

School of Geography and the Environment

MSc and MPhil Dissertation

Coversheet

Candidate Number: 1069776

MSc/MPhil course: Environmental Change and Management

Dissertation Title: Accelerating the decarbonisation of SMEs: A case study of the UK restaurant sector

Word count: 14,999

Abstract

The aggregate emissions of small- and medium-sized enterprises (SMEs) are significant, especially for certain sectors in the UK, such as the restaurant sector. However, few studies have considered how changing the *practices* of SMEs can reduce emissions. This study addresses this by using Social Practice Theory (SPT) to analyse interview responses with SMEs in the restaurant sector and, together with carbon footprint assessments for four SME restaurants, generates new insights into the challenges and opportunities for SME decarbonisation. In addition, accelerating decarbonisation is required to meet Net Zero targets, so this study uses interviews with hospitality sector actors to understand how the decarbonisation of SME restaurants is governed by place-based and sector-based actors. Finally, it considers both the SPT and governance findings to reflect on how governance actors should address the challenges and opportunities for decarbonisation, concluding that *practices* must be considered by governance actors when implementing decarbonisation initiatives.

Acknowledgements

I would like to express my gratitude to my supervisors, Dr Sam Hampton and Dr Katherine Sugar, for their guidance and support in developing the concept of this dissertation, and helpful feedback during the writing process, as well as Dr Tina Fawcett for her helpful suggestions during the early iterations of my ideas.

I would also like to thank all those small- and medium-sized restaurant owner-managers who kindly gave up their time to allow me to interview them, as without them this idea would not have got off the ground. I would especially like to thank those restaurateurs that went the extra mile and provided information for the carbon footprint assessments.

Finally, I would like to thank everyone who has supported me along the way. Thank you to my family for supporting me throughout this Dissertation and all before it, to my friends for being so supportive and always there to provide a nice break from work, and to the ECM family who have been the best course mates throughout this whirlwind of a year.

Contents	Page
Chapter 1. Introduction.....	6
Chapter 2. Literature review.....	9
2.1. Social Practice Theory.....	9
2.1.1. Critiques of SPT.....	11
2.2. Barriers and drivers of SME decarbonisation.....	11
2.2.1. Barriers to SME decarbonisation.....	11
2.2.2. Drivers of SME decarbonisation.....	14
2.2.3. Limitations of the barriers and drivers approach.....	15
2.3. Governance of SME decarbonisation.....	15
2.3.1. Place-based governance.....	16
2.3.2. Sector-based governance.....	18
2.3.3. Governance recommendations.....	18
Chapter 3. Methodology.....	20
3.1. Restaurant recruitment.....	20
3.2. Interviews.....	20
3.3. Interview data analysis.....	21
3.4. Carbon footprint assessments.....	21
3.5. Limitations.....	21
Chapter 4. Results.....	23
4.1. RQ1 – What are the challenges and opportunities to reorient <i>practices</i> in SME restaurants towards Net Zero?.....	23
4.1.1. Challenges: Meanings.....	23
4.1.2. Challenges: Materials.....	30
4.1.3. Challenges: Skills.....	31
4.1.4. Opportunities: Meanings.....	32
4.1.5. Opportunities: Materials.....	35
4.1.6. Opportunities: Skills.....	36
4.2. RQ2 – How can governance arrangements accelerate the decarbonisation of SME restaurants?.....	38
4.2.1. Place-based governance actors.....	38
4.2.2. Sector-based governance actors.....	40

Chapter 5. Discussion.....	44
5.1. RQ1: Challenges – themes of high-carbon dishes, energy demand, and values of the owner.....	44
5.2. RQ1: Opportunities – themes of societal influence, and the wellbeing and skills of staff....	46
5.3. RQ2: Governance – place-based versus sector-based.....	48
5.4. Bringing RQ1 and RQ2 together: Reflections on specific challenges for the changing governance landscape – issues of data and the ‘tail’	49
Chapter 6. Conclusions.....	52
Chapter 7. References.....	54
Chapter 8. Appendix.....	66

List of figures

Figure 1: SPT diagram.....	10
Figure 2: Challenges and opportunities identified.....	27
Figure 3: Bar graphs showing carbon footprints for four restaurants.....	29
Figure 4: The initiatives of place-based and sector-based governance actors.....	39

List of tables

Table 1: Barriers to SME decarbonisation.....	12
Table 2: Drivers of SME decarbonisation.....	13
Table 3: Tools and approaches for actors to promote the decarbonisation of SMEs.....	17
Table 4: Challenges to reorient <i>practices</i> in SME restaurants towards Net Zero.....	24
Table 5: Opportunities to reorient <i>practices</i> in SME restaurants towards Net Zero.....	33

Chapter 1. Introduction

In order to limit warming to 1.5°C, and so avoid the worst effects of climate change, anthropogenic carbon dioxide (CO₂) emissions must decline by 45% from 2010 levels by 2030 and reach Net Zero – the balance between the release and removal of greenhouse gases (GHGs) (Allen *et al.*, 2022) – by 2050 (IPCC, 2018). To achieve this, emissions reductions are needed in *every* sector (RGS, 2020). In the United Kingdom (UK), businesses accounted for 19.1% of CO₂ emissions in 2021 (DBEIS, 2022a), so it is crucial that businesses decarbonise if the UK is to achieve Net Zero. However, the decarbonisation regulatory landscape is different for medium- and large-sized enterprises (MLEs), who have 250 employees or more, than small- and medium-sized enterprises (SMEs), who have fewer than 250 employees (Weatherall *et al.*, 2022). For example, *The Climate Change Act 2008 (2050 Target Amendment) Order 2019*, which set into law a 100% emissions reduction by 2050 versus 1990 levels, states that ‘*the legislation does not apply to activities that are undertaken by small businesses*’ (UK Government, 2019), excluding SMEs. In addition, MLEs have procurement requirements, one of which is tackling climate change (Sugar *et al.*, 2022), and are more motivated to have voluntary Net Zero targets for corporate social responsibility reasons (Girella *et al.*, 2019). Consequently, SMEs have been historically neglected in the governance of Net Zero compared to MLEs, and resultantly, there have been few studies on the governance of SME decarbonisation (Handley and Molloy, 2022).

However, SMEs represent 90% of all enterprises and more than 50% of global employment (World Bank, n.d.). At the start of 2022, there were 5.5 million SMEs in the UK, making up 99.9% of businesses, and accounting for 61% of employment and 51% of turnover in the business sector (DBEIS, 2022b). The high number of SMEs means that their cumulative carbon emissions are large (Moss *et al.*, 2008), since their energy consumption is collectively significant; for instance, SMEs consume more than 13% of total global energy (IEA, 2015), and account for more than 50% of energy use in certain sectors in the UK, such as the hospitality sector (DECC, 2015). Indeed, some authors have suggested that the overall environmental impact of SMEs outweighs that of MLEs (Hillary, 2000). Considering GHG emissions – which can be broken down into three categories, with Scopes 1 (energy produced on site) and 2 (electricity) encompassing energy use, and Scope 3 consisting of all other business operations (DESNZ *et al.*, 2019) – SMEs are responsible for 43–53% of business emissions (British Business Bank, 2021). This percentage is significant, so there must be major reductions in the GHG emissions of SMEs to reach Net Zero by 2050, since their aggregate footprint is impossible to ignore (Blundel and Hampton, 2021). Additionally, through their role as ‘middle-out’ actors, SMEs can facilitate wider societal decarbonisation through improving the agency and capacity of other actors, such as suppliers, consumers, and employees (Parag and Janda, 2014;

Weatherall *et al.*, 2022). However, SMEs are not decarbonising at the speed and scale required to meet national decarbonisation targets (CCC, 2016).

This research focusses specifically on SMEs in the restaurant sector, which typically are energy-intensive businesses (Özgen *et al.*, 2021). For example, in England and Wales, the hospitality sector – which includes restaurants, hostels, hotels, holiday homes, and pubs – is the building use with the highest median gas (284 kWh m⁻²) and electricity intensity (187 kWh m⁻²) (DBEIS, 2021), resulting in significant Scope 1 and 2 emissions. Additionally, restaurants have high Scope 3 emissions through their food sold (Falciano *et al.*, 2022), with food chains accounting for up to 37% of global GHG emissions (Petersson *et al.*, 2021), and supply chain emissions 11.4 times higher than operational emissions for SMEs in general (Jouven and Schmidt, 2022). As of 2022, there were approximately 102,000 *food service activities* businesses, with roughly one-third of them licensed restaurants (*Appendix 1*) (ONS, 2022), making this a large sector with a high potential for emissions reductions. Therefore, it is important to understand the challenges and opportunities for the decarbonisation of SME restaurants, and how it can be accelerated by governance arrangements, especially as SME decarbonisation policy has been affected by a lack of research evidence on governance (Hampton *et al.*, 2023). This study aims to make a distinct contribution to this by addressing this shortfall in research evidence on SME decarbonisation and its governance. In this study, a normative view of governance is taken, considering all arrangements and actors shaping societal activity, including government institutions and informal support structures from local and sector actors (*ibid*).

This research aims to understand how SME restaurants in the UK can transition to Net Zero. To answer this, it has two primary research questions (RQs):

RQ1. What are the challenges and opportunities to reorient *practices* in SME restaurants towards Net Zero?

RQ2. How can governance arrangements accelerate the decarbonisation of SME restaurants?

This study begins with a literature review in Chapter 2 which explains Social Practice Theory (SPT) and its benefits for uncovering challenges and opportunities for decarbonisation, before outlining the key barriers and drivers to SME decarbonisation, and finally providing an overview of the governance of SME decarbonisation. The methods are then explained in Chapter 3. The key empirical findings from interviews and carbon footprint assessments are thereafter presented in Chapter 4, with RQ1 identifying 10 challenges and seven opportunities for decarbonisation, and RQ2 exploring the initiatives of place-based and sector-based governance. Chapter 5 discusses the findings

and reflects on some specific challenges uncovered for the changing governance landscape. Finally, Chapter 6 concludes that governance actors must consider the challenges and opportunities to reorient *practices* in SME restaurants which were identified in this study when implementing decarbonisation measures, in order to accelerate the decarbonisation of SME restaurants towards Net Zero.

Chapter 2. Literature review

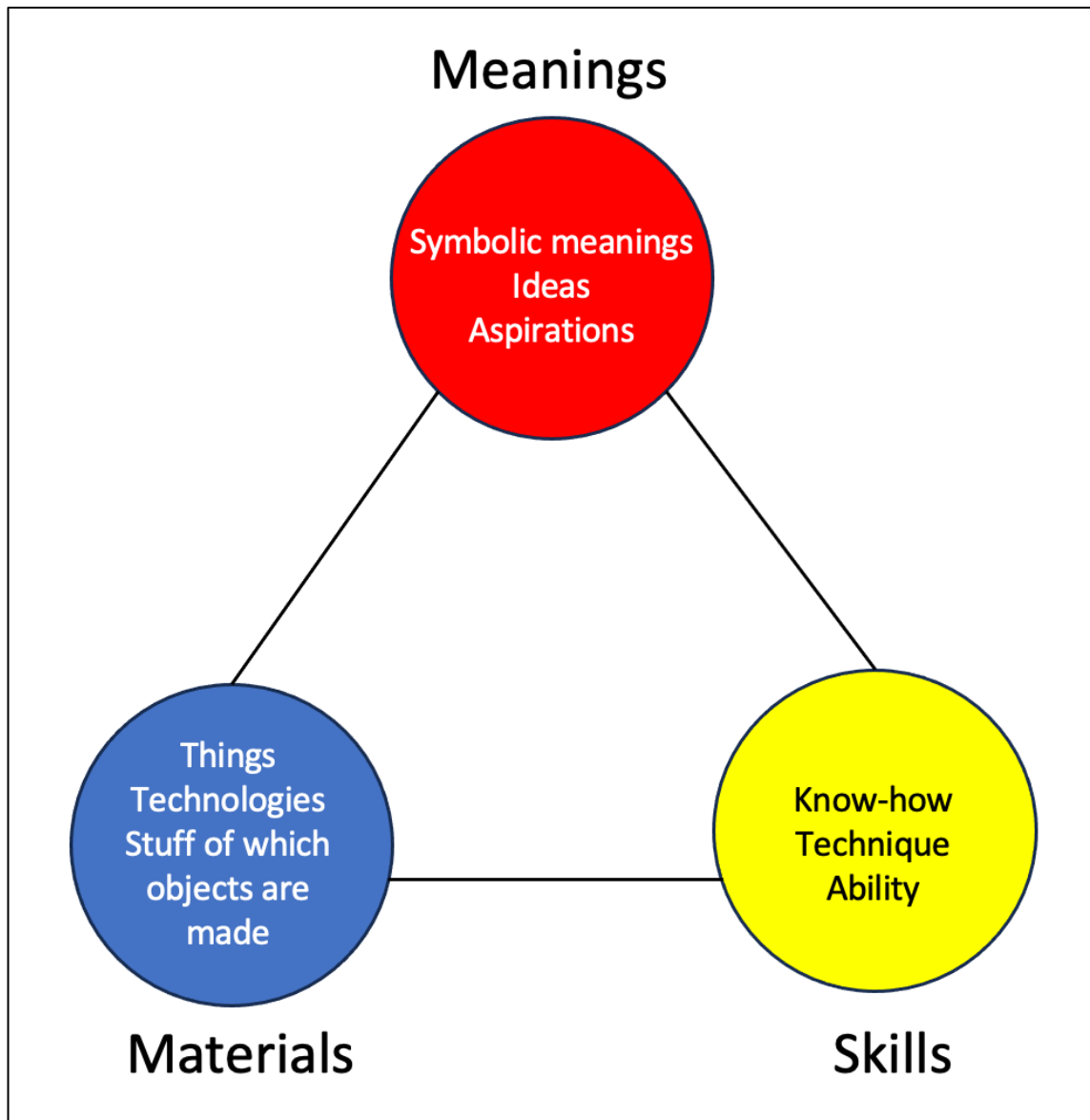
2.1. Social Practice Theory

This study employs a socio-technical approach to studying transitions, which focusses on the use of technology in a social context (Loorbach *et al.*, 2017). While there are many socio-technical theories of change, this study utilises SPT as it both describes and critiques (Sovacool and Hess, 2017). SPT involves taking a relational approach (Gram-Hanssen, 2013), so instead of starting with the technology, researchers start with the *practice* and observe how multiple technologies and materials are integrated into both practice entities and performances (Sovacool and Hess, 2017). Therefore, practices are not just social phenomena, but also the material infrastructures, devices, and artefacts that co-constitute actions (Shove and Walker, 2014). While SPT does not take an individualistic perspective and views attitudes in a structural and collective way (and so captures the important societal processes relevant to decarbonisation) (Gram-Hanssen, 2010), it still emphasises the importance of agency, making it relevant to SMEs.

