



Circular Business decision-making in a time of economic crisis

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Executive Summary

This report details the outcomes of a research project on Circular Economy (CE) engagement and practice amongst small and medium-sized enterprises (SMEs) in Scotland. The specific aims were to explore understanding and attitudes to CE, evidence of practice of CE-related activities amongst SMEs, SME experiences relating to CE including benefits and barriers, and any effect of the current cost of living crisis on each of these. Priority sectors for investigation were identified as:

- Built Environment
- Food systems
- Manufacturing
- Services (including retail)
- Textiles

The ambition for the research was to afford a better understanding of current conditions to inform support for Scottish businesses to make credible and relevant sustainability-orientated decisions.

The research included two main activities:

- A review of extant literature on sustainability and CE practices amongst SMEs in modern developed nations, including academic and policy publications, to explore current knowledge and knowledge gaps in this area.
- Primary fieldwork comprising interviews with 41 SME owners in Scotland within one of the five priority sectors to elicit first-hand testimony about experiences and challenges of CE and sustainability practices.

Key findings include:

- There is evidence of broad and robust understanding of CE principles in Scotland's SME community and practice and engagement of said principles.
- There is evidence of a perceived compatibility between efficient business (including costs-savings and customer perceptions) and CE activities.
- While the current cost of living crisis is not seen as having a particular negative effect, costs of implementation are reported as the most troublesome challenge to CE activity.
- Other challenges to CE practice adoption include having time, space and infrastructure available to implement activities.
- Supply and distribution chains can have positive or negative effects on a firm's

ability to engage CE practices.

- Similarly, both positive and negative effects of regulation and legislation on CE engagement and practice are reported.
- There is some evidence of acknowledgement of the role some SMEs might have in terms of informing the public (via customers and supply chains) about the value and importance of CE, but wider agreement that costs remain the greatest disincentive to markets.

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For further information on this project please call Zero Waste Scotland on 01786 433 930 and ask to speak to a member of the Research and Analysis team, alternatively please use the contact form on the Zero Waste Scotland website: <https://www.zerowastescotland.org.uk/about/contact-us>

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Glossary of Acronyms and Definition of Terms

B2B	Business to business
B2C	Business to consumer
CE	Circular Economy
EBS	Edinburgh Business School
EC	European Commission
HWU	Heriot-Watt University
SME	Small and Medium-sized Enterprise
ZWS	Zero Waste Scotland

Definitions

Small and Medium-sized Enterprises (SMEs)

The SMEs referred to throughout this study and included in the fieldwork are defined as per the European Commission (EC) classification of small and medium-sized enterprises by staff numbers: micro firms fewer than 10 employees, small firms between 10 and 49 employees, medium firms 50 to 250 employees (EC, 2023). Most (26) of the SMEs included in this study for the fieldwork were in the small firm category (10-49 employees), with five in the medium category (50-250) and ten in the micro category (up to nine employees). The research did not include businesses with no employees (sole traders/partnerships or self-employed).

Circular Economy (CE)

Circular economy is defined in the literature review that forms part of this report in Appendix 1 as follows:

We [HWU] adopt the commonly held definition of CE...as in opposition to the linear economy. So rather than an economic system whereby materials are extracted, sourced, used and discarded, in the CE materials are reused, recycled and/or repaired. In this CE system economic (and social) development are not dependent on the extraction of raw natural resources, instead development is

achieved via a regenerative approach to, and innovative use of, material resources.

This is largely in line with the definition used by Zero Waste Scotland, which determines that in a CE “nothing goes to waste, and everything has value”. Zero Waste Scotland thus also define CE in opposition to the linear economy: “in simple terms, 'make, use, remake' rather than 'make, use, dispose'” (ZWS, 2023). Zero Waste Scotland makes specific reference to practices including design, reuse and repair, recycling, remanufacturing, and alternative business models in their definition of CE.

Geographic scope

This research included Urban and Accessible Rural Scotland. Urban includes areas with population above 10,000, while Accessible Rural represents areas with fewer than 10,000 people but within 30 minutes travelling time to a population centre. This research does not include Remote or Very Remote areas, defined as areas in Scotland beyond a 30-minute travel time to a settlement of 10,000 (Scottish Government, 2022).

1 Introduction

This report details the outcomes of a project conducted by researchers at Edinburgh Business School (EBS), Heriot-Watt University for Zero Waste Scotland on circular economy (CE) engagement amongst SMEs in Scotland. Specific aims include to explore understanding of and attitudes to CE, evidence of practice of CE-related activities, experiences relating to CE including benefits and barriers, and any effect of the current cost of living crisis on each of these. Priority sectors for investigation were identified by Zero Waste Scotland to cover a wide range of Scottish industries and perspectives as:

- Built environment
- Food systems
- Manufacturing
- Services (including retail)
- Textiles

The geographic scope of the research was urban and accessible rural Scotland.

The ambition for the research was to afford a better understanding of current conditions to inform Zero Waste Scotland with regards to communicating with and supporting Scottish businesses to make credible and relevant sustainability-orientated decisions.

To meet the aims, the research included two main activities:

- A review of the literature on sustainability and CE practices amongst SMEs, including academic and policy publications, to explore extant knowledge and knowledge gaps in this area
- Primary fieldwork comprising interviews with 41 SME owners within one of the five priority sectors identified above to elicit first-hand testimony about experiences and challenges of CE and sustainability practices.

The literature review is referenced in Section 2, and the fieldwork, including Methodology and Findings, is presented in Sections 3 and 4 thereafter.

2 Extant knowledge and research gap

The full literature review of recent academic research and policy in modern developed nations is presented as Appendix 1. It comprises a review of literature relevant to the aims of this research that cumulatively generates a picture of extant knowledge, and importantly, gaps within the topic of SMEs and CE adoption and practice.

Summary outcomes of this review include various benefits of CE engagement amongst SMEs that include both potential business benefits and wider social and environmental ones. Of the business benefits, there is literature to suggest SMEs might innovate in their sectors, gain competitive advantage with CE-conscious markets, and reap cost-benefits. Of the wider environmental gains, reducing emissions, minimising waste and easing pressure on finite resources all feature as potentials. In terms of experiences of CE amongst SMEs in the studies reported in the literature review, engagement, adoption and practice of CE vary by nation and by sector, and individual practices vary across SMEs. There was substantial cumulative evidence

of barriers to adoption too, including high costs, lack of employee skills, difficulties navigating legislation, and lack of societal understanding of CE and sustainability and their importance. These led to recommendations throughout the literature for ways to improve understanding of CE for SME leaders and their employees, and for wider society. More consistent practice amongst supply and distribution chains was also advocated.

The review thus concludes that various benefits and challenges exist regarding CE implementation for SMEs. There are wide calls for greater dissemination of the business case for CE to encourage SME adoption but there is also note of the potential for SMEs to take a leadership role in terms of driving CE practice and engagement from the wider community due to their greater (than large organisations) proximity to supply and distribution chains and consumers.

With reference to both the brief from Zero Waste Scotland and to the literature review, the following topics emerged as core to the purpose of the primary research to be conducted for this study with SME owners in Scotland in the five sectors of interest. These are given in Figure 1 below. The topics formed the key research items for exploration via the primary fieldwork with a sample of SMEs in Scotland. The methodology employed for this is presented in Section 3.

1. SME leaders' understanding of CE
2. SME leaders' experiences of CE activities
3. SME perceptions and experiences of benefits and challenges of CE practice adoption
4. Effects of supply and distribution chains
5. SME leaders' understanding and experiences of the regulatory environment as it affects CE practices
6. The role of SMEs in disseminating CE and sustainability knowledge and information to wider society and consumers

Figure 1: The research focus

The topics in Figure 1 formed the key research items for exploration via the primary fieldwork with a sample of SMEs in Scotland. The methodology employed for this is presented in Section 3.

3 Methodology

3.1 Overview

The nature of the fieldwork for this study was exploratory – to explore the experiences and practices that relate to sustainability and CE in SMEs in Scotland. As such, a qualitative methodology was employed as this would allow for exploration of a-priori themes and knowledge sourced from Zero Waste Scotland and suggested in the literature, while allowing for the potential for unanticipated information to emerge. Specifically, semi structured interviews were conducted with key SME stakeholders (owners, CEOs, directors) in the five sectors of interest to the research: Built Environment, Food Systems, Manufacturing, Retail & Services and Textiles.

An interview guide was developed with input from the research team and Zero Waste Scotland and was informed with reference to the research focus presented in Figure 1 above. This interview guide is presented in Appendix 2, along with the references between it and the research focus. Pilot interviews were conducted with three participants initially, reviewed, and from there the interview guide was refined. Details of refinements are also given in Appendix 2.

Interviews were conducted one to one, either in person, online (via MS Teams), or over the phone, as suited participants. The numbers for each are shown below in Table 1. Appendix 3 provides some details on each interview, including sector and location.

Table 1: Location of interviews

In person	Microsoft Teams	Phone
10	28	3

Geographically, the 41 interviews span much of urban and non-remote rural Scotland. Figure 2 illustrates.

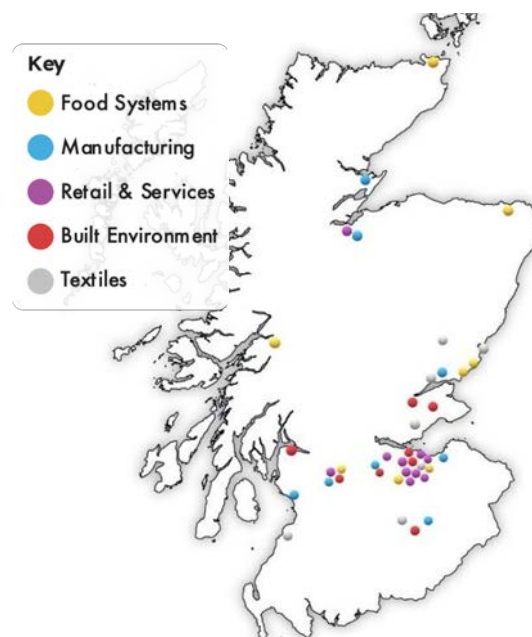


Figure 2: Geography of the research

3.2 Sampling

Since the research aimed to explore experiences and understanding of sustainability and CE throughout the general SME community in Scotland, there was a deliberate effort to avoid businesses with a specific interest or focus on the CE/sustainability agenda. To that end, advertising for participants was considered inappropriate as the chances of participant bias as a consequence of disproportionately attracting those with a specific interest in the topic of study would threaten the objectivity and generalist nature of it. Instead, participants were sourced using purposeful (i.e., targeted) and snowball methods (refer to Figure 3 for further detail), with an avoidance of firms with a specifically articulated stance or view on CE/sustainability. This does not eliminate participant bias of course – the participants all agreed to be interviewed on sustainability/CE and this may well have deterred those with a specific disinterest.

