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SMEs' Drivers and Barriers to Decarbonisation in the East of England

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Abstract
Most businesses in the UK have under 250 employees and thus count as SMEs. SMEs account for a significant proportion of greenhouse gas emissions and so there is a need for urgent action to be taken by SMEs in the journey to achieve net zero. This is currently recognised by SMEs as they are increasingly taking up decarbonisation actions, but their efforts are impeded by several barriers. Our research sought to provide insights into the barriers SMEs face when decarbonising business operations through an online survey and interview. Although our research confirms that financial constraints has been identified as the principal barrier to decarbonisation from SMEs perspectives, more than half of SMEs confirmed they lack the knowledge (34%, n=33) and skill (21%, n=20) was the main reason for not measing their carbon emission and starting their journey towards decarbonisation.

Keywords: SMEs, Barriers, decarbonisation journey, Net Zero.

1. Introduction

Small to medium-sized enterprises (SMEs) account for around 60% of employment and 50% of UK private sector turnover, making up 99.9% of the business population (BEIS., 2022). In 2021 the British Business Bank estimated that UK SMEs accounted for 43-53% of UK business emissions. SMEs may appear up close to have lesser impact on the economy and emissions, but when viewed from further away as a large group of organisations their collective contribution as significant and important to consider (Blundel, P.R., 2021). Thus, SMEs have a huge opportunity to help the UK meet its net zero 2050 target such as shifting to renewable energy sources, improving energy efficiency, implementing circular economy principles (Olarewaju et al, 2023). Despite the opportunity for reducing emissions, take-up of mitigation measures by SMEs remains low. SMEs face specific barriers in relation to Net Zero targets. These include a lack of knowledge and understanding about climate change and how it relates to their own business activities (e.g., capacity to identify and quantify emissions). NatWest Group research has revealed that 87% of UK SMEs are unaware of their business's total carbon emissions (Nat West Group, 2022). A considerable body of work has been done to identify and evaluate barriers and drivers for the uptake of decarbonisation measures and the majority of which identifies main barriers, such as financial constraints as the principal barrier (Andrews and Johnson, 2016), lack of specialist knowledge and technical skills (Fresner et al., 2017), resource constraints (Trianni and Cagno, 2012) and, short-term tenancies (Janda et al., 2014; Fawcett and Hampton, 2020).

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The EU funds various small-scale programmes of information, advice and financial incentives for SMEs through the European Regional Development Fund (ERDF) (DCLG, 2015, Fawcett and Hampton, 2020). Although this funding stream is not available in the UK after Brexit, the Eastern New Energy Project (ENE) received funding from ERDF as part of the European Structural and Investment Funds Growth Programme 2014-2020. The main aim of the research is to understand the barriers that prevent SMEs decarbonising across East of England's including Greater Cambridgeshire, Greater Peterborough, Hertfordshire and New Anglia and provide recommendations to overcome the barriers. Accordingly, this paper is structured into five sections. Following the introduction, the second section explains the methodology adopted, followed by the results of the data collected and a discussion of the research findings. Finally, conclusions are drawn.

2. Methodology

To explore the SMEs' barriers and motivations to decarbonisation, we used an online survey and semi-structured interview. The survey allows us to gain an initial understanding of the types of SMEs involved in the project with the following themes:

- SMEs' drivers to reduce carbon emission,
- SMEs goals in relation to carbon emission reduction,
- Challenges that prevent SMEs from reducing their operational carbon emissions,
- Recommendations to help SMEs to overcome those challenges.

The online survey was designed by "Jisc" and launched in April 2021. The survey was disseminated to all SMEs who registered with the ENE project. The ENE project was offered to SMEs only in the East of England's areas; Greater Cambridgeshire, Greater Peterborough, Hertfordshire and New Anglia. 106SMEs responded to the survey. Then, 10 semi-structured interviews were conducted with the aim of gaining an in-depth understanding in the following areas:

- SMEs' goals related to decarbonisation,
- Type of barriers SMEs have ever experienced towards decarbonisation,
- Recommendations that can help them overcome those barriers.