SPT originated from Bourdieu (1976) and Giddens (1984) and was later developed by Schatzki (1996). In its simplest form, SPT attempts to explain why people do what they do, viewing practices as habitual behaviours driven by beliefs, values, lifestyles, and tastes (Sovacool and Hess, 2017). Shove *et al.* (2012) deconstruct practices into elements of: *materials* (items which enable/constrain individual action); *competences* (skills, habits, and know-how); and *meanings* (ideas, symbolism, and aspirations), as shown in *Figure 1*. Since a practice forms a nexus, connections between different elements hold the practice together (Gram-Hanssen, 2010). Connections also show how practices change over time (Sovacool and Hess, 2017); for instance, new materials might make some practices easier (Shove and Walker, 2014). SPT highlights how emissions arise from everyday social activity; for example, energy (and resultant emissions) is used as an ingredient to accomplish practices (*ibid*). Therefore, analysing practices is an effective way to identify opportunities for decarbonisation through behavioural and material change (Hampton, 2018). This can be more effective than changing values or attitudes (Hargreaves, 2011). Additionally, through contributing new insights into how elements are connected, while viewing multiple practices together which may align, depend upon, or support one another (Sovacool and Hess, 2017), SPT promotes a holistic view of change (Gram-Hanssen, 2010), which is key to understanding how decarbonisation can be accelerated.

Considering energy, SPT questions what energy is for and how it changes temporally, which is rarely understood; for example, UK Government documents like *Pathways to 2050* take current practices as unquestioned and only consider the amount of energy, rather than what it is used for (Shove and Walker, 2014). Indeed, despite SPT having a long history in the social sciences, there have been few attempts until recently to consider energy using SPT (*ibid*). Recent studies investigate standby consumption in households (Gram-Hanssen, 2010), energy consumption in households

Figure 1: The three different elements of Social Practice Theory and their links, adapted from Shove et al. (2012). 'Competences' has been changed to 'skills', which allows this diagram to be used as an interview aid as it uses normative language.



(Gram-Hanssen, 2013), and differences in energy use between people (Shove and Walker, 2014). More recently, Hampton (2019) used SPT to investigate energy management as a practice in three SMEs. Viewing energy use through a SPT lens can enable thinking about energy sufficiency and help understand the policy options for reducing energy *demand* without reducing energy *services* (Darby and Fawcett, 2018), which is an important consideration when applying SPT to restaurants, as energy services are needed to cook dishes.

Most studies of SPT take place in the domestic setting, with few applications to organisations and workplaces, despite the potential of SPT to contribute to understandings of knowledge production and the influence of external advice within organisations (Hampton, 2018; 2019). While there have been some studies relating SPT to restaurants, for instance, using SPT to: analyse food production

and consumption *practices* (Spaargaren *et al.*, 2012; Welch and Warde, 2015; Shove, 2017; Welch and Yates, 2018; Wertheim-Heck and Raneri, 2019); investigate dietary requirements (Oktadiana *et al.*, 2020); or understand the culinary practices of ‘locavore’ chefs (Nelson *et al.*, 2017), little to no research has viewed the decarbonisation of SME restaurants through a SPT lens. Additionally, most studies applying SPT to decarbonisation have focussed solely on energy, whereas this study will focus on the emissions from both the energy and food purchases of restaurants.

2.1.1. Critiques of SPT

However, Sahakian and Wilhite (2014) identified that applying SPT practically is challenging. Firstly, since changes to one practice affect others, the rebound effect (where a reduction in consumption in one area increases consumption in another) may reduce the potential for practice changes to cause emissions reductions. For this reason, practices must be viewed holistically and not in silos. Secondly, multiple elements working together creates effective change, but contributors to a practice have different amounts of power, which may vary across settings. This makes it difficult to understand how practices change across time (Shove and Walker, 2014) and space (Sovacool and Hess, 2017). Finally, SPT is extremely diverse, which is why it is constrained tightly in *Figure 1* for this study. Despite these criticisms, it still serves as a useful lens to provide new and unique insights into the challenges and opportunities for decarbonisation of SME restaurants, hence its use in this study.

2.2. Barriers and drivers of SME decarbonisation

Historical research into SME decarbonisation has focussed on the barriers and drivers, with those most frequently found in the literature shown in *Table 1* and *2* and grouped into two types: external (forces from outside of SMEs); and internal (forces from within SMEs) (Olaewaju *et al.*, 2023). This section explores these barriers and drivers.

2.2.1. Barriers to SME decarbonisation

Considering external barriers, firstly, where SMEs lease their building(s), split landlord-tenant incentives pose a barrier to Scope 1 and 2 decarbonisation (Laes *et al.*, 2019), as tenants have limited control on building heating and maintenance (and thus emissions from the building); for example, being unable to make changes without consulting the landlord (Weatherall *et al.*, 2022). Over half of commercial property is rented (PIA, 2017), and over one-third of non-domestic buildings in England and Wales have an energy performance rating of ‘D’ or lower (DLUHC and MHCLG, 2023), so this barrier likely affects many SMEs. However, where SMEs plan to stay long-term and have good relations with landlords, tenancy agreements may not be a barrier (Weatherall *et al.*, 2022). Secondly,

Table 1: Barriers to SME decarbonisation identified in the literature.

Type of Barrier	Barrier to SME decarbonisation	Indicative literature
External	Landlord-tenancy split incentives	Janda (2014); Laes <i>et al.</i> (2019)
	Evolving comfort, convenience, and cleanliness social norms leading to higher energy consumption	Shove (2003)
	Lack of trusted intermediaries	Hampton (2018)
Internal	Limited internal resources	Vickers <i>et al.</i> (2009); Andrews and Johnson (2016)
	Low-ranking of the environment in business operations	Carvalho <i>et al.</i> (2022)
	Limited knowledge about decarbonisation opportunities	Fresner <i>et al.</i> (2017)
	Lack of control over certain aspects of operations (e.g., supply chains)	Nikula (2022)
	Organisational culture	Isensee <i>et al.</i> (2020)

evolving comfort, convenience, and cleanliness norms have resulted in higher energy use (Shove, 2003), increasing Scope 1 and 2 emissions. Finally, low trust in intermediaries results in SMEs not seeking advice from low-carbon advisors (Hampton, 2018).

Considering internal barriers, the lack of internal resources to implement decarbonisation measures is a commonly-reported barrier (Trianni and Cagno, 2012), with financial resources identified as a key missing resource across all sectors (Andrews and Johnson, 2016), particularly in the restaurant sector, perhaps due to recent economic shocks (Weatherall *et al.*, 2022). Fresner *et al.* (2017) also pointed out that limited resources mean SMEs cannot employ low-carbon advisors or sustainability strategists, impeding decarbonisation. Secondly, decarbonisation is not prioritised within business operations (Carvalho *et al.*, 2022), as a perceived shortage of time by SME owner-

Table 2: Drivers of SME decarbonisation identified in the literature.

Type of Driver	Driver of SME decarbonisation	Indicative literature
External	Consumer pressure leading to new market opportunities	Fleitera <i>et al.</i> (2012)
	Grants or subsidies	Kesidou and Ri (2021)
	Legislation	British Business Bank (2021)
	Conditions for access to sources of finance	Sugar <i>et al.</i> (2022)
Internal	Cost-savings	British Business Bank (2021)
	Pro-environmental values	Nikula (2022)
	Quick decision-making due to short SME organisational structure	Hendrichs and Busch (2012); Grimstad <i>et al.</i> (2020)
	Risk mitigation	Olarewaju <i>et al.</i> (2023)

managers means they find it difficult to dedicate time to implement decarbonisation measures (Weatherall *et al.*, 2022). This barrier is less important as the size of SME increases, as the greater the size, the more structured the organisation of a firm is, lowering the perception of time shortages (Trianni and Cagno, 2012). Thirdly, although awareness is increasing over time (Moss *et al.*, 2008), most SME owner-managers still possess a limited knowledge of the emissions of their business and potential savings (Fawcett and Hampton, 2020), which stems from low energy and environmental literacy levels amongst SME owners (Coles *et al.*, 2016). This means they do not actively seek advice regarding their emissions (Parker *et al.*, 2009). Even if SMEs are aware of their emissions, they find it difficult to find reliable, relevant information on decarbonisation (UKERC, n.d.). In the restaurant sector, information and advice is especially important due to its more complex decarbonisation challenges, although the provision of information is stronger than other sectors, such as the manufacture of clothing (Weatherall *et al.*, 2022). Fourthly, businesses perceive a limited ability to influence Scope 3 emissions from their supply chain, especially with larger companies (Nikula, 2022), so may not seek to reduce supply chain emissions. Finally, the organisational culture of a

business, which is informed by its values, attitudes, and management, is integral to decarbonisation (Isensee *et al.*, 2020), so this acts as a barrier where owner-managers do not prioritise decarbonisation.

2.2.2. Drivers of SME decarbonisation

Considering external drivers, firstly, consumer pressure can drive change, both through placing scrutiny on businesses and creating new market opportunities for SMEs who improve their environmental performance (Williamson *et al.*, 2006; Fleitera *et al.*, 2012). For example, SME restaurants who utilise environmentally-friendly food, such as sourcing local, ‘organic’ produce, offer a point of differentiation to competitors (Weatherall *et al.*, 2022), with environmentally-conscious consumers more likely to visit those restaurants and willing-to-pay more (Shin *et al.*, 2019). Secondly, grants or subsidies can encourage SMEs (who often have fewer cash reserves than MLEs (British Business Bank, 2021)) to purchase more energy-efficient appliances (Kesidou and Ri, 2021). Thirdly, compliance with legislation can drive decarbonisation (Jouven and Schmidt, 2022), which is explored in greater depth in Section 2.3. Finally, making emissions reductions a condition for accessing sources of finance – for example, for public procurement – can drive decarbonisation (Sugar *et al.*, 2022).

Internally, cost-savings are most frequently highlighted as a decarbonisation driver (DECC, 2014), particularly from reduced energy use and increased material efficiency, such as through utilising a greater percentage of food purchased (Nelson *et al.*, 2017). In recent years, increased energy costs have resulted in greater cost-saving opportunities, making this a stronger driver (Weatherall *et al.*, 2022). However, SMEs do not always capitalise on cost-saving opportunities due to the aforementioned barriers, even where the business case is convincing (Bukarica and Tomšić, 2017). Secondly, pro-environmental values of the owner-manager can drive decarbonisation (Nikula, 2022). In restaurants, these values can relate to serving local, seasonal food, in order to support local producers (Nelson *et al.*, 2017), reducing the emissions from food transport. Thirdly, the simple, flat organisational hierarchy of SMEs can result in quicker decision-making and make it easier to develop a shared company vision (Hendrichs and Busch, 2012). This driver interacts strongly with the pro-environmental values driver, as where SME owner-managers are intrinsically motivated to improve the environmental performance of their business, as they are genuinely concerned about the environment, this organisational structure can enable decarbonisation (Grimstad *et al.*, 2020; Kesidou and Ri, 2021). However, this structure can also act as a barrier to decarbonisation if the owner-manager does not want to decarbonise their business, as there is limited external pressure from shareholders, for instance (Henriques and Catarino, 2016). Finally, risk mitigation can be a driver of decarbonisation (Olaewaju *et al.*, 2023), although it is not often a compelling driver (Nikula, 2022).

2.2.3. Limitations of the barriers and drivers approach

Empirical data underpinning barriers and drivers research has relied on surveys and interviews with SME owner-managers, who are more likely to highlight external barriers, such as access to finance, rather than internal factors, such as a lack of knowledge, as reasons for inaction (Hampton and Fawcett, 2017), therefore placing too much weight on a lack of grants as a barrier to decarbonisation. This is emphasised by the fact that 37% of energy-efficiency measures need no capital investment, such as turning down thermostats, yet uptake of these measures is low (DECC, 2014). Additionally, research around barriers has been at the point of investment only, so does not fully acknowledge the preceding period where the decision is framed through the influence of the material, social, cultural, and regulatory domains (Fawcett and Hampton, 2020). Indeed, there has been limited research around energy *practices*, which take these domains into account (Hampton, 2019). Therefore, this research will make a new empirical contribution by using SPT, which considers the *practices* of restaurants, to generate new insights into the challenges and opportunities to decarbonise SMEs in the restaurant sector.

2.3. Governance of SME decarbonisation

Governance, which is based on societal steering where the state no longer plays a central decision-making role, involves many actors with diffused power and responsibility (Gunningham, 2009). This section will outline the literature on the governance of SME decarbonisation and its relations to the restaurant sector.

