoring is also carried out on the field (in the companies), where audits are made. POs use certain KPIs to monitor progress, which are adjusted to specific project and are communicated to the project beneficiary. This has been validated with the project beneficiary's perspective, which explained that the KPIs are mostly connected with the deadlines, quality and reaching the planned objectives. They are specific for every project and are easy to interpret.

The follow up actions include monitoring the companies five years after the project has ended, the beneficiaries also have to report about success and efficiency of the programme. If the performance is insufficient, there are sanctions, defined within the contracts. There is no collaboration requirement after the project ends, so they do not control, if collaborations between organisations further exist.

PO interviewee sees positive consequences of the program in encouraging companies to start thinking in CE direction, but there is yet no major CE principles developed and integrated in most of the companies. There is no platform to capture knowledge about the performance of the project, because results and findings are often business secrets. However, the new Finance platform in 2021 suggests upgrades and separate section on CE area, which shows positive effects of promotion and encouragements in the field.

Project beneficiary interviewee claimed that it is hard to evaluate the successfulness of the project, as it has not yet ended, but until now the program is successful. The key success factors are; creating a new product, added value, and (on the long term) establishing a laboratory for measurements, which brings new employees within the supply chain. The program reporting process could be improved by shortening the report periods, as it is hard to collect all documentation and reports for a six or nine-month period. The program would also be more attractive, if the financing was higher and at least a part of founds would be payed-off in the beginning of the project.

<u>OTHERS:</u>

The ECHO d.o.o.'s project, financed from the RRI program, was connected with biodegradation of raw materials in algae environments, which is strongly related to CE concepts, especially with issues of water pollution, waste management and producing environmentally friendly materials, which will effect waters minimally. The company saw two benefits/impacts by the program; marketing, knowing that the product will create higher added value to the supply chain and boost network sales to new areas and scientific aspect- their goal is to become one of the world's top companies in the scientific and technological area.

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A suggestion from their side for the CICERONE platform is to contain information about matching projects, so similar projects and companies could connect and exchange experiences, products developed in one project could be shared in another. It would also be helpful to create a platform containing equipment data, which could be available for industry sharing (such as microscopes, sensors etc.). Another suggestion is cloud sharing, so participants could share timelines and create synergy or interdisciplinary project linking.

Transcriptions of the conducted interviews for the RRI case study can be retrieved in Appendix 6.

4.4.4 Case 4: Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region (Italy)

Brief description of the programme:

The funding program is in the framework of the Emilia Romagna regional strategies. In particular, Pilot 1 with the Smart Specialization Strategy ('Promotion of sustainable development - Green and blue economy).

The concept of Smart Specialization Strategy (S3) has been developed at European level and indicates innovation strategies - flexible and dynamic - conceived at a regional level but evaluated and organized at national level to avoid the interventions fragmentation sharing research and innovation policies and to develop regional innovation strategies that enhance the production areas of excellence taking into account the strategic territorial positioning and development prospects in a global economic framework.

The Regions of all the Member States are called to draft their own Smart Specialization Strategies starting from the resources and capabilities they have, identifying the competitive advantages and technological specializations most consistent with their innovation potential and specifying the public and private investments necessary to support the strategy.

The program was defined agreed with the Emilia Romagna regional S3s, established also through public consultation, in particular on Research & Innovation, identifying 4 strategic priorities and 5 specialization areas, considered as a driver for the current economic and social importance and due to their growth potential.

Main focusing areas from S3 consultation were emerged and they correspond to the pillars of the regional economy (in terms of % of total employees):

- Agribusiness
- Construction
- Mechatronics and motor engineering
- Health and wellness industries
- Cultural and creative industries

At program launch, CE was not explicitly mentioned because it was not a completely shared concept. However environmental sustainability uses the circular economy as a driver and match the regional energy plan in line with European objectives (2030 Agenda), including the circular economy, through the concept of resource efficiency (materials, as well as human, territorial etc resources).

Format and date of the interviews:

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Date:	Format:	Interviewee	Occupation
Friday 7 June 2019	One on one interview	Anonymous	Responsible of one service of Emilia Romagna Region Direction
Wednesday 19 June 2019 Thursday 20 June 2019	One on one interview	Anonymous	Researcher

Table 9 Format and date of conducted interviews for Emilia Romagna Region

Three interviews were conducted:

- One with the PO, as the interviewee is occupying both the function of PO at agenda-setting and execution level.
- Two with different project beneficiaries

Findings and learnings:

Key findings concerning collaboration and indicators in the Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region programme are presented below.

COLLABORATION:

Collaboration is required and the formation of consortia promoted. Collaboration is a means to stimulate knowledge diffusion and innovation. In the case of research projects, up to 5 research organizations and/or stakeholders were engaged for "testing" the results, while a minimum of two companies had to participate in projects without financing. Such collaboration has been defined profitable by project beneficiaries.

INDICATORS:

The projects had to include objectives agreed with program ones. Research projects, in particular, had to be collaborative (research-companies) and innovative. Specific KPIs were not required, but measurable and credible objectives were mandatory.

The project proposals were required to explain the expected progress beyond the state of the art (benchmark) and the monitoring aimed to verifying its concrete realization.

At program launch, Circular Economy was not explicitly mentioned because it was not a completely shared concept. Nevertheless, even if specific circular economy indicators were not explicated, some of the program specific objectives are sustainability related (such as % CO_2 saving). Now the circular economy concept is shared and it will be included in the future programs, including specific performance indicators.

Monitoring and evaluation phase:
Research projects had to deliver a middle-term and a final report. The first one has to explain the progress of the project according to the expenses. The final one is object of an overall evaluation, by program owners as well as by an independent external evaluator, in order to have the goals achievement (or the non-achievement) certification. The final payment for unreached goals is not made.

OTHERS:

Emilia Romagna PO states that Circular Economy is a complex concept and beneath it is desirable the loop closure on the whole value chains projects, from design to the end of life, this achievement is not

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immediate. There is need of a large leader company able to build the whole supply chain, while Italy has mainly a small and medium enterprises texture. The way could be encourage the industrial symbiosis, and the SMEs would be agreed, but this is hampered by relevant regulatory problems. Project beneficiary suggests a more careful evaluation of long term impacts.

Transcriptions of the conducted interviews for the Emilia-Romagna region case study can be retrieved in Appendix 7.

4.4.5 Additional results

As mentioned in section 4.2, additional interviews were conducted. While the case study method does not fully apply as only one interview has been conducted for both additional programmes, the relevant insights of those interviews have still been transcribed in the following subsections.

4.4.5.1 Estonian Ministry of the Environment- Resource efficiency of companies

Brief description of the programme:

The programme Resource efficiency of companies was initiated, because the resource productivity in Estonia is very low, meaning that there is a strong need for a circular economy based projects. The objective of the programme is to increase Estonian company's resource productivity and competitiveness. Furthermore, the programme was also initiated to make the economy more competitive. The programme is defined by public sector, the requirements are worked together with industry representatives. The interviewee's organisation is public and deals, among other, with circular economy connected activities like waste reduces and supporting IT systems for circular economy.

Format and date of the interviews:

Date:	Format:	Interviewee	Occupation
Monday 1st July 2019	Telephonic interview	Anonymous	Adviser in Environmental management department at Estonian Ministry of the Environment (agenda-setting level)

Table 10 Format and date of conducted interview for Resource efficiency of companies

As described above, only one interview has been conducted as potential additional interviewees (PO - execution level and project beneficiaries) could not have been reached.

Findings and learnings:

Key findings concerning collaboration and indicators in the Resource efficiency of companies programme are presented below.

<u>COLLABORATION:</u>

The programme foster collaboration because of the investment, one requirement is to have resource audit (resource use analysis), who evaluate the collaboration with the resource use specialists. They want to have the best possible outcome of the project, which is the reason for collaboration.

<u>INDICATORS:</u>

The projects are selected based on four main criteria. Those are innovation and increased resource productivity (general criteria), cost effectiveness and resource efficiency (general criteria). General criteria are innovation and increased resource productivity, which are weighted 50-50%. If the project passes the general criteria, then they have additional requirements, which are weighted as followed;

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50% resource efficiency, 30% cost effectiveness, 20% applicant's capability. Resource efficiency is specific criteria and for instance represents, if raw material is used more efficiently in production.

In the monitoring phase, the main indicators are number of supported enterprises and number of projects implemented, also how much resources they are saving. They also use benchmark. The KPIs used for monitoring are raw material use (how and if efficiently used) - for example electricity, heat consumption measurement etc. These KPIs are project specific, do not consider collaboration and are explicitly communicated to the project beneficiary.

In the evaluation phase, the impact of the project is not specifically measured. Success factors of the programme are mainly, that the resource efficiency is raised, the companies are more competitive and that the economy productivity is raised in long term view. If the performance of the project is evaluated as insufficient, the ground money can be taken back.

The follow up action after projects have ended is often the promotion of best practices, where videos are made to raise awareness for CE.

Transcriptions of the conducted interview for the Resource efficiency for companies additional case study can be retrieved in Appendix 8.

4.4.5.2 ROP Umbria ERDF 2014-2020 in the Umbria Region (Italy)

Brief description of the programme:

The ERDF Operational Programme (OP) of the Region of Umbria has been developed in line with the regulatory and normative framework, acknowledging and embracing the principles of the 2014-2020 cohesion policy.

Region of Umbria, through the ERDF Operational Programme 2014-2020, intends to support effective actions (in effect "driving impact") designed to foster smart, sustainable and inclusive growth in the region, according to the requirements identified, the needs revealed by economic and social partnerships, the recommendations of the Council as expressed in the Partnership Agreement and National Reform Programme.

The program is addressed to Enterprises and Public Bodies to fund the following types of projects:

- TO1 "Research and Innovation" provides funding for: Research and Development projects (also complex); System actions, Innovative Start up and Living labs. 101.834.404,00 € (24,7% of the total)
- TO3 "SMEs competitiveness" provides funding for: support interventions in territorial areas affected by industrial crisis, SMEs in areas of crisis; support and promotion of cultural and creative enterprises; SMEs internationalization; support SMEs investments; support SMEs operating in the social field. 85.507.200,00 € (20,7% of the total)
- TO4 "Sustainable Energy" provides funding for: energy consumption reduction and energy efficiency in production processes; investments in renewable energy production. 55.960.120,00 € (13,6% of the total)
- TO6 "Sustainable Urban Development" supports the main Umbrian Cities (Perugia, Terni, Foligno, Città di Castello e Spoleto) in a Smart Cities perspective, with interventions related to sustainable mobility and ICT development. 30.816.400,00 € (7,5% of the total)

The challenges to face through the OP are: specialization and innovation in the region; competitiveness of the production fabric; protection and enhancement of territorial resources; sustainable development; seismic prevention.

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At program launch Circular Economy (CE) was not explicitly mentioned. The CE theme has emerged during the RIS3 thematic Working Groups (attended by different stakeholders, such as Public Bodies, researchers, entrepreneurs, academia) managed by Region of Umbria between October 2016 and December 2018. The CE has been included as a transversal theme for the 7 specialization areas and it has been structured in detail in the "Energy and Green Chemistry" area through specific research and innovation lines, such as for instance: technologies and solutions for a more efficient resources use, substitution of hazardous substances and environmental impact reduction; business models for circular economy; technologies and processes for reusing, remanufacturing and recycling of products (including bioactive components); circular design and life cycle management; technologies and biotechnologies to recover and enhance biobased products and biochemicals.

Format and date of the interviews:

Date:	Format:	Interviewee	Occupation
Thursday 19 September 2019	One on one interview	Anonymous	Responsible of one service of Umbria Region Direction

Table 11 Format and date of conducted interview for Umbria Region

As described above, only one interview has been conducted. ROP Umbria ERDF 2014-2020 in the Umbria Region was not listed among the 108 programmes but has been judged by T1.4 partners as relevant, as it is considered active and representative of Italian current programmes related to CE.

Findings and learnings:

Key findings concerning collaboration and indicators in the Umbria Region programme are presented below.

COLLABORATION:

Collaboration has been the basis of the projects funded under the TO1, and it occurred also at an interregional level.

INDICATORS:

Selection phase:
The general criterion for projects selection is the evaluation of their contribution to pursue (in terms of expected results) the specific goals of the OP. In particular, the selection criteria approved by the Monitoring Committee are used. These criteria are defined for each Action of the OP and include: "eligibility criteria", "evaluation criteria" and "performance criteria".

Specific KPIs regarding CE are not defined. However, specific KPIs are defined for each TO. For example, amongst evaluation criteria regarding the TO4 the following are used:

- Contribution of the project to the reduction of fossil energy consumption and polluting emissions
- Reduction of the gross consumption of electricity from fossil fuels
- Maximization of the contribution to the energy self-sufficiency of the enterprise (technical quality)
- Ratio between investment costs and reduction of the gross consumption of electricity from fossil fuels (technical-financial quality)

Monitoring phase:
To monitor the funded projects, a specific monitoring system (SMG 2014-2020) that encompasses both output and performance indicators, has been created. With particular regard to the RIS3, the

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monitoring system also includes a "context table" to monitor those projects contributing to its implementation, thus allowing a comprehensive view on the RIS3 progress per specialization areas.

Transcriptions of the conducted interview for the Umbria Region additional case study can be retrieved in Appendix 8.

4.5 Findings and learnings from the cases

The objective of the case studies was to identify key success factors in the **operations** of a circular economy funding programme. For that, CE related funding programmes were selected and interviews from different perspectives (agenda-setting level, execution level, project beneficiary) were conducted in order to answer the following research questions:

1. Collaboration (value chain; societal; cross-functional) is of particular importance to circular economy. How does the programme foster collaboration?
2. Indicators. How are indicators used in the selection, monitoring and evaluation phases of the programme?

PROGRAMMES RELATION TOWARDS CE:

The brief programmes descriptions of the case studies first allowed to understand the specific relation of the selected programmes with respect to CE. Indeed, while for the H2020 case, one of the four focus areas of the work programme is directly related to CE: "Connecting economic and environmental gains – the Circular Economy", the MatRessource's PO indicated that the focus was on resource efficiency and resource conservation and that CE was not especially defined in the funding initiative. CE was not explicitly mentioned at program launch neither for the Emiliana-Romagna or Umbria Region cases. In line with the Smart Specialization Strategies those programmes henceforth use the CE as a driver through the concept of resource efficiency. While also connected to the Smart Specialization Strategies, CE is directly included as a priority in the Slovenian case study.

COLLABORATION:

While selected programmes are funding different innovation stages and operating at different levels, the implementation of collaboration requirements seems to be a converging highlighted key success factor within the different cases. While those requirements, related to interdisciplinary collaboration or the inclusion of actors from specific part of the value chain, do not originate from a CE perspective, most interviewees judge them essential to stimulate knowledge diffusion and innovation. This interdisciplinary collaboration initiated with those requirements is also shown to be appreciated by project beneficiaries.

Along the same lines, one insight of the interviews (H2020 case study) referring to the collaboration corresponds to the evolution of the calls from a more technical to a value chain collaboration perspective. In D1.2 (see D1.2, Figure 4), the duration and starting date of current CE funding programmes was displayed. To understand this insight, gained with the interviews, this figure has been analysed by distinctly mapping only programmes funding non-technological related type of activity (programmes funding science & basic research as well as technology & process optimisation have been removed), such as Business models, Policy support, Social & behaviour, Education as well as Coordination, see Figure 52.

Among 22 programmes listed as funding mostly non-technology related type of activity for which information on their starting date were available, 16 have started at the earliest in 2016. This could

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indeed reinforce the fact that most recent funding programmes start enhancing the scope of the type of funded activities and shifting from a technological to a value chain collaboration perspective.

