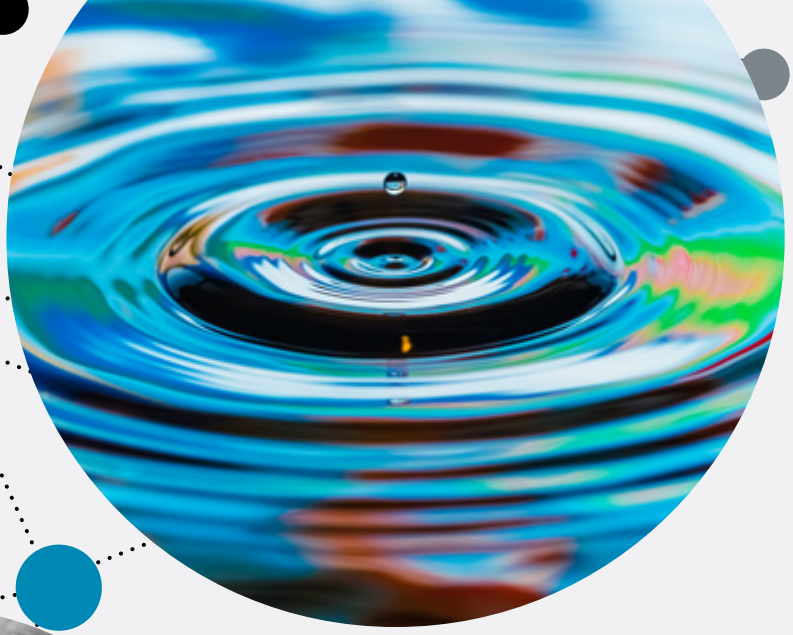


SMALL AND MEDIUM ENTERPRISES AND THE CIRCULAR ECONOMY

Insights and evidence from the NICER Programme

Ryan Nolan[1], Peter Hopkinson[1], Fiona Charnley[1], Carol Pettit[2], Gareth Loudon[3], Żaneta Muranko[3], Eevee Zayas-Garin[3], Ricardo O'Nascimento[3], Roberta Morrow[3], Julia Stegemann[4], Bing Xu[5], Qianqian Ma[5], Brian Cantor[6]

CE-HUB
UKRI National Interdisciplinary Circular Economy Research

NICER PROGRAMME

University of Exeter

UK Research and Innovation

Contents

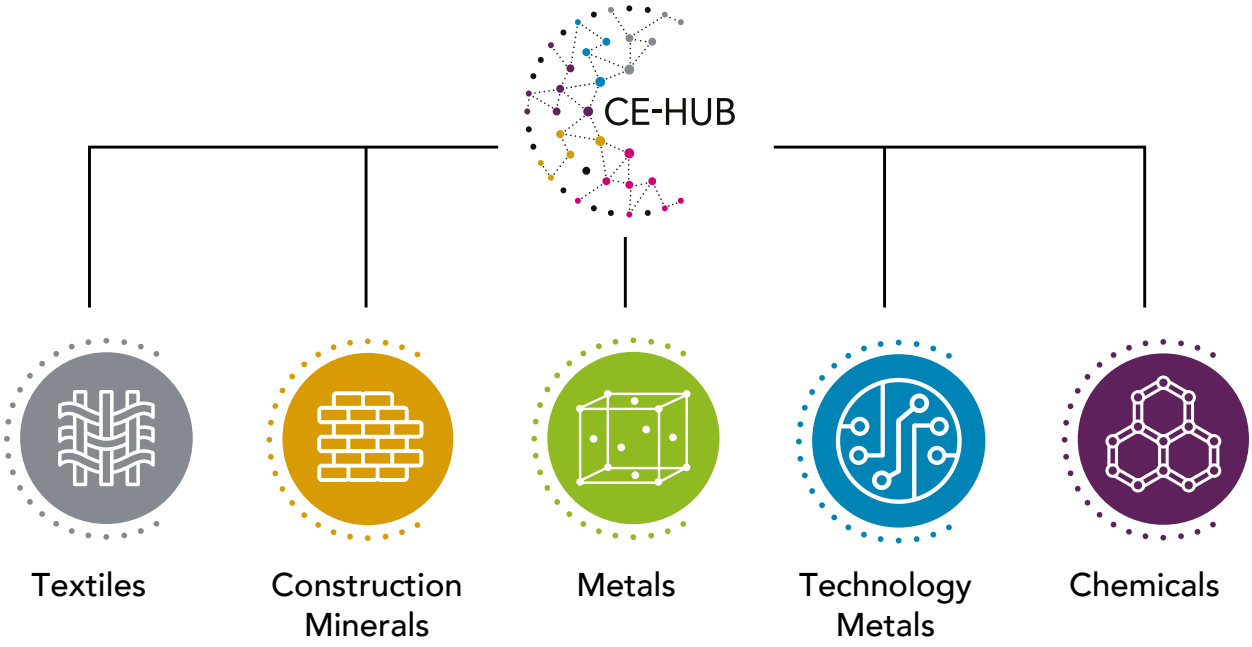
1 UKRI Circular Economy Hub, University of Exeter. **2** UKRI Circular Economy Centre for Technology Metals, University of Exeter. **3** UKRI Textiles Circularity Centre, Royal College of Art. **4** UKRI Circular Economy Centre for Mineral-based Construction Materials, University College London. **5** UKRI Interdisciplinary Centre for the Circular Chemical Economy, University of Surrey. **6** UKRI Interdisciplinary Centre for Circular Metals, Brunel University London.

About the National Interdisciplinary Circular Economy Research Programme

The National Interdisciplinary Circular Economy Research (NICER) programme is a £30 million four-year investment from UKRI and the Department for Environment, Food & Rural Affairs (DEFRA) to deliver the research, innovation and evidence base needed to move the UK towards a circular economy. Launched in January 2021 and comprising initially of 34 universities and over 150 industrial partners, NICER is made up of five Circular Economy Research Centres each focused on a specialty material flow, and the coordinating CE-Hub:

- The National Interdisciplinary Circular Economy Research Hub (CE-Hub), led by the University of Exeter
- The Textiles Circularity Centre (TCC), led by the Royal College of Art
- The Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials (ICEC-MCM), led by University College London
- The National Interdisciplinary Centre for the Circular Chemical Economy (CircularChem), led by Surrey University
- The Interdisciplinary Circular Economy Centre for Technology Metals (Met4Tech), led by the University of Exeter
- The Interdisciplinary Centre for Circular Metals (CircularMetal), led by Brunel University London

NICER is the largest and most comprehensive research investment in the UK Circular Economy to date. It has been delivered in partnership with industrial organisations from across sectors and DEFRA to ensure research outcomes contribute to the delivery of industrial implementation and government policy. A core aim of the programme is growing the Circular Economy community through a significant programme of outreach and collaboration.



About the NICER Insight Reports series

The objectives of the NICER programme are to:

1. Accelerate understanding and solutions to enable circularity of specific resource flows,
2. Provide national leadership, coordinate and drive knowledge exchange across the programme as a whole and with policy, consumer, third sector and business stakeholders,
3. Ensure research is embedded with stakeholders by involving businesses, policymakers, consumers and society, the third sector, and other affected groups and communities at every part of the programme.

The transition towards a UK circular economy requires a whole system approach. This means that, in addition to accelerating knowledge at the resource and sector level, there are a number of agnostic system level enablers or drivers that can be applied to accelerate adoption at scale. The purpose of the NICER Insight Report Series is therefore to highlight learning from across the NICER Programme in relation to these system wide enablers. Small and Medium Enterprises and the Circular

Small and Medium Enterprises and the Circular Economy: Insights and evidence from the NICER Programme

Small and Medium Enterprises (SMEs), defined as businesses employing between 0 and 249 employees, constitute 99.9% of the UK's private sector and account for 52% of the total UK business turnover in 2022 (BEIS, 2022). Collectively, they represent a significant section of the economy that could drive substantial impact in the UK's transition to a more circular economy (CE), aligning with national decarbonisation targets. This transition is crucial for sustainable economic growth and environmental stewardship in the face of growing resource scarcity and challenges posed by climate change.