Historically, SMEs have been excluded from business-focussed decarbonisation at all levels of government (Hampton *et al.*, 2023), with many regulations containing SME exemptions (Hendrichs and Busch, 2012), such as waste regulation (Environment Agency, 2009), or streamlined energy and carbon reporting (DESNZ *et al.*, 2019). This means that SMEs miss out on opportunities for energy-savings through regulatory compliance (Zheng *et al.*, 2021). While some policies have recently become more tailored to the needs of SMEs, for example, energy-efficiency policy (DESNZ *et al.*, 2019), UK Government publications and formal reviews of Net Zero have generally shown little explicit reference to the role of SMEs in meeting Net Zero targets (Blundel and Hampton, 2021), and there is an overall lack of clear guidance, making anchoring sustainability in SMEs difficult (Sloan *et al.*, 2013). Indeed, there are no decarbonisation-relevant regulations in the UK specifically targeting SMEs; most decarbonisation policies affecting SMEs fall under a range of strategies (e.g., the Heat and Buildings Strategy, or Transport Decarbonisation Plan, or policies targeting energy-efficiency, or waste reduction) (Weatherall *et al.*, 2022). Legislative compliance with these policies can be a driver for change (Moss *et al.*, 2008), but SMEs lack awareness of regulation (Petts *et al.*, 1999), and are usually resistant to conventional ‘hard levers’, such as tax and regulation (Hampton

and Fawcett, 2017), explaining why environmental legislation is less effective for SMEs than MLEs (Wilson *et al.*, 2012).

However, there are many different tools and approaches available for external and inter-organisational actors to facilitate decarbonisation (*Table 3*). Historically, SME decarbonisation in the UK mainly took place through funding from the European Regional Development Fund (ERDF), with support programmes based on incentives and the provision of expert advice favoured over regulation or taxation (Hampton *et al.*, 2019). It is estimated that 11% of SMEs in the UK have already accessed external finance to decarbonise through such programmes (British Business Bank, 2021). Following the departure of the UK from the EU, environmental policy in the UK is in the process of change (Burns *et al.*, 2019), with the post-Brexit UK Shared Prosperity Fund (UKSPF) replacing the ERDF (Weatherall *et al.*, 2022), which came to an end in 2023. However, only one of the nine subsidiary objectives of the UKSPF directly mentions decarbonisation (*ibid*).

Historically, the UK Government has been stronger in its policy ideas than delivery; for example, there are no national grant or loan programmes for energy-efficiency in SME buildings apart from the Boiler Upgrade Scheme, nor a free advice service or national support for SME waste reduction (Weatherall *et al.*, 2022). Conventional climate policies have focussed on the activities of SMEs as consumers (e.g., by providing grants) and enablers (e.g., through funding for R&D), although their role as influencers is increasingly recognised, and attempts have been made to harness this role, such as through the creation of the SME Climate Hub (Hampton *et al.*, 2023), which is a non-profit global initiative providing free tools and resources to SMEs to tackle decarbonisation (SME Climate Hub, n.d.). Similarly to the SME Climate Hub, the UK Business Climate Hub provides guidance across the devolved nations, which continues the trend of local, regional, and sectoral initiatives (Blundel and Hampton, 2021). Place-based and sector-based governance approaches are explored in the following sections.

2.3.1. Place-based governance

While the UK Government affects decarbonisation through a top-down approach involving a national legal framework for climate action, Net Zero targets, and procurement rules, local authorities (LAs) and devolved governments can utilise the ‘middle-out’ approach to affect decarbonisation (Sugar *et al.*, 2022). LAs can develop low-carbon transport infrastructure, district heating networks, and building retrofits (*ibid*), and devolved governments can set regulation; for example, the Scottish Parliament regulated that food businesses who generate more than five kilograms of food waste per week must separate this from general waste, unless they are in a ‘rural’ location (Weatherall *et al.*, 2022). Furthermore, support programmes for decarbonisation are usually organised and delivered by local and regional governments. Different structures for these exist throughout the UK; in Scotland

Table 3: Tools and approaches for external/inter-organisational actors to promote the decarbonisation of SME restaurants. Adapted from Blundel and Hampton (2021).

Tools and approaches	Examples
Government regulations	Building regulations, e.g., Minimum Energy Efficiency Standards
General accreditations	B Corps; Carbon Trust
Sector-specific associations and accreditations	Sustainable Restaurant Association; Sustainable Hospitality Alliance
Voluntary commitments and pledges	SME Climate Hub pledge
Supply chain and sustainable sourcing	Soil Association Organic Standard; Red Tractor Assurance
Financial instruments (e.g., grants, loans, taxes)	Boiler Upgrade Scheme; Climate Change Levy
Advice and guidance	Energy Saving Trust; Carbon Trust
Carbon offset schemes	Oxford Principles for Offsetting

and Wales there are national programmes, but in England the matter is devolved to local and regional partnerships (Hampton *et al.*, 2023). LAs in England work in partnership with organisations and support networks, such as through Growth Hubs and Net Zero Hubs, as owner-managers are most likely to see advice from local, trusted sources (Fawcett and Hampton, 2020), although these will no longer be funded by the UK Government after March 2024 (LEPNetwork, 2023). Growth Hubs assist decarbonisation within the broader provision of business support (Britton and Woodman, 2014), such as through channelling significant public funds to employ low-carbon advisors on a regional basis to help SMEs decarbonise (Hampton, 2018). However, while business advisors are a driving force in guiding SME decarbonisation (Johansson and Thollander, 2018), and over 90% of business in the UK use external business advisors (Mole *et al.*, 2017), 75% of this advice is provided by private sector sources, such as accountants, customers, business friends, and consultants, with only the remaining 25% from government agents (Sivaev, 2013), so the provision of low-carbon advisors for SMEs delivered by Growth Hubs is relatively small. Despite this, a ‘Growing Greener’ toolkit was produced by Hampton *et al.* (2019) which aims to celebrate and enhance good practice, as well as to help advisors develop effective language, concepts, and approaches when discussing decarbonisation.

Sugar *et al.* (2022) identified several limitations with place-based decarbonisation governance in the UK. Firstly, LAs lack direct control of energy, waste, and transport flows, due to a system which is largely privatised and deregulated, meaning they are unable to fully make changes to facilitate decarbonisation. Furthermore, there are no Net Zero statutory targets on LAs, so there is no government pressure on them to decarbonise. However, most LAs have declared climate emergencies and have Net Zero plans, but there are significant gaps between pledges to decarbonise and capacity to deliver, with the Green Alliance (2020) finding that English councils can only fund 25-35% of their Net Zero pledges. Finally, there is a lack of coordination and collaborative action between local and central governments in the UK (Kuzemko and Britton, 2020), making joined-up decarbonisation initiatives rare.

2.3.2. Sector-based governance

There are many sector-based actors involved in supporting SME decarbonisation in the restaurant sector. For instance, Food Made Good, run by the Sustainable Restaurant Association (SRA), provides free online resources to encourage restaurants to create more vegetable-focussed menus, and is the largest food service sustainability programme in the world (Weatherall *et al.*, 2022). The number of sector-based actors (e.g., banks, industry associations, and accreditation bodies) supporting SME decarbonisation has increased in response to recent energy price increases (UKERC, n.d.). The relationships between these actors and the government are context-specific (Hampton *et al.*, 2023). For example, in the UK, the Hospitality Sector Council – a UK-based partnership with actors from industry and national government – tend to be supportive for well-designed regulation which creates a level-playing field, such as mandatory food waste reporting (Quinn, 2022). However, in the US, hospitality sector bodies have historically lobbied against regulation (Levine and Baertlein, 2011).

Overall, LAs have a legacy of managing public resources, whilst private entities, communities, and the third sector have a history of mobilising resources to successfully deliver services and projects. Therefore, Sugar *et al.* (2022) suggest that decarbonisation at the municipal level should be facilitated both by LAs/devolved governments *and* sector-based actors. The extent to which this support for SME decarbonisation should be organised locally, nationally, or by sector, and how initiatives, guides, advice, and support for SMEs can be carefully tailored and streamlined, was identified by Blundel and Hampton (2021) as a research gap, which RQ2 attempts to fill.

2.3.3. Governance recommendations

Several authors have made general SME decarbonisation governance recommendations, such as Weatherall *et al.* (2022). Firstly, they highlight the need for a new tactical government plan which

should include: a consistent and ongoing awareness and enabling framework to overcome barriers of time and capacity (e.g., initially engage SMEs through an online carbon footprint, then subsidise SME decarbonisation audits, and include a one-stop-shop contact point for support); a regulatory timeline for SME decarbonisation, since regulation is a key driver for action and a timeline will allow SMEs to prepare for forthcoming regulation and reduce decarbonisation risks and costs; and effective financing for SME decarbonisation. Furthermore, they stress the need for an enhanced and more joined-up policy and support framework, which takes better account of the different needs of SMEs, and includes better coordination, both between regions and with national Net Zero policies, and suggest that SME decarbonisation support should be sector-relevant.

Additionally, Hampton *et al.* (2023) argue that governments must help ‘level the playing field’, providing (perceived) fair support to SMEs, regardless of their current progress towards Net Zero. They also argue that governance institutions must leverage the role of SMEs as influencers and enablers for climate action, and that there is a need for more flexible, mission-oriented governance arrangements.

Weatherall *et al.* (2022) also made several restaurant sector-specific policy recommendations. They recommended that: the government support local and sector-based networks to facilitate practical and virtual support; whole life-cycle analysis combined with impact labelling for individual products be introduced (e.g., Foodsteps); investments be made in online information resources from trade associations and organisations; and carbon audits, which are a useful engagement tool which can be translated into an action plan, be rolled out.

Overall, there is significant academic and grey literature around the governance of SME decarbonisation, but most focusses on general governance, rather than how place-based and sector-based governance actors facilitate and can accelerate decarbonisation, which this study aims to address. Finally, it is more important than ever to focus on the governance of SME decarbonisation, as the current series of global crises have acted as a catalyst for the reconfiguration of the social contract between business, society, and the state (Hampton *et al.*, 2023). This study will seek to contribute to this lacking body of literature through the case study of SME restaurants.

Chapter 3. Methodology

Primary and secondary interview data and carbon footprints were used to answer RQ1 and RQ2.

3.1. Restaurant recruitment

Restaurants in areas I was able to base myself or access easily via public transport (Oxford, Durham, Southend, and north Wales) were identified through online searches. In some cases, it was unclear if a business was predominantly a restaurant or a pub, so where a hospitality establishment offered meals, it was considered for interview. 117 restaurants were emailed; however, only two responded, and both declined. 27 restaurants without an email address were contacted via an online form and four restaurants responded, with three positive responses. Follow-up telephone calls were made, in addition to telephone calls to restaurants with no email or contact form. A diverse mix of both the size and type of restaurant was targeted. Overall, 151 restaurants were contacted, resulting in 13 interviews and four carbon footprints, with the cuisine types of the restaurants shown in *Appendix II*.

3.2. Interviews

Interviews were chosen as the primary research method as they provide the ability to gain in-depth information in a short period of time, and restaurateurs can raise issues not previously considered by the interviewer (Valentine, 2005). Interviews lasted approximately 30 minutes and consisted of eight main semi-structured questions (*Appendix III*), beginning with an ice-breaker about the restaurant characteristics to allow the restaurateur to become comfortable. For the questions, normative language was used to enable all restaurateurs to participate, regardless of their knowledge of the study area; for example, ‘environmental impact’ was used instead of ‘greenhouse gas emissions’. Questions two and three were designed to find out the owner-manager’s awareness of their GHG emissions, which emissions they felt responsible for, and how emissions were prioritised within the restaurant, to answer RQ1. Questions four and five sought to understand how governance actors can enable or prevent decarbonisation, to answer RQ2. The owner-manager was then shown a SPT diagram (*Figure 1*), used as an interview aid to gain further insight, similar to Hampton (2019). The diagram was explained through the example of car driving, based on research from Shove *et al.* (2012), and was then used as a construct during questions six, seven, and eight to uncover challenges and opportunities to reorient *practices* in restaurants to reduce emissions, to answer RQ1.

Secondary data from six interviews with hospitality actors – UKHospitality, UKHospitality Scotland, the SRA, Zero Carbon Forum (ZCF), the Scottish Tourism Alliance (STA), and Hospitality Ulster – were used to answer RQ2. These interviews were conducted in November 2022 for the GOZERO research project (UKERC, n.d.).

3.3. Interview data analysis

Primary data interviews were transcribed verbatim. Both primary and secondary data interviews were then manually coded into themes (Cope and Kurtz, 2016). For RQ1, Shove *et al.*'s (2012) SPT framework was used as a starting point to guide analysis of the challenges and opportunities for decarbonisation. All challenges and opportunities mentioned by interviewees were recorded; however, only those which were mentioned by two or more restaurateurs are included in the findings, as SMEs are so heterogeneous that many have their own unique challenges or opportunities which are not generalisable to other SMEs (Threpsiadi *et al.*, 2022). For RQ2, responses were coded into decarbonisation initiatives which were place-based or sector-based, and this was used as a starting point for analysis to uncover the role of governance actors in accelerating decarbonisation. The results are presented using a narrative approach, which allows the interview responses to be situated within the findings (Creswell and Creswell, 2018).

3.4. Carbon footprint assessments

The UK Government method for calculating carbon footprints was used, published by DESNZ *et al.* (2019). Data required from restaurants included: (i) Energy bills for gas (Scope 1) and electricity (Scope 2); (ii) gas canisters or oil for cooking (Scope 1); (iii) food purchases from suppliers (Scope 3); and (iv) the number of customers. Data was collected over a sample period (typically three-months for Scope 1 and 2 and one-week for Scope 3) and then scaled-up annually. Emissions conversion factors from DESNZ and DBEIS (2023) were used for Scope 1 and 2. Conversion factors for Scope 3 food emissions were obtained from Petersson *et al.*'s (2021) dataset. UK-specific values from this dataset were used where available, otherwise a global average pertained. For food items with no data, the food typology value from the dataset was used. Overall emissions were then calculated over a one-year period and normalised using the number of customers to produce a carbon footprint per customer, providing restaurant-to-restaurant comparison.