3. Results

In total, 106 organisations responded to the survey. The majority of respondents, 82% (n=87), were from organisations that identify as businesses in different sectors such as insurance, real estate, construction etc. This was followed by charities and community groups at 8% and 6% respectively. Farms were 2% (n=2) and social enterprises 3% (n=3). As figure 1b shows 33% (n=34) of SMEs responded in the survey were micro, 52% (n=53) were small, and 15% (n=15) were medium size.

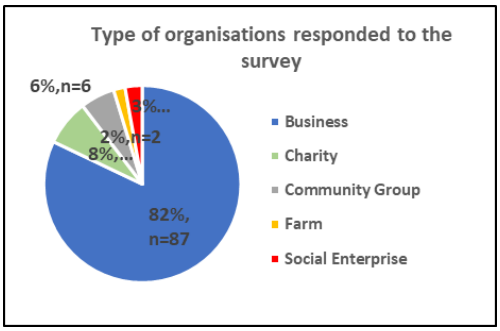

Fig 1a: Type of organisations responded to the survey (n=106)

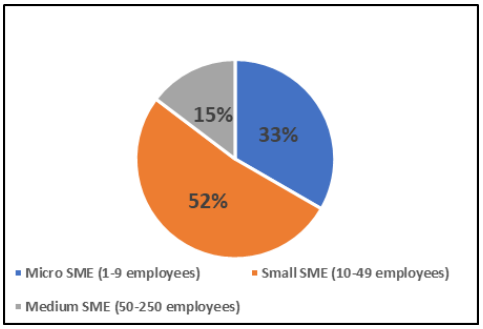

Fig 1b: Share of SMEs by organisational size (n=102)

3.1 SMEs' drivers to reduce carbon emissions

SMEs were questioned about their decarbonisation drivers. This question received 129 multichoice responses. To gain economic advantage from reduced costs (26%, n=34) and environmental sustainability (26%, n=33) were the main driver as suggested by the responses. 26% of responses collected from SMEs surveyed stated reducing costs and maximising profits as decarbonisation drivers. Environmental responsibility was motivated by avoid environmental crisis, reduce pollution, and conserve resources for future generations. SMEs also felt driven by social and moral responsibility (24%, n=31). These involve responsibility to stakeholders and a moral duty to do the right thing. Climate change (14%, n=18) is also a driver as SMEs are concerned by the increasing effects of global warming. Adhering to company policies and values (3%, n=4), setting an example as industry leaders (2%, n=2), for insurance approval (1%, n=1) and in compliance with government policies (1%, n=1) such as net zero targets were also highlighted to be drivers for SME decarbonisation.

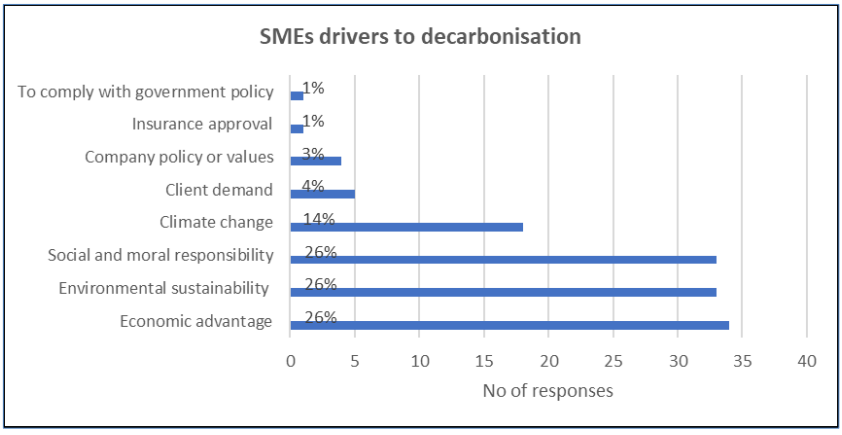

Figure 2: Key drivers for achieving net zero and decarbonisation (n=129)

3.2 SMEs' goals to carbon emissions

92 SMEs provided 100 multichoice responses to the question on what their goals related to reducing carbon emissions were. While a growing number of UK SMEs are ambitious about getting to net zero, some are yet to set specific goals to achieve this (6.1%, n=6). Reasons cited as to why SMEs were yet to set specific goals included factors such as budgetary allowances and uncertainty about specific goals to set, while some were in the process of gaining the knowledge to set goals.

