

Supporting Information to

## **Lessons, narratives and research directions for a sustainable circular economy**

**Supporting Information 1:** Detailed lessons

**Supporting Information 2:** Questions for policy-relevant research on a circular economy including sub-questions

**Supporting Information 3:** Original list of 78 research questions suggested by the study participants

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## Supporting Information 1: Detailed lessons

This table **summarizes the major lessons provided by the 54 survey participants**. To provide an overview of the major lessons, the core research team grouped them based on a joint interpretation process. As the survey participants diverged largely in terms of their stance towards a circular economy, i.e. more critical towards the CE and its potential (skeptical narrative), more cautiously optimistic towards the CE's potential (reformist narrative) or very optimistic regarding its potential (optimist narrative), their lessons were grouped accordingly. **Numbers in brackets** refer to the respective participants (i.e. participant 1 to 54 of the survey) who provided the lessons, to give an impression of how many people supported specific statements. Some statements between these groups are related. These are marked with "→ **similarly, see...**" or "→ **connected to statements in...**"

POLITICAL DIMENSION		
SKEPTICAL	REFORMIST	OPTIMIST
Questions CE's usefulness for sustainability transition	Anticipates CE's transformative potential, but only if contested conditions are met	Takes CE as a goal of sustainability transition
<p><b>CE is a buzzword that lacks a critical reflection on the growth paradigm but forms an excuse for business-as-usual</b> at different levels (14, 46, 17). This is because CE achieves only rarely a decoupling of economic growth and environmental impacts (24). The way CE is approached and evolving today does not consist of a paradigm shift, it is hyped and its environmental potential is overrated (18, 54). Also, it is uncertain under which economic framework CE can be achieved (11) → similarly, see RESEARCH/KNOWLEDGE DIMENSION.</p>	<p><b>Policy is key for CE success, not businesses</b> (39). For instance, Extended Producer Responsibility Schemes are often hampered by institutional weaknesses (13).</p> <p><b>However, vested interests in the status quo are averse to any direct policy interventions</b> and prioritize fiscal measures within a liberal free-market framework (36)</p> <p>At the same time, <b>outdated/conflicting/unconnected regulation</b> (21) is an obstacle and particularly SMEs can be hit hard by policy ineffectiveness (15).</p> <p><b>CE requires a reorientation regarding policy design and evaluation</b> (24, 50). Policies need to be consistent, binding (37) and address total consumption levels (23). Otherwise, policies risk to</p>	<p><b>CE enables progress in resource efficiency policy</b> (12) and <b>business action</b>. It promotes collaborative EU-level policymaking (49), can motivate/engage business to support actions and policies focused on reuse, recycling [national] (14, 7), foster the implementation of strategies in specific sectors at municipal/regional scale (5) and, thus, facilitate local management for an urban sustainability transition (32, 27). This can ultimately lead to GHG emissions reductions and business benefits (34).</p> <p><b>Challenges/obstacles include:</b> labor taxation and subsidies for fossil fuels (33), challenges in measuring the CE's potential (2), uncertainty about the best regulatory mechanisms for CE remains (so a review of policies is fundamental) (2, 15).</p> <p><b>Key drivers of these developments are (directive) national and international regulations</b> driving intervention in industries (8) and creating space for niche CE business to scale up and substitute linear practices (36). CE involves multilevel planning and links to eco-industrial parks at the local level and green manufacturing at the national and international level (27).</p> <p><b>Policies are crucial</b> (1, 4, 5, 30). EU policy is a good engine to speed it up (4) as well as wider international cooperation (13, 52). Vice versa, CE is a good opportunity to engage EU policies (7).</p>

In addition, **CE policies do not promote systemic change**. Although sometimes well intentioned, policies are often incoherent (31, 43) and are not based on or leave room for subsequent experiments/lessons (21). → connected to statements in the optimistic position in POLITICAL DIMENSION, see right.

hinder the necessary transformation. For instance, waste management policies can hinder the implementation of take-back systems (15) or other CE approaches (42). Otherwise, policies risk to be misleading by focusing on specific CE activities, e.g. recycling, at the expense of others, e.g. reuse, remanufacturing or refurbishing (5).