3.5. Limitations

Restaurant recruitment proved difficult for this study. The percentage of restaurateurs who agreed to participate after contact via emails or online forms was extremely low (4%), and still only 18% for phone calls. *Appendix IV* shows the outcomes of the different recruitment methods. The owners who said 'no' did so for a multitude of reasons, including limited time (particularly in the summer and university graduation periods, as some would have participated in the winter), lack of interest, possessing a limited control of the menu (as it was decided by sister restaurants), planned holidays during the interview window, and poor health resulting in an uncertain ability to commit. Four owners also committed to interviews which did not materialise: when I arrived at two restaurants

the owner was not in (despite assuring that they would be); when I phoned for one interview there was no response; and one manager later backed out as they had to cover for staff shortages and was then unable to find the time. While sufficient for analysis in this study, a greater number of restaurants and cuisine types would have added to the robustness of the findings.

Finally, providing carbon footprint assessments was hoped to encourage time-pressured owner-managers to participate in interviews, as well as quantify the impact of restaurant activities on the environment (Frijns, 2012). However, upon speaking to owner-managers, it was clear that the carbon footprint element was viewed as a burden, because restaurateurs were apprehensive as to the level of work required to gather the information for carbon footprinting (and some were simply not interested in finding out their carbon footprint). As a result, only four out of 13 restaurateurs interviewed also provided information for carbon footprints. Again, while this proved sufficient for analysis, additional carbon footprints would have contributed to the robustness of the findings.

Several areas of data for carbon footprint assessments were not included for a plethora of reasons. For Scope 1 emissions, restaurateurs did not know their refrigeration information, so refrigeration was not included. However, this should not impact the results greatly, as the emissions from electricity consumption for running refrigeration systems are larger than those from refrigerant leakage (Cascini *et al.*, 2016). For Scope 3 emissions, drinks were not included because of a lack of emissions conversion factors. Falciano *et al.* (2022) found that beverages contributed to 6.8% of the annual carbon footprint of a pizza restaurant in Italy, so this provides an indication as to the significance of these emissions. Additionally, none of the restaurants sampled had a company vehicle, nor purchased carbon offsets. Food waste was not included as half of the restaurants did not separate food from general waste, and the other half did not have data on waste. Finally, emissions from the purchasing of cooking appliances were not included as one restaurateur suggested that most cooking equipment used in the UK came from a company called BlueSeal, who are based in New Zealand, as there were no quality alternatives made in the UK or the EU, meaning restaurants have limited choice as to the origin of their equipment.

Paper receipts and colloquial language also limited the accuracy of emissions calculations for Scope 3 food purchases. Each restaurant received a paper invoice from each supplier (with some restaurants receiving eight invoices per day), so a minimum one-week sample period was agreed upon to create a manageable workload. On the invoices, colloquial language was often used (e.g., ‘a punnet of strawberries’, or ‘a bunch of rocket’), making it difficult to quantify the weight of the produce. This poses a challenge for both SMEs and low-carbon advisors, adding to the time taken to provide accurate carbon footprint assessments. Communication with owners and best-guess estimates helped address this challenge.

Chapter 4. Results

This section addresses the two RQs outlined in Chapter 1.

4.1. RQ1 – *What are the challenges and opportunities to reorient practices in SME restaurants towards Net Zero?*

Coding interviews using Shove *et al.*'s (2012) SPT framework identified 10 challenges and seven opportunities to reorient *practices* in SME restaurants towards Net Zero targets. Section 4.1. presents these challenges and opportunities as a narrative through the SPT elements of *meanings*, *materials*, and *skills* with which they align the most (as well as showing the links to other elements in Figure 2), beginning with the challenges (Table 4).

4.1.1. Challenges: Meanings

Three challenges to decarbonisation related to the *meanings*: customer satisfaction; the inability of restaurateurs to control emissions; and preferences for serving high-carbon dishes.

Firstly, customer satisfaction was highlighted by *all* restaurateurs as a challenge to decarbonisation, which related to the energy requirements to produce a nice restaurant ambience (Scope 1 and 2 emissions), and the food served (Scope 3 emissions). For ambience, lighting and temperature dictate energy use. Over time, restaurateurs stated that the number of lighting appliances in restaurants has increased, such as additional corner spotlights, in efforts to improve customer satisfaction. This poses a challenge for decarbonisation, as emissions reductions cannot come through reduced energy demand (e.g., from fewer lights), so must come from improved energy-efficiency.

Temperature can also affect the experience of customers in a restaurant:

“[The fireplace is] aesthetically pleasing, isn't it? It's a nice thing to walk into a warm environment and see a fire and smell [it] burning” (owner, rural British inn).

Resultantly, restaurants must be heated in the winter and cooled during the summer. One restaurateur felt the use of cooling devices was a non-negotiable for customer satisfaction:

“If I said to the customers, ‘I'm going to save a bit of energy [by turning the fans off]’, I don't think they'll be happy. We *have* to turn the fans on when it's too hot” (owner, Mexican restaurant).

These devices increase energy use, therefore increasing Scope 1 and 2 emissions.

Regarding the food served, nearly all restaurateurs stated that perceived consumer-demand for meat resulted in them being apprehensive to reduce or remove meat from the menu, for fear of customer backlash:

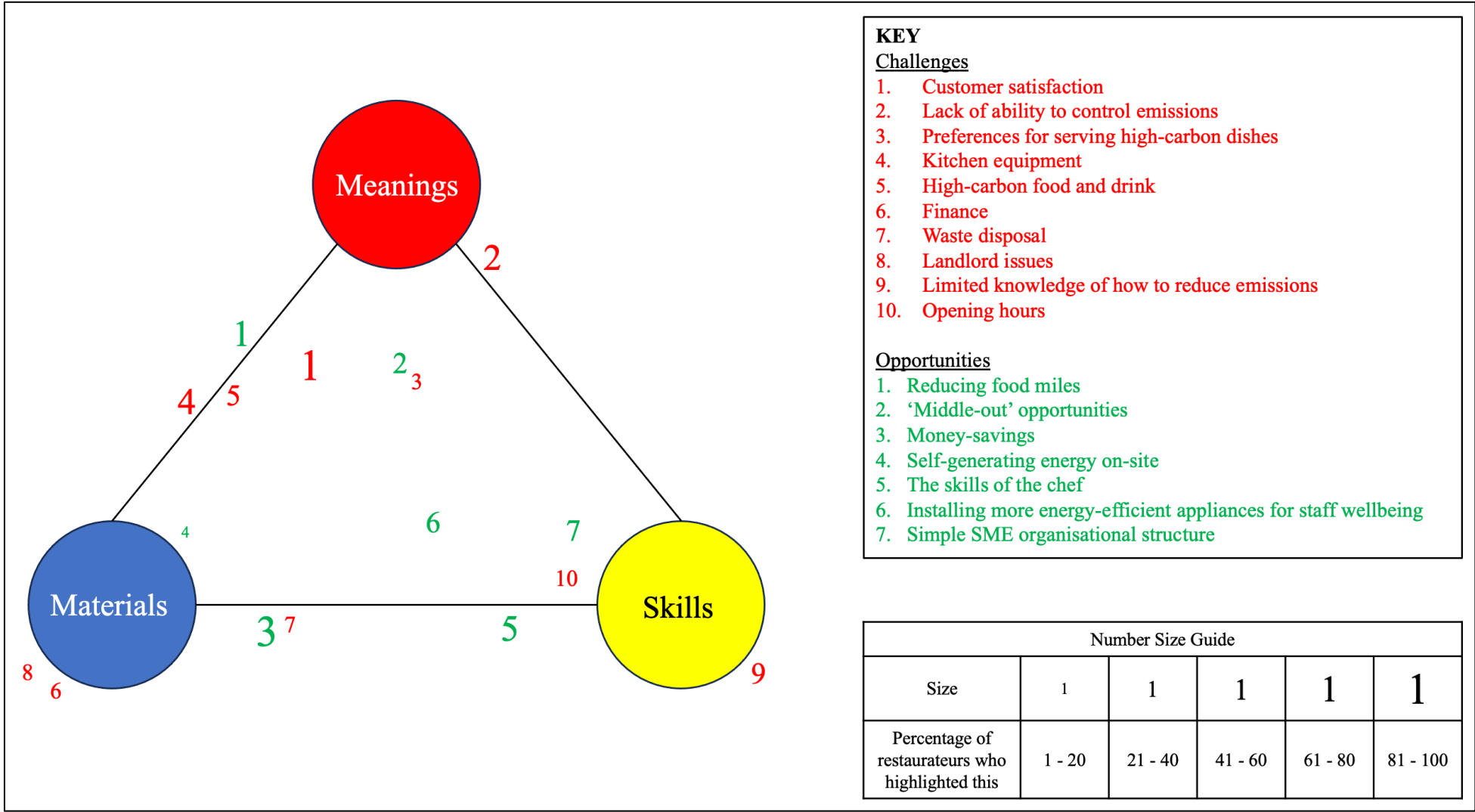
Table 4: Challenges to reorient practices in restaurants towards Net Zero targets.

Main SPT element	Challenge	% of restaurateurs highlighting this challenge	Example quotation(s)	Explanation
<i>Meanings</i>	Customer satisfaction	100%	-“I don't want to use this air-conditioning, but with the warm weather, the customers are asking for us to use it... In the future? I think [we will use it] more” (manager, Italian restaurant). -“You’ve got to give the customers what they want. Our customers know our menu, and would we change our menu because [of] the environment? No, we wouldn’t, because we know what our customers want and like” (owner, rural British inn).	A good customer experience is essential in order to make money and ensure customers return, which results in increased energy requirements for satisfactory lighting and temperature (Scope 1 and 2). Additionally, many owners perceive that demand for meat from customers is high, making them apprehensive to reduce meat from the menu (and thus reduce Scope 3 emissions).
	Lack of ability to control emissions	69%	-“We can’t do much, I’m afraid. We cannot change the system” (owner, Spanish restaurant). -“[The responsibility for emissions lies with] the producers of the electricity. It’s down to them to provide something sustainable and good for the environment” (owner, British restaurant). -“Being so rural, people have got to drive to you. There’s no choice – there’s not a good enough bus route” (owner, rural British inn).	Most owners felt a lack of control of emissions from at least one scope. For Scope 1, owners stressed that they were unable to turn appliances off during opening hours. For Scope 2, owners highlighted that they could not control the carbon intensity of the electricity grid. For Scope 3, most owners felt no responsibility for many areas, such as customers driving to them, or emissions from food production.
	Preferences for serving high-carbon dishes	38%	-“The chef would never plan a menu around energy-efficiency. It will always be planned around flavour” (owner, rural British inn). -“My biggest issue sometimes is [the chef] and how he feels things look. He may feel that two lamb chops looks too small: the customer is delighted because three is too much” (owner, British restaurant).	Some owners who were also the head chef wanted to serve particular foods or cook in particular ways, regardless of the emissions from energy use or food types. In addition, some chefs have a different perception of adequate food portions to their customers, increasing food waste from the plate.

<i>Materials</i>	Kitchen equipment	62%	- “In an Indian restaurant, you need a tandoor oven. If you don’t have one, it’s not an Indian restaurant” (owner, Indian restaurant). - “You can’t just turn all your equipment on when the customers walk in the door. It has to be on from the minute you open to virtually the minute you close” (owner, British seaside restaurant). - “Say, a pan of duck. If we have to marinate that duck and then cook it, it takes quite a long time” (owner, Indian restaurant).	Firstly, some restaurants, particularly those serving foreign cuisine, need specialised equipment for particular foods. Secondly, conventional kitchen equipment takes time to heat up, so must be on all night, regardless of the number of customers served. Finally, some dishes take longer to cook than others, or must be heated to a higher temperature, requiring more energy.
	High-carbon food and drink	46%	- “We are [an] authentic Spanish restaurant, so it has to be those dishes... The rice has to come from the special paella rice [region], for example” (owner, Spanish restaurant). - We’re [a] Greek restaurant, so there’s certain things [that] have to come from Greece (owner, Greek restaurant).	The restaurant setting means that consumers expect certain products for authenticity, regardless of the emissions of the products, or their production origin. This challenge was highlighted by the British steakhouse specialising in high-carbon steak dishes, and half of restaurants specialising in foreign cuisine types, but few specialising in British cuisine.
	Finance	38%	- “Individual restaurants cannot afford £20,000 for [a new] fryer” (owner, Spanish restaurant). - “There’s going to be very few people who can turn around and say ‘[prioritising the environment] is one of the highest things’, [because] the restaurant game is very difficult” (owner, British seaside restaurant). - “If you go for everything expensive [and ‘organic’], unfortunately it will never work” (owner, Greek restaurant).	Restaurants find it difficult to afford more energy-efficient appliances, as even with a low discount rate and a short payback period due to high energy prices, limited cash reserves pose a challenge. Many restaurateurs also associated more expensive, ‘organic’ produce with lower emissions, stating that they could not afford such produce, limiting their ability to lower their Scope 3 emissions from food.
	Waste disposal	31%	- “I don’t think a lot of people realise what stumbling blocks we come across with recycling” (owner, British inn). - “Food waste being segregated would have an impact on our working <i>practices</i>” (owner, British restaurant).	Many restaurants do not have food waste separated from general waste, as doing so would impact upon their practices in the kitchen. This increases Scope 3 emissions.
	Landlord issues	23%	- “We can’t put more tables [outside] because we’ve got some issues with our landlord” (manager, Italian restaurant).	Landlord-tenant issues can make the installation of building materials for Scope 1 and 2 emissions reductions challenging.