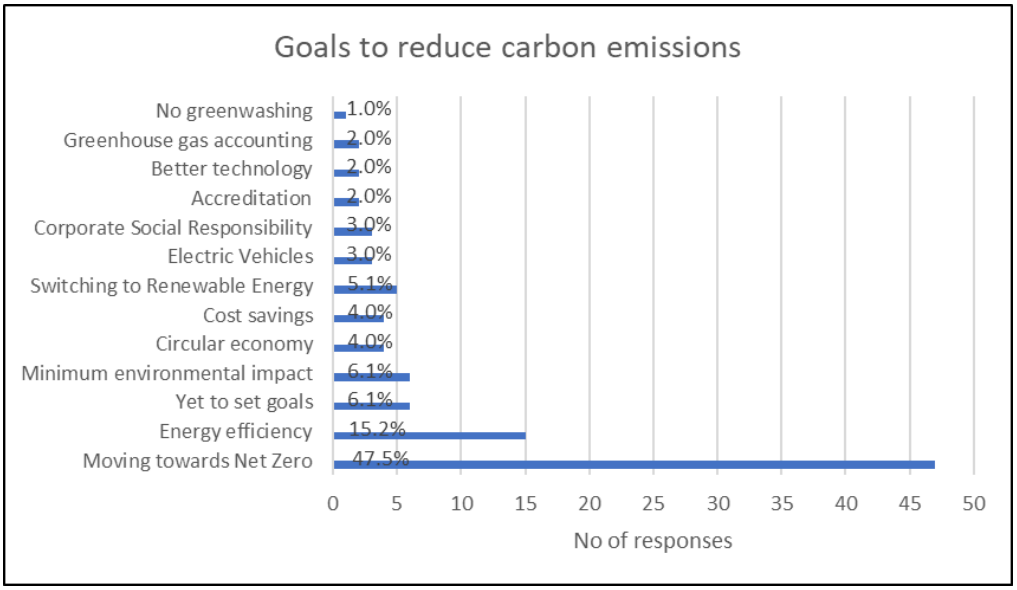

Figure 3: SMEs' goals to reduce carbon emissions

47.5% (n=47) indicated an intent to reach net zero, using actions that include recycling. SMEs suggested targets of achieving net zero or being carbon neutral by specific years e.g., 2030, 2040 and 2050. Some others had ambitions targeted at reducing carbon emissions by 75%, 50%, 25% given specific years. Another way targets were also set was by reducing emissions using the GHG Protocol's Scope 1, 2, and 3 categorisations. Results from this study are similar to results obtained from the survey by Lloyd's bank on understanding the SME net zero journey. 64% of SMEs had a plan in place to achieve net zero (Lloyd's Bank 2023).

While certain SMEs' (15.2%, n=15) goal was to improve energy efficiency to reduce emissions, others were interested in reducing electricity consumption more for the cost saving benefits this offers the business (4%, n=4). The group that undertook energy efficiency measures primarily to reduce emissions, was in relation to buildings and equipment, such as undertaking equipment upgrades and building insulation. Some other SMEs (5.1%, n=5) were looking at goals that involved actions that create less dependency on fossil fuels including switching to renewable sources of energy such as solar.

As discussed in the study by Dey et al. (2022), UK SMEs are increasingly undertaking circular economy practices. Results from the ENE survey supports this as contributing to a circular economy was highlighted as a goal by some companies (4%, n=4), via actions such as alternative disposal methods and reprocessing materials rather than disposal. Furthermore, favouring the use of sustainable materials, undertaking repairs of equipment which will prevent the use of new materials in manufacturing will help further the circular economy goal. They highlight that a core reason for circular economy practices includes reducing emissions generated from sea, road and air freight.