Policies should focus on the growth of in-use materials and include service-material-decoupling (6, 11). CE can only contribute to achieving SDGs with more assessment (34).

Rules from higher levels (e.g. EU/national level) need to be translated into local applications and ordinances (e.g. regional/ city) (21). CE further requires coordination across areas, sectors and stakeholders (50) and a stimulation of secondary markets (55).

**A framework for measuring and monitoring progress** – across all scales is needed (36). → similarly, see critical position in POLITICAL DIMENSION.

At the same time, **regulations need to be** homogeneous and strict (16). To achieve this, coordination is needed at all levels (16, 49, 34, 13), which requires new collaborative types of policy-making (31), concerted government actions (30) and an integration of global, meso and local levels (50). → connected to statements in the critical position in POLITICAL DIMENSION, see left.

**National and/or local policy can support** material self-sufficiency (17), set public procurement standards that influence companies (15, 4), provide financial support and assessment indicators (26), and change incentives by a natural resource oriented tax-reform (16), or by setting energy efficiency schemes that support product design for longevity (35).

Next to policies, **effective local-level implementation is key** and CE indicators should be broken down into specific dimensions (26). At a local management and planning level, policies need to enable easy access for everyone (35).

**CE policies should :**

- not be established universally across sectors (9)
- keep companies competitive (49)
- support entrepreneurship and start-ups (13)
- finance the upscaling of CE ideas and build networks on local and national levels (13)
- address potential trade-offs for products (41)
- fund new technologies and research, nat&int. (48)
- promote local sourcing (international) (35)
- drive resource efficient economy, local to int. (36)

**Policies should support:**

- Extended Producer Responsibility for more resource efficiency (12)
- Entrepreneurship & start-ups (13)
- Reduction in consumption (55)
- Green public procurement (14)
- Economic incentives (1)
- Infrastructure investment (39, 43, 4)
- R&D and financing (16)

## ECONOMIC DIMENSION

SKEPTICAL	REFORMIST	OPTIMIST
<p>It is uncertain under which economic framework CE can be achieved (11) → similarly, see critical perspective under POLITICAL DIMENSION.</p> <p>Industry welcomes growth discourse &amp; vagueness (31,24) to prevent radical change (24).</p>	<p>Currently, CE is heavily weighted toward technological solutions (23, 46).  <b>Barriers to CE, however, are not only technological but economic (41)</b>, for instance, secondary material markets are crucial for a CE (48) and international trade can be a barrier (13).</p> <p>We need <b>better circumstances for innovation and (4) ensure that value creation aligns with regenerative practices (50)</b>.</p> <p>We also need to <b>keep a critical eye on rebounds and greenwashing (38)</b>.</p>	<p>The CE concept holds the opportunity to engage private companies and bring economic benefits (7, 34). It provides a powerful metaphor (51) that has the potential to break silo-thinking (38).</p> <p>It needs, however, closed loops, new business models, tracing data and technological competencies (20, 5), a long-term transition (20) and the integration of bio-based materials (1). It should further internalize the real costs of extraction and production (9). Finally, its benefits should reach all stakeholders in the value chain (3).</p>

