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APPROACHES TO CIRCULAR ECONOMY RESEARCH

Pauline Deutz, Sandra Caeiro, Erik Roos Lindgreen, Kaustubh Thapa, Anna M. Walker and Małgorzata Pusz

2.1 Introduction

This book comprises a contribution to understanding the current state of progress towards circularity and the extent to which outcomes are indeed environmentally and socially sustainable. In this chapter we present the assumptions behind, and the approaches used in, our research both to enable readers to assess the findings presented in the following chapters, and as a guide for future circular economy (CE) research.

For a CE to fulfil its potential, the principles of circularity need to be thoroughly engrained across society, involving new collaborations, different practices and forms of assessment, as will be shown in the following chapters (see also Cowan et al., 2023; [Schultz et al., 2023](#)). To support this progress, data are needed on products, processes, environmental/social impacts, costs, risks and behaviour relating to all types of companies and other organisations. Businesses of all sizes, public sector bodies and governmental agencies, non-governmental and non-profit organisations will need data to be able to relate to themselves and each other in order to progress collaboration. Attitudes of the public, consumers and citizens are likewise relevant. Some of those individuals and organisations (e.g. city administrations, local branches of companies or charities) will have a focus on particular places, while others will not. These groups will have very different interests, besides potentially wanting to prioritise different aspects of a CE (they might be trying to minimise costs, maximise growth, or provide, or indeed limit, public services). Sustainability challenges have been characterised as ‘wicked’ problems, i.e. they do not have a clear definition, nor are there any simple interventions or demonstrably right or wrong solutions – only those that are more or less preferable depending on one’s particular perspective ([Brown et al., 2010](#)). There are also

power discrepancies between organisations, i.e. they have different levels of ability to implement their plans and/or to influence others. Research cannot overcome different priorities or power dynamics but it can at least contribute to an informed compromise.

When different organisations and individuals are discussing the CE, it is relevant to ask what they understand by that and include in the conversation what they recognise as being relevant information (or indeed assume to be relevant) on which to base decisions. Academics refer to these issues respectively as ‘ontology’ (what is relevant) and as ‘epistemology’ (how can I learn about it). There is, however, no one academic response. The answers to ‘what’ and ‘how’ vary considerably between different disciplines, many of which are already involved in CE-related research, while others are likely to become involved in it in future. In this chapter we are deliberately limiting the use of academic terminology, but the ideas contained herein are immensely important to ensure that debates on developing a CE, as well as the actual development thereof, are based on a sharable evidence base.

Research fundamentally involves the collection, or generation, of data to address specific questions. In social science research the intention is to study the views and/or practices of social actors and other stakeholders (individuals and organisations with a role and/or interest in the phenomenon of interest). Based on previous research experience related to CE, critical realism was selected as a suitable framework for Cresting project. Critical realism was formulated as a compromise between major schools of thought in social science (Bhaskar, 1975). Making no disciplinary assumptions, it is a suitable framework for interdisciplinary research (Dickens, 2003). By seeking the causal factors underlying observations, critical realism provides a foundation not only for understanding the present, but also for bringing about change (Sayer, 1982; Schoppek, 2021). Critical realism acknowledges that academia does not have a monopoly on the generation of knowledge and incorporating other knowledges can add significantly to the value and utility of findings (Sayer, 1982). An important choice within the research, therefore, is how to engage with the relevant social actors. One of the richly developed forms of incorporating non-academic views concerns transdisciplinary research, wherein stakeholders are involved in the co-design of the project and the co-creation of data (Witjes and Vermeulen, 2021). While critical realism does not proscribe methods for stakeholder engagement, the selection needs to be well considered to address any questions at hand that are justified by the circumstances. The involvement of non-academic partners was important to Cresting to underpin the relevance of the research. Different projects built on these connections in different ways; mostly not in a transdisciplinary manner in the strictest sense of co-designing the research, but in some cases by co-producing solutions to specific problems (whether product or policy design, assessment frameworks), or in other cases by collecting data to examine perspectives on a particular topic.

In this chapter we first outline critical realism and explain its usefulness to CE research. Next, we outline the range of approaches to stakeholder engagement used

by the Cresting project. We then present the stakeholder engagement and methods of four projects. Finally we offer some conclusions.

2.2 Critical realism as a philosophy for CE research

Working across and between different academic disciplines is important, if not essential, for CE research. This does not simply broaden the range of topics that can be knowledgeably addressed, but brings assumptions about the nature of reality (ontology) and what constitutes a valid approach to gaining knowledge relating to that reality (epistemology) (c.f. [Schmidt, 2007](#)). Critical realism was formulated as a compromise between major schools of thought in the social sciences which are otherwise difficult to reconcile ([Archer et al., 1998](#)). For a more specialised discussion of critical realism, readers should consult [Sayer \(1982 or 2000\)](#) and [Archer et al. \(1998\)](#). Previous applications of critical realism to CE-related research (e.g. [Deutz and Gibbs, 2008](#); [Deutz et al., 2013](#); [Deutz, 2014](#)) provide examples for the following section.

Critical realism seeks to explain the causal mechanisms and relationships underlying observed events and patterns; it involves consideration of which factors might be necessary to a certain outcome, as well as those factors that might be helpful, hinderances or irrelevant contingent upon circumstances ([Sayer, 1982](#)). This may sound useful without being exceptional, but the underlying assumptions are distinguishing. While critical realism is attuned to the information and insights from empirical findings, it contends that they do not present a complete picture of reality ([Bhaskar, 1975](#)). Helpfully expressed as an ‘iceberg’ by [Fletcher \(2017\)](#), only a small part of reality is observable to empirical effort (Bhaskar’s ‘domain of the empirical’). Explanations drawing solely on that domain might appear to be ‘common sense’ but can be deeply flawed ([Sayer, 1982](#)). Below the proverbial waterline, however, are the actual and real levels. The domain of the actual comprises experiences as well as events, which are happening whether we are aware of them (let alone studying them) or not. Our knowledge is not perfect: research, and indeed experience of living, will have captured certain patterns and perspectives but we know there may be relevant information or ideas that are missing (perhaps reflecting a gap in the data collection, biases in perspectives of participants, or just the impossibility of capturing every salient point). Finally, there is the domain of the real, which includes mechanisms of change as well as events and experiences. Mechanisms (sometimes ‘causal mechanisms’) are the factors causing events to happen, whether or not those events are experienced ([Schoppek, 2021](#)). The mechanisms themselves are social products and can also be the objects of research ([Fletcher, 2017](#)). For example, the outcomes of attempted eco-industrial park projects in the US reflected local circumstances (e.g. access to funding for pollution clean-up for former military bases). At the real level, though, a strong influence on their success was the overall attractiveness of the location to companies, which were only marginally influenced in location decisions by environmental

considerations (Deutz and Gibbs, 2008). At different times, and in different places, the combination of mechanisms in operation and their relative significance can be highly variable; nonetheless, there is more in common between diverse examples than might appear at first sight.