Corporate social responsibility (CSR) actions such as engaging the wider community and being market leaders and switching company vehicles to electric were goals indicated by 3% (n=3) respectively. 6.1% (6%) wanted to promote business operations that created minimal environmental impact. Other goals included obtaining accreditations such as Bcorp certifications and PAS 2060 (n=2, 2%), use of improved technology to promote reduction on carbon emissions (n=2, 2%), measuring Scope 1,2 and 3 emissions to have a baseline that promotes target setting and zero carbon washing (n=1, 1%).

Similar to the research by Lloyd's Bank (2023), while 64% of SMEs surveyed had a plan to reach net zero, 29% had no plan. Of that 29% with no plan in place, 15% undertook several actions to decarbonise their businesses such as recycling and reducing energy consumption. Concurrently, reaching net zero may not be the specific goal of every SME surveyed but companies work to reduce emissions. Goals indicated by SMEs demonstrates how different actions have different values, depending on the SME.
Interview result shows SMEs had some ambitious decarbonisation plans (7 participants, 70%). For example, one SME said: "To reduce our carbon output as much as is feasibly possible [...] I did say net zero within three years."

However, only one SME felt they are prepared to decarbonisation and the rest believed they are not prepared for the path of decarbonisation as they are not able to calculate their emission which is linked to their lack of knowledge. This was typically linked to challenges, especially there was a sense of not feeling prepared for the path of decarbonisation, in part due to lack of knowledge. For example, one SMEs said: "I can't calculate. I don't know where we are. If I knew where we were, then I could plan."

Another Organisation confirmed this: "I don't think that we are prepared at the moment, it's purely because we don't understand enough."

Then, SMEs were asked whether they have measured or not their carbon emission. Total responses were 111 from 98 respondents. 15 (15.3%) out of the 98 respondents highlighted that they currently measure emissions with some going a step further to seek verification. This is not far from other evidence e.g., according to literature, only 6% of UK SMEs have even measured their carbon footprint in the last five years (Elliot Coad, 2022). 84.7 (n=83) confirmed that they have not yet started measuring their emissions due to following reasons (Fig: 4).

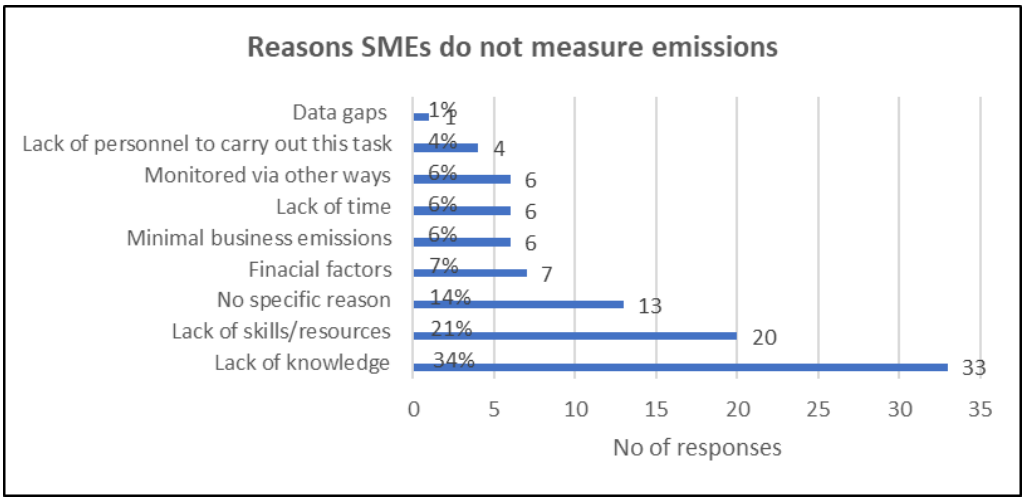

Figure 4: Reasons why SMEs have not yet measured their carbon emissions (n=98)