Despite this, to eliminate bias as much as practical, a multi-pronged approach was taken for sampling. Alongside increasing the chances of eliciting non-CE/sustainability specialists' testimonies, this also reduces the potential for any other type of bias that might arise from sourcing information from a single or otherwise limited range. The key approaches are described in Figure 3.

Purposeful / targeted sampling

The following were consulted to identify suitable SMEs for inclusion:

- Edinburgh Business School Networks
- Yellow Pages Online
- Chat GPT
- Business and Sector Specific Organisations, including:
 - Business Gateway, Scottish Enterprise, Scottish business SME Awards, Federation of Small Business Awards, Small Business Saturday
 - Business Energy Scotland, Food and Drink Federation Scotland, National Federation of Demolition Contractors
- Business Media, including:
 - Scottish Business Insider, Made in Scotland Awards
- Google Maps
 - following the above, to specifically source from areas that had least representation the same search terms were applied by moving around Google Maps.

Inclusion criteria mandated that a business was in the scope of the study (and to that end, where these sources were web-based the key words 'manufacturing', 'construction', 'café', 'restaurant', 'textiles', 'financial services and 'retail' were applied). For each business identified by the sources listed above, further exploration was conducted, for example by visiting the SME's website or checking Companies House data to confirm they were operating in a sector of interest, were registered in Scotland, and had employee numbers in the SME category.

Snowball sampling

The sampling process also included snowballing throughout, as businesses that participated in the research were asked if they had any contacts that may be interested. Again, the search process involved the checks used for purposeful sampling so that only relevant businesses were included.

Figure 3: Sampling approaches

In total, 312 SMEs were contacted and invited to participate in the research. Of these, 41 were able to agree to an interview within the timeframe of the project, representing a 13 percent conversion rate. Table 2 details sample participants by sector of interest.

Table 2: Data sampling – overview per sector

Sector	Agreed to participate	Declined	No response	Total contacted
Built environment	8	26	27	61
Food systems	8	14	49	71
Manufacturing	8	21	60	90
Retail & Services	10	18	27	55
Textiles	7	6	23	35
Total	41	84	186	312

4 Findings

4.1 SME Leaders' understanding of circular economy

Of the 41 participants in this study, there was some inconsistency observable in terms of understanding the specifics of CE, and much conflation with sustainability generally. Table 3 illustrates the key means of defining CE proposed by participants. There was no pattern observable by geography or by sector.

Table 3: Defining Circular Economy

Item	Number of participants*
Relates to repurposing, recycling and reusing	25
Relates to minimising waste	16
Relates to product lifecycle	4
Relates to aiming for Net Zero	2

* some participants mentioned more than one item

In terms of engagement, only one participant claimed they were neither familiar with nor interested in CE-related issues. Eight participants claimed they were not very familiar with the term 'circular economy', but

instead referenced 'sustainability' as a broader concept. A sizeable number of participants (23) expressed they had a strong interest in the sustainability agenda. Participants 8 and 17 for example, referred to their 'responsibility' and 'passion' and Participant 6 contended that the environmental imperative superseded business interests.

Testimonies from participants evidence the range of understanding, from reasonably sophisticated, such as Participants 10, 14 and 33 below, to a broader understanding with some conflation with sustainability more generally.

"It it's basically doing what you can to reuse, recycle instead of wasting everything, instead of single use and things like that. And it's good for the environment" (Participant 34, Manufacturing, Northern Scotland).

"When I think of the circular economy, it's reuse. So, reuse of materials, reuse of buildings and repurposing" (Participant 7, Built Environment, Edinburgh and Lothians).

"I would say it's the opposite of the linear one. The linear one is where we just get our raw materials, use them and then dispose of them afterwards, whereas the circular is about keeping those resources in the economy, keep using them so that we're not putting them to landfill and making the most out of them so that

we're not depleting all of our natural resources" (Participant 14, Food Systems, Northern Scotland).

"Materials that flow around circular, so being mindful of the raw materials you start with; there might be consideration of how they're designed, processed... and then maybe ...deconstructed to either create new materials or be reinvigorated. So, I guess minimising waste" (Participant 33, Manufacture, Edinburgh and Lothians).

4.2 SME Leaders' experiences of circular economy activities

In terms of measures business were taking, all SMEs in the sample were engaged in CE activity (or as they often expressed it, sustainability), including the one SME whose director expressed some disinterest. Responses varied from small changes to practice to a broad strategic approach. Of the small, simple measures taken, almost all participants mentioned reduction of energy usage. Much of these included changes to lighting – LED lighting and timers being the most often reported switch. From a more strategic point of view, several participants mentioned they had changed energy supplier based on the supplier's commitment to sustainability and modern renewable approaches to energy delivery.

Another commonly reported issue was the treatment and disposal of waste. All but one participant reported they outsourced their waste and recycling. For most this was provided by the local authority, but others had contracted with a specific service provider that afforded them industrial compliance (Participant 37 in Textiles) or alignment with the values of the firm (Participants 1, 6, 13, 30 and 39), a practice Participant 1 referred to as "outsourcing our conscience".

There was also some evidence of SMEs engaging with sustainability as a strategic business agenda. Textiles Firm 41 noted that sustainability was part of the business ethos from start-up but without a formal policy, while a further 13 participants claimed that they had sustainability policies. The following illustrate both that there is generally broad engagement amongst SMEs in our sample on CE principles, but that there is a range of practice and levels of formalisation too.

Examples:

Energy

"We've got LED lights throughout the building; we've got sensors that pick people up [when] they walk into the room so that once they leave the room the sensors switch the lights off. We have things in our toilets to use less water. ...There's a lot of light bulbs here and we changed every last one to LED. ...I went with EDF Energy as my energy

provider because they said that they use wind power, nuclear power, things like that, so it would be having less effect on the environment, rather than fossil fuel” (Participant 6, Retail & Services, Edinburgh and Lothians).

“It's more from a profitability point of view... even more so now than ever...like our food wastage...We turn off fridges, we turn the lights off... it's having staff not waste the hot water, you know, using the cold for rinsing, using the dishwasher, not turning things on until they need to, like hot cupboards. Because restaurants consume so much energy and its idle energy that's just burning” (Participant 29, Food Systems, Fife and Tayside).

Waste

“There [are] certain examples, such as hospitals, where containers must be new, they can't be recycled, the plastic going out there must be brand new drums, for obvious reasons. But for places like farms, we can reuse the drums. So, that's the number one goal, straightaway, is to reuse them, rather than send them off to be recycled” (Participant 4, Manufacturing, Southern Scotland).

“We bin virtually nothing. So, any scraps that are from our fabric, we recycle, in terms of threads...and use for cushion stuffing. We use all our

scraps” (Participant 12, Textiles, Fife and Tayside).

“We went through about four or five different suppliers before settling on the one that we're with at the moment. And what we like about these guys is they give us an annual report of the amount of waste that's picked up from us in tonnage, and where it goes, what was recovered, and what was not recovered. So, it gives us better visibility on the waste stream” (Participant 13, Manufacturing, Greater Glasgow).

“I found, and still find waste a really hard thing to deal with. When I speak to other contractors or peers, they find that to be exactly the same” (Participant 18, Built Environment, Edinburgh and Lothians).

Strategic approach

“For sustainability we've got sort of four key focus areas. We've got carbon emissions, packaging, biodiversity and food waste. So, packaging would be the area that's most linked to circularity and we're aiming for all of our packaging to be 100% recyclable. ...In our own pack house, we use renewable energy. And we've got quite a lot of initiatives to reduce energy use and improve efficiency: LED lighting, efficient compressors. We have an energy champion, so he goes around switching things off, and that's been really effective”

(Participant 27, Food Systems, Fife and Tayside).

“Over the years we've tried to remove products and items that are tricky to recycle. Once upon a time you had a lot of fluorescent tubes in the shops... and they were always quite tricky to recycle...so we went for more sustainable LED lighting for instance. So, there's has been incremental changes like that over the years... [Now] we've got a nine-page spreadsheet that my buyer and I have compiled of different criteria, and one those pages is entirely dedicated to sustainability in terms of what we're looking for”
(Participant 1, Retail & Services, Edinburgh and Lothians).

As Participants 29 and some of the other testimonies above evidence, CE-related activities are not entirely driven by sustainability goals; there are often cost-saving benefits too. This idea that CE, with its focus on efficient use of resources illustrates the compatibility between CE and cost savings. Section 4.3 explores this further, while the pertinence of this in the context of the current cost of living crisis is extrapolated later in Section 4.3.2.

4.3 SME perceptions and experiences of benefits and challenges of circular economy practice adoption

In this section, the evidence relating to perceptions and experiences of benefits and challenges of CE practice adoption is explored. First data relating to perceived benefits and cost-savings is presented followed by the effects of the costs of living crisis, general costs of adoption of CE, and other non-cost based challenges respectively.