<i>Skills</i>	Limited knowledge of how to reduce emissions	54%	- “I don’t know how I would [get to Net Zero]. How would somebody like me be ever able to do that?” (owner, rural British inn). - “I know what I want to do, but I have no idea how to get there” (owner, pizzeria and pub).	Most owners were unaware of how to decarbonise significantly towards Net Zero. This was the case even when the owners were eager to reduce emissions.
	Opening hours	23%	- “Monday and Tuesday daytimes are very quiet for us. If we [were] to not open on those, we would lose staff because they’re not going to get enough hours. [Staff are] not going to be happy, they’re not going to be putting the best into the business” (owner, British seaside restaurant). - “A lot of people have started to work from home, so they can afford [the time] to go out on a Sunday, Monday, or Tuesday night. So, to shut on Monday? You’re going to be losing a lot of profit, and you’ve got salaries, tax, [and] rent to pay” (owner, Indian restaurant).	The restaurant sector is experiencing staffing issues, so restaurants must be able to offer good hours to staff who want to have a full-time job, despite this resulting in increased energy use from additional opening hours. However, this can result in improved staff performance, benefitting the business. For example, staff may be more inclined to separate waste properly, which reduces Scope 3 emissions.

Figure 2: A diagram showing how each challenge and opportunity links to each element of SPT, with challenges and opportunities scaled to the percentage of restaurateurs who highlighted them. Those numbers outside of the triangle do not impact all three elements. The closer a number is to an element, the more it is impacted by it.



“We need to be careful [not to] lose our jobs because no-one comes here anymore [if we change our menu to reduce meat]. That’s not really the outcome we’re hoping for. [Change] has to be incremental” (owner, pizzeria and pub).

However, societal norms and expectations of particular food dishes from restaurants were found to be variable across the UK, adding complexity to this challenge. For instance, reducing seafood *materials* may be more feasible inland than at seaside restaurants, where restaurateurs are particularly aware of the *meanings* placed on eating seafood at the seaside:

“If we stopped serving seafood in our seafront restaurant we’d be out of business in a week! You’ll find that in every seaside town” (owner, British seaside restaurant).

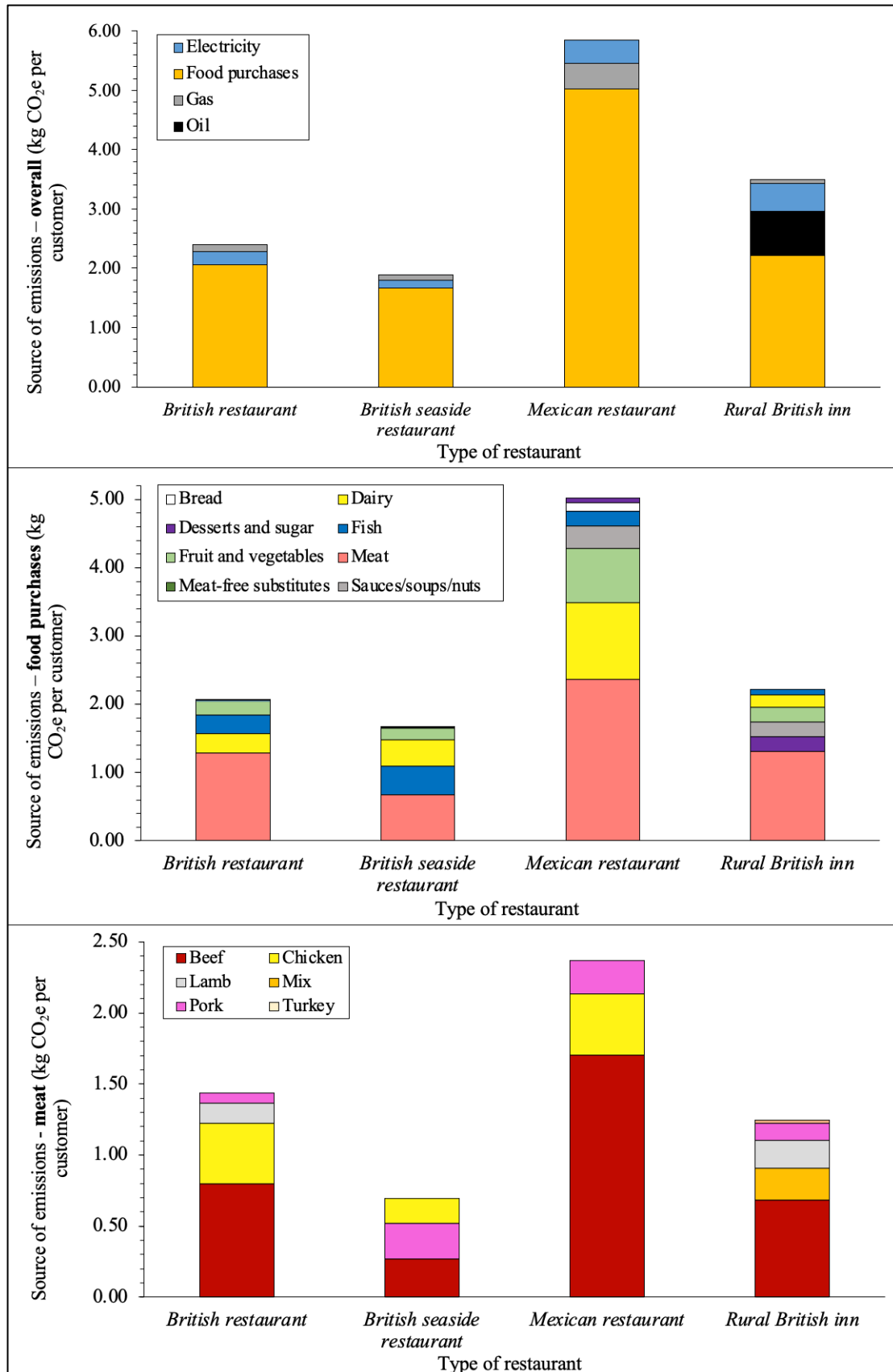
In rural areas, the connection to farming communities ingrains meat in local culture, so rural restaurant owners felt obliged to offer meat dishes to satisfy consumers:

“Would [less meat] sell as well? You could have eight dishes on the menu: four meat, four veggie. You’re still going to sell, here, more of the meat choices. So just because you have four veggie options, doesn’t mean you’re going to sell any less meat” (owner, rural British inn).

This point is crucial in the challenge of decarbonising SME restaurants, as carbon footprint analysis showed that the majority of emissions from restaurants come from Scope 3 food purchases, and within those, a large percentage come from high-carbon meats, such as beef (*Figure 3*). Indeed, meat-based diets have a considerably higher carbon footprint than plant-based diets (Scarborough *et al.*, 2023). Therefore, if owner-managers are reluctant to change dishes to reduce or remove high-carbon foods, such as meat, based on the perceived *meanings* that customers place on eating those dishes, then decarbonisation to Net Zero targets will be difficult.

Secondly, nearly three-quarters of owners felt unable to control their emissions. For Scope 1 and 2 this related to a lack of control over appliances, which is explored in Section 4.1.2. Additionally, for Scope 2 emissions, three restaurateurs suggested that electricity producers were responsible for those emissions, as owner-managers had no control over the carbon intensity of electricity. Finally, most owner-managers felt that they possessed little control over their Scope 3 emissions, arguing that the greatest responsibility for reducing emissions from supply chains lay with the food and drink producers, and that emissions from customers driving to their restaurants were something that owner-managers were not able to influence, particularly in rural areas with limited public transport alternatives. This results in owner-managers not seeking to reduce their emissions as they are unaware of what they can control.

Figure 3: Carbon footprints for four restaurants, showing the source of emissions overall, from food purchased, and from meat. Scope 3 emissions from food purchases make up most of the emissions from the restaurants, with 30-34% of emissions in three restaurants coming from high-carbon beef products. For the fourth restaurant, the impact of location is clearly visible, with meat substituted by fish in the seaside restaurant, resulting in substantially lower emissions per customer.



Finally, a preference from the owners for serving high-carbon dishes poses a challenge to decarbonisation. This often occurred where the owner was also the chef, who wanted to serve particular foods (including portion sizes) or cook using particular practices, such as cooking a *jus* which takes three-to-four days, regardless of the emissions. Since high-carbon foods contribute to a large proportion of the overall emissions (*Figure 3*), decarbonisation will be challenging if the owner is not prepared to change practices because of their preferences.

4.1.2. Challenges: Materials

Interviews uncovered five *material* challenges to decarbonisation (*Table 4* and *Figure 2*), which are presented in this section.

Firstly, many owner-managers reported that there were few efficiency opportunities for conventional kitchen equipment. For example, owner-managers pondered turning appliances off during quiet periods, but concluded that they were unable to do so, as conventional kitchen equipment takes considerable time to heat up, and customers expect their food to be served quickly. This left owner-managers feeling helpless with respect to their energy use:

“As far as the grills, the fridges, the freezers, the fryers, and things like that, you just have no control over” (owner, rural British inn).

Resultantly, owners are reluctant to make kitchen appliances changes. Furthermore, for some cuisine types, specialised equipment is needed. For instance, an Italian restaurant manager highlighted that they needed a specialised wood-oven to produce pizzas with a distinctive flavour, which emits more air particulates than other oven types (Falciano *et al.*, 2022). Furthermore, some dishes require more energy input than others, and some cuisine types require more appliances to cook a dish. For instance, in an Indian restaurant:

“There’s so many different spices and ingredients just in one curry. You might have six different type[s] of stuff, and you have to prepare [them all] in a separate way on a separate cooker” (owner, Indian restaurant).

This results in greater energy use, as more appliances are used (and sometimes heated) and then washed, increasing Scope 1 and 2 emissions.

Secondly, nearly half of owner-managers stated that they needed to serve high-carbon food and drink because of the cuisine setting of the restaurant, with consumption *practices* created by the interplay between the actors (the owner and customers) and the setting (the cuisine type of the restaurant) (Oktadiana *et al.*, 2020). This challenge applied to restaurants serving predominately high-

carbon foods, such as steakhouses, and restaurants serving foreign cuisine, as 50% of restaurateurs specialising in foreign cuisine types felt that they must import particular products for authenticity, regardless of product origin, increasing Scope 3 food emissions due to greater transport emissions.

Thirdly, nearly two-fifths of restaurateurs stated that finance was a barrier to decarbonisation, as they did not have the upfront capital to install more energy-efficient appliances which reduce Scope 1 and 2 emissions:

“A lot of businesses haven’t got a lot of cash reserves” (owner, Greek restaurant).

In addition, many restaurateurs expressed a juxtaposition between emissions-reduction measures and financial benefits, particularly around Scope 3 food emissions. For example, one restaurateur stated that meat-free substitutes had lower profit margins than meat products, and others stated that they did not have the finance to purchase more expensive, ‘organic’ produce, which they associated with low-carbon food.

Fourthly, waste disposal was mentioned as a challenge to reducing Scope 3 emissions, because many restaurants did not segregate food from general waste (including the restaurants participating in carbon footprinting), as this would have an effect on their practices. For example:

“Can we store that extra bin? Can we change our work routines to work around that? Can we lift it? How far have we got to walk with it? Is that safe for the staff to do?” (owner, British restaurant).

Lastly, issues with landlords posed a challenge to decarbonisation. While only 23% of restaurateurs highlighted this, it was not asked how many lease their property. Given that over 50% of commercial properties are leased in the UK (PIA, 2017), leasing was a challenge to decarbonisation for nearly half of SME restaurants who lease their property. Leasing challenges affect Scope 1 and 2 emissions due to the *materials* of the property. For instance, one owner-manager stated that they could not add solar panels to the roof. Another wanted to increase outside dining (and so reduce energy use from indoor lighting and cooling) but could not get permission. Finally, the owner of a Mexican restaurant pointed out that the accommodation above the restaurant was not well-insulated, affecting the ability of the restaurant to retain heat, resulting in increased Scope 1 emissions from energy use.

4.1.3. Challenges: Skills

Two *skills* challenges were highlighted by owner-managers (*Table 4* and *Figure 2*). Firstly, 54% of owner-managers possessed a limited knowledge of how to reduce their emissions. Indeed, two-out-of-five owner-managers did not know what ‘Net Zero’ was, nor the UK’s 2050 Net Zero target. Some owner-managers also did not know about the impact from GHG emissions:

“I don’t understand how carbon emissions affect the world, because it was never a thing in school. And I’m only 37... I could look it up I suppose, couldn’t I? I just don’t. I have too much to do” (owner, British inn).

The emissions from different sources were poorly understood by two restaurateurs, with one young restaurateur confusing GHG emissions with heat from cooking appliances, and one owner near retirement age first thinking about waste and recycling, which only makes up a small percentage of restaurant emissions (Falciano *et al.*, 2022), rather than the larger emissions sources of food and energy, when asked where emissions from the restaurant come from.

Furthermore, several owner-managers also showed limited knowledge of the differential emissions from different types of food:

“I don’t know how much impact [it would make] if it was a vegan restaurant” (owner, Spanish restaurant).

My own carbon footprint analysis in this study found that there were widely-varying values attributed to each food, so it is difficult to reduce Scope 3 emissions from food with certainty and reliability.

Secondly, a low percentage of restaurants also highlighted that staffing determined their opening hours, with them being unable to close on traditionally quiet days, so that they can give their staff enough hours to earn a sufficient wage. This rules out achieving emissions reductions through reduced energy use during quiet days, although one restaurateur suggested that the shift to home-working has made traditionally-quiet days busier.

4.1.4. Opportunities: Meanings

Seven opportunities to reorient *practices* in restaurants towards Net Zero targets were found (Table 5), with their alignment to the elements shown in Figure 2. Two of these opportunities related to the *meanings*.

Firstly, over two-thirds of restaurateurs wanted to use local suppliers, thus reducing food miles. While this affects the emissions from food transport, most owners expressed that they did this to support local businesses, or to source fresh food. The opportunity for reducing food miles was particularly emphasised by restaurateurs in rural, Welsh farming communities:

“It’s local businesses and supporting local farmers. That’s really important to us. Because we’re a farming community, why would we go anywhere else to get our fruit and veg and meat?” (owner, British inn).