Previous policy and research findings have identified numerous challenges that SMEs face in engaging, adopting, and implementing CE principles. These challenges, summarised in Annex 2, range from financial constraints to lack of technical expertise and regulatory barriers. However, the potential for SMEs to contribute to and benefit from the CE remains significant and largely untapped.

This report highlights key learnings from the UK Research and Innovation (UKRI) National Interdisciplinary Circular Economy Research (NICER) Programme, which throughout its lifespan engaged over 200 SMEs. We identify new insights and focus on specific examples of how SMEs have overcome challenges in adopting CE practices. The evidence and insights presented were collected from experiences and interactions with numerous businesses across each of the UKRI Circular Economy Centres (CECs) within the NICER Programme, as summarised in Annex 3.

Over 10 sections, we present insights and learnings across key areas of activity. The report concludes with five overarching insights and corresponding recommendations that can be implemented in policy and practice to support SMEs in engaging with CE principles appropriate to their maturity levels and capabilities. These recommendations aim to provide a roadmap for policymakers, industry leaders, and SMEs themselves to navigate the transition towards greater circularity in the UK economy.

The Opportunity

Since the launch of the NICER Programme in 2021, we have observed a growing interest in, and engagement with, the CE concept from government, academia, and industry stakeholders. This increased awareness is a positive step in the right direction. However, there remains a widespread misconception that the CE is primarily about recycling. As illustrated in Figure 1, a CE goes far beyond improved recycling, which only slows down the rate of resource consumption.

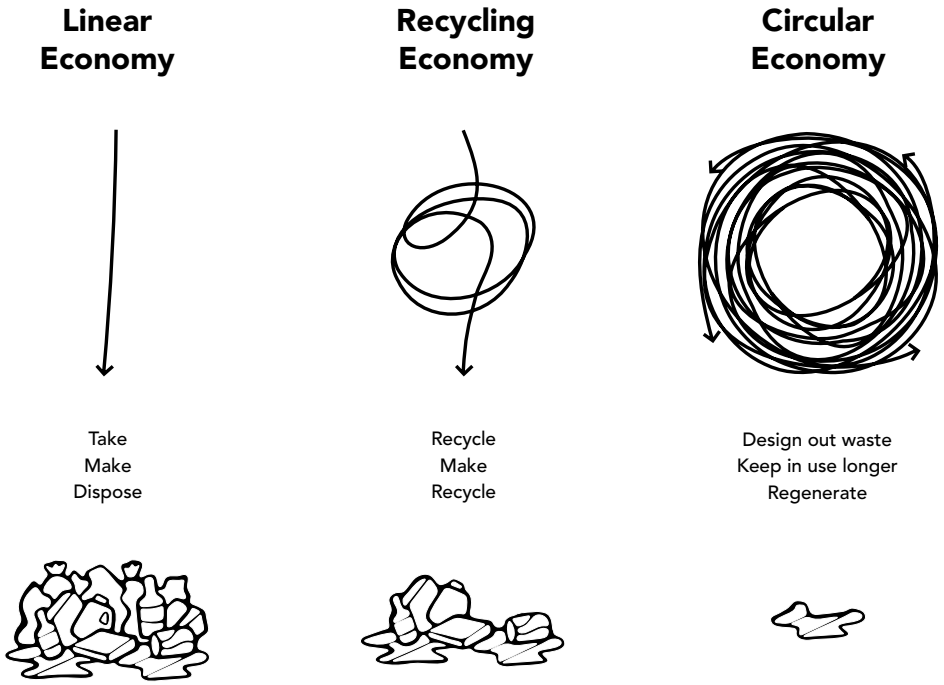


Figure 1. A linear, recycling and circular economy (adapted from Circular Flanders, 2017)

The true power of CE value creation can be realised by designing interventions and innovations as a system across the entire value chain (Figure 2 below). These interventions include:

- **Utilisation:** Prolonging and intensifying product lifespans (without compromising user safety or functionality), increasing asset utilisation and overall resource productivity, and driving down carbon emissions. These actions reduce the overall rate and size of the outflows from the system (reducing externalities, waste disposal and costs).
- **Value recovery:** Designing and managing the reverse flow of products and assets on circular principles, which drives value retention and reduces demand for new products or materials at the inflow stage.
- **Quality of inputs:** Designing products and components for circularity at the outset, which reduces material complexity, toxicity and, in some instances, necessity, and forms a key value creation enabler in the *use* and *outflow* stages.

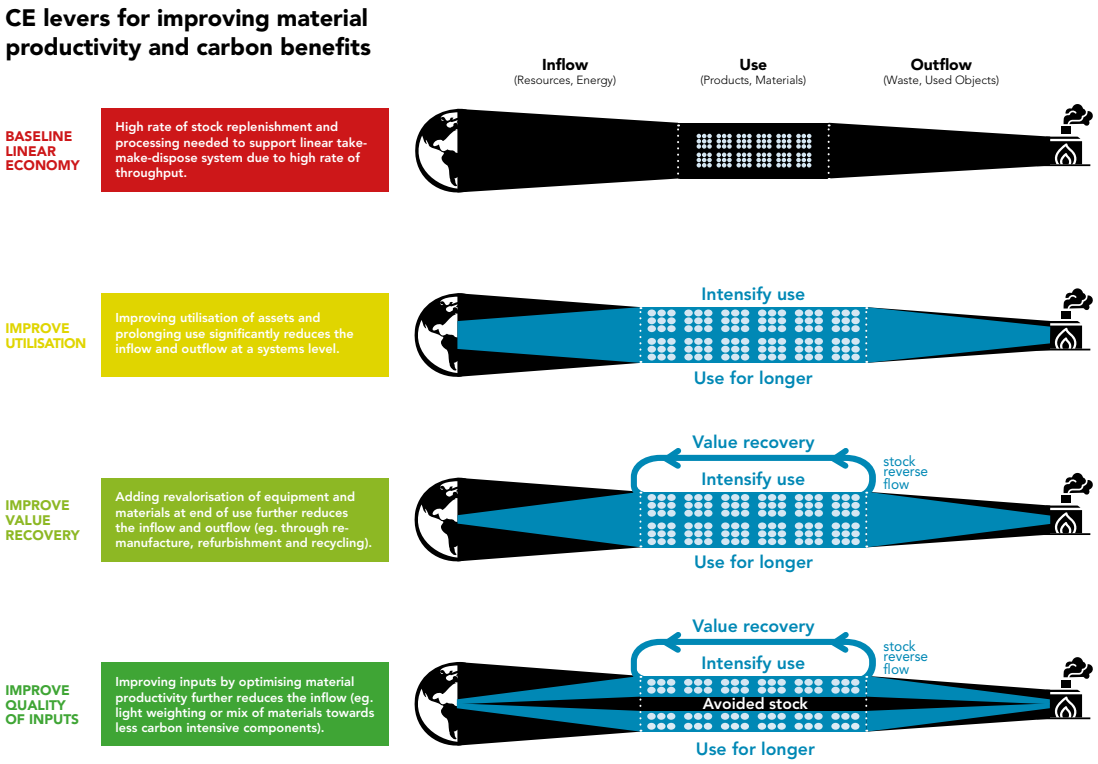


Figure 2. CE levers providing non-linear productivity increases and carbon reductions (adapted from Zils, 2021)

In our experience, successful value creation typically involves the adoption and configuration of four core intervention building blocks (Figure 3):

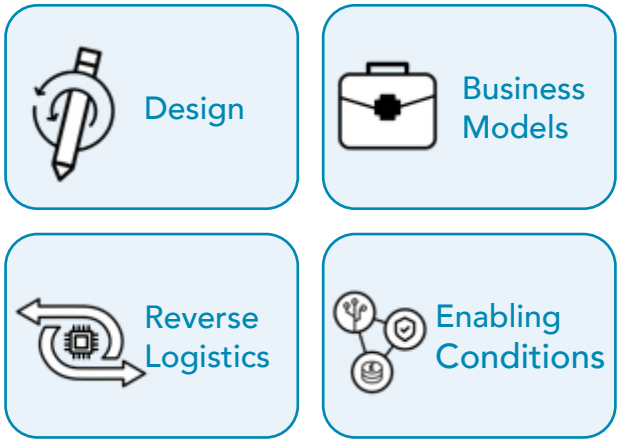


Figure 3. Key building blocks for CE implementation

Design:

SMEs can make decisions to select materials and design inflows, activities and outflows to regenerate nature, reduce inputs and waste throughout the system, and eliminate toxic chemicals.