4.3.1 Cost benefits

As suggested above, the data shows some alignment with the aims of CE and real cost-benefits to SMEs. Of the 41 participants, 15 from all sectors and geographies identified the financial benefits of CE practices in their organisations. For the most part this was not identified as the driving force behind CE practices, and in most cases the cost-benefits reported were small. However, as a welcome side effect, the savings generated by implementation of CE activities was welcomed. Examples ranged from being about reduced energy bills and reduced costs of new materials by reusing or recycling existing ones. Elsewhere, there was evidence also of CE and the wider sustainability agenda being a specific selling point; Participant 16 in Built Environment and Participant 37 in Textiles note

this, advising that in fact as an integral part of the business model and the offering, CE augments sales to their customer. The testimonies below provide greater context:

“There's not a lot of profit margin in the hospitality part of our business, because [customers] want the product as cheap as they can get it. So, I'm really conscious of how much things are costing and if I can reuse something, you know, it saves me money as well” (Participant 34, Food Systems, Greater Glasgow).

“Everything we do on sustainability is also linked to the economic side of things, so it's easy to link them ...because reducing your carbon footprint also reduces your costs” (Participant 27, Food Systems, Fife and Tayside).

“We're probably not that different in respect to most demolition companies in terms of... recycling scrap metals. It's a good income source, so pretty much every demolition company will try to maximise that” (Participant 16, Built Environment, Greater Glasgow).

4.3.2 Effects of the costs of living crisis

Most of the sample (34 of the 41) reported that the current cost of living crisis was not having a substantial effect on their CE-related activities. A clear exception though was the common reportage of the effect of energy prices; for example, Participant 19 made note of the fact

that any savings he might have realised from switching to a greener energy supplier have been eroded by the general increase in energy prices. Beyond this, there was limited evidence that the current economic conditions are having an effect on the ability to adopt and maintain CE practices. Of the few issues that were noted, Participant 21 in Food Systems felt that the instability in the market is causing postponement of long-term investment decisions. Similarly, Participant 14 referred to postponing taking on new sustainability-related initiatives until conditions improved, and Participant 34 in Manufacture identified an adverse effect on cashflow and the ability to invest in CE activities. Alternatively, three participants maintained that the cost of living crisis had increased their CE outcomes by forcing reduction in energy consumption (such as turning down the heating, noted by Participant 24). As such, therefore, the evidence on balance is that while some (four) participants reported negative effects of the costs of living crisis on their ability to practice CE, in fact, either directly or indirectly, CE and cost-benefits are reasonably compatible and provide advantages to most of the SMEs in this sample.

Positive outcomes related to cost of living crisis

“We put solar panels in five years ago, [and because] of the energy crisis at present, that was a boon... We couldn't foresee what's happened... we've actually been very lucky in that respect....in that we spent quite a lot, about £25,000, putting in solar panels in the roof. I suspect its almost paid for itself now” (Participant 11, Textiles, Fife and Tayside).

“I think that with the cost of the electric and stuff [are] going up so much, it would be really difficult to perhaps see any benefit from it. But maybe it would have been worse if we had not done it” (Participant 28, Retail & Services, Northern Scotland).

Negative effects

“I think the biggest challenge for us at the moment is actually what does the future look like and stability...The way the world is at the moment, it feels like if you can get through to August... we're doing really well. I mean the lack of stability in the market is probably the most off-putting thing. Because why would we go and invest in solar panels if in six months' time most of our customers have closed because wages are so high, or costs... Because of the cost of living crisis, people have decided to stay at home, and they've entertained at home. So where does that stand for the cafes, we supply? And that makes it really unnerving to be able

to want to invest in sustainable methods” (Participant 21, Food Systems, Northern Scotland).

4.3.3 Costs of circular economy implementation

While the cost of living crisis was not considered to be having a particular effect for most (though with exceptions), more general costs of CE-related activities were noted by a sizeable number of the participants (23) across all sectors. In some cases, they relate to CE practice within the business, but in other cases they relate to a firm's ability to contribute to CE more broadly, by introducing greener alternatives for customers and other sustainability-related offerings. While these were few, specific examples were reported by participants in Textiles, Manufacturing and Built Environment sectors. Below, some examples illustrate.

“It costs a hell of a lot of money to prove whether something is biodegradable, for instance, it will cost us €25,000 per product to be able to substantiate that something is biodegradable. We know it is because we know our cotton is biodegradable and we know the waxes are biodegradable. But to actually get the certificate and prove it, costs €25,000, so there's a lot of things standing in your way” (Participant 8, Textiles, Fife and Tayside).

“If asked the question ‘why do you not go ahead and do these things?’

then funding is definitely the main reason” (Participant 12, Textiles, Fife and Tayside).

“The main challenges are ...the cost element of it. If you look at things like recycling, if we have concrete or stones on the site and we're looking to crush that to form aggregates that can be sold on, a recent problem we've encountered...is that the legislation changed in the last year or so, so you can't use red diesel on construction sites any longer. Your red diesel was round about 60p a litre, and you're now paying around £1.40 a litre for white diesel. So, the cost of running a crushing machine suddenly almost triples in price for us to operate that type of kit” (Participant 16, Built Environment, Greater Glasgow).

“I would like to turn our yard...[into] a recycling and reclamation yard. We [would] like to...open that up to the public, so that the public could bring items in, and we recycle that stuff for them. But it's just the finances to get something like that up and running... We could...open the gates to the public and...they could bring in their washing machines and electrical goods and their timbers, metals. ...Even going down the line of clothes banks. But there's a cost to that, and because we're a young business...we don't have the funds... It's very expensive to get a licence to do that, ...I think that license is £3500-£4000 per annum” (Participant 26, Built Environment, Southern Scotland).

4.3.4 Other challenges of circular economy implementation

Other challenges to the development of CE activities emerged too. While numbers are low for each item, cumulatively Table 4 shows a range of issues emerging that are acting to restrict CE practice in some SMEs.

Table 4: Challenges associated with circular economy implementation (non-cost based)

Issue	SME numbers	Sectors
Nature of the business does not lend itself to sustainability (e.g., is energy intensive)	7	Manufacturing; Retail & Services; Textiles
Time to consider and develop CE-related activities	7	Built Environment; Manufacturing; Retail & Services
Lack of CE infrastructure e. g., access to recycling services	6	Manufacturing, Retail & Services, Textiles
Not owning premises and therefore not able to make CE-oriented changes	6	Food; Retail & Services
External requirements or regulations	5	Food; Manufacturing
Space/capacity for CE practices such as recycling	4	Built Environment, Food, Manufacturing
Lack of skills/knowledge on CE and sustainability agenda	4	Built Environment; Manufacturing
Confusion about best sustainability practice	3	Manufacturing

Illustrative examples of each of the issues noted in Table 4 are given below.

Nature of business

“Cheese manufacturing requires a disgusting amount of energy. You're heating milk up to pasteurise it; you've got high temperatures to get starter cultures to work. So, it looks like a nice organic holistic business, but no, it requires vast amounts of energy, transportation, dairy farms, methane...steam boilers, refrigeration” (Participant 32, Manufacturing, Northern Scotland).

“For the material we use, the majority of it is not recyclable and...there's no one in Scotland, there's very few places in Europe I think can do it... You've got to generate an awful lot of this fabric waste to make it worthwhile to do it” (Participant 11, Textiles, Fife and Tayside).

Time

“When you're a small company, it's really hard to actually...prioritise that, because it...comes to the bottom of the list. You are like, just go get the job done, get it done, get it out the door” (Participant 18, Built Environment, Edinburgh and Lothians).

“It is setting time aside to get things done, to improve things rather than just sustain your current practices is

quite difficult... You need time, and you need also to really 100% invest in it so that you can take it to your staff so that they understand the importance...and that can be a very difficult thing” (Participant 3, Food Systems, Northern Scotland).

Infrastructure

“More than 10 years ago [there was] legislation whereby all food businesses should segregate their food waste so that it goes to composting and things like that. However, to date there's not an operator within our area that can handle food waste, so it all has to go to general waste” (Participant 3, Food Systems, Northern Scotland).

“Who is responsibility is it to set the facility up to allow you to try and make your products circular? For us, we're a textile company, we're not recycling company, or an upcycling company and we don't have that type of investment or space, or knowledge to do that...I think that's the problem here. There is a lack of joined up thinking...to support industry to actually do good things” (Participant 8, Textiles, Fife and Tayside).

External requirements

“Sometimes they [customers] specify what plastic can be used as part of your registration. It's not always possible to use a recyclable plastic... Another key challenge is, for example, NHS are very rigid. We

are looking...to completely remove plastic from the supply chain. So, instead of supplying in plastic tubs, to supply the tablets [cleaning tablets for surface disinfectants for cleaning floors] in a pouch. ...Now, you won't believe the amount of red tape just for removing a plastic tub and putting them into a fully recyclable pouch instead" (Participant 4, Manufacturing, Southern Scotland).

Space

"Part of it is cost, part of it [is] space. You know, [we are] thinking of getting new immersion tanks, but where can they go? A gas boiler takes up a small amount of space compared to...a big immersion tank. We were thinking of putting in an air source heat pump for the drying machine and for the hot water. But...we would need a massive tank and we have not got space in the factory to put in a massive tank for heating water up" (Participant 10, Manufacturing, Edinburgh and Lothians).

Skills

"So, the goals are great... The difficulty is getting that translated into reality... It's lack of knowledge... [And] architects suffer with the same problem. How do you acquire that knowledge to design a building that will meet that [CE] requirement? The construction

industry is facing an issue, there's a skills shortage" (Participant 5, Built Environment, Edinburgh and Lothians).

Sustainability practices

"The other thing with circular economy...is it CO₂ equivalent effective to be taking waste panels from say England, shipping them up here to be repurposed and resold?... Does that work? Or does the energy used and generated to take the panels from there to here...generate more CO₂...than it would if it went to landfill?" (Participant 15, Built Environment, Fife and Tayside).

4.4 Effects of supply and distribution chains

Supply and distribution chains emerged as influencing adoption of CE practice, both positive and negative. These are discussed in turn.