A key theme across the entire academic literature is the need for SMEs to understand their carbon footprint, known as greenhouse gas (GHG) accounting, and then seek to reduce it via several methods. Previous research has shown that many businesses across the UK want to tackle climate change, but that they don't know where to start (HM Government, 2021). This means SMEs generally are unaware of how to undertake the process,what exactly to do, where to start and what to measure. This is confirmed by our survey' result as more than half of SMEs confirmed they lack the knowledge (34%, n=33) and skill (21%, n=20) to undertake carbon emissions measurement citing factors such as the process being complicated and difficult. 14% of SMEs (n=13) have no specific reasons citing factors that includes a lack of requirement, to not seeking accreditation. Lack of time (6%, n=6), lack of qualified personnel to undertake this (4%, n=4) and data gaps (1%, n=1) were other barriers mentioned. Other SMEs are financially constrained or believe that it is not cost effective (7%, n=7). While (6%, n=6) are yet to measure as it is believed that the business operational emissions are currently minimal or neglible.

Although SMEs surveyed indicated that they were not measuring, some highlighted that they undertake carbon reduction initiatives. As observed by Lloyd's Bank (2023), although 29% of SMEs surveyed did not measure GHGs, 15% were undertaking carbon reduction initiatives such as decreasing energy consumption.

3.3 Challenges that prevent SMEs to reduce their operational carbon emissions

SMEs were asked about the challenges experienced when they engage in reducing operational emissions. The question received a total of 70 multichoice responses. 10 responses (14%) indicated experiencing no challenges to decarbonisation. The challenge most highlighted at 40% (n=28) was cost implication. Organisations experience financial barriers due to factors such as high capital costs, assessing funding, more expensive and higher costs of implementing greener alternatives. 33% (n=23) of SMEs indicated challenge from lack of knowledge of what actions to undertake including in gathering data. Value chain challenges which are often challenges from sources beyond

company's control was also highlighted by 7% (n=5). These include challenges from suppliers, other stakeholders in the industry, lack of greener alternatives in shipping supplies. SMEs also cited challenges from working with suppliers in the far east. Socio-technical barriers from electric vehicles driving range and regulatory constraints were also indicated at 4% (n=3) and 1% (n=1) respectively.

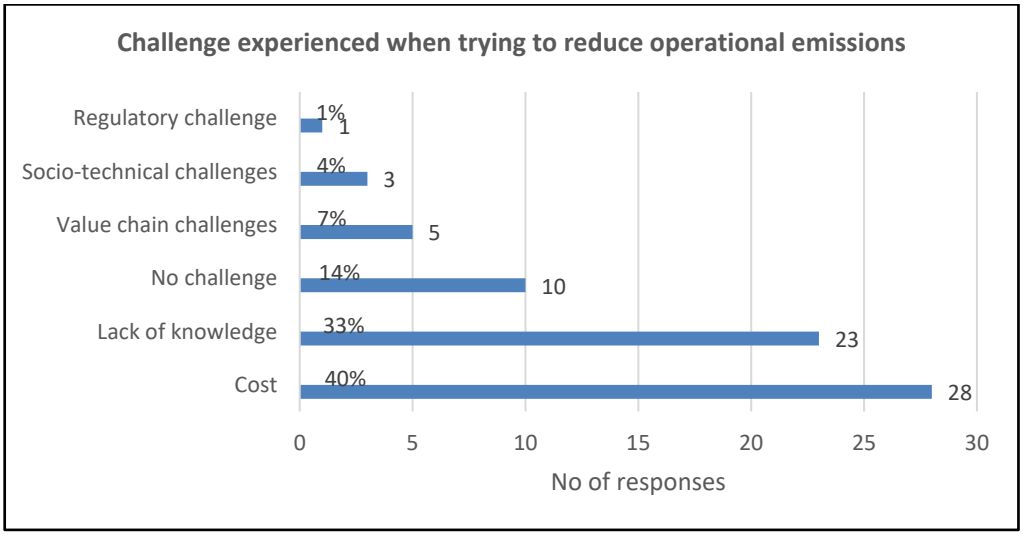

Figure 5: Challenges experienced by SMEs when trying to reduce their operational emission (n=62)