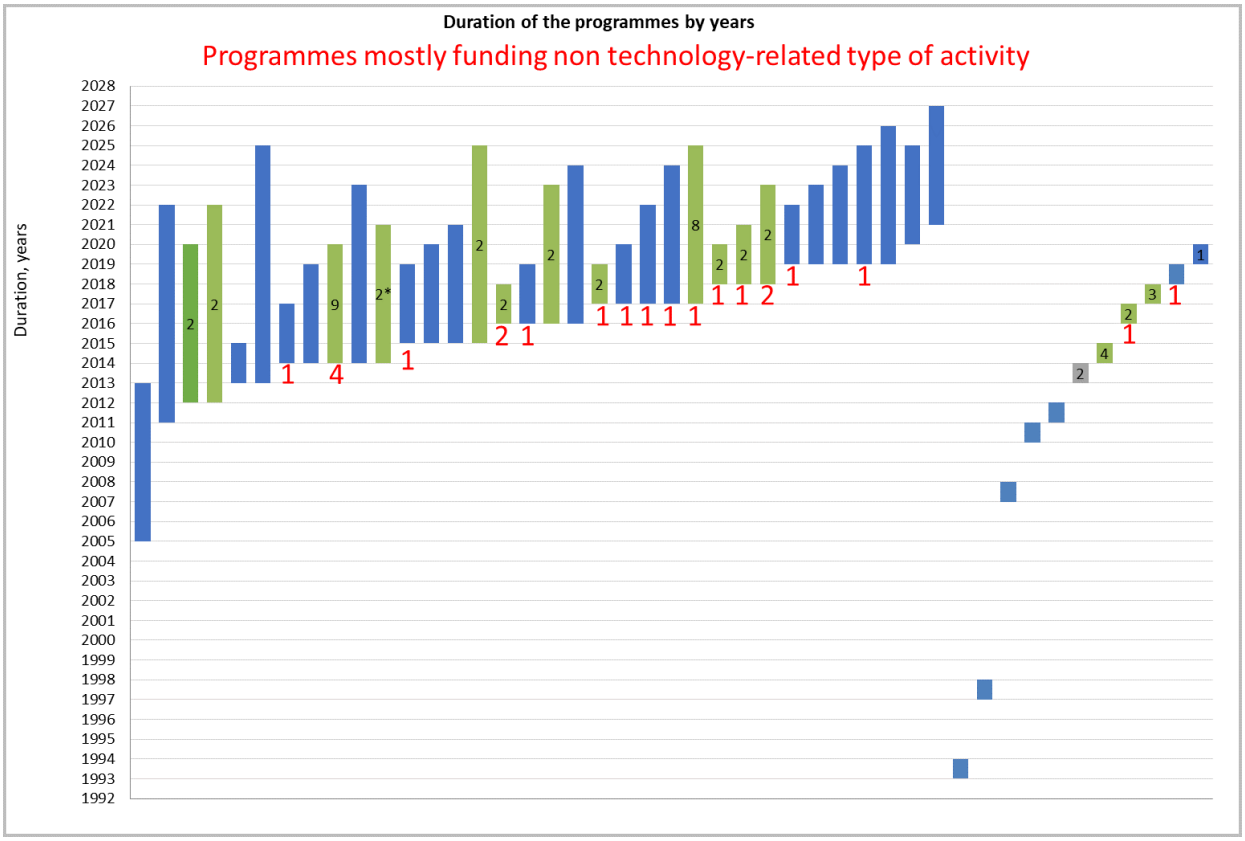

Figure 52 Programmes mostly funding non-technology-related type of activity in function of their starting date, based on Figure 4 described in D1.2

Programme duration of programme

2 Programme duration occurring several times; the number of similar programmes is stated

Programmes for which only starting points were indicated in the survey

2 Similar cases of programmes for which only starting points were indicated in the survey; the number of similar cases is stated

While dissemination of projects results, or networking activities have been judged beneficial, especially through the MatRessource case study, none of the studied programmes provide support for sustaining consortia or "projects" alumni for instance.

INDICATORS:

As the funding scope of CE-related programmes might be quite broad (which has also been confirmed through the coverage analysis, with for instance 76% of programmes related to the Raw Materials priority theme are focusing on more than 5 additional priority themes), interviews have revealed that it is currently difficult to develop generic CE-related indicators at a programme level that effectively apply to all the different projects. Based on the interviews conducted for the H2020 case study, a hybrid approach (combination of top-down and bottom-up set of indicators) has been implemented for giving the opportunity to project beneficiaries to draft their own CE indicators at a project level.

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During the final evaluation phase, MatRessource PO had to provide an estimated resource efficiency potential of all projects. She indicated that having defined a set of indicators at a project level since the starting date would have facilitated this estimate and the evaluation of the success of the funding initiative. This reinforces the potential benefits of implementing such a hybrid approach. Still according to the H2020 case study, effective economic KPIs are believed to be crucial for assessing CE projects. While technical KPIs are context and project specific, economic KPIs could more easily be replicated for many types of projects.

The Slovenian case study shows that indicators implemented during the selection phase already include CE-related aspects: how well a project is integrated with the principles of CE and smart specialization, level of integration of e.g. ecodesign, innovations in business models, the contribution to the CE as well as collaboration with other companies in terms of supply chain added value and their location. As CE was not explicitly mentioned at programme launch, the Italian case studies do not include specific CE indicators yet. However, it is foreseen that future programmes include CE specific performance indicators.

Another converging insight from the interviews, including their different perspectives (POs and project beneficiaries), is that CE impacts might not be immediate and that long-term results, especially as it refers to research and innovation, should also be taken into consideration when evaluating the performance of a programme.

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5 CONCLUSIONS

The objective of this report was to summarize the analyses Task 1.4 partners have conducted on existing circular economy research and innovation funding programmes in EU.

Two major trajectories were presented:

- The coverage analysis that build on D1.2 and further assesses the funding scope coverage of current CE programmes in analogy with the development of the SRIA.
- The case studies that looked into the operational aspects of CE funding programmes and aimed to understand their key success factors.

The 108 current CE funding programmes gathered by T1.1 partners have been mapped per priority themes. Based on this mapping and depending on the prioritized "areas" which will be defined by the SRIA, clear gaps between current and future CE funding programmes could thus be detected (e.g. the SRIA defines a priority in funding programmes addressing Biomass and policy support type of activity, Figure 45 reflects that is not addressed by current CE funding programmes). This coverage analysis allowed to show that some trends highlighted in D1.2 are subject to alteration when using a priority theme perspective. It also allowed to reflect the influence of funding programmes with no major focus (considered as funding programmes addressing more than 4 priority themes) on those trends and detect current priority themes clustering tendencies. This coverage analysis follows on from one conclusion provided in D1.2: "Of course, the overall results are much more differentiated and complex. Nevertheless, this initial spotlight can point to the fact that a consolidation of research and innovation in the context of CE needs to be carefully developed and should be more integrative with regard to resources, sectors, funded activities and beneficiaries addressed."

It turned out to be that the case studies also validated and exemplified conclusions provided in D1.2. T1.1 partners individually analysed key performance indicators of the gathered funding programmes and explained that the results do not really provide a consistent strategic idea of an European circular economy approach: "The different member states and regions seem to follow different and sometimes even contradictive strategies. And although the member states and regions have of course very different potentials and framework conditions for transformations towards a circular economy, the differences worked out in this report seem to rather highlight the need for a more consistent European R&I strategy on CE than a smart specialisation strategy". The Italian case studies seem perfectly illustrating those words.

Indeed, the Italian programs dedicated to circular economy are generally linked to Regional Smart Specialization Strategies, addressing Structural Funds. As in other European regions, these are fragmented, with low impact on overall transition to circular economy. In addition, this concept, even if it is not really new in Italy, has been made explicit in the regional (and national) programs pretty recently. The last but not the least, joint programming should be encouraged with stronger communication: a general caution due to existing fragmentation of programs and political responsibilities has been observed. For this reason, interregional actions should be promoted at national level.

Based on interviews conducted by T1.4 partners, the case studies aimed to understand and provide insights on: How does current CE programmes foster collaboration? How are indicators used in the selection, monitoring and evaluation phases of this programme?

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The findings and learnings from those case studies selected on the principle of representativeness, show that implementing collaboration requirements during the selection phase is key. This emphasis on value chain collaboration has also been noticed in the scope of the recently released H2020 calls.

While some case studies demonstrated that current CE funding programmes are already integrating CE-related indicators, developing, at programme level, quantitative CE indicators specific for several projects remains a challenge. Due to their long-term impacts, the performance of CE funding programmes is thus evaluated with difficulty.

The learnings of this study can be shared with CICERONE stakeholders, in particular programme owners (POs). They can also be used in the design of pilot joint programmes in CICERONE by T2.1 partners.

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APPENDIX 1 Existing funding programme questionnaire

Please also see Annex 5: Questionnaire of D1.2.

General Information	Country	
	Name of Participant	
	Organisation	

Q1: Funding for CE	Please identify max. 5 of the most important CE (framework) funding programmes in your country and analyse them along the following categories.

Programme	*Enter the name of the programme*	*Enter the name of the programme*	*Enter the name of the programme*	*Enter the name of the programme*	*Enter the name of the programme*
1.1 Programme level (specifiy country and region, if applicable)	please select	please select	please select	please select	please select
Specify country and region					
1.2 Programme owner and contact person data					
1.3 Programme website					
1.4 Overall budget size (or part of budget allocated to CE)					
1.5 Number of projects funded (or average funding per project)					
1.6 Duration of funded projects					
1.7 Duration of the programme itself					
1.8 Example projects					
1.9 Resource flows (e.g. raw materials, water, plastic, waste, chemicals, food, biomass)	please select	please select	please select	please select	please select
1.10 Product life cycle phase	*tick all that apply*				
Product design					
Manufacture					
Distribution and Use					
Second-life (repair/ refurbish/ remanufacture)					

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End of life (collection/ recycle/ recovery)												
1.11 Major type of funded activity (select the most relevant one for the programme) Science & basic research (often R projects), Technology and process optimisation (often D&I projects, transfers), Business models & start up support (including coaching, consultancy), Policy support (such as policy implementation or recommendation), Social & behaviour (e.g. awareness raising, consumer behaviour), Education, training & qualification (e.g. students trainees), Coordination (e.g. clusters, networks, platforms)		please select		please select		please select		please select		please select	
1.12 Industrial Sectors addressed (use NACE sectors, only relevant if the programme has a sectoral focus) *http://ec.europa.eu/competition/mergers/cases/index/nace_all.html*												
1.13 If the programme focuses on funding technology innovation select the most relevant innovation stage - Technology readiness level (select one)		please select		please select		please select		please select		please select		
1.14 Beneficiary types (e.g. academia, industry/SME, civil society)												
If you don't think the above classifications (questions 1.9 – 1.14) have described well the programme, please add a **brief explanation** of the scope and objective of the programme.												
1.15 What are the Key Performance Indicators (KPIs) of the programme? (for example, reduced primary raw materials input, or increased secondary raw material input)												
What are the targets?												
What are the actuals?												
CICERONE plans to select a few funding programs for further case studies to identify success factors. If your program is selected as a case study candidate, would you be interested in participating and in sharing data on the impact of the program?		please select		please select		please select		please select		please select		

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1.16 Please provide joint funding ideas or existing collaborations between funding programmes (if any)											

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APPENDIX 2 Priority themes addressed by current CE funding programmes

Biomass	
Country	**Programme**
Austria	*UFI – Environmental assistance in Austria (Umweltförderung im Inland)*
Austria	*Production of the Future (Produktion der Zukunft)*
Austria	*Promotion of environmental protection measures in local authorities (Förderung von Umweltschutzmaßnahmen in Gemeinden)*
Switzerland	*G'innove societal innovation program (programme d'innovation sociétale G'innove)*
Switzerland	*Circular Economy Transition*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Belgium	*BeCircular Project Call*
Luxembourg	*Fonds Climat &Energie*
Italy	*POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy*
Italy	*PSR FEASR CAMPANIA 2014-2020 - Supply chain cooperation for sustainable biomass supply for energy production*
Ireland	*Green Enterprise Call 2018*
Ireland	*ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources*
Czech Republic	***DELTA** - Funding programme for applied research, experimental development and innovation Delta*
Czech Republic	***EPSILON** - Funding programme for applied research, experimental development and innovation EPSILON*
Czech Republic	***Operational Programme Environment***
Poland	*Generator of ecological concepts (Generator koncepcji Ekologicznych GEKON)*
Poland	*FALCON Program - implementation of innovative environmental technologies (Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych)*
Finland	*Bio and Circular Finland*

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Finland	*BioNets*
Finland	*A Climate-Neutral and Resource-Scarce Finland*
Finland	*Keys to sustainable growth*
Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Spain	*SBIOC (Spanish BioCluster)*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT Climate-KIC*
Norway	*Grants for Bioeconomy Projects*
Norway	*Renewable energy in agriculture*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
Norway	*Sustainable Innovation in Food and Bio-based Industries (BIONÆR)*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Sweden	*BioInnovation (Strategic Innovation Program)*
Germany	**Technologie-initiative Bioraffinerie**

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Germany	**Innovationsinitiative industrielle Biotechnologie**
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*

Minerals (Raw materials)	
Country	**Programme**
Austria	*UFI – Environmental assistance in Austria (Umweltförderung im Inland)*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Ireland	*Disruptive Technologies Innovation Fund*
Czech Republic	*Operational Program Enterprise and Innovation for Competitiveness,Low-carbon technologies - Secondary raw materials - Challenge IV*
Finland	*BioNets*
Finland	*A Climate-Neutral and Resource-Scarce Finland*
Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT RawMaterials*
European Union	*EIT Climate-KIC*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*

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Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Germany	**Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)**
Germany	**Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)**
Germany	**Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource**
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*
Estonia	*Circular economy programme*
Estonia	*Ettevõtete ressursitõhusus (Resource efficiency of companies)*

Metals (Raw materials)	
Country	**Programme**
Austria	*UFI – Environmental assistance in Austria (Umweltförderung im Inland)*
Austria	*Production of the Future (Produktion der Zukunft)*
Switzerland	*Environmental technology promotion (Umwelttechnologieförderung)*
Switzerland	*Technology Funds (Technologiefonds)*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Belgium	*BeCircular Project Call*
Ireland	*Disruptive Technologies Innovation Fund*
Czech Republic	*Operational Program Enterprise and Innovation for Competitiveness,Low-carbon technologies - Secondary raw materials - Challenge IV*
Czech Republic	***Operational Programme Environment***

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Poland	*Innovative Recycling (Innowacyjny recykling)*
Poland	*CuBR Joint Undertaking of The National Centre for Research and Development and KGHM Polska Miedź S.A. (Wspólne Przedsięwzięcie CuBR)*
Finland	*Bio and Circular Finland*
Finland	*A Climate-Neutral and Resource-Scarce Finland*
Finland	*ARVI Material Value Chains*
Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT RawMaterials*
European Union	*EIT Climate-KIC*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Germany	*Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)*
Germany	*Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource*
UK	*Industrial Strategy Challenge Fund - Innovate UK*

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UK	*Scottish Institute for Remanufacture (SIR)*
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*
Estonia	*Ettevõtete ressursitõhusus (Resource efficiency of companies)*

Water	
Country	**Programme**
Austria	*UFI – Environmental assistance in Austria (Umweltförderung im Inland)*
Switzerland	*NFP 73 Sustainable Economy*
Switzerland	*Technology Funds (Technologiefonds)*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Belgium	*Brucircle*
Albania	*Economic Reform Programme 2018-2020*
Italy	*POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy*
Czech Republic	***DELTA** - Funding programme for applied research, experimental development and innovation Delta*
Slovakia	*Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE)- Operačný program Kvalita životného prostredia*
Poland	*The Circular Economy in the local community (Gospodarka o obiegu zamkniętym w gminie)*
Poland	*Generator of ecological concepts (Generator koncepcji Ekologicznych GEKON)*
Poland	*FALCON Program - implementation of innovative environmental technologies (Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych)*
Finland	*Bio and Circular Finland*
Finland	*A Climate-Neutral and Resource-Scarce Finland*

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Spain	*Project of demonstration of Circular Economy /*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT Climate-KIC*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
Norway	*Sustainable Innovation in Food and Bio-based Industries (BIONÆR)*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Danish Eco-Innovation Program - Ecoinnovation subsidy scheme*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Germany	**Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)**
UK	*Resource Efficient Circular Economy Accelerator Programme* *- European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Industrial Renewal / New materials and processes / Circular Economy*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*
Estonia	*Personal Research Funding*