4.4.1 Supply chains

Of the supply-related challenges of CE adoption, availability of sustainable alternatives was noted by 16 participants, two of whom claimed there are no suitable green alternatives, and 14 of whom could not source alternatives at competitive prices. Much of the latter issue was associated with packaging, so for example, while participants 3, 19, 27, 34, 35, 37 and 39, across sectors, were using

sustainable packaging, they all complained that it was costly compared to non-green alternatives and had an effect on their prices and profits. Similarly, with regards to other materials, the largely business to business (B2B) SMEs represented by participants 4, 5, 7, 11, 18, 36 and 40, claimed the costs of sustainable materials was prohibitive as they believed it would not be borne by customers.

Some participants mentioned a lack of CE related service throughout the supply chain over which they had no control. Again, this was not restricted to any one sector, but a good example is the case of participant 39 in Retail & Services who noted that they use books printed in China, not necessarily on Forest Stewardship compliant paper, perhaps packed in plastic and shipped at a high CO₂ tariff. Others also noted extraneous packaging or the use of virgin plastics by suppliers.

There was evidence that some of the participants (10 of the 41) in this sample were making an effort to access sustainability-informed supply chains. For some, this meant sourcing materials as locally as possible, whilst for others, such as Participants 4 and 13, both in Manufacture, it involved avoiding sourcing materials from countries known to not be committed to sustainability goals.

“The thing isn't necessarily there for you to be able to buy in some cases...or its very limited. Like the company that we found that can do the product ...it's a very small company and there's quite a long waiting list to actually get these things. So, the accessibility is probably a problem” (Participant 28, Retail & Services, Northern Scotland).

“We set ourselves targets for each of our projects now, to ensure that we're using local suppliers and subcontractors” (Participant 5, Built Environment, Edinburgh and Lothians).

“We buy British beet sugar instead of cane sugar, simply because of the food miles and we're not so keen on child labour in the cane farms, and we kind of know where British Sugar are at. They might not be the best company, but we think...on balance they're a bit better. So, we make small decisions like that across the whole supply chain, and that helps (Participant 4, Manufacturing, Southern Scotland).

“Where we can, we obviously will...use local...suppliers. Because...ethically we feel it's right, not just from sustainability point of view. Sometimes it's more expensive for me, but I won't change my butcher... [Also] the strawberries come from the farm over the road... Seasonality is wonderful...because you really are getting something that hasn't got loads of food miles on it

and you kind of put it back into your local economy when you are buying from your neighbour” (Participant 29, Food Systems, Fife and Tayside).

4.4.2 Distribution and customers

In terms of distributors and customers, testimonies from participants evidenced both push-back against CE practices and pull towards it. Of the 41, 19 participants representing SMEs in all sectors claimed customers were keen that their business engaged with sustainability. While some SMEs were using their CE credentials as a core selling point of their offering, this was not the case for most, but nevertheless they were conscious that customer perception of their engagement with CE and sustainability was important. Alternatively, 16 participants from all sectors claimed customers were not interested in whether their business embraced CE. Within this group, the effect on price was the main barrier to CE engagement, with a few claiming sustainability is just not an issue of interest to their customers. The remaining six participants claimed that some customers care, and some do not.

Example testimonies that illustrate the variety of responses, from claims that customers are keen that CE is practiced through to those that claim that this is of no concern to customers, are given below. The key point perhaps is that there is a lack

of consistency and no pattern by sector or by geography.

“It [CE-related practice] has been in response to consumers going ‘Well I don't want glitter’ or ‘I don't want something that I've got to dispose of in landfill” (Participant 1, Retail & Services, Edinburgh and Lothians).

“Local authorities...tend to be quite keen to see the recycling element included within the project and will look to see if they can get some degree of report back on it. Generally, if we are tendering for those jobs there will be a requirement...to demonstrate how we will recycle the product” (Participant 16, Built Environment, Greater Glasgow).

“I think nowadays...the eco-friendly part of the business, ...more people are asking. Not in big numbers. We tend to deal with oil companies and bigger...companies... For the public, ...there's a few of them ask questions. ...They'll come and say can we get something that's breathable or something that's natural. If they don't want PVC for something, then we'll come up with an alternative for them [like] an old fashioned canvas material or acrylic type fabric that is recyclable but is more expensive. For instance...a PVC cover is £100, and a canvas cover would be £150 and acrylic cover would be £200. So, you give them the numbers and they go ‘Oh the PVC one’. So...at moment...the price comparison is quite a big

jump, and it does put a lot of people off... [And especially] the big guys want it as cheap as they can get it" (Participant 11, Textiles, Fife and Tayside).

"There are a lot of people who we supply who are looking for more sustainable options...but most of our customers are very price sensitive. There is a massive amount of people asking about it [sustainable packaging]. There isn't a massive amount of people moving on to it once I send them the price... We're working with big brands and big manufacturing companies and yes, their customers would probably like them to be more sustainable, but their products are going into Asda or they're going into these cheap retailers like B&M so they can't move over to be sustainable because of the price" (Participant 20, Retail & Services, Greater Glasgow).

"We deal with some big Original Equipment Manufacturers, and we don't see a lot of sustainability requirements coming through from them at all. So, the sustainability efforts that we have are driven by us. They're not driven by a demand from our customers" (Participant 2, Manufacturing, Fife and Tayside).

There was observable variation by industry, particularly in terms of challenges that relate to customers. Eleven of the 18 participants representing SMEs in the

Manufacturing and Built Environment sectors noted specific influences. These included customers effectively acting as barriers to the use of sustainable materials to keep costs down. Several noted that attitudes towards sustainability varied between private and public sector customers in these largely B2B sectors, with public sector clients keen to engage with CE practices (as per Participant 16's testimony above) and private sector ones less so. However, despite this, both private and public sector customers demand close focus on cost-effectiveness regardless of design, materials and processes. The testimony of Manufacturing Participant 4 illustrates this.

"With the NHS, for the tenders for the surfaces...for floor cleaning or cleaning in wards, a big part...of what we are going to submit is about environmental impact and what you're trying to do to reduce your carbon footprint... You get onto this and then it's just the cheapest that wins. So, we put in a bid. We're already doing this anyway; we made a commitment to try and be carbon neutral by 2025... But then it's things like this that are quite annoying, ...you put in a lot of effort, they score you very high on your environmental impact to get onto the list of approved suppliers, and then when you're there it's just on a race to the bottom for the price" (Participant 4, Manufacturing, Southern Scotland).

4.5 SME Leaders' understanding and experiences of the regulatory environment as it affects circular economy practices

In terms of the effects of the regulatory and legislative environment, all but seven participants claimed it is not a hindrance to CE practice adoption. Of these, participants 33, 36 and 40 in Manufacturing, Food Systems and Built Environment respectively, even identified legislation as a positive driving force for sustainability-related change. Despite the broadly positive responses to questions about legislation and regulation, some issues were raised that suggest more could be done to support engagement though and these often included developing more and better information and supporting the costs.

Funding available for the support of legislation compliance was a key area. Nine SMEs in Built Environment, Food Systems and Manufacturing had accessed funds from organisation such as Zero Waste Scotland, Energy Savings Trust, and Business Gateway. A further four cited a lack of clarity about funding to be a barrier to access though.

The Deposit Return Scheme also featured as a topic amongst five of the eight participants representing

SMEs in Food Systems. One cited it as helping to inform him about CE more generally, and all five were generally positive about the Scheme's aims, though there were concerns about implementation.

Seven participants expressed that other legislation and regulation were problematic. Typically, there was mention of not having as much information as they would like in order to be compliant. Costs were mentioned also, for example, the Plastic Tax and the ban on single use plastics were cited as causing additional costs, while as noted already in Section 4.3.3, Participant 16 stated the ban on the use of red diesel made running machinery much more expensive.

"We were ahead of the curve. We always had full recycling from way before there was legislation saying things had to be recycled. Because it was the right thing to do. So, we've never been kind of caught out by new legislation that's come in. It seems that they've caught up with us" (Participant 13, Manufacturing, Greater Glasgow).

"As soon as that legislation's set, it just serves as a stimulus for change because you have to comply. So, our customers have to comply, which means we have to innovate and work with them to solve those technology challenges. So sometimes we welcome legislation because it forces the change"

(Participant 33, Manufacturing, Edinburgh and Lothians).

“I've not seen any government guidance about on the industry and sustainability. And even the industry groups that kind of govern so like HABIA, would be the hair and beauty industry group, I've not seen anything that they have produced to do with sustainability” (Participant 28, Retail & Services, Northern Scotland).

“I would like to see more actual grants rather than just loans because so many businesses, including ourselves, are still paying off COVID loans that we took from the government when we were on furlough... So, I think that government grants would be far more helpful in terms of enticing businesses to actually take the step and it will be worth it if we're helped with the funding of it” (Participant 12, Textiles, Fife and Tayside).

“I know government and lots of third parties are pushing businesses to go into this but businesses like ours are suffering with the COVID hangover still... So, you don't have the spare financial capacity to invest a significant sum of money into replacing all your light fittings. Yes, there's government support to help you, and you can get a fund matching 50/50 grant, and things like that, but you have to find that first 50%. That's the biggest

difficulty” (Participant 19, Retail & Services, Edinburgh and Lothians).

4.6 The role of SMEs in disseminating circular economy and sustainability knowledge and information to wider society and consumers

Of the 41 participants interviewed, 21 noted that SMEs – or at least their organisation – was either informing or had the potential to inform customers about CE and wider sustainability. These participants represented SMEs across all of the sectors of interest to this research, including both B2B and business to consumer (B2C) firms. The potential for informing the public was evidenced therefore, but so too was informing and influencing supply chains. The extent to which participants identified themselves as a key player in the dissemination of sustainability-related information and practice varied though. Book wholesaler and retailer, Participant 39, claimed informing customers and the public more generally and clearly labelling packaging, doing email campaigns and talks on sustainability were core parts of their business. Others were keen that their CE credentials were made explicit and saw this as an advantage in terms of customer perceptions. However, as Participant 40 noted in the construction services industry, despite offering

information, such as advocating eco-friendly heat pumps, often customers would not pay the higher prices compared to traditional heating solutions. Further example testimony is given below.