Interview results confirm the survey result as various challenges were discussed, varying from knowledge gaps, financial challenges, time, lack of influence, funding is their main challenge as this was mentioned by 40% of the interviewees (n=4). For example, one SME said: *"Challenges is funding for actually moving things forward, that's that has been difficult"*. Funding is a problem and finding the time to get funding has also been a challenge that people have encountered. One interviewee said: *"Money is a massive barrier of course."*

Lack of Knowledge to calculate carbon emissions is also a big barrier which was mentioned by 50% of participants (n=5). In this regard, one organisation pointed that: *"The more technical knowledge of how we transfer what we're doing into actual data that we can measure"*

Some SMEs face challenges in measuring those indirect emission that occur in their value chain (Scope 3) which means some knowledge gaps can come from not only the knowledge to understand their own emissions, but also other emissions. This was related to who were in more advanced stages of their journey emphasised the difficulty of calculating Scope 3 emissions compared to Scope 1 and 2 which can be linked to barriers outside organisational control. One organisation pointed out the difficulty of calculating scope 3 emission: *"Not easy calculations - Scope 1 and 2 ok, but scope 3 is tricky."*

Rental property: Some SMEs are renting or leasing their property from a landlord and need to discuss relevant changes with the landlord. Two SMEs confirmed that rental property could be a challenge for them to decarbonise. One participants mentioned: *".. in what we need to be measuring, a key challenge we have is we're in a rented building. We operate from a rented building and trying to get information from the landlord about energy heating use the fuels that they use is actually quite difficult, either because they don't know, or they don't want to tell us…"*

Lack of motivation: Engagement from others and lack of managerial motivation are also a challenge, for example, one SME said: *"Get that engagement. So, yeah, if there's any help that we could have with that."*. Ethnographic studies have demonstrated the importance of SME owners' and managers' personal values in relation to environmental decision-making (Fawcett and Hampton, 2020). The influence of managerial value as a barrier to decarbonisation was mentioned by one of our participants: *"It was really hard work because it's really a small change to the general manager. I have to chase him like I don't know, 10 times eventually said just buy these cups."*

3.4 Recommendation on how to help SMEs to overcome challenges

Organisations were asked about what could help them overcome decarbonisation challenges and 39 responses were obtained. Over half of the responses highlighted funding and expert support as potential solutions. From 15 responses and at 38%, grants and funding were the top mentioned type of support. This included the need for grants for renewable technology. Some innovative grants requests included funded grants that are up to 10-year interest free and grants to fund renewable technologies. Following grants and funding, expert support and guidance at 36% is the most frequently requested support type. Expert support and guidance to provide knowledge and improved understanding in areas such as carbon accounting and energy use. Specifically, SMEs suggests that this support should be streamlined, e.g., engineering support and soil carbon code knowledge. They also highlighted that technical support can be beneficial including improved support from National Association of Local Councils, Society of Local Council Clerks, and the Local Government Association.

SMEs find national policies and regulations can be obfuscating particularly when it applies to a specific field. Organisations also highlight that the UK government's national policy on how it intends to attain net zero needs to be clearer. Collaborative work was also indicated including an integrated supplier network. The role of leadership with innovative ideas was also indicated as they can drive the utilisation of available technologies to promote decarbonisation strategies. Other measures mentioned included improved technology to aid data capture and research.

4. Discussion

4.1 SMEs' drivers to decarbonisation

The decarbonisation of SMEs in the UK is increasingly becoming important as the nation aims to achieve its ambitious net zero emissions target by 2050. In that regard,

understanding the existing drivers and barriers of SMEs' decarbonisation is crucial to developing interventions and policies to support this transition.

Despite existing barriers, there still exists a growing appetite for climate action by SMEs (Mace 2023). The current drivers of SME decarbonisation could either be internal drivers such as business motivation and costs savings, or external drivers which include government policies and regulations, corporate social responsibility and gaining competitive advantage. Furthermore, employees are often motivated by shared purpose and values and the potential of human values in driving environmental change exists (Hampton et al 2022). When employees are motivated by management committed to environmental sustainability, these internal drivers can promote engagement. As suggested by Konig et al. (2020), leadership empowerment is essential to energy management in SMEs in the long run, this can attract and retain employees that are passionate about environmental sustainability.