Plastic	
Country	**Programme**

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Austria	*Production of the Future* *(Produktion der Zukunft)*
Austria	*Waste prevention promotion of packaging collection and utilisation systems* *(Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen)*
Switzerland	*G'innove societal innovation program (programme d'innovation sociétale G'innove)*
Switzerland	*Circular Economy Transition*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Italy	*POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy*
Ireland	*Green Enterprise Call 2018*
Ireland	*Disruptive Technologies Innovation Fund*
Czech Republic	*Operational Program Enterprise and Innovation for Competitiveness,Low-carbon technologies - Secondary raw materials - Challenge IV*
Czech Republic	***Operational Programme Environment***
Poland	*Generator of ecological concepts (Generator koncepcji Ekologicznych GEKON)*
Poland	*FALCON Program - implementation of innovative environmental technologies (Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych)*
Netherlands	*Plastic Pact NL*
Finland	*Bio and Circular* *Finland*
Finland	*ARVI Material Value Chains*
Spain	*Project of demonstration of Circular Economy /*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Repensar os Plásticos na Economia: Desenhar, Usar, Regenerar (DURe)*
Portugal	*Vale Economia Circular*
European Union	*LIFE*

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European Union	*Horizon 2020*
European Union	*EIT Climate-KIC*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Sweden	*Mistra Closing the loop*
Sweden	*RE:Source (Strategic Innovation Program)*
Germany	**Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)**
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*
Estonia	*Circular economy programme*

Chemicals	
Country	**Programme**
Austria	*Production of the Future (Produktion der Zukunft)*
Switzerland	*Technology Funds (Technologiefonds)*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Ireland	*Disruptive Technologies Innovation Fund*
Czech Republic	*Operational Program Enterprise and Innovation for Competitiveness,Low-carbon technologies - Secondary raw materials - Challenge IV*

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Czech Republic	***Operational Programme Environment***
Poland	*Generator of ecological concepts (Generator koncepcji Ekologicznych GEKON)*
Poland	*FALCON Program - implementation of innovative environmental technologies (Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych)*
Spain	*Project of demonstration of Circular Economy /*
Spain	*SBIOC (Spanish BioCluster)*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT RawMaterials*
European Union	*EIT Climate-KIC*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Danish Eco-Innovation Program - Ecoinnovation subsidy scheme*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Germany	**Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource**
Germany	**Technologie-initiative Bioraffinerie**
Germany	**Innovationsinitiative industrielle Biotechnologie**
UK	*Circular Economy Investment Fund*

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UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Industrial Renewal / New materials and processes / Circular Economy*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*

Food	
Country	**Programme**
Austria	*Promotion of environmental protection measures in local authorities (Förderung von Umweltschutzmaßnahmen in Gemeinden)*
Austria	*Funding on the subject of the environment and nature (Förderungen zum Thema Umwelt und Natur)*
Austria	*Waste prevention promotion of packaging collection and utilisation systems (Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen)*
Switzerland	*NFP 73 Sustainable Economy*
Switzerland	*Circular Economy Transition*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Belgium	*BeCircular Project Call*
Albania	*Economic Reform Programme 2018-2020*
Italy	*POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy*
Ireland	*ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources*
Czech Republic	***Operational Programme Environment***
Netherlands	*Samen tegen voedselverspilling(English: joined forces against food waste)*
Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Spain	*SBIOC (Spanish BioCluster)*

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Spain	*Conecta Peme / Initiative BIOPOL*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
Norway	*Sustainable Innovation in Food and Bio-based Industries (BIONÆR)*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
UK	*Industrial Strategy Challenge Fund - Innovate UK*
UK	*Circular Economy Investment Fund*
UK	*Resource Efficient Circular Economy Accelerator Programme* *- European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
Estonia	*Circular economy programme*

C&D	
Country	**Programme**
Finland	*Keys to sustainable growth*
Finland	*ARVI Material Value Chains*

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Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Spain	*SBIOC (Spanish BioCluster)*
Spain	*Conecta Peme / Initiative BIOPOL*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II* *Apoiar a Transição para uma Economia Circular*
Portugal	*Repensar os Plásticos na Economia: Desenhar, Usar, Regenerar (DURe)*
Portugal	*Apoiar a Economia Circular no Setor da Construção (CIRCULAr - Construção)*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT RawMaterials*
European Union	*EIT Climate-KIC*
Norway	*Grants for Bioeconomy Projects*
Norway	*Renewable energy in agriculture*
Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
Norway	*Sustainable Innovation in Food and Bio-based Industries (BIONÆR)*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Danish Eco-Innovation Program - Ecoinnovation subsidy scheme*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*

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Sweden	*Mistra Closing the loop*
Sweden	*Vinnova: Innovations for a sustainable society*
Sweden	*BioInnovation (Strategic Innovation Program)*
Sweden	*RE:Source (Strategic Innovation Program)*
Germany	**Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)**
Germany	**Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)**
Germany	**Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource**
Germany	**Technologie-initiative Bioraffinerie**
Germany	**Innovationsinitiative industrielle Biotechnologie**
UK	*Industrial Strategy Challenge Fund - Innovate UK*
UK	*Circular Economy Investment Fund*
UK	*Scottish Institute for Remanufacture (SIR)*
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Investissements d'Avenir / Accelerating ecological transition / Circular economy and waste valorisation / Demonstrators and ambitious innovative territories*
France	*Industrial Renewal / New materials and processes / Circular Economy*
France	*Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.*
France	*Circular economy, zero waste.*

Waste	
Country	**Programme**
Austria	*UFI – Environmental assistance in Austria (Umweltförderung im Inland)*
Austria	*Promotion of environmental protection measures in local authorities (Förderung von Umweltschutzmaßnahmen in Gemeinden)*
Austria	*Funding on the subject of the environment and nature (Förderungen zum Thema Umwelt und Natur)*

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Austria	*Waste prevention promotion of packaging collection and utilisation systems* *(Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen)*
Switzerland	*Environmental technology promotion (Umwelttechnologieförderung)*
Switzerland	*G'innove societal innovation program (programme d'innovation sociétale G'innove)*
Switzerland	*Technology Funds (Technologiefonds)*
Switzerland	*Circular Economy Transition*
Belgium	*Open Call for demonstration projects*
Belgium	*Flemish Environmental Holding*
Belgium	*BeCircular Project Call*
Belgium	*Brucircle*
Luxembourg	*Fonds pour la protection de l'environnement*
Albania	*Climate-friendly integrated solid waste management and circular economy in Albania*
Albania	*Economic Reform Programme 2018-2020*
Croatia	*FOND ZA ZASTITU OKOLISA I ENERGETSKU UCINKOVITOST*
Greece	*European Regional Development Fund*
Italy	*Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region*
Ireland	*Green Enterprise Call 2018*
Ireland	*Disruptive Technologies Innovation Fund*
Ireland	*ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources*
Czech Republic	***DELTA** - Funding programme for applied research, experimental development and innovation Delta*
Czech Republic	***EPSILON** - Funding programme for applied research, experimental development and innovation EPSILON*
Czech Republic	*Operational Program Enterprise and Innovation for Competitiveness,Low-carbon technologies - Secondary raw materials - Challenge IV*
Czech Republic	***Operational Programme Environment***

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Slovakia	*Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE)- Operačný program Kvalita životného prostredia*
Poland	*The Circular Economy in the local community (Gospodarka o obiegu zamkniętym w gminie)*
Poland	*Innovative Recycling (Innowacyjny recykling)*
Poland	*Generator of ecological concepts (Generator koncepcji Ekologicznych GEKON)*
Poland	*FALCON Program - implementation of innovative environmental technologies (Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych)*
Poland	*CuBR Joint Undertaking of The National Centre for Research and Development and KGHM Polska Miedź S.A. (Wspólne Przedsięwzięcie CuBR)*
Hungary	*Environmental and Energy Efficiency OPKÖRNYEZETI ÉS ENERGIAHATÉKONYSÁGI OPERATÍV PROGRAM (KEHOP)*
Netherlands	*Plastic Pact NL*
Finland	*Bio and Circular Finland*
Finland	*BioNets*
Finland	*A Climate-Neutral and Resource-Scarce Finland*
Finland	*Keys to sustainable growth*
Finland	*ARVI Material Value Chains*
Spain	*National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)*
Spain	*Project of demonstration of Circular Economy /*
Portugal	*Fundação por la Ciencia e la Tecnologia (FCT)*
Portugal	*Apoiar a Transição para uma Economia Circular - Fase II Apoiar a Transição para uma Economia Circular*
Portugal	*Vale Economia Circular*
European Union	*LIFE*
European Union	*Horizon 2020*
European Union	*EIT RawMaterials*
European Union	*EIT Climate-KIC*

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Norway	*Programme for User-driven Research-based Innovation (BIA) - NOK 45 million for projects promoting sustainable value creation and green innovation*
European Union	*EEA Grants and Norway Grants: Green Industry Innovation Programme*
Denmark	*Grand Solutions Programme - Green Growth*
Denmark	*Fund for Green Business Development*
Denmark	*Danish Eco-Innovation Program - Ecoinnovation subsidy scheme*
Denmark	*Increased Growth through Circular Business Models in SMEs*
Denmark	*Denmark Green Investment Fund - Green Loans*
Sweden	*Mistra Closing the loop*
Sweden	*RE:Source (Strategic Innovation Program)*
Germany	**Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)**
Germany	**Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)**
Germany	**Technologie-initiative Bioraffinerie**
Germany	**Innovationsinitiative industrielle Biotechnologie**
UK	*Scottish Institute for Remanufacture (SIR)*
UK	*Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland.*
UK	*Circular Economy Capital Investment Fund*
France	*Investissements d'Avenir / Accelerating ecological transition / Circular economy and waste valorisation / Demonstrators and ambitious innovative territories*
France	*Industrial Renewal / New materials and processes / Circular Economy*
France	*Circular economy, zero waste.*
Estonia	*Circular economy programme*
Estonia	*Base funding*
Estonia	*Ettevõtete ressursitõhusus (Resource efficiency of companies)*

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Non-available information	
Country	**Programme**
Belgium	*NEXT program*
Luxembourg	*Fit4Circularity*
European	*CONTINENTAL GREECE OP*
European	*Interreg Mediterranean*
European	*Interreg V-A - Italy-Croatia*
European	*Interreg V-A Italia-Slovenia*
Italy	*Impresa 4.0*
Italy	*PON Impresa e Competitività*
Czech Republic	*National Programme Environment*
Czech Republic	*The ETA programme supporting research, experimental development and innovation of applied social sciences and humanities*
Czech Republic	*Environment Programme Prostředí pro život (Space for living)*
Czech Republic	*Delta 2*
Czech Republic	*Kappa*
Czech Republic	*Zéta*
Hungary	*Hungarian scientific research Fund (OTKA)*
Hungary	*National Research, Development and Innovation Fund (NKFIA)*
Hungary	*Solution for circular economy –call for proposal by the Ministry of Agriculture*
Estonia	*Central Baltic Programme 2014-2020*
Available information – Others: Sustainable society	
Sweden	*Mistra REES*

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APPENDIX 3 Interview guide for the case studies

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This interview guide is intended to support the collection of in-depth knowledge on success factors of CE funding programmes for four case studies. These case studies are selected based on the survey results in task 1.1. **The results of this survey should be taken into account in the preparation of the interview.**

The main goal of the interview is to assess operational performance of the funding programme, from the perspective of the programme itself. We would like to know why and how a funding programme for CE is initiated, what stakeholders are needed, which barriers are overcome and what the limitations of the programme are. Moreover, the interview should focus on the efforts that target **collaboration** and how a funding programme can facilitate in this, mainly in the project initiation and follow-up phases, as well as on **indicators for circular economy**: how is CE/circularity defined and measured in the programme? This is mainly relevant to the project selection and evaluation phases.

In order to get a full overview, interviews should preferably be conducted on multiple levels of CE funding programmes, e.g.:

- Programme owner agenda-setting level. This stakeholder mainly works on the policy level and on the innovation agenda.
- Programme owner execution level. This stakeholder implements policies and the corresponding programmes.
- Project beneficiary. This stakeholder has received support from a programme.

Before selecting the case and starting with the in-depth interview questions, the following information needs to be collected on the programme (if not available in survey results of T1.1, make sure to check this with the interviewee):

- Type of funding (also public or private)
- EU, national or regional programme
- Funding rate
- Type of project
    - Main activity
    - Level of innovation
    - Collaboration/consortium
- Sector
    - Challenge areas: urban areas, industrial systems, value chains, territory and sea
    - On the basis on selected challenge please select the most relevant priority themes included:
      construction- and demolition waste, critical raw materials, water, plastic, chemicals, food, biomass and bio-based products, or other (please specify)

This is an extended version of the interview guide for reference only.

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Interview guide – extended version

Objective	Programme owner (agenda-setting level)	Programme owner (execution level)	Project beneficiary
Background information			
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation are you working for and what is your current position? (E.g. Public organisation, NGO etc.) - What activities are there in the organisation on the topic of CE? (incl. funding programmes) o How are these activities organized? - Next to the CE funding programme, are there other programmes initiated by your organisation?	- What is your current position? - What activities are there in the organisation on the topic of CE? (incl. funding programmes) o How are these activities organized? - Next to the CE funding programme, are there other programmes initiated by your organisation?	- What type of organisation are you working for and what is your current position? - What activities are there in the organisation on the topic of CE? - How are these activities organized?
Initiation			
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? - How does the programme fit into the innovation agenda? - How is the programme defined, e.g. where stakeholders (including industry) consulted in this? If yes, how did this process look like? - What is the objective of the programme? o How is circularity/CE defined? o What are the focus areas and why? o Is collaboration stimulated? Why (not)? - What type of projects/activities are funded, and why? o What are the target beneficiary groups, and why? o What is the funding rate, and why?	- Why was the programme initiated? - What is the objective of the programme o How is circularity/CE defined? o What are the focus areas and why? o Is collaboration stimulated? Why (not)? - What type of projects/activities are funded, and why? o What are the target beneficiary groups, and why? o What is the funding rate, and why? o Is there any suggested consortium size and composition? And why? - Are the topics defined in a specific way (more like a tender) or an open/generic way? Why is the approach chosen?	- How did you learn about the programme? - Why did you decide to apply for funding under this programme? - Was it recommended, required or suggested to have external support for elaborating your application? Did you get support with your application? o From the programme itself? o From external experts, such as hired consultants?