“We've been super lucky, and we've won a few awards based on sustainability and that enables us to highlight [it]. I don't know that as many people are on board with sustainability as I would like. We did a survey of our refill pouch to find out why they were choosing our pouches. ...And ultimately, most people were about the reduced price” (Participant 14, Food Systems, Northern Scotland).

“Some of our products that we have had made for us, we've purposefully had them glass rather than plastic and stuff like that. And some people did ask at the time... 'why did you do that' and we explained, obviously, that it was easier for recycling, and they actually can be refilled and stuff... So, I definitely think if we set stuff up and explain why, then yeah, people would go along with it, and probably would quite like the idea. It's just kind of planting the seed and explaining the benefits” (Participant 28, Retail & Services, Northern Scotland).

“I would say it's pretty standard procedure for us now and I think we do it [carbon calculation of different options available to clients]

regardless... Some are interested, some are not, but more often they are interested, and I would say they might not get...the whole...but by doing that exercise with architects and engineers and...the field design team, they may take on board some of those recommendations, even if they can't financially perhaps take on all of them” (Participant 7, Built Environment, Edinburgh & Lothians).

“We have a new coating which is chromium free, and we've gone out to our customers to say we've got this, it's much more environmentally friendly, it's much better from a health point of view. And we don't have any customer pushing to use that. We can offer an alternative...we can say to them we've got this instead. If they choose not to engage with that, then there's not a lot we can do about it” (Participant 2, Manufacturing, Fife and Tayside).

“The problem with [sustainable packaging options] ... is just the expense for customers who aren't ready to spend that kind of money. As much as I'm trying to push it through and sending out hundreds of newsletters a month, talking about it, nobody really can afford it right now...so it's kind of tough” (Participant 20, Retail & Services, Greater Glasgow).

5 Conclusion

The research reported here comprises a comprehensive review of the recent literature on SME engagement with, and experiences of, CE principles and practice in modern developed nations. That review has informed a primary research study of 41 SMEs in Scotland to explore their attitudes to, experiences of, and challenges encountered when implementing CE practices in their business activities.

Contrary to some studies in other developed countries, general engagement with CE is reported in this study. All but one of the participants were keen to engage, some passionately embedding CE practice into their business model, strategy and offerings. Even the one who claimed disinterest was practicing some CE-related activities. We conclude here, therefore, that there is no evidence in this sample that there is resistance in the SME community in Scotland in terms of CE principles or potential for practice implementation. Supporting this further is the tendency for the SMEs in this sample to have reported alignment of CE practices with costs-benefits, particularly in terms of more efficient (re)use of resources and reduction of waste. These cost-benefits were not sufficient in themselves to promote CE practice more broadly though,

especially in Manufacturing, Textiles and Built Environment sectors, as the costs of implementation of many CE-related practices were reported as substantial, often prohibitively so.

While there is some evidence in other countries that challenging economic conditions can lead to de-prioritisation of CE practice, there is little evidence that the current cost of living crisis is having a particular negative effect on CE engagement and practice amongst the Scottish SMEs in this sample. There is clear evidence that costs generally are an issue though, affecting implementation, materials, etc, and that these costs, if borne at all by an SME, have a pertinent impact on the prices they charge to their customers. There is much reportage of a subsequent reluctance from customers to switch to sustainable alternatives to products and services because of their higher costs. There is some mention of this effect being acute in the current economic conditions, but that regardless, it is an ongoing disincentive throughout the economy.

Unlike that reported in other studies, there is also little evidence that SMEs felt that wider society and markets do not understand the principles and importance of CE. Instead, again, SMEs in this research point not to a lack of understanding but a lack of ability or willingness to pay the potentially substantially higher prices of sustainability-related products and services or costs that

are inflated by sustainability-related processes that replace traditional ones. As advocated in studies elsewhere, this research therefore supports the idea that costs incentives for CE-related practices are likely to augment the ability of SMEs to implement CE practices, as would costs disincentivisation of non-sustainable products and practices.

6 Summary outcomes and recommendations

6.1 Summary

The data generated for this research provides us with the following key findings:

- There is evidence of broad and robust understanding of CE principles in Scotland's SME community and practice and engagement of said principles.
- There is evidence of a perceived compatibility between efficient business (including costs-savings and customer perceptions) and CE activities.
- While the current cost of living crisis is not seen as having a particular negative effect, costs of implementation are reported as the most troublesome challenge to CE activity.
- Other challenges to CE practice adoption include having time, space and infrastructure available to implement activities.
- Supply and distribution chains can have positive or negative effects on a firm's ability to engage CE practices.

- Similarly, both positive and negative effects of regulation and legislation on CE engagement and practice are reported.
- There is some evidence of acknowledgement of the role some SMEs might have in terms of informing the public (via customers and supply chains) about the value and importance of CE, but wider agreement that costs remain the greatest disincentive to markets.

With these outcomes in mind, recommendations to Zero Waste Scotland in terms of support for the costs and for dissemination of information in particular are implied.

6.2 Recommendations

The data includes some direct recommendations made by participants. Most often idiosyncratic and anecdotal, two issues show some consensus. The first of these, recommended by 17 SMEs was greater availability of funding to support take up of CE solutions. Some participants noted they did not know if funding was available or not for specific CE-related activities, including making direct contribution to the CE by developing, for example, recycling services in the area (Participant 26). Others identified they would like funding to pay for green consultants to advise where they might improve practice

that would help inform and expedite change. These calls for funding link closely with the second recurrent recommendation from SME participants, access to more information and guidance. Thirteen of the current sample requested easily accessible information for SMEs and Participant 30 suggested the development of SME forums for sharing information and good practice. Much of this may be generic, but it is likely that sector specific information and guidance would be useful too.

The following example testimonies illustrate these points:

“The EU legislation is just coming out...on best available techniques... It's all well and good, but there doesn't seem to be any kind of plan on the best ways to implement... It's more of how you are to manufacture... If there's a particular chemical we should avoid for circularity or if there is a different dye or a different weave construction or a different fibre content or things like that, it would be great to have that knowledge so you could build that into your development chain” (Participant 8, Textiles, Fife and Tayside).

“If there was a road map of how to help people to...create a circular economic product, ...how you would go about that, and here's the companies that you need to contact

for XY&Z” (Participant 15, Built Environment, Fife and Tayside).

“I think guidance would be great. I'd love somebody to come in and...say, 'okay you could do this, or you should do that” (Participant 18, Built Environment, Edinburgh and Lothians).

“It would be great actually to have a bit more information on simple things that we could do that maybe I haven't thought of” (Participant 24, Retail & Services, Edinburgh and Lothians).

“You need to know - natural gas, coal, hydrogen, electrification - what does that landscape look like? What are all the facts and figures? What's known, what's unknown, and actually presenting that in a consumable and engaging way might help people” (Participant 33, Manufacturing, Edinburgh and Lothians).

These and other recommendations arising from this research can be summarised into three broad areas of potential interest to Zero Waste Scotland.

- Knowledge

As the testimonies above show, there is some confusion and asserted lack of knowledge about best CE

practice reported throughout this SME sample. This suggests that training and/or availability of consultancy, perhaps specific to sector, would be welcomed.

- Skills

In addition, Zero Waste Scotland might support SME engagement with CE activities by finding ways to facilitate learning – and the time for learning – required to develop understanding the potentials and possibilities of CE practices for them.

- Costs

Investing effort into facilitating support for costs is also likely to be welcomed by Scottish SMEs and innovation in this area is recommended as a priority.

Measure may include for example:

- i. Incentives for use of green products and services and disincentives for non-sustainable products, processes or services, perhaps via taxation or other fiscal levers.
- ii. In terms of direct funding for SMEs, grants have resource implications for funders (including taxpayers) and as such are likely to remain limited for some time, especially during the current cost of living crisis. Loans may not be optimal solutions especially post-COVID for the often resource- constrained

SME sector where margins can be tight even in buoyant economic conditions. Micro-credit, crowd or other types of community or communal industry funding might be worth investigating.

6.3 Recommendations for further research

Due to its scale and scope, this study was not able to observe any link between CE-related practice – or extent of it – and performance in the SMEs sampled. Further research, perhaps using a quantitative analysis with a larger sample would inform this.

There is some inconsistency in reports of the interest of customers in whether an SME engages with CE or not. In this research claims ranged from some participants who believed it was a critical issue for customers, to those who said customers' purchases are not influenced by an SME's CE credentials. There was no pattern by sector or by location in Scotland observable, and so further research to explore why this variation in accounts of the influence of customers is required to illuminate this complex and probably nuanced effect.

7 References

European Commission (2023) Internal Market, Industry, Entrepreneurship and SMEs: SME Definition, available at https://single-market-economy.ec.europa.eu/smes/sme-definition_en

Scottish Government (2022) Scottish Government Urban Rural Classification 2020, available at <https://www.gov.scot/publications/scottish-government-urban-rural-classification-2020/>

Zero Waste Scotland (ZWS) (2023). What is a Circular Economy, available at <https://www.zerowastescotland.org.uk/resources/about-circular-economy>

8 Appendices

8.1 Appendix 1: Circular Business Decision-Making in a time of Economic Crisis - Literature Review

Background

This review serves to provide a summary of some of the extant knowledge about the broad topic of SMEs and sustainability and circular economy (CE) practices. Broad themes included in the review – that have emerged from inspection of both policy and academic literature – include:

- Current rates and types of sustainability/CE adoption amongst SMEs, including in challenging economic circumstances
- The evolving legislative and otherwise regulatory environment
- The advantages for SMEs posited throughout the literature of adopting CE practices and engaging with the sustainability agenda more widely
- Barriers to adoption of CE practices found in empirical studies of SMEs
- Proposed measures to facilitate engagement amongst SMEs

- Proposed structural interventions to encourage and improve take-up

Cumulatively, these themes serve to inform the fieldwork due to start w/c 27th February 2023 in Scotland, exploring empirically amongst a sample of SMEs the experiences, challenges and opportunities perceived of engaging with CE practices.