Business Models:

SMEs can apply various business models that focus on reducing overall demand for resources and increasing overall resource productivity, whilst delivering superior products and services to consumers.

Reverse Logistics:

SMEs can play a key role in leading or supporting reverse flows of materials, products and components back to the producers and suppliers, third parties or adjacent value chains. This ensures that valuable products, components, materials, and nutrients can be recirculated profitably, creating new revenue streams while reducing waste.

System Enablers:

Finally, SMEs can directly enable CE through a wide range of potential actions or support mechanisms. These include adapting their procurement and supplier practices, creating new forms of collaboration, developing core service design, bringing digital and software tools to the market , and producing innovative financial, marketing and accounting tools. Future legislation and policy, such as Extended Producer Responsibility (EPR) or Ecodesign, will also open up opportunities for innovative SMEs to develop new products and services in line with CE principles.

1. Financing Circular Economy

Value chain stage: Cross value chain
Building block: Enabling condition

The NICER Programme's Collaborative Research and Development (CR&D) fund, led by Innovate UK and supported by the CE-Hub, has played a significant role in fostering CE innovation among SMEs. Over two rounds, this initiative directly supported 32 innovative SMEs with an investment of £2.5m across diverse sectors and CE value chain activities. A key insight gained from this experience is the critical importance of adopting a systemic, taxonomic approach to funding CE projects, especially for SMEs. Given the fragmented nature of SME activities across various sectors, material flows, and product categories, a structured approach would enable a more comprehensive understanding of how different projects contribute to the broader CE transition.

To illustrate this point, we have classified the funded projects according to their circular value creation driver while highlighting the challenges each project sought to address, providing a clearer picture of the distribution and impact of the funding across the CE landscape (table 1).

Table 1. SMEs funded through Circular Economy for SMEs: Innovating with the NICER Programme.

Company	Sector	Challenges addressed	CE value creation model
Beta Technology*	Consulting	Limited recycling of niobium products	Enabling solution
Ecomar Propulsion*	Manufacturing	Recycling and reuse of valuable materials in marine propulsion systems	Design
ASBP*	Construction	Energy-intensive recycling process for steel and lack of reuse	Product re-use
Minviro*	Software and Consulting	Critical Raw Materials supply and recycling for low-carbon technologies	Enabling solution
Hexigone Inhibitors	Manufacturing	Sustainable sourcing of raw materials for corrosion protection products	Waste recovery
N.D.T Consultants	Consulting	Inefficient recycling of Lithium-Ion Batteries	Enabling solution
Rheon Labs*	Engineering/Design	Reuse of polymer waste from injection molding in 3D printing	Design/Waste recovery
Twist Solutions*	Finance	E-waste reduction through digital twin of electronic sub-components	Enabling solution
Reusefully*	Construction	Ineffective pre-refurbishment and pre-demolition audits in buildings	Enabling solution
City Science Corporation	Engineering	Unsustainable material use and consumption in new housing developments	Design/Enabling solution
Roundrack*	Software	Low adoption of alternative, next-generation materials in the fashion industry	Enabling solution
Tech-Takeback	Electronics	Assessing the impact of community repair for small electrical goods	Product re-use and repair
Pennog	Waste	Environmental damage from moss and algae control on building surfaces	Waste recovery
Ccell Renewables		Unsustainable coastal protection methods	Design/Enabling solution
Heyne Tillett Steel*	Construction	Validation of older steel stocks for reuse in construction	Waste recovery/Material re-use
Uvamed*	Medtech	Reducing landfill and incineration of potentially recyclable plastic clinical waste from operating theaters	Waste recovery

*** Case studies for highlighted organisations have been published on the CE-Hub's Knowledge Hub.**

The distribution of funded projects across different value creation models and sectors underscores the need for a more structured, taxonomic approach to CE funding. While the current funding model has successfully engaged a wide range of SMEs—who are often in a constant loop of searching and applying for funding, which may be detrimental to innovation—there's an opportunity to further enhance its impact. This could be achieved by long term strategic co-ordination of resources that require collaboration across the CE value chain stage—from inflow to use and outflow stages—and include all four CE building block systemically. Without this there runs the risk of funding leading to an optimization of the parts of the system rather than system optimisation, a core requirement for a healthy, functioning circular economy.

The breadth of the Innovate UK and NICER CR&D fund demonstrates the potential and adaptability of SMEs in applying and integrating CE principles across various commercial contexts, often at a profit and overcoming perceived or actual regulatory or other system barriers.

2. SMEs as System Innovators

Value chain stage: Cross value chain
Building block: Enabling condition, business model, design

It is often claimed that SMEs lack the necessary resources or scale to be able to implement large scale or systemic change by themselves. By their very nature SMEs start small, and in the case of CE, as seen above, frequently specialise around one of the four building blocks. It is generally much more difficult to harness all four building blocks to find innovative system solutions to societal and environmental challenges. Our insight in this example however, is that whilst it is difficult it is not impossible. Over the period of the NICER programme the CE-Hub has collaborated with Revolution-ZERO, a start up with a mission to replace single-use medical textiles (masks, gowns, drapes) with products that are designed to be re-used up to 75 times. Revolution-ZERO, however, is a full CE system value proposition as described below.

Exemplified by Revolution-ZERO is how SMEs can leverage the four CE building blocks to drive systemic change. By reimagining product design (reusable textiles), developing innovative business models (service-based offerings), creating reverse logistics infrastructure (reprocessing facilities), and fostering enabling conditions (regulatory compliance and procurement reforms), Revolution-ZERO is not just disrupting a single value chain stage but catalysing a broader shift towards circularity in the healthcare sector. Their approach demonstrates that, despite resource constraints and other well-established challenges, SMEs can indeed be powerful agents of system-level innovation. By addressing interconnected challenges across the value chain, from product design to end-of-life management, and engaging with multiple stakeholders, including healthcare providers and policymakers, this is a good example of how small enterprises can initiate and propagate transformative change that extends far beyond their immediate operations.

Revolution-ZERO, established in 2020, is an SME working in the medical technology sector focused on transforming the single-use medical textile industry. With the NHS generating over 55,000 tonnes of waste annually from these products, Revolution-ZERO aims to offer a more economical solution through a circular economy system model. Their flagship project involves the re-use of surgical textiles including gowns and drapes driven by a state-of-the-art modular disinfection and sterilisation facility in partnership with Cornwall NHS. This project addresses major CE challenges in health care, including regulatory compliance and the need for specialized infrastructure. The disinfection and sterilization unit, designed with modularity for rapid deployment, meets stringent medical standards and integrates real-time digital reporting for efficiency and quality control. Since deployment at St Michael's Hospital, the system has been well-received, with significant waste reductions reported.

Procurement impacts in this project have been notable (Hopkinson et al., 2024). Revolution-ZERO is engaged in advanced discussions with 8 NHS Trusts/Boards and has secured a place on the National Procurement Framework. They have also achieved B Corp certification and attracted £1.1 million in investor funding. However, scaling up remains challenging due to the current NHS procurement system, and embedded habits and norms of single use. There is a lack of suitable procurement mechanisms for CE solutions, and many NHS Trusts face capital spending constraints. To overcome these barriers, Revolution-ZERO is able to offer their solution as a service-based business model, which requires long-term contracts to secure financing for capital investments.

3. Impacting CE design: Opportunities and challenges

Value chain stage: Inflow
Building block: Design

SMEs often don't have access to resources in the same way multinational enterprises (MNEs) do, and the availability of resources depends on an organisation's strategies and the trade-offs they make. In this context, trade-offs are when decisions are made to pursue gains in one area at the expense of progress in another.

But trade-offs are not only made when comparing economic costs and environmental impacts, they can also feature in strategic decision making within each domain (Ünal and Sinha, 2023; Pinske and Kolk, 2010).

In a CE context, for instance, this might be weighing up the long versus short-term impacts of different material choices or determining the best scenario for products when they reach the end of their useful life. Indeed, knowing how to make the right decision with often limited information and scarce resources, particularly for SMEs (Aghelie, 2017), is one of the key challenges organisations face in the implementation of circularity practices (Greer et al., 2023).