A distinction can be drawn between what is necessary to support an outcome and what is contingent on circumstances (Sayer, 2000). Recognition that circumstances that appear particular or unique (whether relating to a certain place, product or process) are nonetheless responding to wider influences enables critical realism to make connections and generalisations not open to other approaches, thereby emphasising its unique characteristics. Critical realism is therefore better suited to identifying approaches to CE both for specific circumstances and for wider relevance. A pertinent example of this is industrial symbiosis (a strategy for CE using residues from one entity as inputs for another) (Chertow, 2000). Definitions of industrial symbiosis can include an assumption of a local scale. However, the spatial scale of exchanges is better thought of as a contingent circumstance than a definitional characteristic, even though it matches some experiences of industrial symbiosis (Deutz, 2014). Proximity can help to achieve a synergy but openness to arrangements on a larger scale increases opportunity (Sterr and Ott, 2004). Additionally, discussions about industrial symbiosis refer somewhat interchangeably to waste and by-products. However, these terms have spatially variable legal definitions, which are also liable to change over time. We can infer that regulations will influence industrial symbiosis outcomes, but what happens in a certain place will be contingent on the prevailing regulations (which are national rather than local in scope) and other local circumstances. Furthermore, factors such as the price and availability of raw materials, which follow global constraints, may be a limiting factor at some times or an encouraging factor at others and will be influential to different degrees in different places according to the particular conditions (reflecting, for example, the mix of industry present locally or national incentives for different materials/technologies).

A further significant aspect of critical realism is the combination of the realist (objective) ontology with a relative epistemology (acknowledging subjectivity) (Archer et al., 1998). The realist ontology relates to the assumption characteristic of the natural sciences (following a so-called positivist methodology) that there is a reality to study that is independent of the observer (not so trivial a point as might be imagined; see Collier, 1994). Positivist, or objectivist, approaches to the social sciences are seeking to maintain the natural science goal of objectivity in research (so that a different observer would achieve the same results). Researchers in this school would acknowledge that humans may be less consistent or predictable in their behaviour than other objects of research, but seek to minimise the impact of that human variability through the use of large data sets or surveys with enough respondents to be representative of a wider population (albeit that qualitative data might also be used in so far as objectivity can be asserted, or as a prelude to quantitative corroboration) (Crotty, 1998). Objectivists are looking for statistical

regularities and generalisations as a guide to explanations which ideally approach the generality of the ‘laws’ of natural science. This is in contrast to the spectrum of ‘constructionist’, or relational approaches (interpretivism, social constructionism, subjectivism) (Crotty, 1998) according to which our knowledge of ‘reality’ is socially constructed, i.e. irretrievably influenced by human perceptions and biases so that an objective assessment is simply not possible (in extreme approaches the idea of ‘reality’ itself might be questioned). Ethnographic research (in-depth studies of just a few subjects) would be the norm; little of interest around the human experience would be expected to come from trying to reduce complex perceptions/behaviour to numbers. Given the individuality of experience and circumstances, generalisation is difficult and not of value. Such studies risk appearing hopelessly biased or ‘anecdotal’ to objectivists, potentially of some interest but not yielding insights easily extrapolatable into policy or practice. Critical realists concur with the principle that our knowledge of the world is filtered through experience and interpretation, i.e. that knowledge is socially constructed, can contain errors or be swayed by one’s theoretical or political assumptions (Schoppek, 2021). Importantly, though, some knowledge, or social explanations, are closer to the objective reality than others, and we return to this point below.

There is no philosophical bias to different types of data for critical realist research. Types of data, ways of interpreting them and methods of data collection (intensive/extensive) are selected on the basis of their ability to best answer the questions at hand (Sayer, 1982). Critical realism grants that our knowledge of the social world is derived through the subjectivity of respondents, or the perspectives/assumptions behind documents (images, texts, sounds) and is influenced by the researcher’s own positionality. Positivists might question the reliability of an interview as a source of data, as representing one person’s opinions. But interviewees are not seen as sources of facts, so much as they are valued for their interpretation of a situation. What a company representative says about eco-design, for example, is not necessarily a guide to best practice, but it does indicate what a company thinks about the field and what might be influencing their approach (Deutz et al., 2013). Quantitative data is useful to provide a description of circumstances and for indicating areas of interest for further analysis, which might be apparent trends/correlations, or they might be the outliers or exceptions (Sayer, 1982). Even this kind of data comes with assumptions, though. To give a CE-related example, a life cycle assessment (LCA), is an objectivist approach – an effort to quantify (and necessarily simplify), a large volume of information as a decision-making tool to avoid unintended consequences from environmentally motivated changes. Broadening the scope to include other aspects more difficult to quantify (e.g. implications for experience or quality of life) is not just a technical challenge but a potentially contentious move to reducing the objectivity. A critical realist would concur that a LCA is not truly objective as decisions are required as to what to include and the desired data may not be available (Miettinen and Hämäläinen, 1997); there is no fundamental objection to incorporating explicitly subjective criteria which might

contribute to a better understanding of potential impacts. Broadening of the LCA methodology to incorporate social and economic aspects may increase the subjectivities involved. One might also question who has the decision-making powers and what their priorities are.

As mentioned above, while accepting the subjectivity of knowledge relating to society, critical realism's adherence to both independent and layered reality distinguishes it from other subjective approaches. As noted, a critical realist approach lends itself to the identification of causal mechanisms which may be shared between different circumstances, despite differing contingent outcomes. The independent reality further implies that while there may be many interpretations of observations and experiences, some will more closely match the objective reality than others (Sayer, 1982). The advantage of this is that research can build understanding and explanations of the present that provide a foundation for planning change – this does not preclude differences of opinion, or politically motivated preferences, but concurs that there is a reality that we can strive to both explain and change. This is as opposed to facing a range of seemingly disconnected circumstances each of which might have many interpretations and potentially a view that comparing and choosing are not even reasonable steps to take. The critical realist can try to disentangle contrasting views to better explain what is producing observed patterns and relationships and arguably offer insight to the likely future success of different CE approaches (Schoppek, 2021). Critical realists refer to the 'rational judgement' alongside the realist ontology and relational epistemology (Archer et al., 1998).

Progressing from the philosophical assumptions of critical realism to a specific approach to research involves making decisions. Methods may be selected to best address the questions to be asked, but framing the questions involves defining some aspect of reality for study. The archetypal laboratory scientist can construct controlled experiments to isolate the effects of specific variables within systems designed and controlled to be closed. That is, the components of the system can be precisely identified, their impacts on each other isolated and studied. Depending on the nature of the system, there may be external effects, but these are considered distinct from the system itself. Social systems, however, are not closed; the definition of a system is arbitrary. So, for example, the global-level influences on industrial symbiosis mentioned above are not external to local conditions. They are operating on a different spatial scale to other mechanisms but are part of the same reality. Therefore, while a 'system', or case study (which could be a process, or product, or policy, or place, or organisation, or scale, or a CE strategy – or a possible combination of all of these), needs to be defined to establish the empirical scope of the research, it must be remembered that the case study boundaries are strictly conceptual – they do not apply at the actual or real levels. The choice of case study, however, will influence what is observed, casting other aspects to the 'actual' (happening but not experienced) level and influencing the ability to discern causal mechanism at the real level (Ollman, 2003). In this way, for example, a

focus on a specific spatial scale (e.g. regional, national) may give an undue significance to that scale in the interpretations (Jessop et al., 2008). To take the argument one stage further, critical realism is concerned with the *relationships* between ‘objects’ of whatever kind (Sayer, 1982; Collier, 1994). What happens in one place is not independent of what happens elsewhere (Pierce et al., 2011). For example, the development of environmental industries in Europe from 2022 cannot be understood without considering the influence of the US Inflation Reduction Act which creates financial incentives for environmental technology companies to (re)locate in the US; consumers imply producers, and vice versa; a given strategy for the CE is defined as an alternative to disposal and is only viable if certain conditions are in place, which are influenced by multiple relationships that can be global in scale. Of course, everything cannot be studied all at once, especially on the 3–4-year timescale of, for example, a PhD. The task is to justify the choice and be aware of the influences and relationships extending beyond the case study.