Methodology

To source academic literature on the topic of CE and SMEs, keyword searches were conducted in Google Scholar, Scopus and Heriot-Watt University's online library system. The keywords used were SMEs, circular economy, sustainability, recycling, sustainable business, and economic crisis. The search was limited to literature published between 2014-2023. Given the scope of this study, the results were limited to texts focused on industrialised economies; included articles were mainly Europe-based, with some US or Australian. In total, 33 articles were selected for an initial reading to determine their relevance for this study. Six were eliminated for lack of relevance to the study, leaving the review based on the remaining 27 articles. These are listed in the References section at the end of this review.

To source information about the current and evolving regulatory environment a variety of sources

were consulted. For UK policies, information was derived from the Legislation.gov.uk website provided by the National Archives which holds most UK legislation and includes information on UK and EU policies post-Brexit. The UK Government's website (www.gov.uk) was also used as a reference point for general guidance on waste and recycling legislation. In terms of EU policy, the EUR-Lex website detailing the Environmental Industries Commission (EIC) on Brexit and waste legislation was consulted, while the UK tracker reports for Changing Europe were consulted for information on UK and EU law changes and divergences post-Brexit. For Scottish Policy, the Scottish Government website (www.gov.scot) and the Zero Waste Scotland websites were consulted. Specific information on the Basel Convention, the New Plastics Economy Global Commitment as well as Agenda 2030 and the UN's Sustainable Development Goals (SDG) was derived from the respective online sources.

Review: Introduction

The current status of academic research on SME experience of sustainability and CE is that there exists a body of knowledge that is largely contextually disparate. There are sector-specific studies – with a preponderance of studies in manufacturing, and there are region-

specific studies that include finer details pertinent to specific national contexts (see Appendix 1). There are several Europe-wide studies, largely quantitative, based on large surveys taken at EU level such as the European Commission's Flash Barometer Survey (Bassi and Dias, 2019; Demirel and Danisman 2018; Garcia-Quevedo et al. 2020; Ghisetti, et al. 2016; Zamphir et al. 2017). There are several papers that have attempted to pull some of the literature together, however, as Mura et al (2020) note, these in turn can be limited by the antecedent issue of a preponderance of manufacturing and nation-specific papers.

That said, by drawing from the prevailing literature, there are several themes emerging that are pertinent to informing the current research, including signalling areas of interest that might be explored further during the empirical fieldwork with SMEs in Scotland.

Definitions

We adopt the commonly held definition of CE, outlined by the Ellen MacArthur Foundation, as in opposition to the linear economy. So rather than an economic system whereby materials are extracted, sourced, used and discarded, in the CE materials are reused, recycled and/or repaired. In this CE system economic (and social) development are not dependent on the extraction

of raw natural resources, instead development is achieved via a regenerative approach to, and innovative use of, material resources. This is the definition applied throughout the papers consulted for this review.

Specific details of practices that constitute CE activity vary. Several papers collate different types of practice (see below) but Demirel and Danisman (2018) summarise these conveniently as relating to water, waste, energy and renewables.

Why should SMEs engage with SMEs and CE/sustainability practice?

Most papers included in the review begin with a rationale for the adoption of CE practices amongst SMEs. These include that the sustainability agenda may prompt innovation within a firm; cost-savings benefits as a consequence of more efficient use of resources; competitive advantage in terms of price as a result of these cost-savings; competitive advantage as the market turns to favouring firms that engage with CE and otherwise 'green' agenda; increased market share as a result; enhanced customer- relations. Indeed, in their empirical study with Italian SMEs, Mura et al. (2020) correlate improved performance with 16 of the 20 CE practices they specify, arguing this the value-adding CE

engagement can prompt. At a macro level, Rizos et al. (2015; 2016) extrapolate the cumulative potential effect, estimating costs savings in the trillions throughout European industries, up to three per cent productivity growth by 2030, and associated positive effects on employment rates.

Several papers also make the case for the non-business, global benefits of CE and sustainability- oriented practice in business that are well documented throughout popular literature: reducing emissions, minimising waste, easing pressure on finite resources. While the moral case is therefore implicit throughout papers, it is noted explicitly in a few, including Dakup (2018) and Garces-Ayerbe et al. (2019). Certainly, a few papers focus on SMEs that are specifically oriented to green policies and CE-commitment. In these papers, the passion and enthusiasm of the founder or other leaders of an SME are critical factors in their engagement and participation in CE practice (Rizos et al. 2015; 2016; Sharma et al. 2021; Sohal and de Vass, 2022).

What is the current status of CE adoption amongst SMEs?

Following the notions of a moral case, several papers highlight that it is not enough to be well- intentioned, but rather that practicalities and actions must be engaged. The tone of this is echoed in Sharma et al.

(2021) with reference to government pressure for SMEs to adopt CE principles. More broadly, the literature signals that there is nuance to the desire and ability to adopt CE practices in SMEs that must be accounted for.

First, there is the legislative and regulatory environment, which varies by industry sector. In Scotland, SMEs must have cognizance of rules at EU level (post-Brexit EU rules that relate to Transport, Food and Rural Affairs and Business, Energy and Industrial Strategy are likely to remain in place until 2026). They must also account for UK rules and devolved Scottish rules. In some cases, compliance will be required, in others guidance must be adhered to, whether dictated by legislation or changing standards throughout supply chains. The complexity of the legislative environment is undoubtedly a challenge. Despite this, there is an overarching theme that transcends regulation and its source: there is an aspiration throughout society to reduce emissions and achieve sustainable social and economic development as outlined in the UN's SDGs. Specific targets and compliance requirements vary by industry (or the implications do – for example the Scottish, then UK, ban on the use of single-use plastics will have greatest impact on the food and hospitality sectors). Specific deadlines and details vary too. But there is a common thread

throughout the guidance and legislation that the agenda is environmental sustainability and a regenerative model of economic development. Despite this, in their empirical study amongst Spanish SMEs, Ormazabal et al. (2018) find that only half the sample were aware of CE practices.

Additionally, the term CE is an encapsulation of myriad activities, often inconsistent in terms of ease and costs of implementation, a situation especially complex when applied to different industry sectors. Several papers outline different activities SMEs might engage in: Zamfir et al (2017) isolate five practices; Mura et al. (2020) identify twenty; Bassi and Dias (2019), three. A summary list includes practices associated with energy efficiency, reducing water wastage, recycling, use of recycled materials, sourcing selectively from supply chains, and energy efficient production processes. Several papers find that take-up of different types of CE activity varies (Deminel and Danisman 2018; Garcia-Quevedo et al. 2020; Mura et al. 2020; Ormazabal et al. 2018). Mura et al. find the most common adoption amongst their Italian sample is separate waste collection followed by reuse of packaging and energy conservation, while least common is reuse of waste or rainwater.

In their EU-based studies, Mura et al. (2020) and Zamfir et al. (2017)

find that nation and sector matter too with engagement in UK, Belgium, and Spain relatively high compared with other states reported in Zamfir et al., and retail and manufacturing ranking highest in terms of CE engagement compared with other sectors.

Related to this, several papers that explore the link between CE practices and performance of SMEs find correlation between some CE practices over others (e.g., Zamfir et al. 2017 identify a particular link between CE-oriented water usage and financial performance). More broadly though, several papers report with some consistency that size matters most: with correlations with performance observable (for example, where turnover exceeds 10 million Euros in Zamfir et al. 2017; where investment of revenues exceeds 10% in Demirel and Danisman, 2018). This is undoubtedly linked to the greater ability to invest in CE amongst larger firms than smaller ones. Bassi and Dias (2019) report that across the EU larger firms are more likely to have CE policies and those that have invested in R&D are more likely to implement CE practices. This signals a link between resource availability (often correlated with firm size and investment) and the feasibility of CE practices. In turn, where CE practices are embedded as core to business strategy and operations, they are found in Panwar et al.

(2015) to reap performance outputs.

The Panwar et al. study is US-based and refers to SME data following the 2008 recession. It finds that the lower the turnover the greater the decline in environmental activities in an SME during economic contraction. Particularly pertinent to the current study that seeks to explore CE practices amongst SMEs during the current cost of living crisis, Panwar et al.'s findings include that during economically challenging times, CE practices in SMEs are at heightened risk of deprioritization

Barriers

The central aim of many of the papers consulted for this review was to explore the barriers to take-up of CE/sustainability practices amongst SMEs. An abbreviated summary of this is presented below in Table 5:

Table 5: Barriers reported in empirical studies

Barrier	Selected papers
Internal culture in-firm	Caldera, et al. (2019); Ormazabal et al. (2016); Rizos et al. (2015; 2016); Takacs et al. (2022)
Lack of resources/costs	Caldera, et al. (2019); Dakup (2018); de Jesus and Mendonca (2018); Dey et al. (2020); Garces-Ayerbe et al. (2019); Ghisetti et al. (2016); Hoogendoorn et al. (2015); Mura et al. (2020); Oncioiu et al. (2018); Rizos et al. (2015; 2016); Sharma et al. (2021); Takacs et al. (2022)
Employee skills and experience (including tech skills)	Caldera, et al. (2019); Garces-Ayerbe et al. (2019); Kirchherr et al. (2018); Garcia- Quevedo et al. (2020); Rizos et al. (2015; 2016); Sharma et al. (2021); Takacs et al. (2022)
Legislation/regulation bureaucracy or admin	Caldera, et al. (2019); Garces-Ayerbe et al. (2019); Garcia-Quevedo et al. (2020); Kirchherr et al. (2018); Mura et al. (2020); Rizos et al. (2015; 2016); Takacs et al. (2022)
Supply chain barriers	Dakup (2018); Dey et al. (2020); Rizos et al. (2015; 2016)
Commitment to CE innovation amongst leadership	Dakup (2018); Dey et al. (2020)
Understanding/appreciation of sustainability in wider society or market	Dakup (2018); Dey et al. (2020); Hoogendoorn et al. (2015); Kirchherr et al. (2018); Rizos et al. (2015; 2016); Sharma et al. (2021); Takacs et al. (2022)
Low cost of virgin materials	Kirchherr et al. (2018)
Lack of government support	Rizos et al. (2015; 2016)
Practical implementation issues	Sharma et al. (2021)
Time constraints	Caldera, et al. (2019)
Risk regarding costs-benefits	Caldera, et al. (2019); Garces-Ayerbe et al. (2019)

Of the barriers cited above, costs are most often reported, and indeed, some papers (Caldera et al. 2019; Garces-Ayerbe et al. 2019; Rizos et al. 2015) cite it as the item considered most important by their research samples. The next most reported barriers are employee skills, navigating legislation, and understanding of CE in wider society and markets. Some papers make the point that the barriers intersect and influence each-other – for example the costs of training personnel in CE practices impact both financial and skills barriers (Kirchherr et al. (2018).