## SOCIAL DIMENSION

SKEPTICAL	REFORMIST	OPTIMIST
<p>There will be considerable resistance from status quo vested interests to change and new policies for change (10).</p> <p>Shifting ownership will impact disadvantaged social groups negatively (22).</p> <p>“The hard things remain hard”, even as a few more case studies of successes are found, i.e. mainstreaming circular design, fundamental system change, reconceptualising 'efficiency' for resources used across multiple cycles, avoiding toxic materials circulating [all scales] (14)</p> <p>Diverse stakeholders &amp; local groups need to be included in CE development (1).</p>	<p>The CE concept raises societal awareness (52), which is promising.</p> <p>However, neglecting the social dimensions limits CE's potential (5). Some of the most critical enablers for a CE are values, attitudes, beliefs, behavior change (46), willingness to change lifestyles/habits (29, 48).</p> <p>There is a need to include social objectives in policies/institutions &amp; monitoring (6, 13), which also means addressing the current consumer culture and aiming for a fair distribution of resources – worldwide and within countries (22).</p> <p>The definition of a common language (3) is crucial for driving a CE.</p> <p>Diverse stakeholders &amp; local groups need to be included in CE development (1).</p>	<p>Diverse stakeholders &amp; local groups need to be included in CE development (1).</p>

## ENVIRONMENTAL DIMENSION

SKEPTICAL	REFORMIST	OPTIMIST
<p><b>The claim that the CE delivers environmental and/or economic benefits is weakly substantiated (9, 22, 30, 45).</b></p> <p>There is a <b>risk of managerial-techno-optimism to the expense of transformation (38, 55).</b></p> <p><b>Resource inefficiency results mostly from the low cost of disposal not resource availability (30).</b></p>	<p><b>A critical eye on rebounds and greenwashing is necessary (38)</b></p> <p><b>Cycles can be closed when global population growth stops</b> and stock saturation kicks in. This is bound to happen but the time horizon is long. (28)</p>	<p><b>A CE is the only form of human development within planetary boundaries (28).</b> It has the potential to significantly reduce per-capita environmental pressures (12).</p>

## RESEARCH DIMENSION

**It is uncertain under which economic framework CE can be achieved (11) → see POLITICAL DIMENSION and ECONOMIC DIMENSION.**

**CE heuristics are not reliable**, e.g. the solid waste management hierarchy--or the inner-loop-is-better of the Ellen MacArthur Fdn (45).

- Research on circular economy conceptualization, framing & limitations (11,51)
- Analysis of social, environmental, economic costs and benefits of CE (17, 34)
- Understanding the linkages between formal and informal CE activities (23)
- Assessment of environmental and economic benefits of circular solutions (18,45,43,46,54) – policies have to be created after such assessments □ see also POLITICAL DIMENSION and ECONOMIC DIMENSION.
- Assessment of global supply chains and informality in the Global South (52)
- Data on stock quality and quantity (20)
- A definition of value in a CE is critical (41)
- Assessment of behavioral change (46)
- Integration of knowledge, specifically emergent research fields (20), innovative perspectives (8) and learnings/a historical perspective (22)
- Systemic approach including space, time and people (10,18)