Table 5: Opportunities to reorient practices in restaurant-sector SMEs towards Net Zero targets

Main SPT element	Opportunity	% of restaurateurs highlighting this driver	Example quotation(s)	Explanation
<i>Meanings</i>	Reducing food miles	69%	-“I like to try to use as much local as possible, not just for a global impact point of view, but actually just to support other local businesses” (owner, rural British inn). -“We are trying to use all the local suppliers, like butchers, greengrocers, that sort of thing” (owner, Spanish restaurant).	Many restaurateurs aimed to reduce food miles for freshness and supporting the local economy. This reduces Scope 3 food emissions from the transportation of produce. Even for restaurants with foreign cuisines, local butchers, greengrocers, and suppliers of everyday, fresh food are utilised, reducing emissions, with only drinks and long-lasting food imported.
	‘Middle-out’ opportunities	46%	-“We’re telling our suppliers: ‘we will give preference to suppliers who have their own [environmental] policies and targets” (owner, pizzeria and pub). -“If I don’t go to this guy to get that stuff, he’s not going to make it. So, I think I have a responsibility” (owner, Greek restaurant). -“We push our venison product [on the specials board] quite strongly, because we believe in sustainability” (owner, British steakhouse).	Some restaurateurs pushed suppliers to decarbonise, reducing Scope 3 emissions from food. In addition, some restaurants tried to nudge consumers towards perceived low-carbon food, through communication (e.g., on special boards). This is key, as restaurants sit between suppliers and consumers, so have agency through the ‘middle-out’ approach.
<i>Materials</i>	Money-saving	85%	-“I don’t tend to put my outside lights on [until] a lot later. Some of them I don’t even put on” (owner, rural British inn). -“We serve food from 12 until 3, and we reopen [at] 5. [That two-hour window is] purely for the prices” (owner, British inn). -“I changed my spotlights to energy-saving lights because of the high prices” (owner, Indian restaurant).	Most restaurateurs have attempted to reduce their energy use in response to increased energy prices, either through turning appliances off when not in use, reducing working hours, or installing more energy-efficient appliances. This reduces Scope 1 and 2 emissions. Reducing food waste (Scope 3 emissions) also saves money, as more of the produce is used.
	Self-generating energy on-site	18%	-“[With] solar panels, you’re not reliant on somebody else, and you can project what the cost is going to be for a long time. So, it gives you a peace of mind. When that worry goes away, then you start thinking about a positive impact on doing something else” (owner, Greek restaurant).	Because of the persistent energy use in restaurants from appliances which cannot be turned off, calculating repayment on renewable energy is simple, so installing it reduces worry and allows for a focus on decarbonisation efforts elsewhere.

<i>Skills</i>	The skills of the chef	69%	-“If [our menu had more vegan meals], our chefs would have to learn. You will find any decent head chef should be able to turn [their] hand to anything. And they like that” (owner, British seaside restaurant). -“For food waste, we barely have any in the kitchen. Because we’ve done it for that long, you get a rhythm of what you need” (owner, Mexican restaurant).	Most owners stressed that their chefs would have the skills to adopt to a more meat-free menu design in order to reduce Scope 3 emissions, with many stating that they already possessed the know-how, and some stating that they could easily learn. The skills of the chef were also seen as crucial to reducing food waste in some restaurants.
	Installing more energy-efficient appliances for staff wellbeing	54%	-“The new stuff, fully electric, [the chefs] just press one button [and] it’s completely set up. [It’s] far easier to use than normal standard equipment” (owner, British seaside restaurant). -“The chef [says], ‘oh, I need this [appliance] to do this, because I can’t do that’. I respond, ‘OK, we’ll look at how much that is and see whether we can get it’” (owner, British inn).	Newer energy-efficient equipment in the restaurant saves money. However, in addition to saving money, it improves the working environment in the kitchen for staff, especially if newer equipment is electric, rather than the conventional gas, as electric appliances heat less of its surroundings. New equipment also makes it easier to consistently produce good-quality food.
	Simple SME organisational structure	54%	-“The waiter is coming to us [the chefs] and saying ‘this salad is [selling] less. You need to save this food because it’s going to [go in the] bin, you need to do something about that’ (manager, Italian restaurant). -“Running a small business, the advantage is that you can make sure that everything is facing in the right direction, and you can actually make your changes nice and quickly” (owner, pizzeria and pub).	The simple organisational structure of SMEs means that the communication between the front-of-house staff and chefs can be efficient, which can help to reduce food waste (Scope 3 emissions) by providing feedback on items which are overstocked or are being ordered infrequently by the customers. Owners can also implement decarbonisation measures quickly.

Even for restaurants serving foreign cuisine, local butchers, greengrocers, and suppliers of everyday, fresh food can be used, as evidenced by the owner of a Spanish restaurant (*Table 5*).

Secondly, nearly half of owners highlighted ‘middle-out’ opportunities (Parag and Janda, 2014) to influence suppliers and consumers. Regarding suppliers, restaurateurs expressed their ability to encourage suppliers to decarbonise, through giving preferences to suppliers who decarbonise, or supporting local suppliers whom they know work with the environment positively. Some restaurateurs also tried to nudge consumers towards low-carbon dishes, through information on specials boards about (perceived) low-carbon foods, or providing carbon footprint information on the menus, in the case of one restaurant. By doing so, they are also encouraging suppliers to adapt to reduced customer demand for meat, reducing the large Scope 3 emissions from food.

4.1.5. Opportunities: Materials

Two *material* opportunities were identified through the interviews. Firstly, over four-fifths of restaurateurs highlighted money-savings as the main *material* opportunity for decarbonisation (through reduced Scope 1 and 2 emissions). Changes to practices to save money occur in three ways. Firstly, switching appliances off reduces consumption:

“Tonight, customers are not [yet] here. Normally, I would have had the air-con[ditioning] on straight away, [but] I’ve got the windows open [instead]. Once half-full, I’ll get the air-con[ditioning] on. But at least within those two, three hours, I’ve saved a bit of energy. It’s purely for the money side” (owner, Indian restaurant).

“With the energy, we try to not turn everything on until the final minutes before we need to” (owner, Mexican restaurant).

Secondly, restaurants can also reduce their food-serving hours, without reducing their opening hours (and so not affecting staff), allowing kitchen appliances to be turned off mid-afternoon. Finally, restaurateurs can install new, more energy-efficient appliances, with the same practices, but reduced costs.

Furthermore, for a small number of restaurateurs, having self-generating energy on-site was a feasible material installation to reduce Scope 1 and 2 emissions. One restaurateur highlighted that self-generating energy on-site created certainty around their energy bills (due to consistent energy use, as many appliances are constantly on), reducing stress, and so creating more mental capacity to think about other opportunities, accelerating decarbonisation.

4.1.6. Opportunities: Skills

Three opportunities related to *skills* were: the skills of the chef; installing more energy-efficient appliances for staff to use; and the simple SME organisational structure. These opportunities had co-benefits for staff. Firstly, over two-thirds of owner-managers stressed that their chefs possess the know-how to cook dishes with reduced or limited meat, showing that the skills of the chef are not limiting reducing high-carbon dishes on the menu. In addition, it was highlighted that staff satisfaction and seasonal menus were complementary, as:

“No head chef wants to cook the same food day-in, day-out. That’s why we have four menus a year, because the chefs want to be cooking different things” (owner, British seaside restaurant).

Furthermore, many restaurateurs pointed to the skills of their chefs as the cause of their self-reported low food waste, due to chefs gaining a “rhythm” through experience.

Secondly, 54% of owner-managers suggested that they installed more energy-efficient *materials* mainly to improve staff wellbeing, with money-savings an additional bonus. For example, newer, digital equipment is easier to control and cooks more predictably, making it easier to produce good-quality food. Furthermore, newer equipment can also improve the working conditions in the kitchen, where it is usually very hot. For instance, electric induction-hobs only heat the appliance, not its surroundings. As an example, an Indian restaurant had recently purchased a new electric-powered naan-maker for staff wellbeing:

“It’s a lot safer because you don’t have to have a 300-degree oven burning next to you.... On the hottest day of last year, we didn’t open. We shut because it was inhumane to work in [those] conditions. That’s why we’ve invested in it, to make sure everyone’s safe” (owner, Indian restaurant).

Thus, the staff are clearly a consideration when installing more energy-efficient appliances, with the new naan-maker a climate adaptation, changing practices to allow the restaurant to adapt to hotter summer temperatures. This shows how the outcome of energy use (i.e., producing good-quality food) is the important thing in restaurants, rather than the amount of energy, showing how energy is emergent from, and defined by, *practices* (Shove and Walker, 2014).

Finally, the simple SME organisational structure was highlighted as an enabler of decarbonisation, due to it facilitating good communication between the staff. This was most evident when attempting to reduce food waste, with staff providing important feedback between the front-of-house and the kitchen:

“We have to have the feedback. They have to be communicating with us. We’re relying on the skills from our staff, definitely” (owner, British restaurant).

Additionally, owner-managers of micro-businesses reduced food waste further by giving leftover food to staff. Finally, the simple SME structure is also an opportunity for using daily menus, which can further minimise food waste:

“When COVID[-19] happened, you weren’t allowed to hand menus from one table to another. We had to go onto a paper system. We’ve carried on that system because we found it a lot better. Every day, my wife says, ‘this is on the menu, that’s not on the menu’. Beforehand, when we had a set menu, we had to make sure [those] dishes were on every day, where[as] now we can play with the menu a lot more. We’ve found our food wastage has gone down tremendously” (owner, rural British inn).

For this restaurateur, taking the time each morning to discuss stock with his wife has meant that their food waste has greatly decreased, reducing Scope 3 emissions.

4.2. RQ2 – How can governance arrangements accelerate the decarbonisation of SME restaurants?

This section presents how place-based and sector-based governance actors participate in the decarbonisation of SME restaurants (summarised in *Figure 4*). Based on interviews with governance actors and restaurateurs, it discusses how these actors seek to address the challenges and opportunities presented above.

4.2.1. Place-based governance actors

Firstly, while most SMEs had no *preference* as to where support came from, most *expected* it to come from LAs or devolved governments. This was especially found in rural restaurants, who had a stronger connection with place than urban restaurants, and sector-based actors expressed this:

“There’s value in place-based initiatives, because SMEs would identify stronger with being a small business in Cornwall [for example], than they would with the Hospitality Sector Council [for example], and that engagement at a local level would be what they understood and expect” (SRA).

Historically, this support has consisted of providing low-carbon advisors through the ERDF, which is slowly being phased out now that the UK has left the European Union.

Secondly, place-based governance actors can enable reductions in Scope 3 emissions from the supply chains of SME restaurants, particularly food purchases from local suppliers, through facilitating dialogue between SME suppliers and restaurants, as place-based actors are likely to understand their local needs. This is important for SME restaurants:

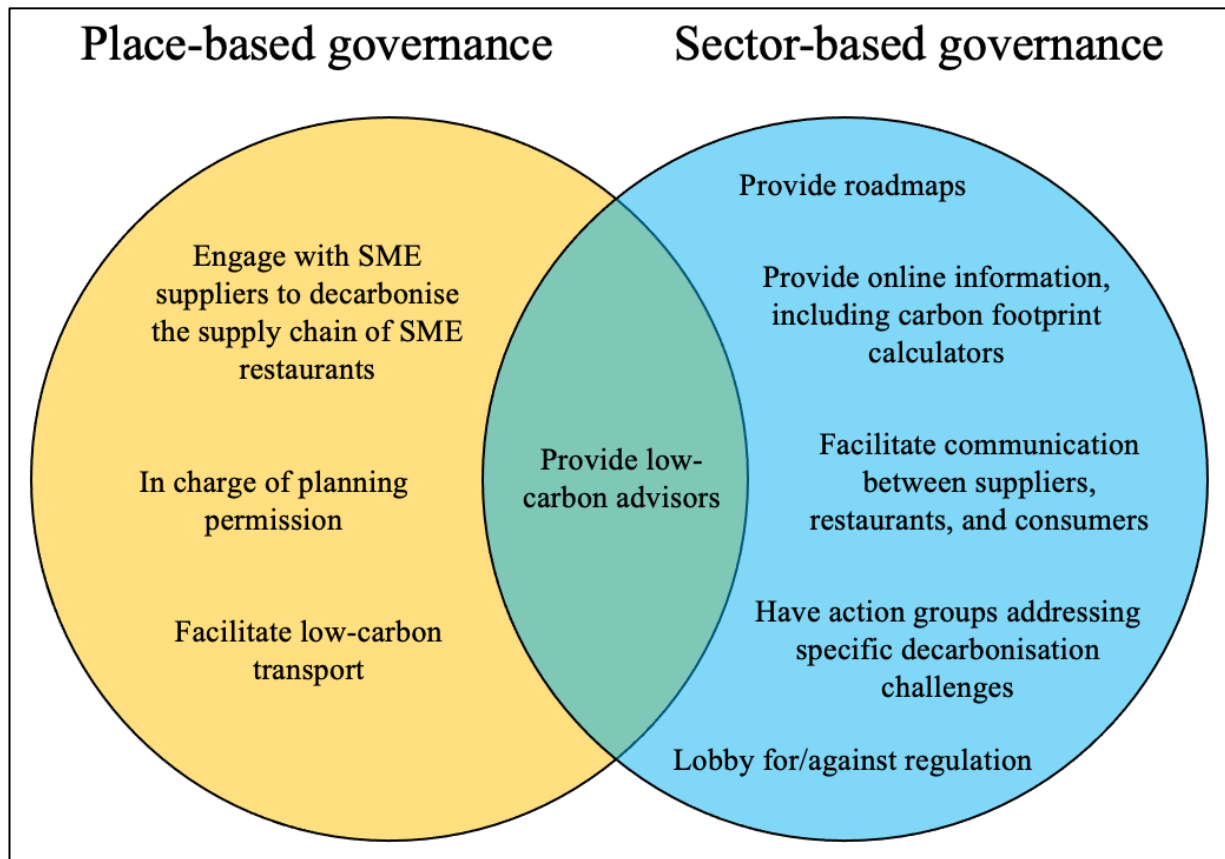
“[The suppliers] are very local. We’ve got a very close relationship with them. It’s about caring and working with people who understand the problems” (owner, British steakhouse).