Graces-Ayerbe et al. (2019) note that the cost-benefit issue – the risk that the costs will not be translated to improvements in performance and yield – is one of the most pertinent barriers to adoption of CE practices. Certainly, compared with large firms and public organisations, SMEs may have fewer resources to invest in change of any kind, including changes to CE practices. Consequently, with greater resource-constraint, Ormazabal et al. (2018) find in their empirical exploration of Spanish firms that SMEs will focus on compliance with the law, rather than engage proactively with sustainability-related change.

Proposed mitigations

Most papers that explored the barriers to SME take-up for CE practices conclude with

recommendations for engaging with them. These fell into two categories, internal and external and these are presented in turn below.

Internal

At the firm level, several research studies note the need for strong SME leadership that engages directly with the principles of sustainability and promotes commitment to it through CE practice (Sohal and de Vass 2022). Where this practice is embedded strategically and as a core element of the operations of the business, the greater the likelihood of its longevity in the organisation and influence on greater organisational culture according to Panwar et al. (2015). Associated with this, there is much advocating of the need to train and educate personnel about the merits – business and ideological – of CE, including developing expertise in the regulatory context, production processes to improve energy efficiency and manage waste, communications with customers and suppliers (Dey et al. 2020; Ormazabal et al. 2016; Upstill-Goddard et al. 2016; Takacs et al. 2022). Indeed, Caldera et al. (2019), Mura et al. (2019) and Sohal and de Vass (2022) extend this to include other stakeholders too, including external ones such as funders and partners, noting the need for transformation throughout supply chains for meaningful engagement with the CE agenda. While they refer to developing

understanding amongst these stakeholders, this inevitably suggests too that choice of stakeholder is important. Takacs et al. (2022) stress the importance of investment in CE practices to cover upskilling costs, technology costs and the costs and risks of CE-oriented innovation, a point made also in Dey et al. (2020) and Zamfir et al. (2017).

External

Several papers identify measures that might be taken throughout the wider environment to assist SMEs adopt and implement CE practices. Beyond legislating, there are practical measures to assist SMEs navigate and comply with what are often complex regulations originating a different level of government and unevenly applicable in different industries. This is a point made in Mura et al. (2020).

One of the most frequently noted measures that might be taken by external bodies and particularly governments is improving understanding and appreciation of the need for a CE throughout society and markets. This point is made in Kirchherr et al. (2018); Mura et al. (2019); Ormazabal et al. (2016); Rizos et al. (2015); (2016); Sohal and de Vass (2022).

At a more practical level, Upstill-Goddard et al. (2016) point to the need for 'significant external levers and extrinsic drivers' to support CE innovation and change from linear

to circular practices. These levers include incentivising the use of CE practice by, for example, disincentivising the use of (currently cheap) virgin materials (Kirchherr et al. 2018; Mura et al. 2019; Sohal and de Vass 2022) or providing tax incentives for CE practices (Mura et al. 2019). It also refers to access to funding, noted by Mura et al. (2019); Zamfir, et al. (2017), and Oncioiu et al. (2018).

At a pragmatic level, a few papers make the case that SMEs will only engage meaningfully with CE practice if there is observable and tangible return for them, noted by Ghisetti et al. (2016), Rizos et al. (2016) and Upstill-Goddard et al. (2016). Currently, there is much regulatory compliance to offset the costs of non-compliance (Ormazabal et al. 2018). There is, however, less observation of how adopting CE practices will improve performance for most SMEs; Demirel and Danisman (2018) find in their quantitative analysis of the EU that debt and grant funding do not show correlation with performance – only the larger and more holistic investments of equity-based funds do. It may be the case that the conditions associated with equity funding – strategic alignment, demonstration of plans for implementation etc. – act to position CE activities as what Panwar et al (2015) as 'core', fully considered and systematised in a business, and it is this rather than the funding itself

that benefits performance. If that is the case, the implication for external mitigation might be support for development of CE activities however funded, as a strategic and core element of business for SMEs.

Conclusion

This review has highlighted some of the most pertinent evidence documented in the scholarly literature on CE practice amongst SMEs. It has summarised the literature on rates and types of adoption amongst SMEs, including in challenging economic circumstances, issues associated with SME navigation of legislative and otherwise regulatory environments, barriers to adoption of CE practice amongst SMEs and measures suggested throughout research to encourage and optimize engagement amongst SMEs.

There is much evidence that several barriers prevail and there are various recommendations for mitigation of these barriers which are useful in informing the empirical part of the current research project. Consequently, the interview guide to be used in this research will include exploration of these items.

Analysis of the extant literature has thrown up two other, less explicit, issues that merit further investigation in this study.

First, the performance returns as incentives for SME CE adoption must be explored. If the business case is not made for SMEs in terms of how

CE adoption will positively impact performance, the literature suggests they will be unlikely to engage. Exploring the experiences of this in Scotland and what might assist SMEs realize returns are therefore important.

Second, there is suggestion throughout the literature of the value of SMEs as a resource for wider societal education about sustainability and adoption of practices aligned with CE and sustainability agendas. While explicit in the literature is the need for wider appreciation of these issues amongst society and the SME markets therein, there is implicit acknowledgement of the value of the SME community itself here. Gennari (2022) engages directly with this agenda by noting that SMEs might have a critical role to play in shaping a wider societal shift in awareness of CE since they are disproportionately represented in economies compared with larger public and private organizations, often have closer relationships with suppliers, clients and consumers, and have greatest "proximity to the local environment and workforce". Sohul and de Vass (2022; 603) note this also, stating "[SMEs] must...take a leadership role in sharing knowledge for far-reaching CE transformation". The fieldwork will explore this from the perspective of Scottish SMEs.

Informed by this review, the fieldwork that will follow will allow

for emerging issues, but will also include direct exploration amongst SMEs of their:

- understanding amongst SMEs of the CE and itinerant CE practices
- understanding of the regulatory environment
- experiences, including barriers, challenges and opportunities associated with CE practice adoption
- perceptions of cost-benefits of CE implementation, if and how this might disincentivize CE practice and how this may be managed in firms
- perceptions of the role of SMEs in disseminating CE principles and awareness to wider society.

Table of References

Author	Year	Title	Journal	Volume	Number	Context
Aghelie, A.	2017	Exploring drivers and barriers to sustainability green business practices within small medium sized enterprises: primary findings	International Journal of Business and Economic Development	5	1	Not specified
Bassi, F. and Dias, J. G.	2019	The use of circular economy practices in SMEs across the EU	Resources, Conservation & Recycling	146		EU
Caldera, H. T. S., Desha, C. and Dawes, L.	2019	Evaluating the enablers and barriers for successful implementation of sustainable business practice in 'lean' SMEs	Journal of Cleaner Production	218		Australia
Dakup, K.	2018	The adoption of eco-innovations: a study of SMEs in the Scottish food and drink sector	Robert Gordon University			Scotland
de Jesus, A. and Mendonca, S.	2018	Lost in Transition? Drivers and Barriers in the Eco-innovation Road to the Circular Economy	Ecological Economics	145		Europe, Asia, Americas, Australia
Demirel, P. and Danisman, G.O.	2019	Eco-innovation and firm growth in the circular economy: Evidence from European small- and medium-sized enterprises	Business Strategy and the Environment	28	8	Europe
Dey, P. K., Malesios, C., De, D., Budhwar, P., Chowdhury, S. and Cheffi, W.	2020	Circular economy to enhance sustainability of small and medium-sized enterprises	Business Strategy and the Environment	29	6	UK (Midlands)
García-Quevedo, Jove-Llopis and Martínez-Ross	2020	Barriers to the Circular Economy in European small and medium-sized Firms	Business Strategy and the Environment	29	6	EU
Garcés-Ayerbe, C., Rivera-Torres, P., Suárez-Perales, I. and Leyva-de la Hiz, D.	2019	Is It Possible to Change from a Linear to a Circular Economy? An Overview of Opportunities and Barriers for European Small and Medium-Sized Enterprise	International Journal of Environmental Research and Public Health	16	5	EU

Author	Year	Title	Journal	Volume	Number	Context
I.		Companies				
Gennari, F	2022	The transition towards a circular economy. A framework for SMEs	Journal of Management and Governance			Not specified
Ghisetti, C. and Montresor, S.	2019	On the adoption of circular economy practices by small and medium-size enterprises (SMEs): does "financing-as-usual" still matter?	Journal of Evolutionary Economics	30	2	EU
Ghisetti, C., Mancinelli, S., Mazzanti, M. and Zoli, M.	2019	Financial barriers and environmental innovations: evidence from EU manufacturing firms	Climate Policy	17	1	EU
Hoogendoorn, B., Guerra, D., and van der Zwan, P	2015	What drives environmental practices of SMEs?	Small Business Economics	44	4	Europe, Asia, USA
Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A. and Hekkert, M.	2018	Barriers to the Circular Economy: Evidence from the European Union (EU)	Ecological Economics	150		EU
Mura, M., Longo, M., and Zanni, S	2020	Circular economy in Italian SMEs: A multi-method study	Journal of Cleaner Production	245		Italy
Oncioiu, I., Căpușneanu, S., Türkeş, M.C., Topor, D.I., Constantin, D.M.O., Marin-Pantelescu, A. & Hint, M.S.	2018	The Sustainability of Romanian SMEs and Their Involvement in the Circular Economy	Sustainability	10	8	Romania
Ormazabal, M. Prieto-Sandoval, V., Puga-Leal, R. and Jaca, C	2018	Circular Economy in Spanish SMEs: Challenges and opportunities	Journal of Cleaner Production	185		Spain
Ormazabal, M., Prieto-Sandoval, V.,	2016	An overview of the circular economy among SMEs in the	Journal of Industrial	9	5	Spain