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	○ Is there any suggested consortium size and composition? And why? - Are the topics defined in a specific way (more like a tender) or an open/generic way? Why is the approach chosen?	- How do you communicate about the programme?	
Selection			
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- How many proposals does the program receive, in comparison to available budget? *In other words, how competitive is the selection process.* -How much of the located programme fund is absorbed? (granted budget vs. planned budget) - How satisfied are you with the quantity and quality of the proposals received? And how do they align to the objectives of the program? - How are projects selected? ○ What is the procedure? Does it consider the possibility of negotiation, clarifications, proposal improvements? ○ What are the criteria and how are they weighted? Is there any focus? ○ What are the impact measures for circularity/CE? ○ What is the evaluation process for project selection? (use of external experts etc.) ○ Is there any strategic approach – considering the programme's overall objectives - behind this selection? *Examples of this could be: Research & Innovation agenda, the overall objective of the programme, a portfolio approach for*	- How many proposals does the program receive, in comparison to available budget? *In other words, how competitive is the selection process.* -How much of the located programme fund is absorbed? (granted budget vs. planned budget) - How satisfied are you with the quantity and quality of the proposals received? And how do they align to the objectives of the program? - How are projects selected? ○ What is the procedure? Does it consider the possibility of negotiation, clarifications, proposal improvements? ○ What are the criteria and how are they weighted? Is there any focus? ○ What are the impact measures for circularity/CE? ○ What is the evaluation process for project selection? (use of external experts etc.) ○ How long does the selection process take? ○ Is there any strategic approach - considering the programme's overall objectives behind this selection? *Examples of this could be: Research & Innovation agenda, the overall objective of the programme, a portfolio approach for*	- How did your project fit within the programme objectives? - Which criteria should be used to select the project? - Did the programme offer flexibility, e.g. possibilities to negotiate complementary conditions for approval; to provide clarifications; to improve your original proposal? - What are improvements that can be made in the selection process? *Example: communication, guidelines and requirements, timing of evaluation etc.*

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	selection of multiple different or similar projects etc. - What are success factors in the selection procedure? - What are improvements that can be made in this procedure?	*selection of multiple different or similar projects etc.* - Does the programme offer the possibility to extend the deadline to include a not foreseen additional activity relevant for CE impact (with or without budget modification)? - What are success factors in the selection procedure? - What are improvements that can be made in this procedure?	
Monitoring			
• To obtain information about programme and project progress, including success factors and possible improvements	- How are the programme results monitored and evaluated? - How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? o Are there KPIs in place to monitor progress? o If yes, are these KPIs programme or project specific? o Are these clearly communicated? - Are there any auditing and other quality control mechanisms in place? Do they consider independent third party auditing and accounting?	- How are the programme results monitored and evaluated? - How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? o Are there KPIs in place to monitor progress? o If yes, are these KPIs programme or project specific? o Are these clearly communicated? - Are there any auditing and other quality control mechanisms in place? Do they consider independent third party auditing and accounting? - How do the results contribute to the programme objective?	- How do you monitor the project's progress? o Do you start with a benchmark? Why (not)? o Are there KPIs in place to monitor progress? o If yes, are these KPIs specifically for your project? - What tools do you use for this? - Do you get support with monitoring progress? o From the programme itself? o From external experts, such as hired consultants?
Evaluation			
• To obtain information about programme and project results, including success	Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal*	- Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal*	- Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not*

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factors and possible improvements	*opinion, and will not refer to your name in further reporting.* - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? - Who is responsible for evaluating the programme and projects? o Are there external experts involved in this, or does it rely mainly on self-reporting? o Does it require independent third party auditing and accounting? - Do you receive feedback from others? o If yes, from whom and how (e.g. channels) do you receive feedback? (Channels) - If already available, what has been the impact of this program? - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries?	*opinion, and will not refer to your name in further reporting.* - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? - Who is responsible for evaluating the programme and projects? o Are there external experts involved in this? or does it rely mainly on self-reporting? o Does it require independent third party auditing and accounting? - Do you receive feedback from others? o If yes, from whom and how (e.g. channels) do you receive feedback? (Channels) - If already available, what has been the impact of this program? - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries?	*refer to your name in further reporting.* - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? - Did you collaborate in the project? If yes, how did this collaboration actually go? - Were you aware of possible actions or sanctions associated to a negative evaluation?
Follow-up			
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured	- Are there any follow-up actions from your side after projects have ended? - Are the project leaders/partners encouraged to further communicate project related results after finalizing the project? How?	- Are there any follow-up actions from your side after projects end? - Are the project leaders/partners encouraged to further communicate project-related results after finalizing the project? How?	- How do you get insights on the performance of the programme and projects?

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• To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on agenda-setting, programme development; technical assistance; matchmaking* - Have you ever considered joint funding (with other programs)? Would you be interested in joint funding?	- Is there a way to capture knowledge about the performance of the programme and projects? - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on programme development; project selection, monitoring and evaluation; technical assistance; matchmaking* - Would you be interested in joint funding (with other programs)? Why (not)? In terms of implementation, do you think this could be feasible?	- Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on project development, selection, monitoring and evaluation; technical assistance; matchmaking*

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APPENDIX 4 H2020 Conducted interviews

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Case Study Interview – Programme Owner (agenda-setting level) – H2020		
Objective	**Guiding questions**	**Answers**
Background information		
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	What type of organisation (public, NGO, private etc.) are you working for and what is your current position? - What activities are there in the organisation on the topic of CE? (incl. funding programmes)	The interviewee works for the European Commission's DG Research and Innovation as Head of a specific sector. This unit within DG RTD is also responsible for circular economy within the context of research and innovation activities. In particular within Horizon 2020, circular economy has been identified as one of the priorities. They also develop topics/challenges that in particular address societal challenge 5 of the Horizon 2020. CICERONE has been selected in the context of this challenge under the 2018 call for proposals as coordination and support action. Recently, there has been a reorganisation within DG RTD. In 2018, the unit was called eco-innovation and was also responsible for circular economy issues, waste, and water in this context. This unit is now circular economy & bio-based systems, and also includes the bio-economy (the biological dimension of the circular economy). Eventually, this evolution worked out well, because before, these two issues where often treated in silos, and with this new unit they have been brought together. In terms of operations, we are responsible for implementing the work programme of societal challenge 5. This work programme includes climate action, environment and resource efficiency/raw materials. Within this programme there are some priority lines on climate, nature based solutions and ecosystem services, environmental observation, raw materials etc. Circular economy is one of the building blocks of the societal challenge. In implementing Horizon 2020, both in the programme of 2015-2016 but in particular in the programme of 2018-2020, the Commission has identified some focus areas. These focus areas bring together related areas from different parts of Horizon 2020. Circular economy has already been identified as a focus area in 2015-2016 and even more so in 2018-2020. Circular economy is thus an important building block of Horizon 2020, and significant amounts of the budget have been allocated to this. In the 2015-2016 programme, this was more than 60 million EUR and for 2018-2020 this was already around 177 million EUR for societal challenge 5 (out of the 920 million EUR for the entire work programme).

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		This increase in budget for circular economy is related to changes in policy. The circular economy has received more attention since the beginning of Horizon 2020 - with the new commission this became more of a priority. This has also been reflected in the focus areas.
Initiation		
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	Why was the programme initiated? How does the programme fit into the national/regional innovation policy? How is the programme defined, e.g. where stakeholders (including industry) consulted in this? If yes, how did this process look like? How does the programme contribute to the transition a CE? What is the objective of the programme? o How is circularity/CE defined? o What KPIs are defined for the programme with relation to CE? o What are the focus areas and why? Does the programme take any measures to stimulate collaboration? How?	Circular economy was first part of resource efficiency – this was an important driver in Horizon 2020. Resource efficiency focused mainly on how to better use products, and not to create waste but instead to better preserve materials. This is also linked to eco-innovation at the time, which then mainly focused on technological development for decreasing environmental impact (and also took into account resource efficiency). Circular economy is only one dimension of eco-innovation. When the Commission proposed the circular economy package, and specifically the Circular Economy Action Plan, one of the concrete actions was to increase funding for the circular economy within Horizon 2020. This also created more priority for the circular economy in the EU. The circular economy definition has changed with the change of the Commission, from a more technical (resource efficiency, eco-innovation) to a more holistic definition. The main definition is an economy where the value of products and materials is maintained for as long as possible. Related to this is that waste is minimized, the use of resources that cannot be recovered are avoided, and the use of secondary instead of primary raw materials. It also includes issues around production, consumption, design and waste management of products. With regards to the targets/objectives related to the circular economy, there are some expected impacts per focus area that are referred to in the description of the work programme. These are also reflected in the calls, and in each call there are also specific expected impacts defined. For instance, in the particular call where the CICERONE was selected, the expected impacts are alignment and coordination of programmes for research and innovation for circular economy, effective regional, national and European funding for the circular economy, accelerated diffusion of state of the art circular economy solutions and practices throughout Europe, implementation of national and EU-level action plans (green innovation plans from cities, eco-innovation action plans etc.).
Selection		
• To obtain information about project selection procedure and criteria, including success factors	What is the procedure for project selection?	In Horizon 2020 there have been externalization of some parts, in particular the implementation of the programmes and the follow-up and monitoring of the calls. This is done by the executive services, which are attached to the policy DGs. For us this is EASME, the Executive Agency for Small and Medium-sized Enterprises, who is in charge for some parts of the execution of the programme.

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and possible improvements	Based on what criteria/indicators are projects selected? ○ What are general criteria? How are these criteria weighted? Is there any focus? ○ What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? ○ Are there any selection criteria for collaboration in projects? Why (not)? What are improvements that can be made in this procedure, when considering CE indicators and collaboration? Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration?	In DG RTD we are responsible for drafting the work programme, in this process we interact with EASME as well - they have the possibility to see the drafts and can comment on the description. Once the calls are published, EASME is responsible for the implementation: the selection of the experts, the organization of the evaluation, the grant agreement preparation and the monitoring of the project. DG RTD is also involved in the info days. The info days are organized by EASME after the calls are launched, and here the topics are presented to potential interested people. DG RTD is also involved in the briefing of the experts and receives the list of the experts beforehand to comment on this. Sometimes EASME asks if we have input on potential experts for specific calls. We are thus in contact with them and have full access, but we are not present in the discussions around the implementation of the programme. We often participate in the briefings and in the review panel meetings where the final ranking of the proposals take place. Regarding the evaluation criteria, there are three general main criteria: excellence, implementation and impact. The proposals are ranked based on these criteria and depending on the marks a ranking list is established. Based on this list and the budget availability, budget is granted to projects. There often is a dedicated budget for projects in a specific topic. Sometimes there are some final adjustments in the proposal when these are not selected at first, but there is still budget available in some areas to ensure the optimization of the budget. The call specific criteria are drafted based on the challenges that are defined. For defining these challenges, there are guidelines. Research requirements are also taken into account - what has to be done to address the specific challenge and based on the state of the art, expert meetings and discussion with member states and colleagues in policy DGs. This process takes place before finalizing the call text – there is thus a lot of expert consultation in drafting the call text and the criteria. The improvement is mainly the fact that more experts are involved - there is wider consultation. This will become even more important in Horizon Europe, and policy DGs will be taken into account more in the process as well. By doing this, we will also try to align more with policy requirements in such a way that the outcomes of research and innovation actions can more easily support policy needs. This is not only production of knowledge, but also supports the implementation of policies. I think this evolution is positive and comes back into the description of the call topics and contributes to the expected impacts. This has been improved more in the latest years.
Monitoring		
• To obtain information about programme and	- How and with which frequency are the programme results monitored and evaluated?	The major improvement is the systemic dimension of the circular economy. This means a more holistic approach to circular economy, no longer focus just on the technology or the scientific dimension for example, but working on the whole system. This also includes trying to engage citizens and take into

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project progress, including success factors and possible improvements	- How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? - Are there KPIs for the projects in place to monitor progress? *If yes:* o *What are the KPIs for the project? (both general and CE specific)* o *Are KPI results being verified by independent third-party auditing and accounting? Which ones?* o *Are these KPIs programme or project specific?* o *Do these KPIs consider collaboration?* o *Are these KPIs explicitly communicated to the project beneficiary?*	account the organisational aspects, such as the end-users and industry. These are important elements of the changes which took place over time in the work programmes. In the first calls, the emphasis was more on for instance better waste management, and now the calls have more transitioned to the circular economy as a whole, especially in the calls of the last work programme of H2020. These are the main changes and improvements: calls are now more system-focused and include the entire value chain, production and consumption, if compared to the earlier call topics. Work programmes are evaluated and these are taken into account for the next work programmes. There has been a midterm evaluation for Horizon 2020, but this is generic – there are no specific evaluations for the circular economy. The evaluation for circular economy activities in the EU are more done by looking at the implementation and status of the Circular Economy Action Plan. The progress and requirements of the implementation of the action plan are taken into consideration, for example in 2018 a new EU strategy was communicated on plastics. This strategy has been reflected in the latest work programme of H2020. In the calls for 2020, a particular call topic is included which focuses on the harmonization of plastics in the different compartments, how to monitor and assess plastic pollution. The understanding about the sources, transport and impacts of plastic pollutions are not always fully understood. In some compartments, such as the ocean, there is more knowledge on this, on land this understanding is more limited. These current issues and concrete actions which are identified in the plastic strategy and reflected in the calls. The way H2020 has evolved over time, increased the need for value chain collaboration. This is also reflected in the next work programmes, it is important that the whole value chain and different stakeholders are considered in projects. There is always an overall impact assessment of Horizon 2020. This is the monitoring of the programme and formally part of the framework programme. There is also specific impact assessments on some parts of the programme, for instance on societal challenges. These assessments are used in the overall impact assessment. This has been done in particularly in 2018 in view of the preparation of Horizon Europe. *(See this and this)* There is also another type of monitoring exercise. Together with EASME, we try to group together different related projects. For instance, we have identified projects for the whole focus area on circular economy. This gives us the opportunity to go more in detail into the results of project. For example on business models or lessons learnt. The results of this exercise sometimes depends on the maturity of the project – not all projects have been developed in the same time period. Because of this, from time to time the projects are assessed. This is also used as a market exercise for future activities. To give an example of such an exercise, external experts analysed the outcome of previous projects recently. From the outcomes, we have tried to extract some policy insights. This is a type of monitoring that we are also doing and we may do something similar for the circular economy.
Evaluation		

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• To obtain information about programme and project results, including success factors and possible improvements	Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? - If already available, what has been the impact of this program? How is it measured? - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries?	The Horizon2020 programme is successful in the field of circular economy. It has been identified as a main focus area. Focus areas are linked to the major policy questions of the commission, and this shows that circular economy is an important component. Also, the fact that there is an increase in funding throughout the work programme is also an indicator that this is successful. Moreover, the projects that have been selected have a wider dimension of circular economy issues and the projects collectively provide a good basis and provide valuable lessons learnt. Then it is mainly the responsibility of the end-users, the policymakers to use these results. One of the main issues is how to increase the impacts of the projects supported by Horizon 2020, and this is a more difficult question that is also being discussed in the preparation of Horizon Europe. This requires more alignment with member states. These have to play a role in this, because they have the responsibility to implement the circular economy action plans. In order to do this, better communication is needed to increase the awareness of policy makers and member states, as well as to use the results of such projects. This is an important issue to discuss in the future. CICERONE can also help in this.
Follow-up		
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the	- Are there any follow-up actions from your side after projects have ended? - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How?	CICERONE is a kind of platform that should not go into individual projects, but instead should focus on some key platforms on the national, regional and European level. At the European level it is important that CICERONE is linked with the European Circular Economy Stakeholder Platform (ECESP), which is the main platform that is promoted by the institutions. CICERONE could potentially play a role in the scientific branch of this platform. To what extent ECEPS has a research component is unclear - this is something that needs to be discussed, also with policy DGs. CICERONE should also identify other key platforms on the national and regional level. This linking of platforms on different levels is something that needs to be done more and should be promoted within CICERONE. To link all the individual projects

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CICERONE can facilitate in this	- If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? - Is there a way to capture knowledge about the performance of the programme and projects? - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on agenda-setting, programme development; technical assistance; matchmaking* - Have you ever considered joint funding (with other programs)? Would you be interested in joint funding?	is a big task and CICERONE should remain on a more strategic level. In my view this seems to be the most relevant to be a network that, for instance, connects key platforms.

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Case Study Interview – Programme Owner (execution level) – H2020		
Objective	**Guiding questions**	**Answers**
Background information		
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What is your current position and role in the funding programme? - In which sectors are you mainly working? - What activities are there in the organisation on the topic of CE? (incl. funding programmes)	The interviewee is a project advisor in EASME. EASME stands for Executive Agency for Small and Medium sized Enterprises. It is one of the Executive Agencies of the European Commission (EC) and does project implementation. It covers the whole project cycle (from selection, grant agreement preparation, and after launch the monitoring of the project) for different programmes (COSME, LIFE, H2020, EMFF). EASME also provides policy feedback to the EC. There are bi-annual work programmes (WP) in H2020. The objectives and focus areas are quite broad - Circular Economy (CE) is at the level of topics under the focus area ''building a low carbon, climate-resilient future''. The interviewee works mainly on the monitoring of projects within the H2020 programme in societal challenge 5 (SC5) on the topics of eco-innovation, CE, water and waste. BBI Joint Undertaking (BBi JU) is a separate legal entity and specifically a Public-Private Partnership between the EU and the Bio-based Industries Consortium. It operates under Horizon 2020 and its mission is to implement the Strategic Innovation and Research Agenda (SIRA) developed by the industry and validated by the European Commission. BBI JU organises Calls for Proposals to support research, demonstration and deployment activities enabling the collaboration between stakeholders along the entire value chains covering primary production of biomass, processing industry and final use.
Initiation		
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? - What is the objective of the programme? ○ How is circularity/CE defined? ○ What are the focus areas and why? *For example: construction- and demolition waste, critical raw materials, water, plastic, chemicals, food, biomass and bio-based products, or other (please specify)*	Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Horizon 2020 has had the political backing of Europe's leaders and the Members of the European Parliament. They agreed that investment in research and innovation is essential for Europe's future and so put it at the heart of the Europe 2020 strategy for smart, sustainable and inclusive growth. Horizon 2020 is helping to achieve this by coupling research to innovation and focusing on three key areas: excellent science, industrial leadership and societal challenges. The goal is to ensure Europe produces world-class science and technology that drives economic growth.