Results from our survey showed that SMEs are motivated to decarbonise their businesses from an economic advantage perspective. 26% of responses collected from SMEs surveyed stated reducing costs and maximising profits as decarbonisation drivers. As highlighted by Olarewaju et al (2023), SMEs view adopting decarbonisation actions as a bid to save costs. Hampton et al (2022) also show from their research that to promote decarbonisation actions to SMEs, the cost saving benefits needs to be highlighted. Previous studies (Luthra et al. 2022, Hrovatin et al. 2021, Meath et al. 2016, DECC 2014) have also investigated these drivers and found out that cost saving factors were the primary reason why SMEs adopted energy-efficient measures. This was also shown in our interview as one company indicated that by engaging in action such as turning off the lights, electricity bills could be reduced. Reducing costs is a crucial motivation underpinning investments in environmental practices. From the Energy saving Trust study, cost reduction was cited as the main benefit to improve energy efficiency. Similarly, as demonstrated in our survey, of the 19.2% undertaking energy efficiency measures, 4% were doing so for the cost saving benefits this offers. This was also shown in the interview as one company indicated that by engaging in actions such as turning off the lights, electricity bills could be reduced.

Our research did not identify government policies and regulations as drivers of SME decarbonisation as only 1 response (1%) stated this. Similarly, research by Brammer et al. (2012) that showed that lack of supporting government policies had a weak correlation to SMEs uptake of environmental initiatives. It is important to note this, as when companies are incentivised by government policies and support, this can lead to more SMEs actively engaging in environmental change (Studer et al. 2006, del Brío and Junquera 2003).

24% of SMEs surveyed highlighted that they were motivated by different social and moral responsibilities. Many organisations embed sustainability and reducing their environmental impact within a broader CSR strategy which is often communicated annually to relevant stakeholders. SMEs are also driven to engage in green business strategies as research shows that this is linked to competitive advantage (Leonidou et al. 2015). Overall, our findings and previous research show policymakers can provide interventions such as streamlined government policies and regulations to incentivise and support SMEs in their transition to a low-carbon economy. Client demand are another important driver for SME decarbonisation. Jansson et al. (2017) found out that SMEs with

a market-oriented sense are driven to commitment to sustainability often due to customer and societal demands. Furthermore, companies that embedded within the supply chains of larger firms would be driven by clients due to their existing supply chain requirements (Studer et al. 2006). In our survey only 4% of companies say that client demands have pushed them to be more sustainable.

4.2 SMEs' barriers to decarbonisation

While results from our survey showed that 14% of SMEs indicated they experienced no barriers to decarbonisation often due to the nature of the business, most struggle with challenges of various kinds. Following the results obtained from interviews, survey, we found that we can categorise the barriers as financial barriers, lack of knowledge and existing barriers beyond organisational control.

One of the top barriers identified by SMEs as preventing decarbonisation is a lack of funds (SME Climate Hub 2023). Previous research from BVA BDRC SME Finance Monitor report says, 41% of SMEs stated that it was difficult for them to access finance (BVA, 2021). This finding correlates with results obtained from our survey as fig 5 shows 40% of the survey participants highlighted the cost implication as the most challenge in decarbonisation journey. Again, this is confirmed by our interview result as almost half of the organisations (40%) interviewed indicated that funding was a barrier. They believe that lack of funding deprioritises decarbonisation. Even where funding can be accessed, SMEs highlight that the process of bidding can be quite challenging from our survey.

Following funding as a barrier, literature indicates that another popular barrier an SME would likely grapple with in the journey to attaining net zero is lack of knowledge (CISL and BSR 2023). This lack of knowledge could indicate factors such as confusion on where to start in the journey to decarbonisation. Many businesses across the UK have said they want to tackle climate change, but that they don't know where to start (HM Government, 2021). SMEs are overcome by the lack of knowledge required to act on achieving net zero (Bank of Scotland 2021). Furthermore, another form of knowledge gap is the disparity between what is known about tackling sustainability issues across the different levels in an organisation. For instance, top level management of SMEs may be ambitious about sustainability but failure to disseminate this ambition across all levels of the business can impede achieving objectives. This lack of knowledge also translates into measuring emissions.