## Supporting Information 2: Questions for policy-relevant research on a circular economy including sub-questions

<b>CONCEPTUALIZING A SUSTAINABLE CIRCULAR ECONOMY</b>	
Reformist	1 What does the socio-economic system need to look like to support circularity principles and be socially, environmentally and economically sustainable in different regions?
	2 How can the circular economy objectives be linked to the different SDGs and other major environmental and social development targets? <ul style="list-style-type: none"> <li>• How do/can CE practices help achieve the SDGs?</li> <li>• How do/can the SDGs guide CE practices?</li> </ul>
Skeptical	3 How can circular economy conceptualizations address the challenges posed by economic growth models, such as the physical constraints of resource and ecosystem regeneration?
	4 How can we determine whether or not sufficiency is part of the circular economy and how can we define it? <ul style="list-style-type: none"> <li>• What kind of policies do we need to achieve sufficiency?</li> <li>• Are policies meant to achieve sufficiency suitable to contribute to the circular economy?</li> <li>• How do we discuss and build political feasibility (e.g. coalitions and actors) for sufficiency policies for a circular economy?</li> </ul>
<b>TRANSFORMING TO A SUSTAINABLE CIRCULAR ECONOMY</b>	
Optimist	5 What are the potentials and limitations of harmonization of circular economy policies across countries (e.g. within the EU, countries with different development stages)? <ul style="list-style-type: none"> <li>• What are the effects of disharmonies between policies within a country/across countries on a transition to a circular economy (e.g. reuse targets, percentage of reuse/recycling)?</li> </ul>
	6 What harmonization of policies between levels and scales is needed to support circular practices? <ul style="list-style-type: none"> <li>• What interaction mechanisms could harmonize circular economy policies?</li> <li>• What interactions of policies discourage the transfer of environmental burdens but allow for local variations and implementation?</li> <li>• What interactions of policies between levels and scales ensure circular practices to meet resource related goals?</li> </ul>
	7 How can policies be designed and integrated to increase material resource efficiency at every stage of the life cycle of products and services? <ul style="list-style-type: none"> <li>• What rebound effects or mutual benefits are generated across policy domains and across industry players in the same value chain?</li> </ul>
Reformist	8 How can we transition to an environmentally sustainable circular economy through outcompeting the linear economy in a given socio-economic system?
	9 What mechanisms can ensure that policy and practice support a systemic societal change towards a circular economy?
	10 What existing policy options and what new transformative policies enable a sustainable circular economy?
	11 How do we leverage a better understanding of the relationship between the formal and informal industrial and service sectors to generate a just transition to a circular economy? <ul style="list-style-type: none"> <li>• What is the relationship the circular economy has with formal and informal practices?</li> <li>• What can we learn from the informal sectors for a circular economy?</li> </ul>
	12 How could we move to circular economy business models that are appropriate for countries in different development stages?

Skeptical	<p>13 Can or should linear economic systems be dis-incentivized and circular systems incentivized, and if so, how?</p> <ul style="list-style-type: none"> <li>• When is it relevant to disincentivize linear economic activities?</li> <li>• How can policy frameworks be reformulated to achieve the transition between linear and circular systems (i.e. incentivize or disincentivize certain economic systems)?</li> <li>• What policies can incentivize circular economic systems?</li> </ul>
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### MEASURING CIRCULAR ECONOMY TO ENSURE SUSTAINABILITY

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	<p>14 What are suitable indicators to measure progress towards circularity and to assess the sustainability of the emerging circular society?</p>
	<p>15 How can we ensure that circular economy initiatives avoid negative effects, including but not limited to, tradeoffs and rebound effects?</p>
Reformist	<p>16 How can we assess what scale is suitable in order to reach circular economy goals given the characteristics of the specific product system?</p>
	<p>17 What tradeoffs does the implementation of circular systems generate in different geographic and organizational scales?</p>
	<p>18 How do we allocate social, environmental and economic costs in circular supply chains from extraction through design, manufacture, retail, use and disposal to recycling?</p> <ul style="list-style-type: none"> <li>• What approaches (e.g. legal frameworks, stakeholder engagement) are most suitable to allocate costs in a fair or equitable manner?</li> <li>• How can such approaches and/or specific measurements support policy deliberation?</li> </ul>

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### SCIENCE-POLICY INTERFACE FOR A SUSTAINABLE CIRCULAR ECONOMY

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Reformist	<p>19 What are the different pathways in the science-policy interface that make circular economy knowledge taken up by decision-makers?</p> <ul style="list-style-type: none"> <li>• Which type of policy (voluntary or legally binding) and research disciplines are most prominent?</li> <li>• What role do responsibilities of scientists and policy makers play in the circular economy's science-policy interface?</li> <li>• Have the findings of circular economy research a higher potential to be taken up by policy? If so, why?</li> </ul>
	<p>20 How can life-cycle oriented sustainability assessment be translated into policy in a circular economy context, given that no supply chain is under the control of a single government or a single sector?</p> <ul style="list-style-type: none"> <li>• How can both science and policy for a circular economy be ensured to be effective?</li> <li>• What can be learned from regulating supply chains towards sustainability for a CE context?</li> <li>• Are the existing methodological approaches to life-cycle oriented sustainability assessments capable to capture the complexity of policy?</li> </ul>

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### Supporting Information 3: Original list of 78 research questions suggested by the study participants