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	○ Are there any CE indicators used for this? If yes, which indicators?	The European Commission was also called to bring together all of the previous EU's research and innovation funding under a single common strategic framework. The Commission launched a wide-ranging consultation involving all key stakeholders which has led to Horizon 2020. Horizon 2020 is the biggest EU research and innovation programme ever. It will lead to more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Almost €80 billion of funding is available over 7 years (2014 to 2020) – in addition to the private and national public investment that this money will attract. Since the first formal use of the circular economy term back in 1990, there have been various attempts for coming up with a CE definition. At the EU level, the European Commission has included a description of the concept in its Communication "Closing the loop – An EU Action Plan for the circular economy", which is part of the Circular Economy Package. Specifically, the circular economy is described as an economy "where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised''. CE is a guiding principle that covers many areas – food, bio economy, water, raw materials. There are no specific indicators for CE in H2020, but there are policy targets on EU level to which projects need to contribute (e.g. the revised legislative framework on waste (entered into force in July 2018) sets clear targets for reduction of waste and establishes an ambitious and credible long-term path for waste management and recycling). Also, the monitoring framework towards CE by EUROSTAT is finalized now and contains 10 indicators. The framework is presented on a website (http://ec.europa.eu/eurostat/web/circular-economy) where all the indicators are available and is kept up to date. In addition, there are some projects that have produced a set of indicators for CE, for example the SCREEN project that produced a set of indicators to be used at national level and the C-SERVEES project which is supposed to produce a set of CE indicators as well. In the proposals, indicators are used to measure potential impact. Some of these indicators are related to CE. The project selection criteria follow the description of the work programme and proposals need to try to meet the requirements of the topic and projects are assessed based on this. There are indicators in place to measure progress of a project once started, but these are generally based on how well they meet the requirements of the work programme and specific call.

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Selection		
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection? - Based on what criteria/indicators are projects selected? o What are general criteria? How are these criteria weighted? Is there any focus? o What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? o Are there any selection criteria for collaboration in projects? Why (not)? - What are improvements that can be made in this procedure, when considering CE indicators and collaboration? - Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration?	Bi-annual work programmes of H2020 are prepared by the EC. This process includes consultation with stakeholders and advisory groups. Each work-programme includes an introduction, a number of thematic sections and the general annexes describing general rules such as standard admissibility conditions and eligibility criteria, selection and award criteria, etc. Each thematic section is self-contained, and describes the overall objectives, the respective calls for proposals, and the topics within each call. The work-programme also specifies the type of action (CSA, IA, RIA), the submission procedure (one-stage or two –stage), the deadline for the submission of the proposals, the available budget, the expected impacts, and any specific conditions for each topic. After receiving proposals, first an eligibility check is done by EASME. EASME then makes a selection of experts to evaluate the proposal. For this selection, several requirements are in place, such as: geographic coverage, gender, nationality (the nationality of the expert should not be the same with the nationality of the coordinator of the proposal under evaluation), no conflict of interest and appropriate expertise in the areas of the topic. This process of expert selection per call takes a lot of effort. Proposals are evaluated by independent experts (usually 4 per proposal). The evaluation procedure is specified in the Horizon 2020 Rules for Participation and is different for the 1- and 2- stage applications. In case of the first, usually 4 independent experts evaluate the proposal (10-page long) for stage 1 remotely (individual evaluation and consensus). For the 2nd stage, there is first a remote individual evaluation by (usually) 4 experts and then experts come together in Brussels to discuss and reach consensus. After this, an evaluation report is drafted. EASME monitors this discussion but does not take part in the evaluation itself. General award criteria include excellence, impact, quality and efficiency of implementation. For the evaluation of first-stage proposals under a two-stage submission procedure, only the criteria 'excellence' and 'impact' will be evaluated. Other specific criteria maybe described under the topic. Experts are briefed on the requirements of the topic and the award criteria before the start of the proposal evaluation usually via a webinar (in the case of 2-stage procedure, there is also a (physical presence) briefing before the central evaluation. Here, all criteria are presented and explained by DG RTD or EASME, so all criteria are clear before starting the evaluation. During the evaluation stage, there is a lot of communication with the experts. The communication is done through the IT tool which is for evaluations (SEP – Submission and Evaluation of Proposals) and is transparent to all the experts that are involved in the evaluation of the same proposal.

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		The weighting of general criteria depends on the type of action – this is specified in the work programme. A proposal can score from 0-5 on each criterion. Per action there are different thresholds for each criterion and the overall score. In general, there are no CE/circularity specific award criteria. Any additional criteria to the general award criteria, i.e. 'excellence', 'impact' and 'quality and efficiency of the implementation' will be described in the topic, for example under the "Scope", the "expected impacts" or in a dedicated part of the description. The H2020 programme is not prescriptive to give more freedom to proposals. The programme is about good ideas and wants to allow bottom-up ideas (this was one of the outcomes of the assessment of the previous Framework Programme (FP) as well). There are selection criteria for collaboration in projects. In RIA and IA at least 3 legal entities from different Member States are required for a project to be eligible, so these are by definition collaborative projects. In terms of building on latest achievements under the Criterion "Excellence", there is sub-criterion 1.3 "Extent that proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models)". Under this sub-criterion it is assessed whether the proposal builds on latest achievements, including previous EU/national/other activities and if yes, to which extent this is convincingly. Moreover, in the selection criteria we assess the quality of the consortium and its complementarities. Large consortia are not necessarily favourable in H2020. The quality of the consortium is assessed, not the size. It is important that the partners that are needed for the excellence for the project are there. Also, all partners should have the right role to contribute to the project and should complement each other. The composition of the consortium is really important – also in terms of task and budget allocation, in line with the expertise of the beneficiaries. If this is not the case, it might cause doubts on the quality of management of the project (more difficult to coordinate, increased risk without adding any value). This is assessed by the expert panel. The merging of two project consortia does not happen (or at least the interviewee has not experienced this). If EASME sees potential synergies between projects, after the launch of the project they will be introduced to each other as early as possible after launch to increase exploitation potential. The selection procedure is robust, objective and transparent. During the evaluation and at the end of the process the external experts are asked to express their opinion on the procedure and to make

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		recommendations for improvement. This feedback has been taken into account in the next Framework Programme, "Horizon Europe". There is no flexibility in project deadlines and on other criteria - equal treatment is important.
Monitoring		
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? - How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? - Are there KPIs for the projects in place to monitor progress? *If yes:* o *What are the KPIs for the project? (both general and CE specific)* o *Are KPI results being verified by independent third-party auditing and accounting? Which ones?* o *Are these KPIs programme or project specific?* o *Do these KPIs consider collaboration?* *Are these KPIs explicitly communicated to the project beneficiary?*	There is no procedure in place for evaluation of specific topics under H2020, the programme as a whole is evaluated. This is specified in the legal basis of the programme (Regulation no 1291/2013 of the European Parliament and the Council establishing Horizon 2020 the Framework Programme for Research and Innovation (articles 31 and 32)). Evaluation takes place twice during the duration of the programme for 2014-2016 (published in May 2017) and after completion. This assessed the progress of the programme on 5 aspects – relevance, efficiency, effectiveness, coherence, EU added value – and provides input for the design of Horizon Europe. For the monitoring of the programme, there are also ways to access data and reports about the EU framework programme, for example: • The interactive Horizon 2020 Dashboard • The brochure "Horizon 2020 in full swing", a snapshot of Horizon 2020 main achievements after 3 year of implementation • The Horizon 2020 Monitoring Flash, quick reports on selected strategic topics providing insights and analysis of the Horizon 2020 implementation (three issues up to 2019) The legal basis of Horizon 2020 specifies a list of compulsory Key Performance Indicators to be taken into account in its evaluation and monitoring system. This was the first time that these Key Performance Indicators were identified prior to the start of the Framework Programme (before this was only done during implementation). The Key Performance Indicators are focussed on assessing the impact of Horizon 2020, they are based on information provided in the periodic and final reports of projects, so substantial data for them will only become available in the later stages of Horizon 2020 (e.g. as patent applications, patents awarded, publications, growth and job creation in participating SMEs). Moreover, a wide range of data linked to programme implementation will be collected for annual programme monitoring purposes. In particular, the legal basis for Horizon 2020 includes an obligation to carry out an annual monitoring of Horizon 2020 addressing a list of 14 cross-cutting issues.

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		There are no indicators that apply for all the 3 pillars of the whole programme. For societal challenges there is a set of KPIs, but not specific for CE. Because the sectors are so different it is difficult to find KPIs that are representative even for all projects within one pillar (for instance, projects in the theme of energy are more market based and would have less publications). Within DG RTD there is a specific unit that works on indicators for the programme and projects.
Evaluation		
• To obtain information about programme and project results, including success factors and possible improvements	Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? - If already available, what has been the impact of this program? How is it measured? - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries?	H2020 is a successful programme, the interim results were encouraging, and the success is demonstrated by the fact that there is an increased budget for Horizon Europe. However, it is still difficult to assess the impact because research and innovation projects take a bit longer to show results. Compared to the previous programme, participation is now easier and less complicated, time to grant is shorter (on average 192 days, 100 days faster than in FP7) and there is a Common Support Center for the whole programme. It is also less restrictive and less prescriptive – although projects still need to fit the requirements of the call topic, there is more freedom for participants. A potential point of improvement is to reinforce synergies with other EU funds, notably the European Structural and Investment Funds. The European Court of Auditors has carried out an audit in 2018 in order to assess the simplification measures that were put in place in Horizon 2020 and contribute to the preparation of the next research and innovation framework programme (Horizon Europe). The overall conclusion of that audit is that the majority of simplification measures taken by the Commission have been effective in reducing the administrative burden for beneficiaries in Horizon 2020. Recommendations for improvement include: ➢ Better communication with applicants and beneficiaries ➢ Intensify testing of lump sums ➢ Explore greater use of two-stage proposal evaluations ➢ Re-examine remuneration conditions for expert evaluators ➢ Increase recognition of the Seal of Excellence ➢ Stability for rules and guidance for participants ➢ Improve quality of outsourced ex-post audits ➢ Further simplify tools and guidance for SMEs We monitor the projects closely and the first action we take is to try to help and support the beneficiaries so that they can overcome any difficulties they might be facing in the project implementation.

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		If these efforts do not flourish, then the Grant Agreement has provisions concerning the non-satisfactory performance. The Horizon 2020 model grant agreements (MGAs) provide for a set of measures to be taken in case of grant agreement violations. These measures can lead to rejection of costs and/or to grant. Beneficiaries are all aware of this – during the project kick-off meeting this is discussed too. Extended project duration is possible in exceptional and well-justified cases.
Follow-up		
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects have ended? - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How? - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? - Is there a way to capture knowledge about the performance of the programme and projects? - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on agenda-setting, programme development; technical assistance; matchmaking* - Have you ever considered joint funding (with other programs)? Would you be interested in joint funding?	In terms of finding funding for projects after they are finished, there are no follow-up actions from EASME (there is no dedicated service on this). EASME does keep projects informed on relevant events and success stories as well as events related to investors. Also, there is support in the dissemination and exploitation of project results and EASME encourages partners to communicate about this as well. In case of close-to-market projects this is also beneficial for them. EASME does not provide support on this. In some cases the collaboration sustains. A number of beneficiaries of one project participate in a new consortium for a follow-up project. Project results can be found in different databases. For example: the CORDIS Database, the EASME Data Hub on H2020 – SC5, databases developed by projects themselves. The European Circular Economy Stakeholder Platform is a Platform to exchange and interact, and make circular economy happen faster to the benefit of all. Additionally, there are EU Innovation Partnerships (EIPs) on different areas. These bring together all relevant actors at EU, national and regional level. The provision of services on how to attract the interest of investors and capacity building. There are currently some services but maybe they have to be better exploited. Needs from CICERONE platform (next to what is already mentioned in the GA) is to meet research and innovation needs for CE that focus on: - National and regional funding schemes for CE, in particular enabling POs with a framework for project selection criteria similar to the seal of excellence

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Case Study Interview – Project beneficiary and coordinator – H2020		
Objective	**Guiding questions**	**Answers**
Background information		
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation are you working for and what is your current position? - What is the size of your company (no. of employees)?	The interviewee is a professor and mechanical engineer at a scientific-technological university and is also associated to a national council for research. The interviewee has participated in a lot of projects, including some on circularity. The function of technical consultant has been performed in some regional projects, where help was provided in setting up methodologies and identifying potential new businesses. In addition, a large scale demonstration project on reuse and remanufacturing has been coordinated by him. The sectors that are being addressed are related to sport equipment, automotive, construction and design models. In terms of research, the main focus is on innovative technologies for the identification and manufacturing, disassembly and remanufacturing of products that are at the end of life. The laboratory already established in 2013 a pilot plant for this disassembling and recycling of mechatronics of the automotive industry.
Initiation		
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- How did you learn about the programme? - How did your project fit within the CE objectives of the programme? - Why did you decide to apply for funding under this programme? - Was it clear what kind of impact on CE the programme expected from the funded projects? Why (not)? - Did you collaborate in the project? If yes:	The text of the call related to development of large demonstration projects on circular economy. The content of the call was well understood and therefore matched. Some of the projects were born through discussions that were conducted every month within the working group on circular economy. This is a permanent working group of the cluster where, with companies in the region, discussions take place around the topic of circular economy. The calls that are related to circular economy are screened and it is decided which innovation could address the content of the call. They are now in the process of helping the region in defining the first circular economy roadmap for that region. This is done by the same group that is involved in understanding and identifying the strategic research agenda for the region that will be published at the beginning of 2020. This could be another possible area of control within Cicerone, because at the end there will be a complete roadmap of all the strategic topics and objectives of research priorities coming from the region stakeholders. It was clear what kind of impact was expected. Usually, circular economy projects are very clear from the point of view of the objectives. It is always the goal to develop within the proposal proofs that are in agreement with the KPIs. The large scale demonstration project is a collaboration project in which there are 20 partners containing 7 research and technology organisations (RTOs) and 13 companies, some of which are big

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	○ What is the composition of the proposal/project consortia? ○ Is there anything the program can do to further foster collaboration in the project and between projects?	companies. The interesting aspect of these projects is that you can create a bridge between SMEs in the region and large enterprises coming from other countries. It is of great value to the partners to be involved in projects where some big stakeholders are available in order to reach the scale, otherwise the project could be interesting but many projects remain at a small scale.
Selection		
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- How did your project fit within the programme objectives? - Which criteria should be used to select the project? - Did the programme offer flexibility, e.g. possibilities to negotiate complementary conditions for approval; to provide clarifications; to improve your original proposal? - What are improvements that can be made in the selection process? *Example: communication, guidelines and requirements, timing of evaluation etc.*	There were some critical points on the implementation, on the work plan that was developed. The main suggestion was to anticipate some of the variables, because they were late in the process and the commission wanted to have more control over the results. There is a very productive interaction, but not really negotiations. The EC collaboration is very positive, because they are interested in both the technical results and the functioning of the project. The way circular economy is implemented in some sectors should be improved and should take the impact into account. Within the impact assessment, there is a need for more KPIs related to the real potential of the solutions that the project involves to reach the market. Sometimes, projects are focussed on very detailed solutions from which there is no large scale implementation of these solutions in the market. This is due to that solutions are very often situation specific. The potential applicability in other sectors, cases or context is absent. The credibility of the projects towards large scale impacts could be better addressed. What is needed now in terms of circular economy is not small examples, it is the real big change, the impact, the scale and this should be included in the next programme as well.
Monitoring		
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency do you monitor the project's progress? ○ Do you start with a benchmark? Why (not)? ○ Are there KPIs in place to monitor progress? ○ If yes:	There are internal consortium web meetings every two weeks and there are several work package meetings that are controlled by the work package leader. The costs of the project is monitored every 6 months. In addition, there are life meetings every 4 months that often take 2 or 3 days, because these are big projects so there is a lot to discuss. There are two sets of KPIs, technical KPIs that monitor the material properties, and economic KPIs for validating the economic result of the new value chains. There is also a team that is a partner of the project and they