Ecomar Propulsion Limited, a UK-based SME specializing in clean electric marine products, is dedicated to advancing sustainability in the marine technology sector through innovative solutions. Their product portfolio includes robust electric outboards and internal motor-driven systems designed to operate on batteries and hydrogen. Ecomar distinguishes itself by integrating circular economy principles into their manufacturing processes, emphasizing the use of recycled or repurposed materials wherever possible. Their commitment extends to ensuring high recyclability of products at the end of their lifecycle and actively managing embedded carbon in material choices.

Ecomar partnered with NICER's **Interdisciplinary Circular Economy Centre for Technology Metals** (Met4Tech) to embed CE principles into their manufacturing and operational practices for clean electric marine products. Their initiative involved conducting a comprehensive review of their Bill of Materials to identify opportunities for incorporating recycled materials, developing strategies to enhance product recyclability and reduce waste, and actively managing embedded carbon in material choices to minimize environmental impact. Addressing supply chain challenges, particularly in ensuring responsible sourcing of materials like rare earth and technology metals, was also a critical component of their approach. The project serves as a good example of the kinds of trade-offs SMEs are facing as they progress with their circular economy transitions.

Trade-offs Encountered:

Material Choices Balancing the use of recycled materials with meeting performance standards posed challenges. Opting for recycled materials sometimes meant higher costs or limited availability, impacting product design and supply chain efficiency.

Embedded Carbon vs. Emissions Reduction Despite higher embedded carbon in electric outboards due to copper use, these products offered significant emission reductions over their lifecycle compared to traditional petrol engines. This trade-off between initial environmental impact and long-term benefits was critical in their decision-making process.

Supply Chain Engagement Ensuring responsible sourcing practices involved trade-offs between rigorous supplier vetting (potentially increasing costs and lead times) and meeting ethical standards in material procurement, particularly concerning rare earth and technology metals extraction.

These trade-offs illustrate Ecomar's strategic decisions in navigating circularity challenges while maintaining their commitment to driving innovation in the marine technology sector.

Managing Trade-Offs

Effective management of trade-offs is crucial for SMEs as they balance immediate needs with long-term environmental impacts. Drawing from Kaplan's (2020) four-stage approach, we can distill key insights for SMEs navigating circularity challenges:

- Understand and identify trade-offs within the business model.
- Reframe trade-offs as opportunities for innovation and value creation.
- Innovate to develop solutions that transcend traditional trade-offs.
- Acknowledge persistent trade-offs and explore experimental solutions.

For SMEs, implementing this approach often requires additional resources and support. Two key strategies emerge as particularly effective:

Securing Funding for Innovation: Access to funding is crucial for SMEs to test new solutions and implement innovative approaches. In the UK context, opportunities such as the NICER and Innovate UK partnership funding, as well as targeted competitions like the **Future Economy-focused Investor Partnerships**, provide vital support. These initiatives enable SMEs to explore and implement sustainable practices across various sectors, including Net Zero, Healthy Living and Agriculture, and Digital Technologies.

Strategic Partnerships and Collaborations: Forming alliances with other organizations allows SMEs to leverage external knowledge, capabilities, and resources. This collaborative approach not only addresses immediate challenges but also fosters innovation and resilience (UK Government, 2016; Audretsch et al., 2023).

By focusing on these strategies, SMEs can more effectively navigate the complex landscape of trade-offs inherent in circular economy transitions. This approach enables them to advance their circularity goals while maintaining competitiveness and driving long-term success. Policymakers and support organizations should consider how to facilitate access to funding and encourage collaborative ecosystems that empower SMEs in their CE journey

4. SMEs as Business Model Innovators

Value chain stage: Outflow
Building block: Business models

A question that came up time after time throughout the NICER Programme is whether CE is just for big established businesses, and how SMEs can engage and find new business opportunities either as a start-up or to expand and scale up. Over the four years we have seen growing interest amongst SMEs, and a growing realisation of their innovation potential and ability to overcome perceived barriers and challenges (as demonstrated by the CR&D projects described in Table 1 and the Revolution-ZERO case).
Making small adjustments to individual products or processes will no longer be enough for companies to adapt and thrive in this changing environment and overcome prevailing barriers (Annex 1). Instead, businesses are rethinking their business models to find more innovative solutions to remain competitive and viable (Biloslavo et al., 2020). Incorporating CE principles into their value offering, value creation and delivery operations, and/or value capture methods (Haines-Gadd and Charnley, 2019) is one such innovative solution businesses can turn to. For many SMEs, making progress with CE benefits through collaboration and partnerships through networks and supply chain partners, as exemplified by ASBP.

The **Alliance for Sustainable Building Products** (ASBP) demonstrates how SMEs can catalyse circular innovation through knowledge-sharing and supply chain collaboration. Their **DISRUPT Project**, which received Innovate UK and NICER funding, has developed new enabling processes and business models to increase steel reuse in construction, working with key stakeholders including the **Institute of Demolition Engineers**, **Cleveland Steel and Tubes Ltd**, and demolition contractors across the UK.

While steel recycling is well-established, the DISRUPT project identified and addressed specific barriers to reuse, creating practical tools to enable greater circularity. Their research demonstrated significant potential impact: reclaimed steel could save up to 250,000+ tonnes of CO_2 per year by 2050, alongside substantial cost savings of £40m annually on construction projects.

The project delivered a comprehensive, **free-to-download toolkit** providing guidance, business considerations, and case studies to facilitate new market entrants. This included specific checklists for different stakeholders across the supply chain, from demolition contractors to designers and clients. The toolkit was supported by over 10 new case studies spanning residential, industrial and commercial projects, demonstrating the practical application of steel reuse across different scales.

DISRUPT's success has led to a second phase (DISRUPT II, 2023-24), which focuses on working with the demolition industry to increase the supply of reclaimed steel. The project has also launched a new material reuse platform alongside ASBP's ongoing **Reuse Now** campaign, fostering engagement between design, engineering and demolition communities.

This case study demonstrates how SMEs can drive systemic change by developing practical tools and frameworks that enable greater visibility of circular practices across entire supply chains, while continuing to build evidence of both environmental benefits and a clear business case.

5. Increasing the utilisation and end of life of products and assets

Value chain stage: In use, Outflow
Building block: Reverse logistics

The journey towards CE adoption can vary significantly based on an organisation's starting point. For instance, start-ups may have the flexibility to embed circular practices from the outset and be 'born circular', designing their operations around CE principles without the constraints of legacy systems. Established SMEs, which originally operated under a traditional linear model, face different challenges and trade-offs (as described in section 3; see **Ünal and Sinha**, 2023) as they transition to a circular model, even when the benefits of making the shift are evident. This requires a change in operational practices and a transformation in corporate mindset and stakeholder engagement (with customers, employees, society, etc.). Understanding these differences is crucial in identifying key success factors and appropriate key performance indicators (KPIs).

KPIs are essential for measuring the implementation and performance of CE initiatives (Shchudlack and Ulbinaitė, 2023), especially so for SMEs where KPIs are often not used meaningfully or in the most optimal ways (Tieber et al., 2019; Zaitsev, 2023). Fortunately, there are many resources SMEs can turn to for guidance, such as the World Business Council for Sustainable Development's **Circular Transition Indicators**, CE standards such as **ISO 59004**, **ISO 59010** and **ISO 59020**, **OECD guidance**, and the EU's **Corporate Sustainability Reporting Directive**. Similarly, they can look to MNEs and larger corporations like **Ricoh**, **Philips**, and **DS Smith**, who have developed their own methodologies and tools to track and drive circularity within their operations (Zils et al., 2023). However, despite this rich landscape, questions remain concerning the best KPIs to measure progress, effective processes to drive internal change, suitable monitoring frameworks, alignment with CE principles, environmental and social impacts, and so on.

The Pre-Demolition Environmental Assessment and Decision-Making for Social Housing (PreaDeM) project by **Reusefully**, supported by ICEC-MCM, exemplifies the kinds of trade-offs and challenges organisations might face and how KPIs are used to support goals. Aimed at improving circularity outcomes in the social housing sector, the project developed a user-friendly platform to estimate materials in existing assets and assess their reuse potential. This approach balanced the need to maintain safe and healthy homes while integrating circular practices, highlighting the trade-off between immediate operational needs and long-term sustainability goals. The project underscored the importance of leveraging existing data and systems to minimise disruption, and developed KPIs such as material reuse rates, embodied carbon reduction, and decision-making efficiency. By focusing on stakeholder engagement and creating accessible tools, Reusefully demonstrated that gradual integration of circular practices alongside existing priorities is feasible and beneficial, even for established SMEs transitioning from a linear model.