Another dimension of lack of knowledge is related to measuring emissions. While a recommended first step would be to measure emissions, SMEs do not often start with measuring emissions due to an inability to calculate emissions as results from our survey indicate that this is a major hurdle for SMEs. According to our survey only 15% of SMEs undertake GHG accounting, with 85% citing various reasons for not measuring emissions (see Figure 4). Another research shows Just 6% of UK SMEs have even measured their carbon footprint in the last five years (Elliot Coad, 2022). The main hurdle identified was that the measuring process can be complicated and difficult. This correlates with findings from SMEs surveyed in the UK as 30% find it hard to measure environmental impact (Bemment 2021). SMEs we interviewed stated that this difficulty experienced in measuring emissions leaves them unprepared to undertake decarbonisation.

Currently to measure business emissions, the GHG Protocol is the most widely used GHG accounting guideline and categorises emission measuring into Scopes 1, 2 and 3 by companies (Hendrichs and Busch 2012). Previous research has shown that SMEs find measuring of emissions can be tough, particularly Scope 3 emissions (Hendrichs and Busch 2012). Due to the complexities attached to measuring emissions, organisations surveyed also indicated that asides having the knowledge of how to evaluate emissions, they lack the resources or skill set required to do so. This was confirmed by interview as 50% of participants interviewed pointed out that the technical know-how required to measure emissions remains a big barrier. NatWest Group research has revealed that 87% of UK SMEs are unaware of their business's total carbon emissions (Nat West Group, 2022). A key theme across research is the need for SMEs to understand their carbon footprint, known as greenhouse gas (GHG) accounting, and then seek to reduce it via several methods (Olarewaju et al, 2023). Based on our survey result, only 15% (n=15) of SMEs are currently measuring their carbon emission and rest have not started due to lack of knowledge (28%) and lack of skill (17%). This has been mentioned by other research as the research conducted by O2 and the British Chambers of Commence said only 11% of SMEs are measuring GHG emission regularly (Edie Newsroom, 2021).

To gain an understanding of what recommendations could work best, SMEs surveyed were asked on what could help them overcome decarbonisation challenges. SMEs can be seen to align their requests for support with the barriers they had previously suggested. That said, it was unsurprising to see that the most proposed recommendation from our survey was funding. Over half of the responses from our surveyed highlighted expert support and funding as potential solutions. These requests have been conflicted by empirical research produced for a UK government report, which found that up to 37% of energy efficiency measures required no capital investment, and yet take-up remained low (DECC 2014). Therefore, the reason for not starting the journey must be explored beyond financial barriers.

5. Conclusion

Our research confirms that financial constraints has been identified as the principal barrier to decarbonisation as well as the first solution to overcome barriers from SMEs perspectives. However, the result shows most of SMEs were at the early stages of their net zero journey and didn't have a clear understanding of what net zero means and how to start the journey which means this must be explored beyond financial barriers. Financial constraints are pointed out by some scholars as the main barrier for the uptake of energy efficiency measures and investments (Hampton, 2018). Nearly 85% of our participants confirmed that they have not yet started measuring their emissions due to various reasons especially lack of knowledge. When it comes to start the decarbonisation journey, SMEs first needs to have an understanding of what net zero means to them and how to get there. This lack of knowledge could relate to general lack of knowledge on where to start in the journey to decarbonisation as well as measuring emissions. Considering that the first fundamental step for an SME to start the journey and take meaningful action is understanding their carbon footprint, SMEs require government

supports to enable them to understand the meaning of net zero and its target to start the journey as well as some provision of a simplified user guide on how to calculate and reduce their greenhouse gas emissions. Therefore, the provision of raising awareness, user guide, and expert advice need to be a preferred approach by policymakers.

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