Finally, as the objects of study for social science are people and organisations comprising people and the relationships between them, there is a possibility (even probability) of a two-way exchange of knowledge between researcher and researched that may not be available to other fields (Sayer, 1982). Researchers can choose the level of engagement with their research objects, which might vary from a reliance on secondary data collected by others (e.g. provided to a regulatory or industry body) or publicly accessible documents, to a close relationship where the academic and the stakeholder(s) are working together to ‘co-create’ the data or even the design of the project itself (i.e. transdisciplinarity). These options are reviewed in the following section.

2.3 Stakeholder engagement

Stakeholders can be defined as individuals or organisations which have a direct influence on the matter of interest (Freeman and Reed, 1983), and more inclusively can also include those who may be impacted by the matter even if they have no influence (Bryson et al., 2002). The expression ‘stakeholder’ comes from the management literature, where it is used from the point of view of how might this diverse group be managed to achieve a company’s objectives (e.g. Ackerman and Eden, 2011). Stakeholders for a CE transition would include a large and diverse group redesigning business practice, cooperation (or coercion) across supply chains; planning public infrastructure; collaboration in specific territories; policymakers seeking to influence behaviour and outcomes; organisations changing their own behaviour; the public modifying their behaviour either proactively or in response to available options). The list is reduced to a somewhat more manageable number through the choice of case study. The term ‘stakeholder’ has become a shorthand expression for the population of potential research participants for a social science study as the relevant collection of individuals and organisations whose perspectives are considered of interest (e.g. Ho et al., 2023).

Important to the research is understanding the perspectives of different stakeholders, not just by category, but also the variability within categories, e.g. not all companies will be approaching the CE in the same way. Consideration is needed in how to approach different types of stakeholders in terms of their institutional role and national context (Li, 2022). Notably, the selection, and self-selection, of stakeholders for participation in the research (i.e. who is asked and who agrees) may influence the findings (Collett, 2023). Furthermore, as Cresting is concerned with the impact of the CE, rather than adopting a more normative approach to increasing circularity, each stakeholder is simultaneously a potential actor and influenced by the actions of others. As noted above, we are interested in their relationships rather than treating them as separate entities. Within Cresting, all the early stage researchers (ESRs) had a partner (or two) who could provide a window on a particular aspect, as well as practical experience in the form of secondments (sometimes used for familiarisation or making connections, sometimes as a means of accessing interviewees). Partners were variously public (at a local, regional and national level), private or third sector. The approaches taken varied significantly (Table 2.1), with the COVID-19 pandemic reducing face-to-face interactions and changing and generally reducing the level of stakeholder engagement. That it was possible to conduct online meetings and interviews meant that the research questions did not need to be significantly reconsidered.

A key choice for researchers to make is the extent to which stakeholders to the topic of the research are also stakeholders within the research process. Concern to make a difference in solving the complex problems relating to sustainability has encouraged researchers to adopt a transdisciplinary approach (Vermeulen and Witjes, 2021). Definitions vary but here we used the term to mean that one or more (non-academic) stakeholders were actively involved in the research process (Vermeulen and Witjes, 2021). Transdisciplinarity is used beyond the social sciences, e.g. in medical research, but here we are considering it as part of a spectrum of approaches to stakeholders for social science (i.e. research seeking to understand and influence societal arrangements). Vermeulen and Witjes (2021) identify a range of possible forms that transdisciplinary research can take, depending both on the level of engagement (e.g. the extent to which the stakeholder is involved in designing the research, whether they are decision-makers on a par with the academic or merely consulted at intervals) and the approach to identifying relevant stakeholders (e.g. whether the otherwise marginalised are included). There is a power dynamic, as it is likely that the researcher is more experienced in research and may have particular funding expectations to meet. Conversely, the non-academic is highly likely to be more experienced and knowledgeable about the field in question. The academic and/or lead partners need to decide how to include a range of voices to safeguard against variations in influence or conflicts of interest if there is a desire to reflect diversity including the voices of marginalised groups. While transdisciplinary research can provide close access to the diverse perspectives of stakeholders, the co-creation of ideas, and its ownership, legitimacy and implementation could

TABLE 2.1 Research focus, methods and stakeholder engagement for each project

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Martin Calisto Friant	CE discourses: European Union (EU), the Netherlands, plastics sector, city scale (Amsterdam, Netherlands, Copenhagen, Denmark, and Glasgow, UK).	Interviews, participatory workshops, online surveys, discourse analysis, policy analysis, literature review.	<ul style="list-style-type: none"> Dutch government and private actors involved in the management of the Dutch extended producer responsibility (EPR) system for tyres, plastics and packaging. Citizens and people interested in circular economy to answer the survey (n = 1150 in 77 countries). 	<ul style="list-style-type: none"> Collaborated with two other WP 1 students and one master's student to do the interviews and workshops on EPR. Collaborated with NGO Revolve Circular to create the survey and worked with 20+ organisations to disseminate it. 	<ul style="list-style-type: none"> The COVID-19 pandemic restricted the methodological choice and led to stronger focus on desk research methods such as policy and discourse analysis rather than more inclusive transdisciplinary research methods. Difficulty finding sufficient participants for online surveys.
Kieran Campbell-Johnston	CE policy – EU, Netherlands, specifically product and recycling policy and its effectiveness.	Exploratory field visits, Delphi survey, workshops, interviews, literature and policy analysis, exergy thermodynamic rarity assessment.	Dutch, French, Italian and broader European actors engaged in the implementing, monitoring and running of extended producer responsibility systems, including policymakers, recyclers, producer responsibility organisations, auditing agencies, academics and industry.	<p>Participatory observation during secondment at the Dutch government agency involved in monitoring and enforcing waste policy.</p> <p>Workshops and interviews with Dutch and European actors involved in EPR systems. Focus on how to improve and align the policy instrument with CE goals.</p> <p>Presentation to policy (Dutch parliament) and research organisations including the Organisation for Economic Co-operation and Development and the Dutch environmental agency (PBL), on EPR and critical raw materials and their losses within waste.</p>	<p>Competing interests and agenda particularly regarding the responsibility to lead and develop new CE activities, e.g. reuse of products.</p> <p>Data quality issues, particularly regarding the quality of waste data and reporting data, partly due to the COVID-19 lockdowns.</p> <p>Challenging to present results in the correct environments.</p>

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TABLE 2.1 (Continued)

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Kaustubh Thapa	CE governance focusing on the EU's international waste trade in the EU, China, Nigeria and Vietnam.	Exploratory field visits and observation, Delphi survey, workshops, interviews, relationship-building, literature and policy review.	Stakeholders in the waste trade value chain, including policymakers and implementors, waste traders, processors and recyclers (formal and informal), exporters, importers, national and international non-profit organisations, universities, including these actors in waste importing countries.	Transdisciplinary: fairness-driven and solution-oriented transdisciplinary research focused on co-creating solutions.	Some challenges: navigating diverse socio-economic and cultural contexts, facilitating diverse stakeholders with different power relations, accessing waste trade data and some stakeholders for interview, adapting to online research during the COVID-19 pandemic.
Tomas Santa-Maria	Circular Business Model Innovation in incumbent firms.	Multiple case study (semi-structured interviews, on-site observation, document analysis); action design research; systematic literature review.	Ten CE pioneer incumbent firms from Austria and the Netherlands; 16 CE and innovation experts; 107 workshops participants (i.e. academics, sustainability professionals, students, start-up members and CE corporate project members); leading Austrian waste management firm and Austrian green technology economic cluster.	In-person interviews with CE pioneers; in-person secondments with leading Austrian waste management firm and Austrian green technology economic cluster; six online workshops; online feedback from CE and innovation experts.	Due to the COVID-19 pandemic all workshops were held online.