The close relationship between supplier and SME restaurant is particularly prevalent in Northern Ireland because suppliers were the only organisations willing to extend finance to rebuild and restock damaged businesses after the Troubles. In general, the local, short supply chains contribute positively to sustainability criteria:

“SMEs tend to do better on the sourcing section of our rating than larger businesses, because they generally have shorter, more transparent supply chains” (SRA).

Place-based governance actors can adapt the decarbonisation of supply chains to their unique local challenges. For instance, place-based governance actors may hold specialist knowledge of how to

Figure 4: A summary of the responses by sector-based actors and SME restaurateurs when asked how governance actors promote decarbonisation.



decarbonise the supply of specific local food, such as seafood for seaside restaurants. Finally, ZCF highlighted that place-based actors can be especially important for promoting seasonal food and encouraging the use of local allotments.

However, place-based governance actors involved in planning applications may prevent Scope 1 and 2 emissions reductions. For example, one restaurant had accepted a quote for solar panels, but cannot yet install them as it must be first calculated that the local grid can cope with the energy when the restaurant is closed on a Monday. Additionally, one restaurateur stated that local planning restrictions, such as those in National Parks or Areas of Outstanding Natural Beauty may prevent the installation of visible renewable energy, such as solar panels. Even in urban areas, being a listed building and the heritage of a location creates challenges to solar panel installation:

“We want to challenge the council and see if we can get solar panels. There’s not a single solar panel in central Oxford, because it’s a policy conflict between heritage and sustainability” (owner, British pub and pizzeria).

Finally, place-based governance actors also have an important role to play in reducing Scope 3 transport emissions, by facilitating low-carbon transport options to restaurants.

4.2.2. Sector-based governance actors

Sector-based governance actors are also important in enabling the decarbonisation of SME restaurants for several reasons. These actors (e.g., trade associations such as UKHospitality) represent venues throughout the country, as hospitality is dispersed.

Firstly, governance actors produce roadmaps and strategies, such as UKHospitality collaborating with ZCF to create a roadmap detailing how the UK hospitality sector can achieve Net Zero, with goals to abate all avoidable Scope 1 and 2 emissions by 2030, and all avoidable Scope 3 supply chain emissions by 2040. These roadmaps are sometimes produced in collaboration with governments:

“Industry, government, and public agencies work really closely together, and it was that collaboration which developed the National Tourism Strategy, Scotland, Outlook 2030. [This] tries to bring together everybody and look across tourism and hospitality, and it very much has sustainability at its heart, and delivering responsible tourism practices” (STA).

However, roadmaps mostly target MLEs, whom sector-based governance actors found easier to engage in decarbonisation efforts. Sector-based actors therefore suggested that decarbonisation for SMEs occurs top-down, creating systemic change through engaging larger organisations and then trickling down to SMEs.

Secondly, sector-based governance actors provide decarbonisation information in three ways: through online information; carbon footprints; and low-carbon advisors. This is critical, as sector-based actors and non-rural restaurants stated that most restaurants would look internally for solutions:

“You see things [that] other restaurants might be doing. A lot of us [in the hospitality sector] talk” (owner, British seaside restaurant).

Regarding information online, sector-based governance actors attempt to make as much information available on the core elements applying to all SMEs, and then point SMEs in the direction towards experts, rather than provide prescriptive measures. These core elements mostly relate to Scope 1 and 2 emissions reductions, as these emissions sources, such as from kitchen equipment, are similar across restaurants due to similar appliances:

“The equipment everywhere is the same. We have certain makes. Any name, any make, they are all the same” (owner, Spanish restaurant).

Carbon footprint calculators are also provided by sector-based actors, mostly online. For example, UKHospitality have partnered with Sky Zero to provide a carbon calculator for their members, ZCF have launched a carbon calculator and toolkit, and the SRA does (self-assessed) audits, which culminate in a report showing how restaurants compare to other businesses and the next steps. Uptake of carbon footprint assessments is low, however, as restaurants find it difficult to provide the information required, partly due to the mismatch of units – an issue unique to restaurants:

“To estimate your supply chain [emissions] – it [is] really hard for restaurants, as you want the number in kilos to match with what you’re putting in your calculator, [but restaurateurs say], ‘I have number of eggs. I don’t have kilos of eggs’. [So] Net Zero Now has a calculator [which] allow[s] restaurants to answer in bottles of things, or the number of eggs, and then the calculator does the work to say the average egg is this heavy, and you get an approximation from that” (SRA).

In addition, sector-based governance actors are also providing low-carbon advisors to restaurants, taking over from the (place-based) role of ERDF. These advisors can provide more-specific initiatives to help SME decarbonisation than offered online and previously by ERDF advisors:

“When we go into a pub or restaurant, we know 25 initiatives they can do, whereas the generic energy auditor [has] five checklists that are relevant for a hairdresser or a pub. That [place-based] support for smaller businesses is good, just make sure it’s relevant to them” (ZCF).

However, sector-based governance actors are currently limited in their scope to provide this service:

“We as an organisation need more resources. We’ve got the model: it is just about scale. We [also] know all the technologies we can deploy to cut carbon. Now some of those, like induction hubs, will have a capital element to them” (ZCF).

Therefore, it appears as though sector-based governance actors have organised themselves in preparation for the transition to Net Zero, and are now asking for funding to accelerate decarbonisation.

Thirdly, sector-based governance actors facilitate communication between suppliers, restaurants, and consumers. For example:

“We’re just launching a supplier marketplace to connect suppliers of low-carbon technology tools” (ZCF).

Suppliers sharing best practices can accelerate decarbonisation of the supply chain and reduce Scope 3 emissions. In addition, sector-based governance actors play a key role in communicating with the public on behalf of the sector. For example, ZCF speak on behalf of the sector by encouraging consumers to order plant-based alternative protein options, making it more economical for restaurants to sell these low-carbon dishes.

Fourthly, sector-based governance actors have action groups addressing sector-specific decarbonisation challenges that individual restaurants cannot solve, such as ZCF focussing on low-carbon technology, tenants and franchisees, dairy (e.g., how to decarbonise cheese), regenerative agriculture, and engaging suppliers.

Finally, sector-based governance actors affect decarbonisation legislation for SMEs through lobbying and actors showed mixed views towards legislation. In order to accelerate SME decarbonisation and reach more SMEs, some sector-based actors suggested that SMEs must be included in decarbonisation legislation:

“Sometimes businesses need things to be a bit more prescriptive, and actually set out what is expected from business” (UKHospitality Scotland).

Sector-based governance actors stated that this was because:

“[Food service] businesses are focussed on survival [and so] do what is legally required of them” (Hospitality Ulster).

However, for some issues, such as food waste reporting, sector-based organisations campaign for SME exemptions from regulation:

“We’re slightly conflicted, because as an industry, we want to be forward-looking and progressive on sustainability issues. But we also have a lot of businesses that are slightly overawed and would quite like to be excluded from some legislation. So generally, we support exemptions for smaller businesses” (UKHospitality).

This shows that support for SME inclusion in decarbonisation legislation is not always a given from sector-based actors. However, a legislative approach towards decarbonisation was received with indifference from most restaurateurs, with some restaurateurs in favour of regulation, and only one restaurateur actively against additional decarbonisation regulation:

“There’s so many rules and regulations you have to follow anyway. If you have to do it, you have to do it” (owner, rural British inn).

In conclusion, Section 4.2. has demonstrated that place-based and sector-based governance actors undertake many initiatives targeting SME decarbonisation, which are summarised in *Figure 4*.

Chapter 5. Discussion

10 challenges and seven opportunities to reorient *practices* in SME restaurants towards Net Zero were found in RQ1, and place-based and sector-based governance initiatives for SME restaurant decarbonisation were identified in RQ2. This section will discuss these findings.

5.1. RQ1: Challenges – themes of high-carbon dishes, energy demand, and values of the owner

The main theme uncovered within the challenges was a reluctance to reduce serving high-carbon foods and dishes, which, as carbon footprinting showed contributed to a significant percentage of emissions from restaurants, poses the greatest challenge to decarbonisation. Firstly, owner-managers perceived a strong consumer demand for meat, which they related to place, as food can be an identity aspect of local culture (Noguer-Juncà and Fusté-Forné, 2022). This perception of owner-managers is supported by recent surveys which show that only 12-25% of British people are willing to reduce meat and dairy consumption (Gillison *et al.*, 2021), so demand for low-carbon dishes is unlikely to be consumer-driven. Secondly, many owners expressed preferences for serving high-carbon dishes, which related to the image and identity of a restaurant (Oktadiana *et al.*, 2020), and occurred where the owner was the chef, who is a key player in menu planning (Ho *et al.*, 2021). For example, the *raison d'être* of a steakhouse is to serve predominately beef steak, which is a high-carbon food (Petersson *et al.*, 2021). It may therefore be difficult for such an establishment to significantly reduce their emissions if their identity prevents them from serving lower-carbon foods. This study and others have shown that specific food items make up a considerable proportion of the entire carbon footprint of restaurants (e.g., Falciano *et al.*, 2022), so where high-carbon dishes are integral to consumer-demand or owner preferences, decarbonising to Net Zero will be extremely difficult. In addition, other factors are also important in influencing menu design, such as religion and allergies (Oktadiana *et al.*, 2020), making it more difficult to get owner-managers to prioritise emissions when designing menus.

Another core theme identified was related to energy demand, which is important for decarbonisation as hospitality is the building use with the highest median gas and electricity intensity in England and Wales (DBEIS, 2021), although carbon footprints showed it is less important than Scope 3 emissions from food. Firstly, the drive for customer satisfaction increases energy demand, which counters the increased energy-efficiency of appliances. This has also been found in households (e.g., Gram-Hanssen, 2013), suggesting that the *meaning* of satisfaction is widespread across society, and so is not just a decarbonisation challenge for SME restaurants. The demands of temperature are also particularly important, as increasingly warm summers mean that as a (mal)adaptation to climate change, restaurants will likely use more energy for cooling to provide a satisfactory temperature for their customers, increasing Scope 2 emissions. This challenge is unique to restaurants, as for other

SME sectors, such as those based in offices, low-tech means of achieving comfortable temperatures, for example through purchasing thermals for staff for warmth, can be used (Hampton, 2017). However, since customers and staff utilise the same space in restaurants, this is not an option, so customer satisfaction poses a challenge for decarbonising Scope 1 and 2 emissions from energy. Secondly, the *material* properties of kitchen equipment and energy requirements for dishes contribute to Scope 1 and 2 emissions. For appliances in specialised restaurants, there may be less research and development to make them more energy-efficient, as they are not commonplace across all restaurants. To reduce energy use, Liqin (2011) suggested serving more food which does not need to be cooked using high amounts of energy, such as vegetables. However, a major overhaul of the menu would be needed for this, as appliances are unable to be turned off during opening hours due to them taking a long time to heat up, because of the pressure to serve food ‘just-in-time’, rather than pre-prepare and reheat food. Therefore, the only way to reduce emissions using this suggestion would be from having fewer appliances, due to having a significantly greater proportion of food cooked using low or no amounts of energy. In most places this is unlikely, due to the challenges previously identified with changing the food served. Therefore, the greatest emissions reductions from Scope 1 and 2 appliances will likely come from increased energy-efficiency and the electrification of appliances (as well as a less carbon-intensive electricity grid), such as through utilising induction hobs, which are extremely energy-efficient compared to conventional cooking appliances (Aisyah *et al.*, 2021). However, the challenge of limited finance will make this difficult.

The final theme identified within the challenges relate to the SME owner-managers themselves. To begin with, a large number of owners felt unable to control emissions, which closely related to their limited knowledge of how to decarbonise. Indeed, for many SME owner-managers, decarbonisation was interpreted in extreme ways, with owner-managers arguing that they could not turn appliances off or interpreting the reduction of high-carbon dishes as stopping serving their main product, such as seafood, completely. These responses reaffirm the limitations of previous studies which asked SMEs to name barriers, as owner-managers were often defensive and blamed external factors. The understanding of SME owner-managers of how to decarbonise is closely related to the values of owners. This challenge could be addressed by low-carbon advisors targeting their approaches by attempting to understand the values of owner-managers (Hampton *et al.*, 2019), trying to change attitudes and the perception of whose responsibility different sources of emissions are (Gram-Hanssen, 2010), and what practice changes are possible for emissions reductions. This is where the benefits of using a *practice*-oriented framework come to the fore. Simply listing the barriers and drivers does not address how governance initiatives affect the practices of restaurants. However, viewing decarbonisation through a SPT lens generates insights into how the meanings, materials, and skills within a restaurant interact and prevent decarbonisation, so that interventions can be targeted to

overcome challenges. For example, listing ‘time’ as a barrier to decarbonisation does not provide insights into how to address that barrier, as the hospitality sector has a staffing shortage with 124,000 job vacancies (ONS, 2023), so cannot simply hire more people to overcome that barrier. However, viewing restaurant *practices* uncovered how performances can be made easier and less time-consuming (e.g., through purchasing appliances which heat up more quickly), so interventions for one challenge (e.g., reducing energy use) can positively affect other challenges (e.g., time shortages). In this way, SPT creates insights into opportunities for changing *practices* to accelerate decarbonisation. This will be explored in greater depth in the following section.