The abundance of available resources and standards provides a strong foundation for those looking to develop and refine KPIs, but the challenge lies in tailoring these tools to the specific needs and contexts of individual SMEs. Moving forward, the focus should be on developing flexible, adaptable frameworks that can guide SMEs through their unique circular transitions. These frameworks should not only measure progress but also drive internal change, align with CE principles, and capture both environmental and social impacts. By embracing such holistic approaches, SMEs can navigate the complexities of adoption more effectively, while balancing immediate operational needs with long-term circularity goals. Ultimately, the success of the CE transition will depend on the ability of policymakers, researchers and bigger businesses to support SMEs in this journey, providing them with the tools, opportunities, knowledge, and metrics they need to really make the jump from linear to circular.

6. Building the value of reverse loops: Overcoming Logistical and Regulatory Challenges

Value chain stage: Outflow
Building block: Reverse logistics

For many SMEs (as for other organizations), the transition to a CE is often hindered more by logistical and regulatory challenges than by technical feasibility. While the technical potential for reusing materials or adopting particular circular practices may be well understood, the practicalities of implementing these solutions can be fraught with difficulties. Logistical challenges include complexities in sourcing, processing, and managing recycled materials, as well as coordinating with various stakeholders throughout the supply chain (Bressanelli et al., 2020) and later in reverse logistics necessary for strategies such as remanufacturing.

Regulatory barriers further complicate the picture. For instance, existing waste regulations, such as those outlined in the **Waste Framework Directive (EU) 2018/851** and the **Environmental Protection Act 1990**, are designed to ensure safe and controlled waste management. However, these regulations can inadvertently restrict circular practices by defining waste in ways that hinder the reuse of materials (Hopkinson et al., 2023). The requirement to classify certain materials as waste before they can be processed or reused often conflicts with the CE's goal of keeping materials in use for as long as possible. This misalignment between regulatory frameworks and CE principles poses a significant challenge for SMEs striving to innovate within these constraints.

One key regulatory hurdle involves the classification of materials as waste. However, under certain conditions, a material may not be considered waste if it meets specific criteria, such as being used for its intended purpose, being returned for a refund, or being a by-product of a manufacturing process. For example, a material may be classified as a fuel rather than waste if it meets certain calorific standards, or it may not be deemed waste if it is reused with minimal repair. However, the complexity of these definitions can lead to uncertainty and regulatory inconsistency. In practice, this means that SMEs may face difficulties in navigating the regulations that govern the reuse and recycling of materials, particularly when those materials fall outside the typical definitions or require nuanced interpretation.

A NICER funded feasibility study supported by ICEC-MCM focused on utilizing calcium carbonate waste (CCW), such as eggshells and seashells, in lime manufacture to enhance sustainability in infrastructure construction. The aim of the Sustainable Infrastructure Construction and Repair Using Calcium Carbonate Waste Lime project was to divert food waste from landfills, reduce limestone depletion, and improve soil performance for transport infrastructure.

Several SMEs, including **Just Egg Ltd**, **Envirosoil Ltd**, and the **Scottish Shellfish Marketing Group**, collaborated with academic and municipal partners to develop and test CCW lime. They optimized manufacturing protocols, validated long-term soil stabilization performance, and built strategic partnerships to overcome logistical and regulatory hurdles.

Regulatory and Logistical Challenges Overcome:

- **Material Processing and Supply** Streamlined collection and processing of CCW ensured a steady supply of high-quality material.
- **Performance Validation** Tests confirmed that CCW lime performed comparably to conventional lime, demonstrating its viability for infrastructure applications.
- **Policy Advocacy** Life-cycle analysis supported policy changes for the use of CCW in construction. The project also addressed regulatory challenges, as the use of food wastes (e.g., eggshells) is not currently permitted as a feedstock for other processes.

The findings provided evidence to advocate for regulatory adjustments to allow these wastes in construction applications.

This project exemplifies how, through collaboration with research institutions and industry bodies, SMEs can play an active role in addressing logistical and regulatory challenges aimed at advancing circular economy practices.

To overcome these challenges, SMEs need to develop strategies that align with both regulatory requirements and CE goals. (Hopkinson et al., 2023). This may involve engaging with regulatory bodies and building the knowledge capabilities to clarify definitions and seek exemptions or adjustments to existing frameworks.

It can also include working closely with industry partners and stakeholders to ensure compliance while pursuing innovative circular solutions. By examining case studies of SMEs that have successfully navigated these obstacles, we can gain valuable insights into effective strategies for overcoming logistical and regulatory barriers.

7. Data Accessibility, Curation and Aggregation

Value chain stage: Cross value chain, Outflow
Building block: Enabling Condition

For SMEs to effectively engage in CE activities, such as developing new materials, tracking products or remanufacturing components, they require comprehensive, accurate, and actionable data. Enhancing data accessibility is essential for informed decision-making, identifying opportunities for improvement, and fostering innovation. However, available data for circular economy-related activities is scarce, and where it exists, it is often piecemeal or difficult to access (Lysaght et al., 2022; Bouwens, 2023). This is because existing data assets have been curated in the context of, and optimised for, the linear economy. Addressing these challenges and leveraging relevant technologies and partnerships can significantly improve data accessibility and utilization.

One significant challenge is the inconsistency and fragmentation of data availability. Gaps in publicly accessible data, such as incomplete information on secondary materials and product lifespans, hinder effective analysis and decision-making (Lysaght et al., 2022).

For instance, data on the material composition of products is frequently outdated or fragmented, complicating thorough life-cycle assessments and understanding the environmental impact of various materials.

Another issue is the dispersed nature of current data sources. Information is scattered across multiple platforms with varying levels of detail and formats, making it difficult for SMEs to integrate and analyze data comprehensively. This fragmentation prevents SMEs from obtaining a holistic view of material flows and circular economy metrics. CE-Hub research has demonstrated that it is possible to utilise existing data sources and map them along a circular value chain (for examples, see Lysaght et al., 2022), however this is time consuming and only reflects the current state of play which is filled with limitations, such as patchy coverage depending on sector or product type, and data on reverse logistics outside of recycling is particularly limited (Lysaght et al., 2022).

The Circular Niobium project, spearheaded by **Beta Technology** in collaboration with **Echion Technologies**, **British Geological Survey**, and Met4Tech, aimed to develop a sustainable recycling value chain for niobium products. Niobium, a transition metal used in small amounts to enhance the performance of steels and batteries, currently has a recycling rate of only 0.3% globally. The project sought to overcome this challenge by improving data accessibility and developing innovative recycling and business models.

The project's success hinged on the effective use of data. Partnering with the world's largest niobium supplier provided access to critical information on niobium flows, which was essential for creating a detailed understanding of material movement and recycling potential. However, the project faced significant hurdles due to gaps in data availability and accuracy. For instance, tracking niobium through its entire lifecycle proved difficult due to incomplete data and the complex nature of material reuse, such as in MRI scanners. These challenges underscored the broader issue of inadequate data collection in enabling circular solutions.

Findings highlighted that comprehensive data is crucial for developing effective recycling strategies. The detailed cost model for recycling niobium from battery materials, although promising, could only be as robust as the data it relied upon. Additionally, the business model development was impeded by incomplete stakeholder engagement and fragmented data, which could have been mitigated with better early-stage data collection and integration.

The project demonstrated that improved data collection is essential for advancing circular economy solutions. By enhancing the understanding of material flows and recycling potentials, the project contributed valuable insights to the Met4Tech National Virtual Data Observatory. It also led to the establishment of the Circular Niobium Knowledge and Innovation Centre, aimed at bridging gaps between users and the recycling value chain.

Ultimately, the Circular Niobium project serves as a compelling case for the need for better data collection to support the development of circular economy solutions. Accurate and comprehensive data are vital for mapping material flows, assessing recycling opportunities, and creating effective business models. This case study underscores the critical role of data in enabling successful circular economy initiatives and highlights the need for continued efforts to improve data availability and integration.