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TABLE 2.1 (Continued)

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Anna Diaz	Circular product design in manufacturing industries.	Interview, case study, support design, experimental design.	Sustainable product managers from 15 EU-based multinational enterprises linked to the manufacturing sector; R&D managers from two multinational enterprises linked to the manufacturing sector, MSc course students.	Semi-structured interviews, in-person, 1-hour duration; semi-structured interviews, in-person, 3-hour duration; workshop participation for method testing, 3-hour duration.	The COVID-19 pandemic prevented in-person secondment at iPoint-systems GmbH and the return stay at the University of Troyes, although the deliverables of both projects were completed remotely.
Estephania Delgadillo	Circular and territorial product-service systems (PSS).	Case study including semi-structured interviews, participatory social network analysis, PSS design workshop observations.	Start-up and small and medium-sized companies (SMEs) from France (3), Switzerland (1) and Taiwan (2) (start-ups and SMEs) with pre-existing intention to innovate for sustainability a current product-service system offering or develop a new one. Participants included company directors, production managers and marketing representatives.	Two case studies were employed to explore the implementation of territorial PSS. One case study was conducted in-person (France), while the other was conducted remotely (Switzerland). In the four additional case studies (France and Taiwan), companies tested a new participatory design method to conceptualise a territorial PSS offering. These case studies were conducted remotely.	Most case studies were conducted online, and a secondment in Taiwan was impossible due to COVID-19 restrictions.

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TABLE 2.1 (Continued)

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Natacha Klein	CE implementation in public sector organisation – national scale, Portugal.	Online survey and semi-structured interviews; document analysis.	National-scale public organisations (ministries of the Portuguese government).	Secondment with Portuguese Environmental Agency of the Ministry for the Environment and Climate Action; online survey of multiple departments; interviews for employee perspectives on CE implementation.	The COVID-19 pandemic prevented an international comparison.
Hinrika Droege	CE assessment in public sector organisations.	Document analysis, including the review of press and policy documents; semi-structured interviews; participatory workshops.	National-scale public organisations (ministries of the Portuguese government);	Secondment Portuguese Environmental Agency of the Ministry for the Environment and Climate Action; interviews for employee perspectives on CE assessment; participatory workshops to discuss and co-develop solutions for CE assessment.	
Aodhan Newsholme	Regional CE; relationship between public bodies and companies, N. Humberside, UK, Styria, Austria.	Critical discourse analysis; observations; semi-structured interviews, survey.	Local authority, economic development agencies, business organisations, large companies.	Secondment with local authority; participated in local business network in N. Humberside during the period of research; interviewed corporate and public body representatives in both locations; findings shared with national and local policymakers in the UK.	Online interviewees worked well for contacts through the network; the COVID-19 pandemic prevented a return visit to Austria.

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TABLE 2.1 (Continued)

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Heather Rogers	Repair sector, city-scale, public opinion and self-employment, Hull, UK.	Online survey, semi-structured interviews; document analysis.	Local authority; self-employed repairers, sole traders and very small-scale employers.	Secondment with local authority, resulting in collaboration on public survey circulated by local authority (n = 740); interviewed self-employed repairers; findings shared with national and local policymakers in the UK.	Lockdowns disrupted engagement with small employers and prevented a potential international comparison. Larger companies not responsive on repair.
Malgorzata Pusz	Social enterprises and public agencies, Hull, Graz, Austria, and Santiago, Chile.	Document analysis; participant observation, semi-structured interviews; stakeholder mapping, social network analysis.	Social enterprises with a wide range of specialisms (e.g. food, textiles, furniture); some directly promoting CE activities (recycling/upcycling); others fund raising e.g. for mental health support.	Secondment with a social enterprise in Hull – part-time for 1.5 years prior to the COVID-19 pandemic; detailed stakeholder mapping in Hull and Graz, interviews in Santiago; findings shared with national and local policymakers in the UK.	To some extent, the COVID-19 curtailed the Chile case study, although some interviews were possible online.
Santiago Perez	Industrial ecology implementation and impact on sustainability of a territory, Strasbourg, France.	Case study, semi-structured interviews.	Local authority and local companies.	Secondment with the local association in charge of industrial ecology promotion and implementation.	Significant delays in research owing to the COVID-19 pandemic.

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TABLE 2.1 (Continued)

<i>Researcher</i>	<i>Focus</i>	<i>Methods</i>	<i>Stakeholders</i>	<i>Engagement</i>	<i>Issues</i>
Erik Roos Lindgreen	CE measurement; sustainability measurement; private sector; LCA.	Case study; survey and semi-structured interviews; expert panel survey and focus groups.	CE businesses (end-users), CE measurement experts from academia and consultancies, businesses.	Experts from academia and sustainability/ CE consultancies provided feedback to the proposed framework, end-users (CE businesses) validated the application in focus groups.	Different interpretations of CE lead to a variety of understandings of what CE measurement should be; available impact assessment methods (such as LCA) are often considered as complex while simpler methods (CE metrics) do not capture an accurate estimation of all impacts.
Anna Walker	Understanding company approaches to CE as a guide to the design of assessment approaches; the Netherlands and Italy.	Online survey, semi-structured interviews.	Companies from CE networks, CE network coordinators in countries where collaborating researchers are based.	Worked with network coordinators on questionnaire design; survey distributed by networks; online interviews carried out with volunteer companies from the survey. Circulated updates and articles.	Response rate helped by engagement with networks – built up a connection with the coordinators and subsequently with the interviewees. Linguistic abilities of the team used to best advantage (Dutch, English and Italian).
Katelin Opferkuch	Development of a framework for corporate disclosure of circular CE.	Online survey, semi-structured interviews, focus groups.	Companies from CE networks.	Stakeholders help to develop recommendations that support the integration of CE within corporate sustainability reports.	Survey was not conducted in Taiwan and Portugal due to the COVID-19 pandemic and difficulties with contacting companies.

be hijacked by the powerful parties to the research. The researcher needs to navigate these challenges fairly while balancing academic roles, being accountable to the research funder, and managing stakeholders' expectations, all while constantly checking one's biases in order to stay critical (Thapa et al., 2022a). Within Cresting, Thapa's research (see Table 2.1 and section 2.4.1 below) employed a transdisciplinary approach.

If research is not transdisciplinary, there is still a range of possible levels of stakeholder engagement. Different types of stakeholders allow different possibilities. At one extreme, governmental bodies and other interest groups produce copious documents that can be studied for a representation of their views without any direct contact with the authors. Large companies and business organisations can have a significant online presence which can be a useful guide to how they want to be seen. Quantitative data can be accessed from databases providing a number of respondents and/or a timeseries far beyond the practicalities of research defined by the duration (or budget) of for example a PhD (i.e. secondary data). Public documents and data sets yield information without the complexities of directly engaging with stakeholders, but can nonetheless provide rich insights from the analysis and comparison of interest to the stakeholders as well as the researchers (Calisto Friant, 2021, 2023; Newsholme et al., 2022; Opferkuch et al., 2022; see Chapter 3 in particular and also Chapters 5 and 6 in this volume), and can be a guide to subsequent primary data collection.