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	○ Are these KPIs specifically for your project? ○ Are the KPIs clearly communicated and easy to understand or interpret? - What tools do you use for monitoring? - Do you get support with monitoring progress? ○ From the programme itself? From external experts, such as hired consultants?	continuously monitor the risks, and every 6 months this risk table is updated. In addition, there is a technology manager that monitors the risks in terms of technological developments. Moreover, there is a stakeholder board, which involves other companies and stakeholders from Europe that are not active in the project, but they help directing the work towards the solutions and results which are provided from an expectations point of view. The most important KPIs to the project are the economic ones, because technical KPIs are important in a context in which you are proposing new solutions for the reuse of materials or components. Proving that you can meet the technical KPIs for enabling the reuse of materials can be done by an economical visible process chain. Circular economy solutions should rely on availability of second life materials that have at least the same performance as new materials with lower costs. One cannot rely on legislation for opening new business, the business case is needed before the legislation comes. Since each company in the project has its own business case, the partners are asked at the beginning to list a set of KPIs, the current value of these indicators and the target value, with a sort of indication of the first stage gain and what they want to reach. These KPIs are therefore well-known within the partners and well understood. No specific tool is used to monitor KPIs. The properties of the material are checked periodically along the technical work packages, and then in the demo there are companies that perform continuously experiments, also during the development of the solutions, in order to provide continuous feedback to the development process. The overall monitoring for the technical aspects is done by the interviewee himself. The coordination for the financial management is done by a group within his department
Evaluation		
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful programme? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* - What are success factors of the programme? ○ Why do you think these are success factors?	There is a difference in terms of declaration since the proposal of the preparation phase of the expected impact within Horizon 2020 compared to other projects. It is important within Horizon to request the consortium to analyse and identify the main impacts of the project already in the proposal phase. This has been an extremely useful gain in H2020. The simplification in the reporting makes it easy to report costs in Horizon. The calls always contain some scientific relevance with a clear target to industry. This made it easier to involve companies into consortia and to transfer the need of industry into projects. A suggestion to improve the programme is to establish networks at European level for pilot plants. In this way, pilot plants can integrate results of other projects and present them in an integrated environment to demonstrate the industry the visibility of specific process chains and the economic viability of the specific business cases. Then, the companies should be ready to transfer the solutions into their own production facilities. There are some very interesting projects but they sometimes have trouble to be mature enough at the end to go to the market. In one project, it is proposed that a pilot plant network is setup, to support the

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	○ What can be improved and why? ○ Do you have a suggestion how? ○ Why do you think this will improve the programme? - Did you collaborate in the project? If yes, how did this collaboration actually go? - Were you aware of possible actions or sanctions associated to a negative evaluation?	industry transfer to the market the mature technologies and results, demonstrating the visibility of these technologies within a complete process chain. This could be a viable way to increase the market penetration of results. The overall collaboration is very good. There are some technical issues but this is part of the project. The consortium is strong and the cohesion is very high.
Follow-up		
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- How do you get insights on the performance of the programme and projects? - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on project development, selection, monitoring and evaluation; technical assistance; matchmaking*	When working with circular economy, the need of perceiving the evolution of legislation at European level will eventually arise. There is some information on the work process in certain topics. There are activities around waste, but it would be nice if these projects could be continuously formed about the work of the legislators around legislation that is affecting circular economy. It would be very important to avoid reaching results that are grounding on some assumptions about future legislation that are not corrected through. 70% of the projects that have been finished on circular economy in the last five years, will not find the potential market because of legislation. This would be an important innovation for the next programmes, that some support, continuous interaction or permanent observatory on what is going on in terms of legislation evolution, could help projects in understanding the main trajectories of evolution of the legislative framework. Projects have intrinsically a very limited impact. The impact may be on one business case, but no extended impact at European level. A project can be ready for the market, innovative and good from a technical point of view, but at the end the business case is limited and difficult to make it a large impact at European level. What should be added in the proposal phase, is that a certain impact at European level ten or five years after the project could be very big. There are a lot of things that can be done, to help projects reach the market, for example clustering. Clustering between projects and permanent thematic clustering is a good way of making sure that thematic innovations are able to reach the market.

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		The interviewee is now involved in the development of circular economy cluster around plastics, and mentions that a lot of things can be done in terms of organising, dissemination events, organising big shows where the results of projects are presented together to the market. More could be done, but they have to be thematic, because it otherwise is too dispersed and unclear. So, the needs are clustering in the criteria and professional dissemination.

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APPENDIX 5 MatRessource Conducted interviews

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Case Study Interview – Programme Owner (agenda-setting & execution levels) – MatRessource	
Objective	Guiding questions Answers
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What is your current position? I work for the Project Management Jülich. In the area "New Materials and Chemistry" I head the department "Materials Technology for Energy and Mobility". As one of the leading project management agencies in Germany, we work hand in hand with public authorities in science, industry, and policy-making. With our expertise in research and innovation management, we support our clients in the German federal and state governments as well as the European Commission in achieving their funding policy objectives. On behalf of our clients, we implement research and innovation funding programmes that have been tailored to meet their specific requirements and address socio-political needs. We integrate national and European funding initiative with the aim of enhancing Germany's competitiveness as a prime location for research and innovation in a common European Research Area. - What activities are there in the organisation on the topic of CE? (incl. funding programmes) Over the past few years, our business unit has implemented a number of funding guidelines that relate to CE. However, no subsidy directive focused exclusively on CE. The strongest reference to CE is the "MatRessource - Materials for a Resource-Efficient Industry and Society" funding directive. With the MatRessource funding initiative, the Federal Ministry of Education and Research (BMBF) is promoting the better use of resources through material innovations. The research projects are intended to permanently reduce dependence on raw material imports. At the same time, international competitiveness will be improved by reducing energy and material costs, thus relieving the burden on the environment. The research projects provide effective impulses for improving resource efficiency. The approaches pursue not only the efficient use of raw materials, but also their substitution and the closure of material cycles through recycling. In the "MatRessource" initiative, the BMBF has been funding projects since 2012 that investigate how resources can be used more profitably and more gently through new or improved materials. MatRessource is part of the BMBF framework programme "From Material to Innovation". The BMBF is investing around 70 million euros in 44 collaborative projects.
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? Under the MatRessource funding measure, research projects are being funded that investigate how resources can be used more profitably and sparingly than before through new or improved materials. The aim is to focus more on the material aspect when conserving resources.

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	- What is the objective of the programme? o How is circularity/CE defined? o What are the focus areas and why? *For example: construction- and demolition waste, critical raw materials, water, plastic, chemicals, food, biomass and bio-based products, or other (please specify)* o Are there any CE indicators used for this? If yes, which indicators? CE was not defined in the funding initiative. The focus is on resource efficiency and resource conservation. The focus here is on material efficiency, substitution, recycling, corrosion protection and process optimisation. Within the framework of the MatRessource funding initiative products and production processes are developed, in which new materials lead to an increased contribute to resource efficiency. Resource efficiency is generally defined as the ratio of a particular benefit or result (e.g. of a specific product) for the required application natural resources (raw materials, energy sources, etc.), Environmental media such as water, soil, air). In simple terms, higher resource efficiency means the more economical use of natural resources with the same functionality of the product.
Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection? The funding procedure was a two-stage process. In the first stage of the procedure, project outlines that could be evaluated were to be submitted. The outlines were reviewed by internal and external experts. - Based on what criteria/indicators are projects selected? o What are general criteria? How are these criteria weighted? Is there any focus? o What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? o Are there any selection criteria for collaboration in projects? Why (not)? In order to increase resource efficiency, a broad spectrum of individual technologies will be addressed as the object of funding, which can be assigned to various basic strategies: substitution, increase in energy and material efficiency, recycling, prolongation of service life, and optimization of chemical processes. In principle, the strategic approaches to increasing resource efficiency concern the product life cycle in all its phases. The project outlines received were evaluated according to the following criteria: - technical reference to the call for proposals, - contribution to a resource-efficient industry and society, especially in future technologies, - scientific-technical quality of the solution approach, - the level of innovation, risks and scope of application of the scientific-technical concept,

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	- technical, economic and social importance, in particular market and job potential, - quality of the project consortium, coverage of the value chain, - the viability of the recycling concept, contribution to strengthening the innovative capacity of enterprises and - Involvement of SMEs. In addition, there were no criteria on resource efficiency and CE. - What are improvements that can be made in this procedure, when considering CE indicators and collaboration? Since no clear resource efficiency criteria were already defined in the call for tenders, it was very difficult to evaluate them later according to the relevant criteria. In any case, it would be better to define clearly from the outset which criteria one would like to use at the end of the funding period. This would make it easier to draw conclusions and evaluate the success of the funding initiative. -Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration? The MatRessource funding initiative is accompanied by a scientific coordination project (MaRKT) which performs organizational and content tasks. The goals of MaRKT are among others - networking the research projects among each other, - supporting projects in the preparation and dissemination of results, - maintaining contacts with comparable national and international research activities, - the organization of networking events and - the provision of effective publicity Information material. Since 2012, various workshops and seminars have been held, thus strengthening the networking between the projects. - Does the programme offer the possibility to extend the deadline to include a not foreseen additional activity relevant for CE impact (with or without budget modification)? This is not excluded in principle, but has not yet been claimed.
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? The evaluation of the projects themselves is carried out as part of the normal examination of the numerical evidence at the end of the period. The numerical evidence shall include a final report describing the results achieved and the planned exploitation.

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	In addition, MatRessource also carries out a further evaluation of the MaRKT accompanying project. At the end of the project term, MaRKT conducts a survey of the projects in order to assess their success and, if necessary, plan follow-up funding initiative. The aim of this evaluation is to work out the most important results of the projects and to be able to present an estimate of the resource efficiency potential of all projects. For this purpose, an evaluation form was developed which is sent to the coordinators of the projects. The questionnaire describes the developed technology, the product or the process. In addition a reference case is to be represented. This is followed by the calculation of the contribution of the development to resource efficiency and then the assessment of the resource efficiency potential for different time horizons with three local reference frameworks. - How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? Within the framework of a MatRessource workshop, the projects expressed the wish for a guideline on resource efficiency assessment. The guideline was developed by MaRKT and made available to the projects. The aim of the guideline is to provide basic assistance and procedures for resource efficiency assessment within the framework of the MatRessource funding initiative. Thus, an accepted basis for the evaluation of resource efficiency through material innovations should be created. The guide can help to answer the above mentioned questionnaires. However, no benchmark was established. The projects have a very wide range of topics and the proportion of basic research and application-oriented research is also different. - Are there KPIs in place to monitor progress? No. *If yes:* o What are the KPIs? (both general and CE specific) o Are KPI results being verified by independent third party auditing and accounting? Which ones? o Are these KPIs programme or project specific? o Do these KPIs consider collaboration? o Are these KPIs explicitly communicated to the project beneficiary?
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* In my opinion a very successful funding initiative. The BMBF funding initiative "MatRessource - Materials for a Resource-Efficient Industry and Society" supports research and development of innovative technologies and processes for better use of resources through material innovations. Between 2012 and 2019, a total of 44 collaborative projects at the interface between materials science, materials technology

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	and resource efficiency were funded with around 70 million euros. The research projects provided effective impetus for increasing resource efficiency. The projects included material developments in the field of renewable energies such as offshore wind energy and biogas generation, in the field of exhaust gas cleaning for stationary and mobile plants and in the field of electro mobility. In addition, developments for better wear protection in tool and pump construction and for more efficient thermal waste treatment were promoted. Quantifiable results were achieved in many projects. A few of these successes in the projects are listed below: - savings of more than 30 percent gallium in the Production of light emitting diodes. - Successful development of substitute materials for tungsten carbide as wear protection for Excavator shovels. - Almost ten percent efficiency with the Hydrogen production with the aid of sunlight through the use of new catalytic converters without expensive precious metals. - Savings of around 40 percent on precious metals through the development of a new catalyst technology for gasoline engines at constant good exhaust emission values. - 50 percent reduction in personnel and maintenance costs through the use of new inspection methods and repair systems for offshore wind turbines. - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? In my view, the success factors were above all the close support provided by the MaRKT coordination project. By holding regular events, the networking and understanding of the topic of resource efficiency was strengthened. Next time, I would set clearer targets from the outset for achieving the goals, so that the evaluation would be easier at the end. - If already available, what has been the impact of this program? How is it measured? A final evaluation is still pending. It is to be carried out with the support of MaRKT by the end of 2019. - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries? The evaluation of the course of the project is checked in the usual project monitoring. In the context of the interim reports, for example, the projects must state their most important scientific and technical results

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	to date and any necessary changes to the objectives. If critical points arise, the work plans can be adapted, for example.
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects end? Not planned. - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How? The publication of project results is an integral part of the exploitation and is primarily carried out by the scientific project partners. Since 2012 two MatRessource brochures have been published. The first results of the projects have already been presented in the brochures. A final publication on the funding initiative and the funded projects is planned for 2019. It is scheduled for publication at the end of 2019. - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? Cooperation was a prerequisite for funding. Sometimes successful collaborations lead to another project. We keep out of the formation of consortia and their continuation. - Is there a way to capture knowledge about the performance of the programme and projects? In principle, there is a homepage for the funding initiative (www.matressource.de), but there is no complete recording of results from the projects. - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on programme development; project selection, monitoring and evaluation; technical assistance; matchmaking* Not at the moment.

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Case Study Interview – Project beneficiary – MatRessource	
Objective	**Guiding questions** **Answers**
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation are you working for and what is your current position? CEO of Loser Chemie GmbH, a SME from Germany - What is the size of your company (no. of employees)? 17 employees in our company, but 240 in our group under the umbrella of L´fficiency Holding
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- How did you learn about the programme? by invitation on an poster session of a conference - How did your project fit within the CE objectives of the programme? For about 10 years we work actively on fields of CE. On the one hand, it is in their own interest to substitute raw materials for secondary raw materials and, on the other hand, to fill in valuable cycles. In order to reach our goals faster, we like to work in projects, both nationally and internationally. Noteworthy are H2020 projects: Cabriss, Super PV and Circusol as examples of international cooperation. - Why did you decide to apply for funding under this programme? partner quality and the topics were the main reasons for joining the projects - Was it clear what kind of impact on CE the programme expected from the funded projects? Why (not)? Yes, because of we learnt, that • Disposal problems have been the subject of specialist conferences in the industry for many years • Producers push for solutions (B2B calls) • Political constraints (EU directive WEEE) • Own offers, which contribute to the improvement of the resource efficiency of enterprises, immediately find acceptance on the market • Our planet is a closed system … • To make raw materials “cheaper” - Did you collaborate in the project? If yes: o What is the composition of the proposal/project consortia?