The challenges in data accessibility and integration highlighted by projects like Circular Niobium reveal a critical insight: comprehensive, well-curated data is fundamental to system innovation in CE. Overcoming data fragmentation and inconsistency is not only a technical challenge, but a systemic one that can unlock transformative potential across entire value chains.

By reimagining how we collect, share, and utilize data—from linear to circular—we can enable better decision-making, foster cross-sector collaboration, and uncover hidden opportunities for circularity. This systemic approach to data management is itself a form of innovation, capable of accelerating the transition to circular models across diverse industries and scales of operation.

8. SMEs as Collaborative Innovators in Circular Value Chains

Value chain stage: Cross value chain
Building block: Enabling Condition, Design, Business Model

SMEs are not just recipients or beneficiaries of circular innovations but are often at the forefront of developing and implementing CE solutions across various sectors. Through strategic collaborations with research institutions and larger industry partners, SMEs are driving innovation in areas such as sustainable materials, digital platforms, and consumer engagement tools. These partnerships highlight the crucial role of SMEs in bridging the gap between academic research and practical industry applications, fostering a more integrated and effective CE ecosystem.

Building on the insights from Section 2, which highlighted SMEs as system innovators, and Section 4, which discussed SMEs as business model innovators, we can see how collaborations amplify this potential. The following case study provides just a couple of examples of how SMEs can contribute to solving complex supply chain challenges:

Roundrack, a start-up biomaterials platform, collaborated with NICER's **Interdisciplinary Textiles Circularity Centre** at The Royal College of Art to develop a Material Impact Tool for the circular textiles economy.

The NICER **Interdisciplinary Textiles Circularity Centre** (TCC) has facilitated several key collaborations that showcase the innovative potential of SMEs in driving circular economy solutions specifically within the textiles sector:

Digital Supply Chain Innovation: Roundrack, a start-up biomaterials platform, partnered with The Royal College of Art through the TCC to develop a Material Impact Tool for the circular textiles economy. This collaboration addressed the critical question of what data is needed along a transparent, circular, bio-based supply chain for textiles. The project revealed the need for improved transparency in the biomaterials industry and demonstrated how digital platforms can facilitate better communication between suppliers and buyers of textile materials.

Integrated Circular Solutions: The TCC team collaborated with multiple SMEs in the textiles sector, including Tessa The Dresser, ForElvin, and Work and Play Scrapstore, to create a comprehensive exhibition called the Regenerative Fashion Hub. This initiative showcased how various SME efforts in textile reuse, repair, and upcycling can synergize with academic solutions to form a Social Production Network specifically for the fashion industry.

Consumer Engagement Innovation: Arcade XR, an award-winning studio specializing in immersive experiences, worked with the TCC team to develop the BioFiber Explorer, an augmented reality (AR) tool. This innovative approach aims to enhance consumer understanding and perception of new biobased textiles, showcasing how SMEs can leverage cutting-edge technologies to bridge the gap between circular textile innovations and consumer awareness.

Sustainable Material Development: SAGES, a company focused on natural dyes, collaborated with Cranfield University through the TCC to explore the refinement of food-waste derived dyes for commercial use in the textile industry. By utilizing Cranfield's wet spinning facilities, SAGES was able to incorporate their dyes into textile fibres, illustrating how SMEs can drive innovation in sustainable material development for the fashion sector.

It is clear that SMEs are not just adapting to CE but are actively shaping and driving the transition across various aspects of the value chain. From developing digital platforms and creating immersive consumer experiences to innovating with sustainable materials, SMEs are proving to be agile, innovative partners in researching and implementing circularity.

Through these insights, we underscore the importance for relevant stakeholders in government and academia to create supportive ecosystems that enable SMEs to access research facilities, expertise, and larger industry networks.

9. SMEs as Policy Enablers

Value chain stage: Cross value chain, Outflow
Building block: Enabling Condition

The role of policy and regulation to drive down resource consumption and waste through CE is gaining increasing government attention. Regulatory instruments such as extended producer responsibility (EPR) are designed to place the costs for end-of-life collection and treatment for products such as vehicles or packaging onto the producer, or those that placed the products onto the market.

The effectiveness of such regulatory instruments has been frequently challenged, with arguments that the fees charged are too low, only cover a narrow set of products and fail to reflect the wide variations between products in the same class in terms of their environmental, social or economic impacts (EMF, 2024). This has led to calls for modulated EPR fees based on circularity criteria. In a circular EPR products that are harder to recycle, less durable or have higher LCA impacts would attract a higher fee, incentivising producers to shift from linear to circular fashion. A modulated EPR would potentially have significant impacts on the UK fashion industry, especially the fast fashion sector.

How such a modulated system would work and how to define circularity criteria is a complex task. The SME QSA Partners were funded through the Innovate UK and NICER CR&D programme to take on this challenge, with impressive results, demonstrating how a small company can take a leading role in shaping and informing future UK CE policy and regulatory interventions.

QSA partnered with leading and specialist brands such as **M&S**, **New Look**, and **John Smedley** to combine product material data with large volumes of sales data, aiming to analyse and measure garments placed on the UK market against key circularity criteria. Over 250 million data points were assessed across six circular economy (CE) criteria, including material and fibre types, durability, and recyclability. From this, QSA was able to generate scores that informed the creation of an intelligent Extended Producer Responsibility (EPR) fee.

A sandbox approach was used to test different modulated fees, offering lower fees and incentives for products with higher circularity, and higher fees for those using complex materials, having shorter lifespans, or being difficult to sort and separate. The project revealed a broad range of circularity among UK fashion brands and demonstrated how modulated fees could encourage circular design, sustainable business models, and future end-of-life recovery systems.

On 19th September 2024, QSA presented at the CE-Hub webinar **Future Fashion, Future Fibres, and the Circular Economy** alongside Sophie Hoog of the **Ellen MacArthur Foundation** and Professor Kate Goldsworth from the **UKRI Future Fibres Network**, to discuss the role of EPR in shaping future policies and industrial developments. QSA is now looking to commercialise their approach, continuing their collaboration with the UK Fashion & Textiles Association, the British Fashion Council, and the British Retail Consortium. Their goal is to ensure that a future eco-modulated EPR fee for textiles and fashion is fair, transparent, and effective in reducing consumption, extending product lifespans, lessening environmental impact, and addressing the end-of-life management of textile waste.

This case illustrates that even very small companies—a team of four, in the case of QSA —with the right capabilities can make a big difference in driving forward circularity. By harnessing the power of modern data analytics, targeting a serious linear sectoral challenge (fast fashion) and focusing on actionable policy tools (EPR) aligned to industry needs, QSA has shone a spotlight on around 25% of the UK fashion products placed on the market. From a systems' perspective, the case shows how small inputs can produce potentially large system effects. It will take many more collaborations, engagements and further modelling before a modulated EPR will be introduced, but it places the UK at the forefront of EPR for fashion policy developments.

10. SMEs as CE Activists

Value chain stage: Cross value chain
Building block: Enabling Condition

The NICER Programme has demonstrated the importance of community building in fostering SME engagement with CE principles. Through a series of targeted initiatives, we have successfully created a vibrant ecosystem that supports knowledge sharing, collaboration, and innovation among SMEs.

Key activities and outcomes include:

Webinars: Our monthly webinar series has proven popular with the CE community, where topics as diverse as circular innovation, CE roadmapping, and interdisciplinary collaboration have been discussed and debated. 11 SMEs have been directly represented as speakers across 8 events, reaching an audience of around 500 attendees. A dedicated session on '**Circular Economy for SMEs**' featured presentations from three funded CR&D projects (Twist, Eslando and Roundrack), highlighting practical applications of CE principles with reflections on the challenges and opportunities SMEs face in the transition.

CE Stories: We amplified the experiences and expertise of 23 SMEs through our spotlight **CE Stories** series, reaching over 5000 interested stakeholders via the CE-Hub website, newsletter, and social media channels.

Showcase Events: Our annual Showcase events engaged over 140 SMEs, including direct participation from 24 SME speakers. A side event by Innovate UK at our 2023 Showcase at the University of Birmingham further enhanced networking opportunities.