Some types of stakeholders have a much smaller digital footprint, so the researcher will need to collect the data directly (i.e. primary data) to capture their views and experience. In any case, collecting primary data allows the researcher to customise the research questions and to solicit opinions from stakeholders who may be happier to share anonymously than they are to report in public documents (e.g. why certain actions were undertaken, what were the challenges, what might they have tried that was not successful). Most Cresting ESRs used a combination of methods including interviews (primarily semi-structured) as a data source (Table 2.1). Several researchers additionally, or alternatively, used a form of workshop or focus group as a means to either co-creating data or testing CE assessment of action on potential users (Table 2.1 and discussed below). In all these approaches there is a direct meeting of researcher and research participant (in some cases online because of public health restrictions). An intermediate level of engagement comes with questionnaire surveys, where individual respondents are aware of the research but generally are not in direct communication with the researchers. In some cases, partners facilitated the distribution of online surveys e.g. to governmental colleagues or, at the other end of the power scale, to members of the public. Surveys can be a gateway to a closer level of communication, e.g. with the possibility to volunteer to be interviewed or to receive follow-up information.

The COVID-19 pandemic had notable effect on the research. The government-enforced lockdowns in 2020–2021 considerably reduced engagement, especially face to face. Secondments and other participatory experiences were reduced along

with use of face-to-face workshops that could have been excellent occasions for personal network building for all involved. Conversely, the switch to online activities, especially for focus group activity, broadened participation allowing participation from different regions and locations. However, while large organisations (public and private sector) remained accessible for interviews, small organisations and individuals were more difficult to reach than might have been the case in person. This does impact on the balance of perspectives obtained. We try to make some allowance for the impact in our analysis, but equally we endeavour to avoid over-interpreting the minority perspectives obtained.

The following section provides an insight to the methods and stakeholder engagement of four projects. For full details of the methods employed by the various projects, publications and/or theses can be consulted. [Table 2.1](#) provides a summary of all the approaches used across Cresting. Each chapter briefly indicates the methods used for the relevant work.

2.4 Examples of stakeholder engagement and data collection

2.4.1 *The case for just and circular management of the EU's exported e-waste in Nigeria*

This research aimed to understand the practices and challenges posed by used electronic and electric equipment (UEEE) imported to Nigeria from the European Union. 'Reuse' is a circular value retention option that offers major environmental benefits through minimal processing and extends the functionality and, thus, the durability and lifespan of products ([Reike et al., 2018](#)). The research aimed to assess the extent to which these benefits apply when items for reuse are being transferred to a different spatial context and to understand the environmental and social implications of such international-scale trade for reuse. Together with stakeholders, researchers explored this UEEE value chain and mapped actors and policies to get an overview of its governance.

The study used a transdisciplinary approach to integrate interdisciplinary scientific knowledge with the knowledge of the societal actors to co-create solutions ([Brown et al., 2010](#); [Vermeulen and Witjes, 2020](#); [Thapa et al., 2022a](#)), which could be useful for navigating sustainability challenges ([Brown et al., 2010](#); [Vermeulen and Witjes, 2020](#); [Thapa et al., 2022a](#)), in addition to change-making ([Gibbons et al., 1994](#); [Leavy, 2011](#)). Various transdisciplinary principles ([Witjes and Vermeulen, 2021](#)) and insights from the transboundary waste movement literature ([Thapa et al., 2023a](#)) guided the research. Using the emergent transdisciplinary process, we relied on hunches to adapt the research to contextual needs and challenges whenever necessary ([van Breda and Swilling, 2018](#), [Thapa et al., 2022a](#)). Hunches are a culmination of researchers' intuition and positionality, past knowledge and experiences, theoretical knowledge and embeddedness in the research context that guides the research forward – equivalent to retrodution in critical

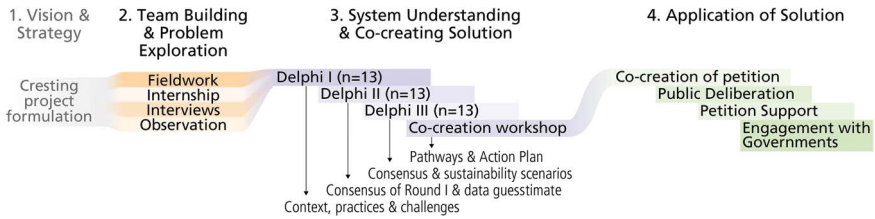


FIGURE 2.1 Stakeholder engagement in the research process to enable team building and problem exploration, system understanding and co-creation of solutions, and application of knowledge

Source: Figure 1 in [Thapa et al. \(2023b: 35\)](#) used under CC 4.0.

realist terminology (see [Fletcher, 2017](#) for an example). Researchers took on multiple roles as the need arose, including facilitator, coordinator, mediator, co-learner and researcher. Rather than imposing non-contextual solutions, this fairness-driven research aimed to foster a safe space for collaborative engagement, learning and collectively envisioning a circular and just future within the specific context.

The research can be divided into four phases (see [Figure 2.1](#)). The vision and strategy phase, writing and securing a grant to start the Cresting project and hiring a PhD, enabled other phases. Phase 2 involved a month-long exploratory field visit to Nigeria in August 2019 to immerse in the research context and to identify stakeholders and build relationships. This consisted of interactions with government, businesses, formal and informal recycling centres and academic institutions in Ibadan, Abuja and Lagos and a short internship with the Basel Convention Coordinating Centre for the African Region responsible for e-waste management in West Africa.

Phase 3 lasted from June 2020 to December 2022, during which time the COVID-19 pandemic rendered it impossible to return to Nigeria to undertake the originally planned fieldwork. Thus, we adapted the research online to engage with stakeholders. Three Delphi ([Dalkey and Helmer, 1963](#)) rounds ($n = 24$) and three Art of Hosting guided workshops ($n = 16, 8, 5$) facilitated multiple consultations and confirmation rounds. In addition to academic knowledge creation, this research phase was designed to foster consensus among stakeholders, aiming to generate both social and scientific legitimacy. Guided by these legitimacies, Phase 4 of the research involved taking the co-created knowledge and solutions to society for the generation of actionable measures. This took the form of (a) a petition co-written with stakeholders to recommend and demand necessary changes ([Thapa et al., 2021](#)), (b) a policy brief for policymakers advocating change ([Thapa et al., 2022b](#)), and (c) a YouTube video ([Utrecht University, 2021](#)), a press release ([Utrecht University, 2022](#)), and articles and interviews to inform a wider audience about the research, its findings and the implications thereof.

Looking back, this fairness-driven transdisciplinary approach enabled us to address an unequal trade scenario where influential actors exploit structural inequalities.

In this case, Nigeria's reliance on UEEE imports for digitalisation results in the externalisation of toxic e-waste from the Global North to a less equal country already struggling with domestic waste management. Despite European producers being responsible for their waste through Extended Producer Responsibility (EPR) policy, about one-third of all EU-shipped UEEE is e-waste in disguise, and the rest becomes e-waste after a relatively short lifespan, disproportionately affecting poor and marginalised workers in the informal waste sector and causing socio-ecological harm in Nigeria. In this context, transdisciplinary research enabled us to integrate interdisciplinary perspectives of justice and equity into the CE transition research through facilitated collaboration with various value chain stakeholders globally for change-making, and thereby being guided by local social, cultural, economic and political contexts. This contextual and nuanced understanding with scientific and social legitimacy guided the co-creation of recommendations such as ensuring that the EU exclusively trades functional and durable UEEE; integrating circular opportunities like repair, reuse and refurbishment across the value chain; holding European producers accountable for their UEEE exports through circular and ethical policy, as discussed in Ultimate Producer Responsibility (UPR); and incorporating consideration for global socio-ecological impacts of the EU's circular economy transition in discourse, policies and practices. UPR and its aspects are incorporated in university lectures, UN reports, politicians' and policymakers' discussions, and government and non-governmental actors' programmes. Without the transdisciplinary ethos which emphasises the societal impact of academic research, it is likely that the research output would be limited to the thesis chapter and academic publications. Implementation, however, requires uptake by the Global North parties at least implicitly benefiting from the current arrangements.