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	Mixed, R&D and industry o Is there anything the program can do to further foster collaboration in the project and between projects? o Not sure, not really
Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- How did your project fit within the programme objectives? Very well, because of, we work directly in CE. - Which criteria should be used to select the project? Target and content are very important! - Did the programme offer flexibility, e.g. possibilities to negotiate complementary conditions for approval; to provide clarifications; to improve your original proposal? That was generally never the case and not necessary. We have learned that suggestions have been made, but changes never had to be discussed. - What are improvements that can be made in the selection process? *Example: communication, guidelines and requirements, timing of evaluation etc.* multilingual coordinators
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency do you monitor the project's progress? o Do you start with a benchmark? Why (not)? o Are there KPIs in place to monitor progress? o If yes: o Are these KPIs specifically for your project? o Are the KPIs clearly communicated and easy to understand or interpret? Yes, it was very helpful to have a contact person and receive reminders in good time for reports, meetings, telephone conferences, and for the milestones - What tools do you use for monitoring? only communication via email and the internal web-space, the projects provide - Do you get support with monitoring progress? o From the programme itself? o From external experts, such as hired consultants? Yes, from the coordinators.
Evaluation	

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• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? Yes, it was/is successful. We made use of recycled waste materials (Si, In and Ag). CABRISS focused mainly on a photovoltaic production value chain, thus demonstrating the cross-sectorial industrial symbiosis with closed-loop processes – everything could be demonstrated. - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? The interdisciplinary cooperation was very beneficial. Uncomplicated and sufficient promotion enabled a functional demonstration. Unfortunately there is a lack of funds for the implementation in higher TRL level or for the construction of pilot plants. - Did you collaborate in the project? If yes, how did this collaboration actually go? After finished the project most of the partners work further together, B2B but also in some cases in new projects. - Were you aware of possible actions or sanctions associated to a negative evaluation? No!
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- How do you get insights on the performance of the programme and projects? By coordinators, project web pages and own researches… - Are there any needs you have identified that go beyond the programme? We believe that better support for upscaling and industrial application needs to be provided. - Are there any needs that the CICERONE platform can fulfil? CICERONE will establish a platform which will determine the priorities and pathways for coordinated R&I for circular economy? Okay, publish, how it works – more it just has to be understandable and workable

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APPENDIX 6 Incentives for research, development and innovation projects (RRI) Conducted interviews

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Case Study Interview – Programme Owner (execution level) – RRI	
Objective	**Guiding questions** **Answers**
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What is your current position? Ministry of Economic development - What activities are there in the organisation on the topic of CE? (incl. funding programmes)? CE is included into the Programme RRI (Research, development and Innovation) as one of the priorities of the Smart Specialization Slovenia.
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? The programme was initiated to increase research, innovations and competitiveness by the Slovenian companies and increase the resource efficiency. - What is the objective of the programme? Regarding the CE priority - To encourage companies in implementing circular economy into their practice and to speed up the development of the companies in CE directions. o How is circularity/CE defined? It is mostly understood as reducing emissions (CO_2) to the environment and also to consider CE principles already in developing phase of the products, to extend product's lifetime and to reuse its parts after disposal. o What are the focus areas and why? *For example: construction- and demolition waste, critical raw materials, water, plastic, chemicals, food, biomass and bio-based products, or other (please specify)* All areas are included in the programs, there is no specific focus. o Are there any CE indicators used for this? If yes, which indicators? Especially indicators connected with water, energy use- environmental aspects of energy consumption.
Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection?

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	The selection is carried out, based on the pre-defined criteria, which are published in the Call. Each project is evaluated by 2-3 evaluators, and then the consolidated evaluation is prepared (similar to the evaluations of the H2020). - Based on what criteria/indicators are projects selected? o What are general criteria? How are these criteria weighted? Is there any focus? The criteria are divided into 4 sub-criteria groups: • A compliance of the project: if the project is well integrated with the one of the focused topics (e.g. CE, Smart city, etc.) and Smart Specialisation Slovenia • Excellence • Impacts (within this a CE criteria is exposed, weighted 20 % as a criteria only.) • Competencies to execute the project • Project management • Location Actually each criteria is weighted. Within the above 6 groups there are:16 criteria (indicators), weighting 15%, 20% or 35 %. The highest weights are given to the excellence. o What are the CE/circularity specific criteria? How are these criteria weighted? As mentioned before there is 1 out of 16 CE specific criteria weighted 20 % o Are there any selection criteria for collaboration in projects? Why (not)? The project who includes collaboration gets more points. - What are improvements that can be made in this procedure, when considering CE indicators and collaboration? Sometimes the Ministry has perceived that the collaborations were made only for the project proposals to receive higher scores. Actually, it needs to be done in a way that collaborations show an added value along the supply chain. -Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration? No, the programme does not offer that possibility. - Does the programme offer the possibility to extend the deadline to include a not foreseen additional activity relevant for CE impact (with or without budget modification)? No, there has not yet been such case.
Monitoring	

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• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? Monitoring lasts for three years (6-9-9 month reports). The goals are evaluated through timelines, where activities are checked, also there are audits in the field executed. Indicators are determined. - How is the progress of the programme measured? Kako merite napredek programa? Activities are monitored through timelines, reports are carried out, and also finances are audited. o Do you start with a benchmark? Why (not)? They compare timelines with other programs. - Are there KPIs in place to monitor progress?? Yes, they do. *If yes:* o What are the KPIs? (both general and CE specific)? KPI s are defined for each project separately, one of them is resource efficiency. o Are KPI results being verified by independent third-party auditing and accounting? Which ones? Yes. It depends form the programme to programme as Ministry always carries out an open call for the EX-POST Programme evaluations. o Are these KPIs programme or project specific? They are project specific. o Do these KPIs consider collaboration? Not specifically. o Are these KPIs explicitly communicated to the project beneficiary? Yes, they are.
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? Yes, improvements are seen in CE thinking, but there is still a large gap in the area. *Note: we will consider this answer as your personal opinion and will not refer to your name in further reporting.* - What are success factors of the programme? Higher level of innovativity and activities in CE direction Why do you think these are success factors? Because they improve CE thinking. o What can be improved and why? Separate programme sector for CE. o Do you have a suggestion how?

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	Same as answer before. o Why do you think this will improve the programme? More companies would participate. - If already available, what has been the impact of this program? How is it measured? There are not yet specific results, as the programme has just ended. - Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Actions are determined within the contracts.
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects end? Partial promotion within other organisations, monitoring for five years after the end of project. - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? Yes, they have to report five years after the end. - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? They do not monitor that. - Is there a way to capture knowledge about the performance of the programme and projects? No. - Are there any needs you have identified that go beyond the programme? Yes, new Financial platform includes new needs. - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on programme development; project selection, monitoring and evaluation; technical assistance; matchmaking* Yes, it would give a comprehensive overview of CE situation. There is a need to review good practices and to take good features to next programs. It is also a need to compare with other programs and learn from them.

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Case Study Interview – Project beneficiary – RRI	
Objective	**Guiding questions** **Answers**
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation are you working for and what is your current position? Director of the company. - What is the size of your company (no. of employees)? 12.
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- How did you learn about the programme? They usually learn about the programs from the Ministry web page, from consultant companies for applying to the programs or in Finance newspaper. Ideas for project are usually prepared in advance, then they are then waiting/searching for appropriate programme. - How did your project fit within the CE objectives of the programme? The goals was to determine the biodegradation of raw materials in algal environments, which is closely connected to the issues of water pollution –biological treatment plants, which effects CE. - Why did you decide to apply for funding under this programme? Because the programme corresponds to CE contribution and was connected closely with their idea. - Was it clear what kind of impact on CE the programme expected from the funded projects? Why (not)? Yes, the saw two benefits- marketing point of view- high added value and boosting network sales to other areas and scientific aspect- to be one of the world's top companies in the scientific and technological area. - Did you collaborate in the project? Yes. If yes: o What is the composition of the proposal/project consortia? They cooperated with the company, who produces algae. Anyhow, if you cooperate globally, there is a smaller risk for recession problems. o Is there anything the program can do to further foster collaboration in the project and between projects? Simplification of administrative processes, sometimes there is un-transparency in the system.
Selection	

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• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- How did your project fit within the programme objectives? The project concerned CE issues, connected with water pollution. - Which criteria should be used to select the project? The criteria was suitable, objective criteria in finance area- credit assessment are not objective by all companies. - Did the programme offer flexibility, e.g. possibilities to negotiate complementary conditions for approval; to provide clarifications; to improve your original proposal? Yes, the clarifications were possible, there was good communication and possibility to improve proposal. - What are improvements that can be made in the selection process? *Example: communication, guidelines and requirements, timing of evaluation etc.* They are satisfied with the process of selection, the points were clearly explained, the deadline for the application (3 months) was long enough. Instructions were clear, there were examples explained, which helped them a lot. They suggest sample application and possibility to add pictures, as sometimes it is hard to describe a product only in words.
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency do you monitor the project's progress? Monthly or for two months. o Do you start with a benchmark? Why (not)? No. o Are there KPIs in place to monitor progress? Especially deadline KPIs- product produced by the deadline, quality, reaching the objectives. o If yes: (če da…) o Are these KPIs specifically for your project? They are specific. o Are the KPIs clearly communicated and easy to understand or interpret? Yes - What tools do you use for monitoring? Excel. - Do you get support with monitoring progress? Yes From the programme itself? Yes, communication is good so if they have problems, the programme employees give them information. From external experts, such as hired consultants?

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	Yes, they external help for controlling the project and documentation.
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* Hard to evaluate project, as it has not yet ended, but until now the program is successful. - What are success factors of the programme? New product, added value, establishing a laboratory for using the product (carrying out measurements), new employments within the supply chain o Why do you think these are success factors? Because of the contribution to the society o What can be improved and why? Shorter report periods (at least three month period)- that would simplified the process and reduce the amount of documentation, also the money should be divided more evenly (not to get pay-out at once, at the end). o Do you have a suggestion how? Explained in previous answer. o Why do you think this will improve the programme? The processes would be shorter and simplified. - Did you collaborate in the project? If yes, how did this collaboration actually go? Yes, they have strong synergy with a company producing algae and they will work with them in the future too. - Were you aware of possible actions or sanctions associated to a negative evaluation? Yes
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- How do you get insights on the performance of the programme and projects? With reports, checking if the set goals have been reached. - Are there any needs you have identified that go beyond the programme? Yes, it would be more attractive, if financing was higher and the part of financing would be executed already in the beginning of the project, to start it easily. - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on project development, selection, monitoring and evaluation; technical assistance; matchmaking* -matching projects connecting similar projects and companies so they could possibly cooperate -to have a platform, which would contain data of all equipment, which could be used by companies- like a platform of available equipment for industry sharing

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	-cloud sharing- shared timelines, interdisciplinary project linking, synergy- useful at certain stages

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APPENDIX 7 Emilia Romagna Region Conducted interviews

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Case Study Interview – Programme Owner (agenda-setting & execution levels) – Emilia Romagna Region	
Objective	Guiding questions Answers
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation (public, NGO, private etc.) are you working for and what is your current position? Responsible of one service of Emilia Romagna Region Direction – Public organization - What activities are there in the organisation on the topic of CE? (incl. funding programmes) Funding programmes
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? 2014 - How does the programme fit into the national/regional innovation policy? How does the programme contribute to the transition a CE? The program was launched agreed with regional strategies. In particular, Pilot 1 with the Smart Specialization Strategy (S3) of the Emilia Romagna Region ('Promotion of sustainable development - Green and blue economy). Environmental sustainability uses the circular economy as a driver and match the regional energy plan in line with European objectives (2030 Agenda), including the circular economy, through the concept of resource efficiency (materials , as well as human, territorial etc. resources). How is the programme defined, e.g. where stakeholders (including industry) consulted in this? If yes, how did this process look like? The program was defined agreed with the regional S3s, established also through public consultation, in particular on Research & Innovation, identifying 4 strategic priorities and 5 specialization areas, considered as a driver for the current economic and social importance and due to their growth potential. - What is the objective of the programme? o How is circularity/CE defined? o What KPIs are defined for the programme with relation to CE? o What are the focus areas and why?

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	At program launch Circular economy was not explicitly mentioned because it was not a completely shared concept. However the terms of inclusive economy, inclusive development, principles underlying the circular economy were included. Specific circular economy indicators were not explicated, even if some of that are sustainability related (such as % CO_2 saving). Main focusing areas from S3 consultation were emerged and they correspond to the pillars of the regional economy (in terms of% of total employees): • Agribusiness • Construction • Mechatronics and motor engineering • Health and wellness industries • Cultural and creative industries - Does the programme take any measures to stimulate collaboration? How? This was done in particular with research projects, where up to 5 research organizations and/or stakeholders were engaged for "testing" the results. Furthermore, a minimum of two companies had to participate in projects without financing.
Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection? - Based on what criteria/indicators are projects selected? o What are general criteria? How are these criteria weighted? Is there any focus? o What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? o Are there any selection criteria for collaboration in projects? Why (not)? The projects had to include objectives agreed with program ones. Research projects, in particular, had to be collaborative (research-companies) and innovative. Specific KPIs were not required, but measurable and credible objectives were mandatory. - What are improvements that can be made in this procedure, when considering CE indicators and collaboration? Now the circular economy concept is shared and it will be included in the future programs, including specific performance indicators. - Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration? This was not foreseen.
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? Research projects had to deliver an middle-term and a final report. The first one had to explain the progress of the project according to the expenses. The final one to a further evaluation was submitted.

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	- How is the progress of the programme measured? o Do you start with a benchmark? Why (not)? The project proposals were required to explain the expected progress beyond the state of the art (benchmark) and the monitoring aimed to verifying its concrete realization. - Are there KPIs for the projects in place to monitor progress? *If yes:* o What are the KPIs for the project? (both general and CE specific) o Are KPI results being verified by independent third party auditing and accounting? Which ones? o Are these KPIs programme or project specific? o Do these KPIs consider collaboration? o Are these KPIs explicitly communicated to the project beneficiary? The program has specific objectives where the projects were required to contribute, even if not all explicitly linked to the circular economy (i.e. % CO_2 savings). The project evaluation by program owners as well as independent external evaluators was delivered, in order to have the objectives achievement (or the non-achievement) certification. Collaboration was a requirement.
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* I consider the program successful because all the objectives have been achieved. In particular, in the agro-food sector 80% of the projects have achieved specific sustainability objectives linked to the circular economy, both carried out by research institutions and by companies (resource efficiency, waste recovery). - What are success factors of the programme? o Why do you think these are success factors? o What can be improved and why? o Do you have a suggestion how? o Why do you think this will improve the programme? Circular economy is a complex concept and we are agree to aim to closure the loop on the whole value chains projects, from design to the end of life. However it is complicated. We need a large leader company able to build the whole supply chain. The purpose is not immediate.. Italy has a mainly small and medium enterprises. We would like to encourage the industrial symbiosis, and the SMEs would be agreed, but we have relevant regulatory problems. - If already available, what has been the impact of this program? How is it measured? The program is ongoing. It will be close in 2020.

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	- Which actions and/or sanctions are foreseen in the programme when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries? The final payment for not objectives achievements was not payed. The beneficiaries were informed.
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects have ended? Not evident. - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How? Sure, through the final project presentation. Dedicated budget to communication/dissemination was allocated. - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? The collaboration was a requirement to be funded. - Is there a way to capture knowledge about the performance of the programme and projects? The program is ongoing (it will close in 2020). All project have developed public websites. - Are there any needs you have identified that go beyond the programme? It could be useful to write the program directly after needs collection from potential beneficiaries. - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on agenda-setting, programme development; technical assistance; matchmaking* Yes. In fact Emilia Romagna Region has expressed their interest to participated since the proposal phase. - Have you ever considered joint funding (with other programs)? Would you be interested in joint funding? We would be interested, but political issue could be occurred.

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Case Study Interview – Project beneficiaries – Emilia Romagna Region	
Objective	Guiding questions Answers
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation are you working for and what is your current position? 1. Public organization – researcher 2. Public organization -researcher - What is the size of your company (no. of employees)? 1. >2000 2. >2000
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- How did you learn about the programme? 1. The program are disseminate through different channels. 2. The program are disseminate through different channels. - How did your project fit within the CE objectives of the programme? 1. It was a project on resource efficiency/valorisation. 2. It was a project on resource efficiency/valorisation. - Why did you decide to apply for funding under this programme? 1. Because it is my research field. 2. Because it is my research field. - Was it clear what kind of impact on CE the programme expected from the funded projects? Why (not)? 1. Very clear 2. Not clearly related to circular economy. However circular economy related impacts were required. - Did you collaborate in the project? If yes: o What is the composition of the proposal/project consortia? o Is there anything the program can do to further foster collaboration in the project and between projects? 1. Mixed consortium – Not answer 2. Mixed consortium – Not answer

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Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- How did your project fit within the programme objectives? 1. It was a project on resource efficiency/valorisation. 2. It was a project on resource efficiency/valorisation. However my project could fit also with other fields (other verification could be necessary). - Which criteria should be used to select the project? 1. More coherence between companies needs and project objectives 2. No answer - Did the programme offer flexibility, e.g. possibilities to negotiate complementary conditions for approval; to provide clarifications; to improve your original proposal? 1. On the consortium composition 2. Flexibility of scientific data but not on prototypes - What are improvements that can be made in the selection process? *Example: communication, guidelines and requirements, timing of evaluation etc.* 1. No answer 2. Motivation strictly related to measurable numbers
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency do you monitor the project's progress? o Do you start with a benchmark? Why (not)? o Are there KPIs in place to monitor progress? o If yes: o Are these KPIs specifically for your project? o Are the KPIs clearly communicated and easy to understand or interpret? 1. Research projects had to deliver an middle-term and a final report. The first one had to explain the progress of the project according to the expenses. The final one to a further evaluation was submitted. No evident KPIs to be monitored. 2. Research projects had to deliver an middle-term and a final report. The first one had to explain the progress of the project according to the expenses. The final one to a further evaluation was submitted. No evident KPIs to be monitored. - What tools do you use for monitoring? 1. Internal check with partners – literature 2. Internal check with partners – literature - Do you get support with monitoring progress? o From the programme itself?