These community-building efforts have created a foundation for ongoing collaboration and knowledge exchange. However, to ensure long-term sustainability and growth of this community, we recommend that organisations such as the **Federation of Small Businesses**, **B Corp**, and **ISO** take a leading role in driving these communities forward. These bodies can provide the necessary incentives, certification, and support structures to encourage wider SME participation in circular economy initiatives.

Looking beyond the NICER Programme, the community we have mobilized will continue to be supported by the **Exeter Centre for Circular Economy**. This ongoing support will focus on skills building, higher education institution (HEI) funding partnerships, and other resources crucial for SMEs transitioning to circular business models.

By encouraging and developing these communities and partnerships, we can create a more robust and interconnected CE ecosystem that empowers SMEs to innovate, collaborate, and thrive.

11. Building SME capacity through Knowledge and Skills

Value chain stage: Cross value chain
Building block: Enabling Condition

While there is a wealth of guidance available online for SMEs (as well as other organisations) transitioning to CE practices, navigating this information can be challenging. Structured educational programmes aimed at professionals, such as the Ellen MacArthur Foundation CE Masterclass delivered by the University of Exeter, have proven invaluable in providing focused, practical knowledge to SMEs. Over 6 weeks, participants are taken through a combination of case studies, theoretical foundations and challenges, designed to get them thinking about their own organizational context and producing a CE action plan that can be taken back into the business. To date, the Masterclass has engaged 62 SMEs across the UK and globally.

Participants have highlighted the Masterclass's strengths:

Alessandro Mariani, Export Area Manager, Infia:
'The EMF Masterclass has been, for me, a great experience with a straight focus on practical applications. My business is packaging for the food sector. This course has helped me to get an analytical point of view of this new approach to thinking about business. The EMF is extremely well organised and gathers theoretical concepts with practical applications, taking also into consideration a great work of networking among students. Highly recommended indeed.'

Helen White, Brand Director, BAM Clothing:
'The way the Masterclass was organised was brilliant. Learning was focussed, easy to fit into a busy week and enabling you to go as deep as you chose. Having the chance to work alongside classmates from other businesses and industries gave insights that you would never have got from pure book reading. I'm really grateful for the chance to do the course and valued my time on it.'

Mathsy K, APAC Leader, The Climate Pledge:
'I attended the Exeter's Masterclass on Circular Economy and I must say it was excellent. The tutors and host made the learning experience truly exceptional. The real-life examples, encompassing both challenges and successes, added a practical dimension to the program, making it incredibly enriching. The tutors' expertise and passion were evident, providing valuable insights in an engaging manner. This Masterclass stood out for its seamless blend of theoretical concepts and practical applications. The inclusion of industry-specific examples made the content relatable and applicable to diverse professional backgrounds.'

Moving forward, expanding access to these types of educational resources and tailoring them to specific SME needs will be crucial in accelerating the adoption of circular economy practices across diverse sectors.

Overarching Insights and Recommendations for Next Steps

Insight 1: SMEs can go unrecognized as pioneers of circular economy practices, with numerous opportunities for engagement across sectors and value chains.

Recommendation: To better encourage and leverage the pioneering role of SMEs in developing the CE, policymakers and industry bodies could support engagement in community-building initiatives to encourage collaboration between SMEs and larger organisations, such as multinational corporations, industry bodies and government agencies. This could include creating platforms for knowledge exchange and amplifying the impact of innovative practices. As we have been able to model, future programmes like NICER should focus on championing successful SME-led initiatives and facilitating access to larger networks, collaborative funding opportunities, and national-level CE discussions to boost their visibility and influence.

Insight 2: While SMEs face resource constraints, their agility and adaptability position them as potential frontrunners in circular innovation. Their capacity to quickly adopt new business models and seize emerging opportunities makes them uniquely suited to drive circular economy transitions.

Recommendation: Encourage SMEs to engage in circular business model experimentation—especially where their primary model is based on principles developed for the linear economy. This can be supported by exploiting existing tools and resources such as the Circular Business Model Design Guide discussed in this report, which allows SMEs to tailor CE approaches to their specific circumstances. Relevant bodies, such as Innovate UK, should continue to fund pilots and innovation grants that specifically support iterative experimentation, enabling SMEs to trial new approaches while mitigating risk. Further, dedicated support programmes and collaboration networks could include mentorship from CE pioneers (established SMEs or larger enterprises) and access to shared tools or technology platforms, helping to accelerate adoption and adaptation in diverse sectors.

Insight 3: Some businesses claim engagement with circular economy while still fundamentally adhering to a linear logic, creating products that ultimately end up in landfill or incineration despite 'circular' elements such as incorporation of recycled materials.

Recommendation: Encourage SMEs to adopt a whole-systems approach to circularity, moving beyond superficial or siloed measures such as the use of recycled materials or components. Business leaders wishing to make the transition should invest in upskilling their workforce through training programmes that ensure a broad understanding of core CE building blocks and their application. This includes expanding training for managers and employees on the diversity of available business models, systems thinking and the opportunities presented by CE both specific to teams/roles and the broader organisation. Engaging SMEs in sector-specific workshops could support the development of a shared understanding of true CE practices, with a focus on end-to-end system circularity.

Insight 4: While abundant circular economy resources exist, many are ill-suited for SMEs' specific needs and capacities.

Recommendation: Knowledge producing stakeholders such as NGOs and universities, and organisations involved in dissemination, should consider tailoring resources to SME capacities by developing sector-specific toolkits, training programmes, and case studies. SME networks should be engaged to co-create these resources, ensuring they are applicable, practical, and scalable. As demonstrated in the Innovate UK and NICER CR&D Fund, funding and support programmes should also incorporate flexibility, allowing SMEs to access expertise and resources at different stages of their CE journey. Additionally, streamlining access to CE resources by investing in a centralized digital platform, such as the UNECE's Circular Step platform, can significantly reduce the time and effort SMEs spend navigating the CE landscape in search of information and collaboration.

Insight 5: The diversity of SMEs necessitates a more nuanced categorization based on sector, value chain position, and engagement with core circular economy building blocks.

Recommendation: Introduce a sector-specific framework for SME engagement with the circular economy, categorizing businesses by their position within the value chain and their engagement with key CE building blocks (e.g., design, reverse logistics, business models, and enabling conditions). We have attempted to model this approach in this report and across a series of outputs and believe its adoption would facilitate a more targeted and effective approach to support and incentives. For example, SMEs developing solutions for product remanufacturing may need access to different technical support and funding opportunities than those focused on service-based circular models. Tailoring policies and interventions in this way ensures more effective outcomes and a systematic transition to circularity across diverse sectors.

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Annexes

Annex 1

Indicative challenges faced by SMEs in the CE transition, derived from the academic and practitioner literature, accompanied by short reflections on what we've learnt during NICER.

Challenge	Description	Citations	What we've learnt
Company environmental culture	SMEs often view environmental initiatives as costly and do not see the profitability relationship. Policymakers are increasingly aware of the need to support SMEs in environmental practices.	Rizos et al., 2016; Biondi et al., 2002	Once a viable path has been set, SMEs are uniquely positioned to rapidly embrace circular processes. Their size allows for quicker adoption of new practices.
Lack of capital	High upfront costs, indirect costs (time and resources), and long payback periods hinder SMEs. Costs are categorised into technical measures, environmental management systems, and third-party certifications.	Rizos et al., 2016; Biondi et al., 1998, 2002; Costa et al., 2010	While SMEs often operate on low capital costs, they are also able to operate and execute their activities with pace, which can be an innovation barrier for larger organisations.
Lack of government support/effective legislation	Inadequate legislative frameworks and lack of support in funding, training, and effective policies impede green solutions integration. Complex administrative burdens also add to the challenges.	Rizos et al., 2016	SMEs can become pioneers in navigating emerging regulatory frameworks, and their adaptability enables them to adjust quickly to new legislation, often turning compliance into a strategic advantage.
Technical expertise	Transitioning to circular practices requires significant management time and technical expertise, which many SMEs lack.	Costa et al., 2010	Many SMEs thrive in collaborative environments, meaning they are often well positioned to co-create solutions with external experts or within networks, fostering fast learning and skill-sharing opportunities.
Information/data	SMEs often lack access to critical information and quality data on environmental impacts, technologies, product lifespans and waste management options.	Costa et al., 2010; Lysaght et al., 2022	Lack of data is not restricted to SMEs, and in many cases innovative data solutions for CE are driven by SMEs.
Unavailability of technical resources	Even with qualified personnel, SMEs may lack the technical resources for in-depth material flow and lifecycle analysis.	Costa et al., 2010	SMEs often excel at forming strategic partnerships to access the technical resources they need (they often have to). Their smaller size allows them to experiment with alternative approaches that may not be feasible for larger companies.