Author	Year	Title	Journal	Volume	Number	Context
Jaca, C. and Santos, J.		Basque country: A multiple case study	Engineering and Management			
Panwar, R., Nybakk, E., Pinkse, J. and Hansen, E.	2015	Being Good When Not Doing Well: Examining the Effect of the Economic Downturn on Small Manufacturing Firms' Ongoing Sustainability-Oriented Initiatives	Organization & Environment	28	2	USA
Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M. & Topi, C.	2016	Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers	Sustainability	8	11	EU
Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbers, M. and Ioannou, A.	2015	The Circular Economy: Barriers and Opportunities for SMEs	Centre for European Policy Studies (CEPS)			EU
Sharma, N. K., Govindan, Lai, K. K. L., Chen, W. K. and Kumar, V.	2021	The transition from linear economy to circular economy for sustainability among SMEs: A study on prospects, impediments, and prerequisites	Business Strategy and the Environment	30	4	India
Sohal, A. and de Vass, T	2022	Australian SME's experience in transitioning to circular economy	Journal of Business Research	142		Australia
Takacs, F., Brunner, D. and Frankenberger, K	2022	Barriers to a circular economy in small- and medium-sized enterprises and their integration in a sustainable strategic management framework	Journal of Cleaner Production	362		Switzerland
Triguero, A. Moreno-Mondéjar, L. and Davia, M. A.	2014	The influence of energy prices on adoption of clean technologies and recycling: Evidence from European SMEs	Energy Economics	46		EU
Upstill-Goddard, J., Glass, J., Dainty, A. and	2016	Implementing sustainability in small and medium-sized construction firms: The role of	Engineering, Construction and	23	4	UK

Author	Year	Title	Journal	Volume	Number	Context
Nicholson, I.		absorptive capacity	Architectural Management			
Zamfir, A.-M., Mocanu, C. and Grigorescu, A.	2017	Circular Economy and Decision Models among European SMEs	Sustainability	9	9	EU

8.2 Appendix 2: Interview guide and link to research focus

Research agenda represented in questions in the interview guide	
1. SME leaders' understanding and practice of CE □ Examples of implementation experiences	2; 4
2. SME leaders' experiences of and challenges relating to CE — General — Example experiences — Waste and recycling — Influence of supply and distribution chains	3; 4; 5; 7
SME perceptions and experiences of benefits and challenges of CE adoption — Perceptions of cost-benefits of CE implementation — Disincentives of costs — Impact of the costs of living crisis	7; 10; 11; 12
4. Effects of supply and distribution chains	6; 12
5. SME leaders' understanding and experiences of the regulatory environment as it affects CE practices	8
6. The role of SMEs in disseminating CE and sustainability knowledge and information to wider society and consumers.	11

Interview guide

1. To start, would you like to just tell me a bit more about your business?
2. What is your current understanding of Circular economy?
3. How does this play out for you in your business?
4. Can you give examples of any implementation and use of CE and/or sustainability

principles and practice you've done?

5. How is waste and recycling handled in your businesses?
 - Has it been outsourced?
 - If so, has there been any sustainability considerations of the chosen waste/recycling company?

6. Are there challenges in terms of CE-related practices?
 - Can mention here as an example that this can include both internal and external challenges (e.g., economic constraints or legislation/policy)
 - Now?
 - Future?

7. Are there any specific challenges when it comes to suppliers or contractors?
 - E.g., choosing a more sustainable option over a less sustainable one
 - Is it even an option for the business to choose?

8. Probe on legislation:
 - Has Brexit caused any particular issues (esp. exporting-related)? - only ask if applicable, i.e., if the business is exporting to EU countries or receiving supplies from EU countries
 - Are there issues associated with being a devolved administration within the UK? - ask this if the business is exporting to the rest of the UK or receiving supplies from rest of UK

Probe on specifics if useful: - ask the relevant ones if they bring up legislation as an issue and/or ask if they are specifically applicable for the businesses (e.g., single use plastic ban for food establishments, deposit and return scheme for shops etc.)

- CURRENT Single Use Plastics ban
- PROPOSED Duty of care Bill (no destruction of unsold goods)
- CURRENT Deposit & return scheme
- PROPOSED surplus stock or waste reported (textiles & food respondents?)

- PORPOSED ban on landfilling old wind-turbine blades (energy respondents)

9. What do you think would help you to implement sustainability-related activities and practices?

- Can you give any specific examples?
- Anything that have helped your business already if they are engaged with sustainability/CE (grants, guidance etc)
- Anything that you believe would get you to engage if they are not already involved with CE
- In relation to this question, do your business have any internal sustainability or CE policies?

10. Has there been any particular effects in the context of the current cost of living squeeze on adoption and implementation of sustainability and CE practices?

- Are there any perceived opportunities as a consequence of cost of living crisis?
- Are there any perceived threats as a consequence of the cost of living crisis?
- For these questions, ask the one they don't bring up, so for example if they bring up negatives ask about positives and vice versa
- How are decisions that relate to sustainability and CE practices made in SMEs during cost of living crisis when balancing business sustainability and environmental sustainability goals?
- Can ask specifically about decision making if they don't already talk

about this when answering the first question

- Related to the above (and if this is not brought up already, can perhaps link to answers to Q4)
- Do you think that you will see any performance or turnover benefits from adopting CE practices? (or have you seen any already if they have adopted CE)

11. Do you see a role for SMEs when it comes to spreading awareness to the wider society about sustainability and CE practices?

- * For example, to consumers or suppliers
- * If they are already engaged in sustainability link to this and ask if that is something they try to convey or raise awareness of outwards
 - Related to this, are your customers concerned about sustainability and the circular economy?


12. Did the pandemic impact your business in terms of CE practices and sustainability?

- Could for example be related to changes to working processes

8.3 Appendix 3: Overview of all Interviews

	Sector	Number of employees	Location	Interview format
1	Services	18	Edinburgh & Lothians	Online (MS Teams)
2	Manufacturing	80	Fife & Tayside	Online (MS Teams)
3	Food systems	12-16*	Northern Scotland	Online (MS Teams)
4	Manufacturing	15	Southern Scotland	In person
5	Built environment	10	Edinburgh & Lothians	In person
6	Services	14	Edinburgh & Lothians	Online (MS Teams)
7	Built environment	23	Edinburgh & Lothians	Online (MS Teams)
8	Textiles	45	Fife & Tayside	Online (MS Teams)
9	Manufacturing	14	Southern Scotland	On the phone
10	Manufacturing	13	Edinburgh & Lothians	Online (MS Teams)
11	Textiles	24	Fife & Tayside	Online (MS Teams)
12	Textiles	10	Fife & Tayside	On the phone
13	Manufacturing	17	Greater Glasgow	In person
14	Food systems	16	Northern Scotland	Online (MS Teams)
15	Built environment	10	Fife & Tayside	Online (MS Teams)
16	Built environment	21	Greater Glasgow	Online (MS Teams)
17	Services	7	Edinburgh & Lothians	Online (MS Teams)
18	Built environment	10	Edinburgh & Lothians	Online (MS Teams)
19	Services	15	Edinburgh & Lothians	In person
20	Services	49	Greater Glasgow	Online (MS Teams)
21	Food systems	6	Northern Scotland	Online (MS Teams)
22	Textiles	64	Southern Scotland	In person
23	Built environment	17	Greater Glasgow	In person
24	Services	8	Edinburgh & Lothians	Online (MS Teams)
25	Textiles	8	Southern Scotland	Online (MS Teams)
26	Built environment	14	Southern Scotland	Online (MS Teams)
27	Food systems	247	Fife & Tayside	Online (MS Teams)
28	Services	50	Northern Scotland	Online (MS Teams)
29	Food systems	20*	Fife & Tayside	Online (MS Teams)
30	Food systems	23	Edinburgh & Lothians	In person
31	Services	9	Edinburgh & Lothians	In person
32	Manufacturing	16	Northern Scotland	Online (MS Teams)
33	Manufacturing	28	Edinburgh & Lothians	Online (MS Teams)
34	Manufacturing	1-10*	Northern Scotland	Online (MS Teams)
35	Food systems	11	Greater Glasgow	On the phone
36	Food systems	9	Edinburgh & Lothians	In person
37	Textiles	40	Edinburgh & Lothians	Online (MS Teams)
38	Services	4	Edinburgh & Lothians	Online (MS Teams)
39	Services	55	Edinburgh & Lothians	In person
40	Built environment	3	Fife & Tayside	Online (MS Teams)
41	Textiles	3	Fife & Tayside	Online (MS Teams)

*includes seasonal workers/volunteers



Zero Waste Scotland is Scotland's circular economy expert. We exist to lead our nation to use products and resources responsibly - focusing on where we can have the greatest impact on climate change.

A not-for-profit environmental organisation, funded by the Scottish Government and European Regional Development Fund, we have the ear of the government and the voice of the people. Because of this we can play a key role in connecting communities, businesses, and public bodies - using evidence and insight to inform, inspire, and enable them to embrace the environmental, economic, and social benefits of a circular economy.

More than ever, Zero Waste Scotland is in a unique position to encourage vital shifts in behaviours to accelerate progress towards zero waste and a global circular economy. Together, we can all move towards a circular economy, restore our natural systems, and regenerate our communities in a fair and equal way.

More information on all Zero Waste Scotland's programmes can be found at <https://www.zerowastescotland.org.uk/>. You can also keep up to date with the latest from Zero Waste Scotland via our social media channels - [Twitter](#) | [Facebook](#) | [LinkedIn](#)