No	Original Question	Final Question (see Table 1)
1	Is CE research fundamentally different from past research using similar methods or concepts or is it a narrative framing mechanism?	
2	Is CE more effective than other concepts in realizing change?	
3	What needs to change in order to make the circular movement a true success, i.e. more than just a buzzword?	9 - merged with original question 9
4	What is the end point desired?	
5	How can CE be aligned with the sustainable development goals?	2
6	Is the goal of materials systemic change enough or do we need to change people (social/economic system)?	
7	Can a circular economy operate and bring the supposed (net) environmental savings in the long-term under the current economic laws that govern the world?	1 & 8 - split into two final questions
8	How can we truly address the issues with the growth model that underpins the CE?	3
9	How can policies help to make circular economy the "new normal" instead of remaining a niche approach of doing business?	9 - merged with original question 3
10	Which policy options exist that go beyond curing "linear economy symptoms" but instead foster a deep and sustainable paradigm shift towards CE?	10
11	How much harmonization of national policies is needed to reach a sufficient degree of incentives in an industry to switch to a circular economy set-up?	5
12	How can we achieve policy integration to facilitate the transition to a circular economy between different sectors of the economy?	
13	How can policies be designed and integrated to increase material resource efficiency at every stage of the life cycle of products and services without generating conflicts across policy domains?	7
14	What policies are required to ensure the transition from a linear to a circular economy and society are just?	
15	How can hard limits per capita be imposed and enforced to ensure that the CE actually alleviates pressures/impacts on the environment, instead of only optimizing product/material cycles?	
16	How can we effectively downscale waste and resource policies?	
17	How can waste and resource policies be designed that allow for continuous advancement of circular practices and improvement of circularity?	
18	How should we disincentivize linear systems?	13
19	How do we meaningfully discuss and build political feasibility for sufficiency policies?	4
20	How do we design regulation that ensures the full social, environmental and economic cost of extracting resources is reflected in their price, and ensure that responsibility for these costs is shared equitably by the whole supply chain from extraction through design, manufacture, retail, use and disposal to recycling?	18
21	What mix of policies can be introduced at what level of governance?	
22	How do we design the policy processes so that they allow for further innovation and help to create value from resource conservation?	



No	Original Question	Final Question (see Table 1)
23	What policies are needed to make these (business models and technological solutions) happen?	
24	What role do political initiatives and supporting regulatory frameworks play in fostering the diffusion of circular economy?	
25	How might the policy effect/be influenced by different places?	
26	How can multinational companies cope with differences in policies across countries?	
27	How can policies favor the development of SMEs or start-ups that aim to promote disruption in CE for a sustainable development?	
28	What policies (at multiple scales) can ensure that CE policy contributes to an overall global reduction in materials throughput?	
29	How do circular economy policies influence relevant innovation and design activities?	
30	At which level (national vs. regional vs. local, industry vs. industrial clusters vs. single companies) are policy initiatives and frameworks most effective? And what is the influence of interactions among different levels?	
31	How can we promote the integration of scientific research results and policy formulation?	19
32	How should findings of life-cycle oriented sustainability assessment translate into policy, given that no life cycle is under the control of a single government? For example, how can EU policy prevent plastic leakage in China, which is driven by European consumption?	20
33	At which scale(s) should we organize the circular economy while respecting the planetary boundaries, e.g. national, regional, local, industry, industrial clusters or single companies?	6
34	What is a good balance between going local and being global for circular economy value chains?	16 & 17 - split into two final questions
35	What is the actual implementation and upscaling potential of circular economy practices and how can pilot projects help us understand their impacts?	
36	How long can circular economy practices be maintained over time considering the limiting properties of materials, products and technologies?	
37	What would be a good system and location to identify products with great potential for reuse?	
38	How do learnings from circular economy cases applied in different industrial sectors compare and what can be generalized across them?	
39	In which socio-economic sectors could the implementation of circular economy principles be more effective for the optimization of resource use?	
40	What is the relationship between formal and informal CE practices? How might we leverage a stronger understanding of this relationship to design a CE that values the distributive labor performed in the informal sector?	11
41	In the Global South, how can we transform the existing informal refurbishing/recycling networks to formulate an acceptable basis for circular economy?	
42	How can we design products and their supply chain to maximize their lifetime, to ensure their recyclability and to minimize the use of energy and materials in their production and at the same time improve quality of life for those who need it?	
43	How can we project and quantify eco-innovation at the initial stage of product and service design?	
44	How can we make material cycles simpler in product design in order to facilitate material separation prior to remanufacturing/recycling?	