Relationship building including trust is fundamental to engagement with stakeholders for co-creation. In our case, we had to navigate different cultural and socio-political contexts first. For this, we partnered with the University of Ibadan in Nigeria for the research collaboration, which hosted us and helped us to build legitimacy and trust. Adapting the research online enabled wider participation and flexibility. However, the embeddedness of the researcher in the research context was virtual, which compromised enabling qualities for transdisciplinary research like trust building and using abductive reasoning. The researchers consider in-person month-long field visits essential for the co-created solutions (see Thapa et al., 2023) and doubt that the research would be rich and socially legitimate without the relationship built during the month-long field visit. The output could have been more robust if some of the stakeholders were in the informal sector, to whom some of European waste management responsibilities are shifted unfairly. Even with an explicit focus on fairness, our research failed to incorporate the marginalised informal sector. Since most of the research work was adapted online during the COVID-19 pandemic, it posed a challenge to incorporate informal sector workers, who have limited access to technology. Without a physical presence, building relationships and trust online seemed impossible. Even though some stakeholders who closely worked with the

informal sector represented their voices, the research lacked their active participation. See [Chapter 6](#) for further consideration of the findings from this research.

For the benefit of fellow transdisciplinary researchers, we outline six interconnected challenges and lessons learned from this research. These encompass building trust, adapting to the research process, navigating institutional and academic epistemic cultures, balancing the researcher's role, and monitoring progress and legitimacy ([Thapa et al. 2022a](#)).

2.4.2 *The case of Dutch and Italian companies from circular networks*

A major task of the Cresting project was establishing and selecting the most suitable assessment procedures for circular inter-firm networks. Therefore, a literature review of the available approaches was conducted first ([Walker et al., 2021c](#)), featuring assessment approaches that were developed in the fields of circular supply chain management and industrial ecology, due to the conceptual proximity of the fields. In parallel, a survey was developed to capture the assessment approaches of companies in CE networks in Italy and the Netherlands. The aim was thereby to juxtapose academic propositions with actual practice. This research has a normative motivation which is to facilitate the assessment processes in companies. Companies therefore had the role not only of providing the information to help to develop the assessment process, but also to understand how they would approach using it. As part of this research process, companies were surveyed for their understanding of CE and its relationship to sustainability, which provides a more general insight to their attitudes and constraints that can be useful to contribute to our understanding of the causal mechanisms influencing them (i.e. an analytical goal alongside the normative one). This level and form of stakeholder engagement is not a transdisciplinary approach as there was no joint setting of questions or analysis ([Vermeulen and Witjes, 2021](#)), albeit that such engagement can be a useful preliminary to a more collaborative phase of research. When interacting with companies, special attention was attributed to the style of communication (bi-directional or unidirectional/formal and informal) as proposed by [Jolibert and Wesselink \(2012\)](#). Below, the stakeholders as well as the ways of interacting with them are presented.

The research combined both quantitative and qualitative approaches: a semi-quantitative survey and semi-structured interviews. The questionnaire survey gauged how companies perceive the relationship between CE and sustainability; how they assessed these two concepts in their operations and products; and what barriers and drivers to CE they observed. Purposive sampling was used to identify companies actively engaged with CE practices in Italy and the Netherlands ([Hibberts et al., 2012](#)). Thus, only companies that were members of existing national and international CE networks were included, as it was assumed that these companies engaged with CE. Web-based surveys distributed via pre-defined lists have been shown to have the highest respondent rates, as following up with reminders is facilitated and invitations can be personalised ([Lozar Manfreda et al.,](#)

2008). Drawing on the language capabilities of the team, the survey was delivered in English, Italian and Dutch through the online survey tool SurveyMonkey (2021), with personalised email invitations and was open for three months in 2019. To distribute the survey, contact was established with the coordinators of the CE networks. A total of 155 valid responses were received, a response rate of 19%. Certain features were added to make the online survey more accessible: an official letter of invitation, signed by two professors, and a brief introduction, structured in short paragraphs, underlining the main aims of the survey, the information required from the respondents as well as data confidentiality, complemented with a data privacy form (Manzo and Burke, 2012). In keeping with the ethical guidelines that Cresting followed, respondents could skip any questions that they did not wish to answer, which furthermore reduced the chances of people pre-emptively abandoning the survey (ibid.). It is likely that the overall and individual question response rates were supported by the relevance of the survey to the target group (Albaum and Smith, 2012); automatised reminders sent two weeks later also elicited further responses. At the end of the survey, respondents had the option to stay informed about the results of the research (i.e. including insights from their business peers) which probably provided a further incentive for participation (Andrews et al., 2003), as well as comprising a step towards direct engagement between the stakeholders and the researchers.

The qualitative research comprised interviews with survey respondents who volunteered via the survey. This phase of the research provided insight to the survey responses, which helped to identify the underlying reasons for responses (Flick, 2009). It was important to understand how companies perceived the relationship between CE and sustainability, how they assessed these two concepts in their operations and products, and what barriers to and drivers of CE they observed. The interview sample ($n = 43$) consisted of a subset of the survey respondents, i.e. all those who, at the end of the survey, opted in for an interview. These interviews were conducted during a two-month period in 2020 through video calls. Drawing on the language strengths of the research team, interviews were held in English, Dutch and Italian. Loubere's (2017) Systematic and Reflexive Interviewing and Reporting method was therefore applied. This method requires scholars to hold frequent meetings to discuss the findings and impressions of the individual interviews, instead of writing and analysing full transcripts. To avoid interviewer-related errors, the interview recordings were then revisited, and the notes revised, if necessary, and translated into English. Thereafter, the notes were jointly analysed and coded inductively, while quotes which encapsulated the major themes emerging were selected. These *ad verbatim* quotes were then verified with the interviewees, creating another point of interaction through email.

This research process provides a good example of two-way exchange with research subjects (Sayer, 1982). The survey provided the pretext for the researchers to get in contact with CE network coordinators as well as their members, building relationships through preliminary meetings and offering the survey respondents updates on the progress of the research. During the interviews researchers

were able to form closer relationships with the companies. Many companies were interested in the final research results and reiterated their wish to stay informed. Therefore, the survey has established a communication channel to directly provide the companies with updates on CE and sustainability assessment research. Some respondents have also become personal contacts on LinkedIn. They are informed periodically when a new research output becomes available, such as an interim survey report, a blogpost on CE companies and COVID-19, as well as scientific articles (Roos Lindgreen et al., 2022; Walker et al., 2021b, 2021a). This research has also enlarged the pool of potential case study companies for the next research steps or members of focus groups as discussed in the following section. Chapter 4 in this volume includes a discussion of the results.

2.4.3 *The case study CE assessment framework: SCEIA*

One of the Cresting projects (see Roos Lindgreen in Table 2.1) undertook to design and validate an assessment framework that guides companies with the measurement of their CE impacts. The basis of the Strategic Circular Economy Impact Assessment (SCEIA) framework was established through a critical literature review on the links between CE and sustainability, also utilising strategic decision-making literature. A set of five framework objectives were formulated, and appropriate methods selected that made it possible to fulfil these objectives. These five objectives were (1) to facilitate a holistic (multidimensional) assessment; (2) to prevent burden shifting to other parts of the supply chain or life cycle (life cycle perspective); (3) to provide flexibility in terms of (a) scale and (b) sustainability maturity; (4) to build on existing assessment tools such as LCA; and (5) to assist in strategic decision-making processes. For this stage of the research, a more active kind of stakeholder engagement was needed.