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	○ From external experts, such as hired consultants? 1. No 2. No
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? *Note: we will consider this answer as your personal opinion, and will not refer to your name in further reporting.* 1. My project was a successful from my side. Not sure on general impact on circular economy 2. My project was a successful from my side. I hope in a follow-up results - What are success factors of the programme? ○ Why do you think these are success factors? ○ What can be improved and why? ○ Do you have a suggestion how? ○ Why do you think this will improve the programme? 1. The program should enhance the potential business of circular economy. 2. The program should include the circular innovation (i.e. this could not ignore the long term research projects). Furthermore the long term impact should be evaluated. - Did you collaborate in the project? If yes, how did this collaboration actually go? 1. Very good 2. Very good. - Were you aware of possible actions or sanctions associated to a negative evaluation? 1. Not very clear 2. Clear
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- How do you get insights on the performance of the programme and projects? 1. Maybe some projects could be revised 2. No, maybe too large scope - Are there any needs you have identified that go beyond the programme? 1. More coherence between companies needs and project objectives. 2. To be reach specific circular economy objectives value chain consortium should be verified - Are there any needs that the CICERONE platform can fulfil? *Examples: providing information on project development, selection, monitoring and evaluation; technical assistance; matchmaking* 1. Yes, sure 2. Yes, sure

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APPENDIX 8 Additional Conducted interview

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Case Study Interview – Programme Owner (execution level) – Umbria Region

General info

Type of funding
ROP Umbria ERDF 2014-2020. Funding for:
- Enterprises (Thematic Objectives 1-3 and 4)
- Public bodies (Thematic Objective 6)
-

Funding rate
Total: 412.293.204 €, with a total EU contribution of 206.146.602 € (50%)

Type of projects
TO1 "Research and Innovation" provides funding for: Research and Develompment projects (also complex); System actions, Innovative Start up and Living labs.
TO3 "SMEs competitiveness" provides funding for: support interventions in territorial areas affected by industrial crisis, SMEs in areas of crisis; support and promotion of cultural and creative enterprises; SMEs internationalization; support SMEs investments; support SMEs operating in the social field.
TO4 "Sustainable Energy" provides funding for: energy consumption reduction and energy efficiency in production processes; investments in renewable energy production.
TO6 "Sustainable Urban Development" supports the main Umbrian Cities (Perugia, Terni, Foligno, Città di Castello e Spoleto) in a *Smart Cities* perspective, with interventions related to sustainable mobility and ICT development.

Sector
Industrial systems (TOs 1, 3 and 4)
Urban Areas (TO6)

Resources
Financial allocation:
TO1: 101.834.404,00 € (24,7% of the total)
TO3: 85.507.200,00 € (20,7% of the total)
TO4: 55.960.120,00 € (13,6% of the total)
TO6: 30.816.400,00 € (7,5% of the total)

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Website http://www.regione.umbria.it/programmazione-fesr/programma-operativo-regionale-2014-2020		
Objective	**Guiding questions**	**Answers**
Background information		
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What is your current position? - What activities are there in the organisation on the topic of CE? (incl. funding programmes) ○ How are these activities organized? - Next to the CE funding programme, are there other programmes initiated by your organisation?	
Initiation		
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? - How does the programme fit into the national/regional innovation policy? - How does the programme contribute to the transition a CE? - How is the programme defined, e.g. where stakeholders (including industry) consulted in this? If yes, how did this process look like? What is the objective of the programme?	The ERDF Operational Programme of the Region of Umbria has been developed in line with the regulatory and normative framework, acknowledging and embracing the principles of the 2014-2020 cohesion policy. Region of Umbria, through the ERDF Operational Programme 2014-2020, intends to support effective actions (in effect "driving impact") designed to foster smart, sustainable and inclusive growth in the region, according to the requirements identified, the needs revealed by economic and social partnerships, the recommendations of the Council as expressed in the Partnership Agreement and National Reform Programme. The challenges to face through the OP are: specialization and innovation in the region; competitiveness of the production fabric; protection and enhancement of territorial resources; sustainable development; seismic prevention.
	- How is circularity/CE defined? - What KPIs are defined for the programme with relation to CE? - What are the focus areas and why?	At program launch Circular Economy (CE) was not explicitly mentioned. The CE theme has emerged during the RIS3 thematic Working Groups (attended by different stakeholdes, such as Public Bodies, researchers, enterpreuners, academia) managed by Region of Umbria between October 2016 and

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		December 2018. The CE has been included as a transversal theme for the 7 specialization areas and it has been structured in detail in the "Energy and Green Chemistry" area through specific research and innovation lines, such as for instance: technologies and solutions for a more efficient resources use, substitution of hazardous substances and enviromental impact reduction; business models for circular economy; technologies and processes for reusing, remanufacturing and recycling of products (including bioactive components); circular design and life cycle management; technologies and biotechnologies to recover and enhance biobased products and biochemicals.
Selection		
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection? - Based on what criteria/indicators are projects selected? - What are general criteria? How are these criteria weighted? Is there any focus? - What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? - Are there any selection criteria for collaboration in projects? Why (not)?	The general criterion for projects selection is the evaluation of their contribution to pursue (in terms of expected results) the specfic goals of the OP. In particular, the selection criteria approved by the Monitoring Committee are used. These criteria are defined for each Action of the OP and include: "eligibility criteria", "evaluation criteria" and "performance criteria". Specific KPIs regarding CE are not defined. However, amongst evaluation criteria regarding the TO4 the following are used: - Contribution of the project to the reduction of fossil energy consumtpion and polluting emissions - Reduction of the gross consumption of electricity from fossil fuels - Maximization of the contribution to the energy self-sufficiency of the enterprise (technichal quality) Ratio between invesment costs and reduction of the gross consumption of electricity from fossil fuels (technical-financial quality)
	- What are improvements that can be made in this procedure, when considering CE indicators and collaboration?	A list of CE indicators (characterized by specific calculation methods) could be very useful to support the OP definition within the next long-term EU funding 2021-2027. These CE indicators could ease the development of the OP by the Programme Owner and they could also contribute to a easy comparison between Regions and Member State.
Monitoring		

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• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? - How is the progress of the programme measured? Do you start with a benchmark? Why (not)?	To monitor the funded projects, a specific monitoring system (SMG 2014-2020) that encompasses both output and performance indicators, has been created. With particular regard to the RIS3, the monitoring system also includes a "context table" to monitor those projects contributing to its implementation, thus allowing a comprehensive view on the RIS3 progress per specialization areas.
	- Are there KPIs for the projects in place to monitor progress? If Yes: - What are the KPIs for the project? (both general and CE specific) - Are KPI results being verified by independent third party auditing and accounting? Which ones? - Are these KPIs programme or project specific? - Do these KPIs consider collaboration? - Are these KPIs explicitly communicated to the project beneficiary?	KPIs regarding CE are not included in the monitoring. Anyway, other specific KPIs are used, such as, for instance: - Additional energy production from renewable sources - Reduction of primary energy annual consumption - Estimated annual GHG emissions reduction
Evaluation		
• To obtain information about programme and project results, including success factors and possible improvements	- Would you assess this as a successful program? Why (not)? - What are success factors of the programme? - Why do you think these are success factors? - What can be improved and why? - Do you have a suggestion how? - Why do you think this will improve the programme? - If already available, what has been the impact of this program? How is it measured? - Which actions and/or sanctions are foreseen in the programme when a	The program is ongoing and a complete evaluation of its impact and success/unsuccess factors is not still available.

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	project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries?	
Follow-up		
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects have ended? - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How? - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? - Is there a way to capture knowledge about the performance of the programme and projects? - Are there any needs you have identified that go beyond the programme? - Are there any needs that the CICERONE platform can fulfil (providing information on agenda-setting, programme development; technical assistance; matchmaking) - Have you ever considered joint funding (with other programs)? Would you be interested in joint funding?	There is not sufficient evidence in this regard, since the program and the funded projects are still ongoing. Visibility to successful ended projects (some examples) is also given in the Region of Umbria website. Collaboration has been the basis of the projects funded under the TO1, and it occurred also at an interregional level.

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Case Study Interview – Programme Owner (agenda-setting level) – Resource efficiency of companies	
Objective	Guiding questions Answers
Background information	
• Explain CICERONE project and its objectives • Explain goal of the interview • Address privacy/GDPR issues • To obtain general information of the interviewee and its organisation	- What type of organisation (public, NGO, private etc.) are you working for and what is your current position? Public – Estonian Ministry of the Environment, Adviser (Environmental management department) - What activities are there in the organisation on the topic of CE? (incl. funding programmes) Dealing with waste residues (used as resource), supporting IT systems for circular economy (IT systems are also used for providing better data about the products that are produced).
Initiation	
• To obtain information about why the programme was initiated, how this is initiated and communicated about • To obtain information about if and how the programme facilitates in collaboration	- Why was the programme initiated? The programme was initiated, because the resource productivity *(t.i. resource productivity – how many euros you get from 1 kg of raw material) in Estonia is very low (3rd lowest in EU??), meaning there is a strong need for circular economy based projects. Furthermore, the programme was also initiated to make the economy more competitive. - How does the programme fit into the national/regional innovation policy? Resource efficiency is a part of their smart specialisation programs and it is a part of national innovation policy. - How is the programme defined, e.g. where stakeholders (including industry) consulted in this? If yes, how did this process look like? It is defined by public sector and the requirements are worked together with industry representatives. Firstly, the most important industry representatives are gathered together and the working group and several other individuals from the Estonian Ministry of environment consult with them. The industry representatives present the needs of industry and ideas for the programme, based on which the programme is defined. The most important factor in defining the programme are the need of the industry and their representatives. - How does the programme contribute to the transition to CE? By supporting innovative projects on the thematic of circular economy, which help Estonia to the transition to circular economy in companies and economy. It helps the manufacturing industry to invest in more circular solutions, innovative technology (machines, IT systems), and it helps the economy to make the resource use more efficient - What is the objective of the programme? Increase our companies resource productivity and competitiveness.

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	○ How is circularity/CE defined? How a company can be more efficient. ○ What KPIs are defined for the programme with relation to CE? Resource efficiency (shows if raw material is used more efficiently), measure how much resource saving is made in the lifetime of the investment, cost effectiveness of crods. ○ What are the focus areas and why? Mining, manufacturing industry (wood (timber industry), food. - Does the programme take any measures to stimulate collaboration? How? Yes, because for investment, one requirement is to have resource audit (resource use analysis), they evaluate the collaboration with the resource use specialists (they have to). They want to have the best solution, which is the reason for collaboration.
Selection	
• To obtain information about project selection procedure and criteria, including success factors and possible improvements	- What is the procedure for project selection? First, the project beneficiary individuals or groups apply by internet, where they submit the project. When the projects are gathered, they are reviewed by individuals from Ministry of the Environment, who are responsible for project selection. When they are reviewed, the projects are assessed by 4 criteria, from which 2 are general and are required (those are project has to be include innovation and has to have an impact on the increased resource productivity). If the project passes the general criteria, then the projects are assessed by 2 additional criteria (cost effectiveness and resource efficiency), based on which the projects are selected. When the projects are selected, additional questions are asked to the applicants. The projects are reviewed in 3 rounds based on criteria and questions asked. The number of rounds depends on the quality of the applicants. - Based on what criteria/indicators are projects selected? The project are selected based on 4 main criteria. Those are innovation and increased resource productivity (general criteria), cost effectiveness and resource efficiency (additional criteria). ○ What are general criteria? How are these criteria weighted? Is there any focus? General criteria are innovation and increased resource productivity. These are weighted 50 – 50. If the project passes the general criteria, then they have additional requirements/criteria, based on which the projects are selected. Those additional "general" criteria are weighted: 50 % resource efficiency, 30 % cost effectiveness, 20 % applicant's capability. ○ What are the CE/circularity specific criteria? How are these criteria weighted? Is there any focus? Resource efficiency is CE specific criteria and for instance presents, if raw material is used more efficiently in production. There is no focus. ○ Are there any selection criteria for collaboration in projects? Why (not)? No. Due to the objectives. - What are improvements that can be made in this procedure, when considering CE indicators and collaboration?

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	There are no improvements that I can remember at the moment, as the procedure is working well. - Does the programme provide any support connecting different selected projects, or project "alumni" to enhance knowledge sharing and collaboration? Good practices can be good for knowledge sharing. They have one project manager, who is involved in raising awareness in companies and promoting good solutions.
Monitoring	
• To obtain information about programme and project progress, including success factors and possible improvements	- How and with which frequency are the programme results monitored and evaluated? Results are monitored/evaluated annually by Minsitry and Environmental Investment Centre. - How is the progress of the programme measured? Main values for measuring the progress of the programme are number of supported enterprises and number of projects implemented. Also, how much resources they are saving. o Do you start with a benchmark? Why (not)? Yes. - Are there KPIs for the projects in place to monitor progress? Yes. *If yes:* o What are the KPIs for the project? (both general and CE specific) Raw material use (how it is used and if it is efficiently used). Electricity, heat consumption measurement etc. o Are KPI results being verified by independent third party auditing and accounting? Which ones? No. They (project beneficiary) design own KPIs. Also, we use our own KPIs. o Are these KPIs programme or project specific? They are project specific. o Do these KPIs consider collaboration? No. Are these KPIs explicitly communicated to the project beneficiary? Yes.
Evaluation	
• To obtain information about programme and project results, including success factors and possible improvements	Would you assess this as a successful programme? Why (not)? *Note: we will consider this answer as your personal opinion and will not refer to your name in further reporting.* Yes. - What are success factors of the programme? Main factor is that the resource efficiency is raised. More competitive companies, economy productivity raised (long term).

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	○ Why do you think these are success factors? If you have sustainable and efficient companies, then this could present the backbone of a good national economy. ○ What can be improved and why? Difficult to say. Maybe evaluation. ○ Do you have a suggestion how? No. ○ Why do you think this will improve the programme? /. - If already available, what has been the impact of this program? How is it measured? The major impact of this program is raised awareness about circular economy and resource efficiency. Impact is also the fact that companies are thinking about circular solutions and circular economy. The impact is not specifically measured, but it is just seen that the resource efficiency is more in media and present in the companies. It is, however, too early to tell about the general resource efficiency of companies, because it is hard to measure, as it has to be measured as a long term result. - Which actions and/or sanctions are foreseen in the programme, when a project's performance is evaluated as insufficient? Are these explicitly communicated to the beneficiaries? The actions are for instance that the aplicant has to give reasons, if it isn't sufficient. Also, we can end up asking the ground money back, if the performance is evaluated as insufficient. Yes, they are explicitly communicated to the beneficiaries.
Follow-up	
• To obtain information about the follow-up of the programme/project and its results, as well as if and how knowledge is captured • To obtain information about the identified needs and if the CICERONE can facilitate in this	- Are there any follow-up actions from your side after projects have ended? The most common action is the promotion of best practices, where we make videos and ask them to participate in their awareness raising events. - Are project leaders/partners encouraged to further communicate project-related results after finalizing the project? How? Yes, they are encouraged by cooperating in aforementioned promotion. By their own, because it is a good marketing tool. - If collaboration was a requirement; did collaborations sustain? Was support provided on this aspect? Usually it sustains, as collaboration between companies and auditors is developing more and more, as many auditors are also consultants and can help companies. - Is there a way to capture knowledge about the performance of the programme and projects? Yes, by presenting and capturing knowledge of best practices. - Are there any needs you have identified that go beyond the programme? Yes, company to company/B2B solutions.

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	- Are there any needs that the CICERONE platform can fulfil? There is always lack of knowledge when it comes to the projects on thematic of circular economy, because sometimes, also in our universities, there is not enough knowledge about circular economy, especially from evaluation perspective. - Have you ever considered joint funding (with other programmes)? Would you be interested in joint funding? It is very difficult. Maybe.

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