No	Original Question	Final Question (see Table 1)
45	Can the implementation of CE strategies in product regulations generate a global change towards the design of more circular products? What might be an effective mechanism or method to monitor such improvement and account for such benefits?	
46	How can we move to a circular economy that includes countries in different development stages?	12
47	What international and multilateral mechanisms are required to facilitate collaboration between countries?	
48	Which is the best set of indicators to measure the degree of circularity and sustainability of any new circular-economy related policy at the national, regional, and local levels?	14
49	How should we evaluate circularity to ensure that circular economy practices are truly sustainable?	
50	What are the materials, technologies, business models and practices with the largest capacity to lower environmental impacts and to increase circularity?	
51	What evidence do we have on the environmental and social impacts and benefits of CE interventions from resource and energy perspectives so far?	
52	How can we identify tipping points which make certain ways of closing the loop towards a circular economy less favorable than an optimized linear solution?	
53	How much time do we have left for changing our habits toward sustainable development and a circular economy in order to reduce the effect of climate change, environmental pollution, marine littering, and soil contamination before making them irreversible?	
54	How can we ensure that circular economy initiatives do not create tradeoffs and rebound effects?	15
55	What is the time and economic investment needed to implement circular economy practices?	
56	How can "circular" materials be more economically viable and competitive with virgin material supplies?	
57	What knowledge and resources are needed to build entrepreneurial ecosystems for the CE?	
58	How do we develop a circular green city?	
59	What is the full potential of the urban mine, technologically, economically and organizationally?	
60	Who benefits and who is impacted by CE policies, and how can differently impacted groups be incorporated into the CE policy design process?	
61	How can we balance the interests of different stakeholders and their acceptance of circular economy initiatives?	
62	What transition pathways achieve high business and consumer buy-in but also move us towards sustainability?	
63	How do stakeholders evaluate CE strategies, make decisions regarding CE implementation, and assess outcomes?	
64	How can we engage, empower and educate society?	
65	What is the role of the state and different policy, economy and societal actors in the policy making and the change pathway towards CE?	
66	How is change driven (top-down or bottom-up) and what are the actor relations and stakeholder dynamics during a process of CE policy reconfiguration?	
67	How can companies influence changes to policies in favor of CE and sustainability based on their experiences in different countries?	
68	How/when will governments underscore circular business?	

No	Original Question	Final Question (see Table 1)
69	How do we reorganize current governmental agencies for a role as stewards of resource, not just protectors of the environment and public health?	
70	How can governments encourage sustainable local production and consumption over global to satisfy local needs, based on the industries, business ecosystem and capabilities of each country in order to become as self-sufficient as possible?	
71	What institutional and human resource changes are needed?	
72	How can CE-research achieve on equal footing in decision making in local, national and international decision-making, as powerful a role as other stakeholders?	
73	How can CE achieve a visible role and position of influence within mainstream academic research in universities and in university curriculum?	
74	How can we build a CE that is socially just and ensures widespread participation and equity? (rather than accumulation by dispossession)	
75	How can we make the 'circular economy' approach economically attractive, socially adaptable and uniformly distributed?	
76	How does the circular economy enhance social and societal benefits?	
77	How can resource (CE) and social development strategies be co-designed to achieve environmental and social outcomes synergistically?	
78	How can we live better with less?	