A fundamental aspect of the design of the framework was, as is reflected in the framework's objectives, to guarantee methodological soundness and practical feasibility. In other words, the challenge was to balance the tension between giving an accurate picture of sustainability impacts, while remaining usable for companies. We aimed to incorporate these principles through validating the preliminary framework through two forms of collecting qualitative data on its practical usefulness through dual triangulation, thereby enhancing its effectiveness (Cornwall and Jewkes, 1995): an expert panel survey and focus groups.

A survey was designed to collect feedback from a specific group of knowledgeable participants: an expert panel of private sector and academic experts in CE assessment at corporate level (Blessing, 2002; Kravchenko et al., 2021). The four private sector experts had experience of designing and applying CE assessment frameworks for consultancy companies, while the seven university experts had been involved with building the scientific foundation of CE and sustainability assessment through the publication of scientific articles.

The feedback process focused on the methodological set-up of the framework, and was structured according to the expert panel validation steps as described in

Beecham et al. (2005): (1) defining the objectives of the assessment framework; (2) designing the validation instrument, namely a written survey that presented the framework and allowed the participants to provide feedback; (3) composing a relevant expert panel; (4) providing the participants with the survey and an ‘information package’; (5) collecting and analysing the responses; (6) interpreting the expert survey results to gain an impression of the strengths and weaknesses of the framework, and adjusting the framework accordingly. The expert survey itself consisted of three parts. First, a covering letter explained the research objective of the project and the expected role of the expert survey participants. Then, the CE assessment framework itself was detailed in a PDF of the ‘information package’. The survey was presented in Microsoft Excel and sent by email. It contained open fields to collect expert’s comments or amendment proposals related to the proposed methodology for each of the application steps. The closing part of the survey was designed to collect feedback on the five objectives of the framework. All the collected feedback was evaluated, and suggestions were incorporated when indicated by a majority (>50%) of participants.

In the second triangulation step, the revised framework was validated using feedback from its envisioned end-users through focus groups: a selection of five companies motivated to assess their CE impacts. They delivered their considerations to the different parts of the framework through various online focus group sessions (Nyumba et al., 2018). This method comprises a form of ‘consultative participation’, as practitioners are asked for their opinions and are consulted by researchers before interventions are made (Cornwall and Jewkes, 1995). The focus group approach was conceived as a strategy to bridge scientific research and ‘local’ knowledge, with local referring to companies that might be interested in applying the framework (Nyumba et al., 2018). The companies that were selected are both European (Italy and France) and African (Tanzania, Ghana). They consisted of a mix of limited and wide experience with CE and sustainability assessment. For practical reasons, the online focus groups were divided over different sessions, each with 1–2 participating companies. Before each focus group, 30- to 60-minute interviews were held with each company to better understand their business context and assessment experience. The focus group consisted of the following parts: (1) 15-minute introduction and context; (2) 5-minute explanation of the objectives of the framework; (3) 20-minute outline of the framework’s application steps and test case example; (4) 15-minute clarification questions; (5) 15-minute discussion of the objectives of the framework; (6) discussion of the framework’s feasibility; and (7) round-up and conclusion.

The sessions were recorded and viewed afterwards to complement the coding notes taken during the focus groups. The results were obtained by applying thematic analysis on two levels (Guest et al., 2014; Massey, 2011): using (i) articulated data and (ii) emergent data. The first level of data was acquired by asking the participants direct questions related to the framework. These questions focused on the framework’s clarity, its ability to respond to the set objectives, and the company’s

barriers to application of the framework – and of CE and sustainability assessment in general. The answers to these questions were addressed directly and then coded for analysis. The second level of data, emergent data, was acquired through analysing and interpreting the information provided by the companies ‘in between’ the direct questions that were asked – through, for example, stories and anecdotes. Emergent data therefore capture themes that are important to the participants, but that are invisible prior to the study (Massey, 2011). Chapter 4 in this volume includes further discussion of the framework.

As stated above, the validation exercise was undertaken with companies which had at least limited (in some cases extensive) experience of assessment and a prior interest in CE. While that was important in refining the framework, further work is needed consider support for inexperienced companies and to produce a self-assessment process to assist companies in understanding which capabilities they need to develop further.

2.4.4 Contribution of social enterprises to the CE

This project sought to examine the actual and potential contribution of social enterprises to CE activity using the city of Hull, UK, as the case study location (Pusz, 2023).

2.4.4.1 Social Network Analysis

Social Network Analysis (SNA) seeks to identify and study, both qualitatively and quantitatively, complex relationships among organisations (Wasserman and Faust, 1994). Complementary to the critical realist approach, SNA can enable researchers better to investigate (through a combination of extensive and intensive methods) causal relationships and power structures underpinning networks for the CE, knowledge of which can result in more informed policymaking. Following Sayer (1982), extensive methods seek to identify patterns and properties (typically drawing on quantitative approaches, providing concise data on multiple examples). Intensive research seeks addresses ‘how’ and ‘why’ questions, for which qualitative methods are preferred as they provide greater in-depth insight from typically fewer examples than extensive research. Whereas extensive research enabled Pusz et al. (2023) to identify general patterns and characteristics of the mapped *social circular enterprise ecosystem* landscape in Hull, intensive research enabled them to identify causal relationships behind particular attributes of organisations in that ecosystem. Intensive research also enabled them to uncover the contingent conditions prompting those organisations to undertake activities aimed at fostering local development of the CE. SNA hence provides an additional route to engage stakeholders in research relating to the application of CE principles in particular organisations.

In Pusz (2023) and Pusz et al. (2023) SNA involved a combination of semi-structured interviews with a visual method of mapping inter-organisational flows

of (in)tangible resources, actors and values, which enabled the researchers to uncover structural properties of organisations' individual connections (i.e. 'ties') with external actors, i.e. ego networks. The data, comprising respective ties between social enterprises (SEs) and other actors, was obtained via semi-structured interviews. Out of approximately 74 SEs identified using snowball sampling and an online search, 40 agreed to participate in the study and it was possible to map the ego networks of 31 of these SEs to the researcher's best ability. Those SEs were categorised into the following key ten clusters/categories to highlight cross-cluster linkages for the development of a socially inclusive CE: (1) food; (2) furniture; (3) clothing and other textiles; (4) arts and crafts (wooden/textile/cardboard/other); (5) construction/housing; (6) hygiene; (7) electronics; (8) disabled; (9) elderly; and (10) mixed/other (in terms of materials). Some 'clusters' were hence distinguished on the basis of client/beneficiary (e.g. elderly). Some of the less dominant categories represented by the same SEs, and which were likewise distinguished on the basis of client/beneficiary, were as follows: mentally struggling; ethnic minorities; homeless; ex-offenders; prisoners; vulnerable youth; children; refugees and asylum seekers; unemployed; vulnerable women; and alcohol addicts (Pusz 2023). Crucially, these clusters with underlying cross-sector interlinkages and respective ego networks served as a departure point for disclosing many other existing and potential cross-sectoral linkages for the CE.