Annex 2

Background context for recent academic and policy interest in the role of SMEs for the CE transition.

Support and information can come from a range of places, and the important role SMEs could play in the circularity transition has received increasing attention from policy communities and academics over the past couple of years. The Organisation for Economic Co-operation and Development's (OECD) **SME and Entrepreneurship Outlook** (2023) report explores some of the challenges SMEs face, addresses the role of governments, and the need for targeted support to enhance resilience and drive economic, environmental, and societal transitions through further engagement with, and development of, circular supply chains. Similarly, the United Nations Economic Commission for Europe's (UNECE) drive to provide case studies and best practice offers SMEs a '**compendium of guidance resources**' (2023) to support and accelerate the advancement of circularity in alignment with sustainable production and consumption (**Sustainable Development Goal** 12).

While these reports are international in scope, they tend to focus on mainland European nations and there has been less localised consideration of UK SMEs. The topic of circularity in relation to SMEs would benefit from further engagement by the UK government, devolved administrations and local authorities. One such engagement includes the 2012–2014 **Fusion project** led by Kent City Council, which aimed to explore the long-term growth potential for SMEs by promoting CE principles. The project highlighted the challenges SMEs faced in transitioning to a CE at that time, such as a lack of information, inconsistent legislation, and financial barriers, providing recommendations for policymakers to address these issues and support the shift towards a sustainable and inclusive economy. While those challenges are still present today, ten years on from this project we add several more nuanced questions posed by SMEs, marking both a sign of progress and the evident need for further investigation.

The academic literature on CE and SMEs is also developing, complementing existing research that has focused on large and multinational organisations. Utilising network analysis, Ferasso et al. (2023) discovered several emerging themes in the CE/SME literature, including studies that address: 'SMEs' environmental management and resources; SMEs' owner/manager attitudes toward environmental impacts; Waste management actions in SMEs' context; Public policies and incentives for SMEs to engage in CE; Cost-benefit assessments of environmental engagement; Circular business models for SMEs; and CE strategies for SMEs' (2023, p. 7).

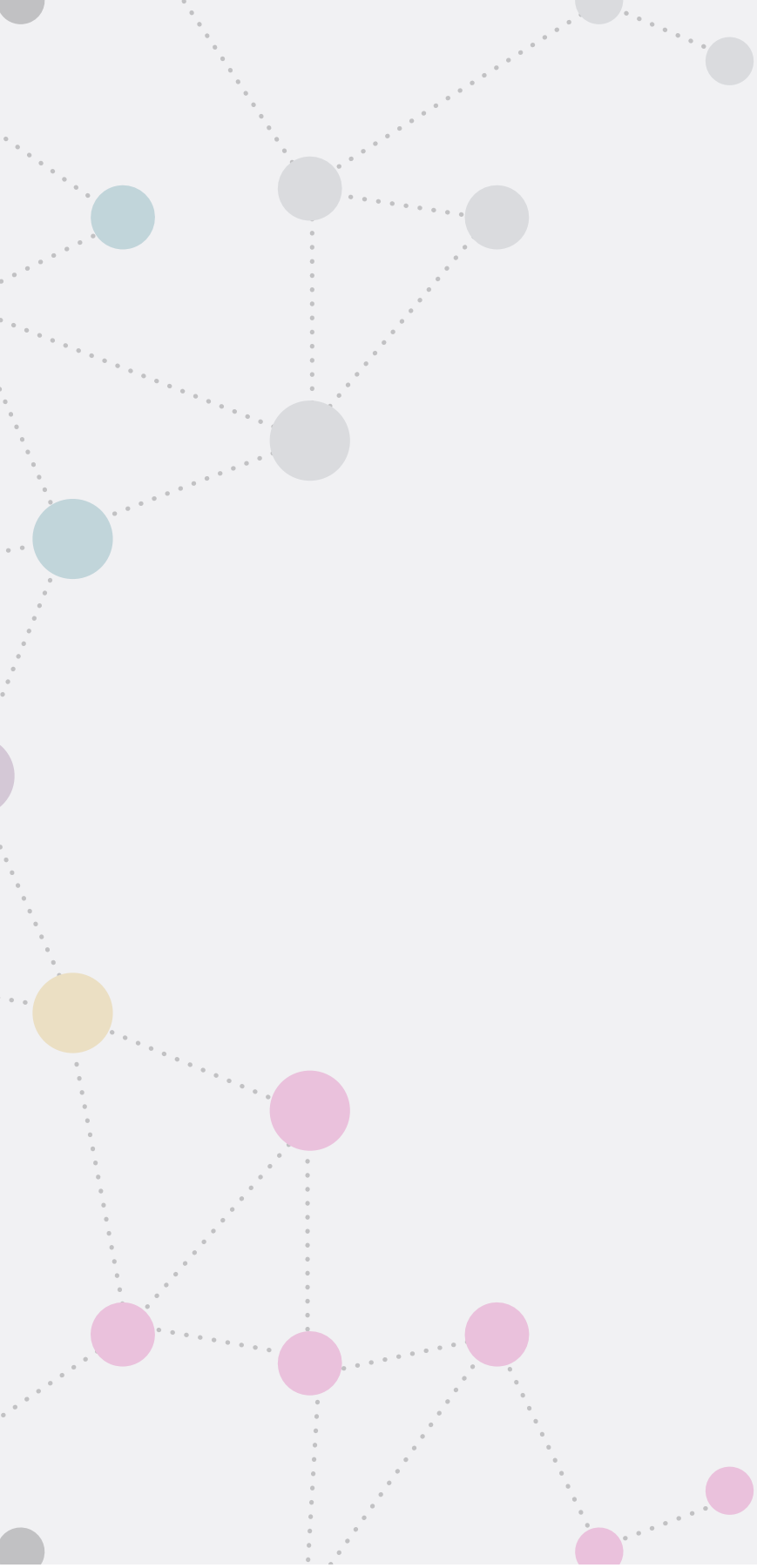
Similarly, studies such as Rizos et al. (2016) document several barriers to CE implementation faced by SMEs, including lack of information about concrete benefits, lack of technical know-how, perceived administrative burden and cross-value-chain integration. Howard et al. (2022a) highlights the adaptability of current management tools, including value mapping, life cycle assessment, modelling and simulation, and capability maturity, in aiding SMEs in their circularity journey. The study proposes a framework outlining a phased transition in deploying CE tools, urging SMEs to extend their focus beyond waste reduction to other circular strategies. Howard et al. (2022b) presents a place-based perspective of SMEs in their transition to a CE, arguing that SMEs play a crucial role in the resilience of place-based circular systems and emphasise the organisational mechanisms of local cooperation and value sharing. They highlight that, while place-based circular systems bring benefits, they also involve tensions and trade-offs, suggesting that the survival of one element is interconnected with the circulation of resources in another and a whole systems view of SMEs in the supply chain is required.

Despite the progress made in promoting CE practices among SMEs, several research, policy, and practice gaps remain. There is a need for more studies across various sectors and empirical contexts to understand the unique barriers and opportunities faced by SMEs. Additionally, enabling taxonomies and regulations that are tailored specifically for smaller businesses are crucial to support their transition to circular economy practices. Furthermore, developing and sharing practical examples of CE success stories with tested key performance indicators can provide valuable insights and inspiration for other SMEs. Enhanced collaboration between government, academia, and industry is essential to drive innovation and whole system change.

Annex 3

How we collected data for the report

We gathered insights through active participation in events and webinars, conducted interviews at showcases, and analysed digital assets (e.g. recorded interviews) where SMEs engaged with the NICER Programme. We collated and quantified SME stakeholder engagement from project managers in each of the five CECs and CE-Hub, while drawing additional data from annual reporting from the programme. The CE Masterclass, delivered by the University of Exeter, provided another valuable data source through both enrolment figures and participant testimonials.



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