## Supporting Information 4: Online survey and Demographics

### Title: Policy-relevant Research for a Sustainable Circular Economy – Lessons and Future Directions

*Introductory text: This is a propitious moment to take stock of what we have learned about pathways to a sustainable circular economy and to identify the most pressing lines of inquiry for the future. To facilitate this process, this study is interested in:*

- 1) The main policy-relevant learnings that emerged from your research.*
- 2) The main future directions, i.e. questions that should guide future policy-relevant research on a circular economy for social and environmental sustainability.*

*We thank you for making this concerted scholarly effort possible.*

#### 1. Let's get started. What is your name?

*This information is necessary so we can get back to you for the next steps of this study. All answers you provide in this survey will be processed anonymously.*

#### 2. What is your e-mail address?

*We will only use your e-mail address to get back to you for the next steps of this study.*

#### 3. What is your main research focus?

- Disciplinary
- Interdisciplinary
- Transdisciplinary (integrating non-academics)

#### 4. What is/are your main disciplinary background(s) related to the circular economy?

- Biological Science
- Environmental Science
- Engineering
- Natural Science
- Social Science
- Product and/or Industrial Design

#### 5. Within the broader disciplinary groups you checked above, how would you name your specific discipline(s)?

#### 6. What sector(s)/topic(s) has your research on the circular economy focused on in the past 5 years?

- Actors, Clusters, Networks
- Bio-based Products, Biomass
- Business Models
- Chemicals
- Cities, Urban Planning, Urban Management
- Conceptual and Monitoring Frameworks
- Consumers
- Design of Products or Processes
- Economy-wide Resource Management
- Electric and Electronic Products
- Energy
- Ethics
- Food and Agriculture
- Innovation and Innovation Systems
- Labour
- Law and Regulatory Governance

- Manufacturing
- Material Recycling
- Material Reuse and Remanufacturing
- Metals
- Mining
- Packaging
- Policy Design
- Power and Politics
- Resource Efficiency
- Services
- Social Justice
- Supply Chains
- Trade
- Waste
- Water

**7. When did you first introduce the term “circular economy” into your research?**

- 1-2 years ago
- 3-5 years ago
- 6-10 years ago
- 11-20 years ago
- >20 years ago

*The following two questions are open-ended - asking for your main learnings (max. 2,000 characters) & future directions (max. 700 characters).*

You are welcome to consult with colleagues before providing answers.

Please let us know how many colleagues gave input:

- Nobody
- 1 colleague
- 2 colleagues
- 3 colleagues
- 4 colleagues
- 5 colleagues
- more than 5 colleagues

**8. What are your 3 main policy-relevant learnings on how a circular economy facilitates or hinders a sustainability transition?**

*Max. 2,000 characters for all 3 learnings.*

*Please specify the scale that each learning applies to:*

- local management and planning
- national policy
- international policy (e.g. for the EU, the WTO or the Basel Convention)

*Your answers will not be saved if you leave this website. They will be saved if you return to a previous question.*

**9. In your opinion, what are the 3 most important questions that should guide future policy-relevant research on the circular economy?**

*Max. 700 characters for all 3 questions.*

*Closing text: The Circulus research group thanks you for your answers! Your input is very much appreciated and we are excited about this community effort.*

*What happens next?*

- As elaborated in our invitation e-mail, we will get back to you on June 22 to ask you to rank the answers given by all participants (in an anonymous fashion) – Step 2.
- After that, you will be invited to participate in a ~60 minutes online discussion on July 13, in which we produce a final ranking and wording of answers with you and a small group of other participants (grouped by topic) – Step 3.
- Finally, we will invite you to co-author the paper with us and the other participants who participated in all three of the above steps based on the survey, ranking, and online discussion in September/October – Step 4.

## Survey demographics

Figure 1 summarizes the disciplinary profiles and research focus of the 54 survey participants. Interdisciplinary research is the dominant profile, with a strong interaction between environmental science, engineering and social science. The main areas of research include waste, material recycling, resource efficiency, business models and circular economy conceptualization.