When collecting data, researchers asked interviewees to report their ventures' links to particular actors based on (1) (in)tangible resources being accessed/shared, i.e. using the 'resource-generator technique' (Hansen, 2009), (2) levels of trust, and (3) frequency of interaction (to some extent). Some interviewees were provided with a roster showcasing approximately 130 social sector organisations to aid identification of ties. They were also asked about their most important connections to social, public and private sectors, respectively. The network data were additionally complemented with secondary data sources, particularly social media websites of respective enterprises. Identified ties were then transferred into a matrix in Excel spreadsheets and converted into a graph using online kumu.io software, which additionally enabled researchers to calculate the strength of relationships and organisations' relative level of connectedness (see Pusz et al. 2023). The generated network graph was complemented with a geographic map showcasing spatial positioning of respective SEs under study (see Pusz et al. 2023). Nonetheless, given that SNA is data-intensive, the network map is not exhaustive, but strongly indicative of the broader social circular enterprise ecosystem in Hull at the time of the research. For example, some SE managers were unwilling to share all the names of their connections due to confidentiality reasons and time constraints. Moreover, as interviewees probably identified the most important collaborations in their view, potentially unidentified ties could be significant to the diffusion of CE innovations across the wider network. Furthermore, some of the mapped ties are temporary (though they may occur periodically over an extended period of time). Information on past connections is especially difficult to retrieve from 'mental archives' of

research participants (Walsh and Ungson, 1991), some of whom had not necessarily worked for a given SE since its conception. Finally, another SNA-related issue concerns legacy meaning that the co-created social network map requires maintenance and updates to render further benefits in the future.

Key outcomes of this method fostered the understanding of key structural characteristics of the social circular enterprise ecosystem in Hull, including positions of influential actors within the network. SNA helped to explain how particular network ties not only enable the development of CE, but also how they could potentially be instituted to foster the adoption of CE thinking and practice. SNA thus helped to better assess the (collaborative and organisational) capacity of respective SEs to incorporate CE principles into their mainstream activities through (existing and potentially existing) network connections. SNA also enabled researchers to identify structural holes within a given network (i.e. potential connection links between specific actors/organisations), as well as brokers who (could) foster knowledge spillovers and formation of cross-sectoral networks (cf. Burt 2004). Such information is vital to know how to foster (re-)circulation of relevant resources (e.g. materials and knowledge), and hence diffusion and development of social circular innovations. SNA also helped to demonstrate the formation of (inter-)organisational social capital (i.e. differential levels of trust), which impacts the collaborative capacity for CE development. Nonetheless, considering the data-intensive nature of SNA, it was impossible for the researchers to obtain levels of trust for each tie (i.e. when using the Likert scale from 1–5, whereby 5 indicated the highest level of trust). Trust was thus not measured quantitatively but, instead, qualitatively (through semi-structured interviews). By adopting SNA, it was also possible better to demonstrate the interplay of actors across formal/mainstream-informal/alternative economic spheres (see Lekan et al. 2021). However, as SNA does not enable researchers to depict the broader social, economic and environmental settings in which organisations are embedded, this approach was complemented and enriched with a critical realist approach (Pusz, 2023).

Overall, SNA results helped researchers to discover a collaborative common ground and connectivity within the broader complex ecosystem whereby the mapped SE ecosystem in Hull can help to challenge any possible ‘silo mentality’ that often prevents diverse actors from noticing broader existing and potential cross-sectoral interconnections. Presumably, such ‘systemic awareness’ could motivate diverse stakeholders to stay connected and work towards shared goals (cf. Staicu and Pop, 2018). Linked to this, the results are expected to encourage decision-makers to invest in social infrastructure in such a fashion that it is possible to unlock the potential for more local and community-driven circularity in the city.

2.4.4.2 Value mapping

SNA-related mapping of actors and resource flows can be complemented with value-mapping sessions. Pusz (2023) used this method to map value outcomes associated

with the performed activities of respective enterprises in order to improve knowledge of circuits of value underpinning the local development of the CE (see also [Lekan et al., 2021](#)). [Lee et al.'s \(2004\)](#) circuits of value draw on ideas from the diverse economy literature ([Gibson-Graham, 2008](#)), which examines the potential of non-financially driven transactions (i.e. based on social desirability and usefulness, rather than economic value). Examples include voluntary work, product/time sharing either within the formal charity/social enterprise sector or individual/community arrangements. These social flows of value comprise Lee's circuits of value (2013). Within Cresting, [Lekan et al. \(2021\)](#) undertook value mapping to examine the role of circuits of value in the development of a local CE.

Value mapping was applied by [Pusz \(2023\)](#) to two case study SEs, namely *heidenspass* (Graz, Austria) and Rooted in Hull (Hull, UK), and was facilitated by the Value Mapping Tool (VMT). Developed by [Rana et al. \(2013\)](#), VMT is a subjective value-mapping technique used better to identify value creation, delivery and capture, and hence value outcomes associated with organisations' activities. VMT distinguishes four conceptions of value: (1) current value proposition of a company; (2) value destroyed (i.e. negative social or environmental impacts) that may be reconceptualised as (3) value missed (i.e. under-utilised assets, resources, capabilities and failure to capture value, e.g. due to competitors); and (4) opportunities for new value creation (i.e. new value-generating activities, complementary relationships, and network reconfigurations). In [Pusz's \(2023\)](#) research, the VMT aided the mapping of use and exchange values attached to flows of labour, materials and money in the local CE, and ensured that the study incorporated perceptions of value outcomes across the social, environmental and economic dimensions of sustainability.

Entrepreneurs were additionally asked to identify the desired value in their actions to prompt them to think about a desired future prior to exploring respective circular scaling pathways and feasibility of pursuing thereof. Overall, VMT painted a largely enterprise-centric picture as the mapping exercise highlighted *heidenspass* and Rooted in Hull employees' perceptions of value outcomes associated with their activities for (1) young employees, (2) private firms, (3) customers, (4) the environment, (5) society and (6) local authorities. Such an approach illuminated the more intangible aspects associated with participants' perceptions on their work environment and work activities. More specifically, the VMT served as a means of untangling and interrogating circuits of value underpinning tangible and intangible resource flows whilst identifying any potential and existing threats/risks associated with respective stakeholders and external conditions in the local CE development (see [Lekan et al., 2021](#)). The outcomes of this approach are considered in [Chapters 6 and 8](#) in this volume.

2.5 Conclusions

This chapter has presented the overarching philosophy of the project, discussed the approaches to stakeholder engagement and provided some in-depth examples

of those approaches and associated methods of data collection, co-creation and the validation of ideas emerging from the research.

Critical realism provides the philosophical approach through which we seek to identify the underlying causal mechanisms and relationships which are influencing our empirical observations. By acknowledging and contextualising diverse perspectives, while simultaneously seeking to judge their reflection of an objective reality, critical realism provides an ideal foundation for both understanding the present and steering a path to a desired future. This approach does not presuppose particular methods; the examples presented in this chapter have illustrated some of different approaches that can be used to build an understanding of the wide range of issues relevant to a CE.

Research enables the building of knowledge relating to stakeholders to different aspects of the CE. Stakeholders were variously involved in the co-design of a project (transdisciplinary approach), and as questionnaire survey and/or interview respondents providing insights to their behaviour, motivations and constraints. Stakeholder groups also help to refine and validate normative frameworks for CE implementation (including assessing impacts). The approaches used with large organisations (public and private sector) have demonstrated the benefits of combining the extensive (e.g. survey of opinions/behaviour) with intensive methods (e.g. interviews to explore motivations and understandings). This combination allows a rich picture of what is happening as well as a route to developing/maintaining a relationship with a number of stakeholders. The style of engagement was impacted by the outbreak of the COVID-19 pandemic; some aspects of the research survived the switch to online working with little alteration, others required adaptation. This exacerbated the already challenging task of reaching the most marginalised stakeholders, e.g. the informal sector in Nigeria.

Each individual project within Cresting offers insights to a particular aspect of the implications of implementing a CE. They cast light on the issues through the lens offered by the perspectives of certain stakeholders in certain locations and operating at various scales from local to global. In this volume we are seeking to deepen comprehension of the mechanisms mediating the societal impacts of a CE, and simultaneously the societal influences on a CE, by drawing on the multiple perspectives offered by the different projects.

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