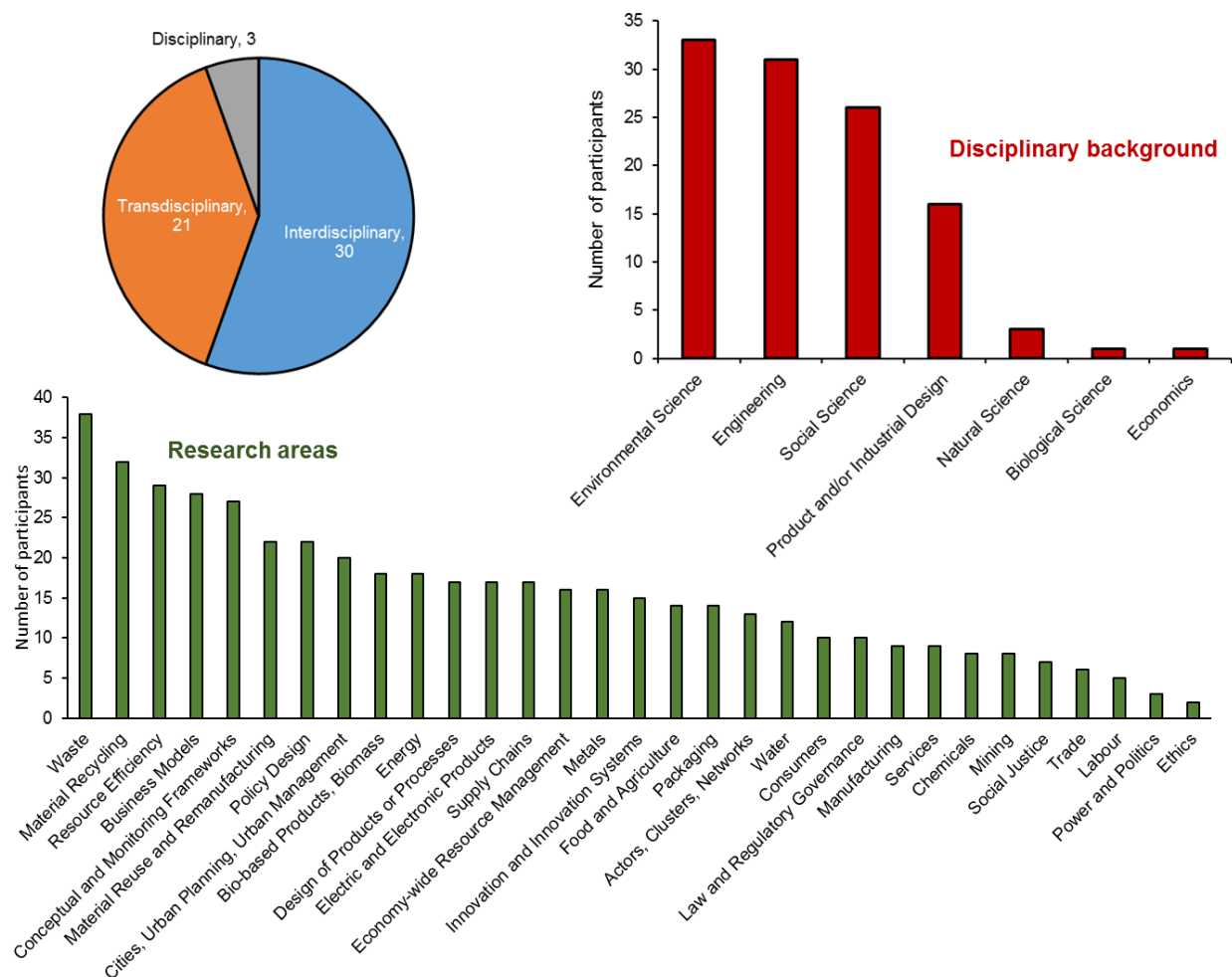


Figure 1 Disciplinary background and research areas of the survey participants (n=54)