5.2. RQ1: Opportunities – themes of societal influence, and the wellbeing and skills of staff

The greatest opportunity for decarbonisation is through reducing Scope 3 food purchase emissions. Interview responses suggested that restaurants can use their societal influence for this, such as from reducing food miles by using local food and exerting ‘middle-out’ influence on suppliers and consumers (Parag and Janda, 2014). However, local food does not necessarily have lower emissions, as emissions also depend on the operational efficiency of producers (Sahakian and Wilhite, 2014), and local food also has seasonality restrictions. This returns to the challenge of knowing how to reduce emissions, as carbon footprint values are not tailored enough for SMEs to choose suppliers based on emissions, as emissions from food types are not differentiated to each individual supplier. Despite this, SME restaurants can still use their ‘middle-out’ potential to encourage suppliers they work with to decarbonise, which although may not be reflected in carbon footprint assessments as assessors do not have the data to reflect decarbonised supply chains (unless the supplier calculates the footprint of *their* products), will reduce Scope 3 emissions. This opportunity is best when working with local SME suppliers (and can be enabled by place-based governance actors), as organisational influencing is limited when working with MLEs (Nikula, 2022). Finally, the potential for ‘middle-out’ opportunities, particularly when nudging consumers, is currently untapped. Nudging customers can be successful in reducing Scope 3 emissions, by encouraging consumers to purchase low-carbon dishes rather than high-carbon ones. This is because even though there are differences in the emissions of the same produce due to region of origin and method of production, the difference between diet groups is not obscured by this (Scarborough *et al.*, 2023); for example, the lowest-carbon meats have higher emissions than vegetable substitutes (Poore and Nemecek, 2019). Even where perceived demand for high-carbon food is great, simple nudges such as information or offers on low-carbon foods can be effective (Betz *et al.*, 2022). For example, in Austrian Burger Kings, staff ask if customers would like their burger as ‘normal, or with meat?’, trying to change the traditional paradigm of meat being the standard option, thus reducing the amount of high-carbon meat consumed (Burger King Österreich, 2022).

To reduce Scope 1 and 2 emissions, money-saving was seen as a great opportunity, although this may be inflated due to recent increased energy prices. However, investment is typically worthwhile as commercial cooking appliances last 10+ years (Weatherall *et al.*, 2022). This being said, most historical installations highlighted by restaurateurs have occurred in the front-of-house (e.g., lighting), as the challenge of finance limits the more-expensive kitchen appliance upgrades. Across SMEs in general in the UK, the missed opportunity for money-savings from energy-efficiency is £1.26–2.63 billion (DECC, 2016), so this decarbonisation opportunity from reduced energy use is widespread. In addition, while high energy prices may result in some energy-savings, increased prices negatively affect equality (Reiss and White, 2008), as SME restaurants who are unable to afford more energy-efficient appliances are left behind both financially and with respect to decarbonisation. While money-saving was important, the wellbeing of the staff was also seen as an important driver behind installing new, more energy-efficient kitchen appliances. This finding was uncovered through focussing on the *skills* of restaurateurs and shows the value of using the SPT framework. This reaffirms that low-carbon advisors should focus on other aspects (e.g., the wellbeing of employees) rather than just cost-savings, to encourage SMEs to implement decarbonisation measures.

Finally, to reduce Scope 3 emissions from food purchases and food waste, the *skills* of restaurateurs were important. For food purchases, restaurateurs stated that their chefs have the know-how to cook low-carbon dishes, so their skillset is ready if menus were to change towards more low-carbon foods, which can significantly reduce emissions (Betz *et al.*, 2022). However, this opportunity is limited where there is tension in weighing up what the owner thinks the restaurant should serve. In addition, since practices exist as *performances*, as patterns are reproduced through successive performances (Shove *et al.*, 2012), although chefs were said to have the know-how, it may take them time to adapt to new practices of cooking low-carbon dishes. To make the most of this opportunity, restaurants should provide training for chefs (Özgen *et al.*, 2021). Furthermore, chefs were key to reducing food waste, although the SME organisational structure was also an enabler of this. In particular, the changes made by one restaurateur to switch to daily, paper menus, which results in reduced food waste, in response to the COVID-19 pandemic restrictions show how shorter lines of communication help decarbonisation (Aragón-Correa *et al.*, 2008). This change in habit occurred due to a change in knowledge forced upon the owners by COVID-19 restrictions and was able to be implemented due to the social relationship shared between the owners (Gram-Hanssen, 2010). This suggests that changes in knowledge around carbon emissions could equally cause changed habits which accelerate decarbonisation, helping restaurants towards Net Zero.

5.3. RQ2: Governance – place-based versus sector-based

Section 4.2. found that place-based and sector-based governance actors participate in the decarbonisation of SME restaurants through a multitude of ways. For Scope 1 and 2 emissions, sector-based actors have the greatest role to play, through providing information about energy-reducing practices (Olawejaju *et al.*, 2023), and place-based actors are in charge of planning permission for renewable energy on-site. However, while consumption of energy is the largest source of emissions for most SMEs, so most decarbonisation attention has been centred around energy use (e.g., Fleitera *et al.*, 2012), carbon footprinting showed that this is not the case for SME restaurants, so only reducing Scope 1 and 2 emissions will not enable SME restaurants to reach Net Zero. For Scope 3 emissions, engagement with place-based versus sector-based actors appeared to depend on the location of the restaurant, whether it was rural or urban. Place-based actors were found to better understand local needs of rural restaurants, explaining why they are key in reducing Scope 3 emissions from local suppliers through engaging with SME farmers, suppliers, and restaurants. While place-based actors can also reduce Scope 3 emissions from local suppliers in urban restaurants, the connection between place and restaurant did not appear as strong, so support could more readily come from sector-based actors. For emissions reductions from national, MLE suppliers, sector-based actors were key through setting roadmaps and targets. Roadmaps are usually aimed at MLEs as they are more responsive (and there are fewer of them) (Aragón-Correa *et al.*, 2008), but decarbonisation of MLE suppliers will reduce Scope 3 emissions for SME restaurants who use those suppliers. Sector-based actors further drive Scope 3 decarbonisation of food through finding solutions on how to decarbonise specific food types, through action groups. This is important, as many restaurants stated that they do not want to change what they serve (for instance, by switching to vegan cheese), so action groups can find solutions which maintain the *meanings* of restaurants.

Sector-based actors were also found to be taking over from the historically place-based carbon footprint audits, and sector-based actors appear to have organised themselves on the transition to Net Zero. Since few sustainability-focussed business networks have originated autonomously in the past (Hampton, 2018), this finding provides an important update of the sector-based governance of SME restaurants. Where place-based audits still occur, such as through LEPs, low-carbon advisors can promote the commonplace decarbonisation opportunities (such as decarbonising the building, which have the same solutions across a plethora of sectors), before linking the restaurant up with a sector-specific advisor to continue decarbonising (although there are some organisations that are both place- and sector-specific, such as Good Food Oxford). Greater coordination between different place-based actors and sector-based organisations will be needed for this and other decarbonisation initiatives, especially as the importance of place-based or sector-based networks differ between individual SMEs (Hampton *et al.*, 2023). Support for SMEs needs a collaborative, cross-disciplinary effort from MLEs,

place-based actors, and sector-based actors (Jouven and Schmidt, 2022), in addition to greater coordination between networks and actors to allow for more tailored governance arrangements, which can help find solutions for the heterogeneous SME restaurant population. On the whole, more sector-based initiatives were found (and *Figure 4* shows little overlap between the two types of actors), but this may be because interviews with sector-based actors and restaurateurs informed the findings, meaning the initiatives of place-based actors are likely underrepresented in this study. To further understand the role of place-based governance actors in the decarbonisation of SME restaurants and their interactions with sector-based governance, interviews with place-based governance actors can also take place.

5.4. Bringing RQ1 and RQ2 together: Reflections on specific challenges for the changing governance landscape – issues of data and the ‘tail’

Overall, it was evident that there is a challenge around the lack of emissions data from both the overall sector, and individual restaurants, with no measures to share that data with customers:

“A huge thing is data. I don't think historically we've had really robust data that enables us to identify the problems and what to do about it. We're still quite a way off. So, those organisations that provide better data are important” (ZCF).

This lack of data is a significant hindrance to effective governance, as actors do not know the most carbon-intensive sources of emissions (Moss *et al.*, 2008), so are unable to target their interventions. While sector-based actors provided carbon footprint assessments for individual SMEs, these faced several challenges. For example, UKHospitality's carbon calculator is basic and designed to start the conversion, and audits by the SRA must be paid for (as the SRA believe this makes restaurants more invested), which hinders uptake.

However, the greatest issue with carbon footprint assessments for restaurants are issues with data, arising due to the application of different emissions conversion factors, through the lack of standardisation (Frijns, 2012). This issue is especially acute for Scope 3; in particular, emissions from food purchases, since values – such as from the UK Government's GHG conversion factors – are crude and data is not readily available for particular varieties of foods:

“We're finding with Net Zero Now being hospitality-specific, that even they are not specific enough. The information is just not there to actually show what you're doing. You can say meat or cheese, but there's very little to say whether it's sustainably-produced or not. Everything seems to be broad brushstrokes” (owner, pizzeria and pub).

Falciano *et al.* (2022) also found that there was a lack of information for emissions from food for carbon footprints in Italy, showing that this problem is not unique to the UK. One issue is that environmental impacts among producers of the same product can vary by a factor of 50 (Poore and Nemecek, 2019), so many carbon footprints do not include Scope 3 emissions, since suppliers lack usable information (Özgen *et al.*, 2021). However, lack of data availability are not grounds to ignore significant Scope 3 emissions (Moss *et al.*, 2008), which contributed to 63–86% of the emissions from restaurants in this study, and 95% in a study by Falciano *et al.* (2022). Therefore, it is important that carbon footprints include the significant emissions from food supply, even if this information is difficult to obtain.

In addition, since there is a clear relationship between emissions and animal-based food consumption (Scarborough *et al.*, 2023), and the 2021 National Food Strategy called for a 30% reduction in meat consumption (National Food Strategy Team, 2021), carbon footprint information must be passed on to the consumer, through information on the menu (Liqin, 2011) as, even when equipped with the correct knowledge, individual SMEs still feel unable to make changes because of perceived consumer demand for high-carbon food, and/or preferences for serving high-carbon dishes. Currently, labelling is not widely used in restaurants (with the major exceptions being health ratings and awards, and user-driven rating schemes, such as TripAdvisor), unlike food for home consumption (Futtrup and Grunert, 2023). Introducing carbon footprints on menus can change customer attitudes (Özgen *et al.*, 2021) and should be pursued (Poore and Nemecek, 2019), as it may result in owners feeling more confident about taking high-carbon dishes off the menu if they are ordered less frequently because of their carbon footprint. One restaurant sampled had introduced carbon footprint values on its menu six months prior to interview, and its inclusion on the menu appeared to generate moderate changes to orders in this short period:

“We are slowly seeing [that] we’re selling more of our vegan alternatives. It’s great” (owner, pizzeria and pub).

This is confirmed by previous studies; for example, Betz *et al.* (2022) found that the GHG emissions per dish were 0.2 kg CO₂ (13.5%) lower with carbon labels present. However, Spaargaren *et al.* (2013) found that carbon labels are only effective if they are embedded within a comprehensive information strategy, with consumers educated about carbon footprints, such as through providing normative comparisons (e.g., emissions from short-haul flights), and when labels were colour-coded. Adding colour-coding draws attention to the label, which is crucial because if consumers do not pay attention to them, they are not effective at creating change (Babakhani *et al.*, 2020). Therefore, carbon footprints on menus, embedded within a comprehensive information strategy, may help overcome

preferences identified in RQ1 for high-carbon dishes and so reduce the significant Scope 3 emissions from food, which is the greatest step that restaurants can take towards Net Zero, so governance actors should help to accelerate the use of footprints on menus, such as through making it part of carbon auditing.

Finally, the heterogeneity and sheer number of SME restaurants makes decarbonising *every* restaurant extremely challenging for governance actors. Ultimately, one of the most effective tools for reaching the ‘tail’ was suggested by sector-based actors to be regulation, which is a strong driver of decarbonisation (Gunningham, 2009). While regulation places additional burdens on SME restaurants, they have managed with previous regulation, such as the single-use plastics ban in England and Scotland, so additional regulation could accelerate decarbonisation of SME restaurants towards Net Zero. However, the difference in the views of governance actors, based on whether they are public sector, lobbying organisations (e.g., UKHospitality), or membership organisations (e.g., SRA), means that agreement on the type and degree of decarbonisation regulation will be extremely difficult.

Chapter 6. Conclusions

This study brought new insights into the challenges and opportunities to decarbonise SME restaurants through considering the *practices* of restaurants, and an understanding of how place-based and sector-based governance actors can accelerate decarbonisation. Interviews with 13 restaurateurs and six hospitality actors, in addition to four carbon footprints for restaurants, were used to inform the findings. Analysis using SPT identified the challenges and opportunities, and coding of different initiatives enabled the role of governance actors to be understood.

10 challenges and seven opportunities to reorient *practices* towards Net Zero in SME restaurants were found. The challenges were grouped into three themes: high-carbon dishes, energy demand, and the values of the owner. Firstly, high-carbon foods were shown through carbon footprint assessments to contribute to a significant proportion of the emissions from restaurants, so a reluctance to reduce high-carbon dishes based on the *meanings* of customer satisfaction and owner preferences was the biggest decarbonisation challenge. Energy comprised a much smaller percentage of emissions from restaurants, but the emissions are still high compared to other sectors. The *meanings* of customer satisfaction and the *material* properties of the kitchen contributed to this challenge. Finally, interpretations of decarbonisation were sometimes extreme, showing a limitation of asking owner-managers about decarbonisation challenges. However, analysing responses through a SPT lens uncovered opportunities for decarbonisation, which focussed on the restaurant practices and how changes to practices could overcome the challenges. It was found that the influence of restaurants on society through the ‘middle-out’ approach was a strong decarbonisation opportunity, as this affected Scope 3 food emissions. In addition, the wellbeing of staff (in addition to money-savings) was a key reason behind energy-efficiency improvements of kitchen appliances. Finally, the know-how of the chefs was key for reducing food waste and their skills are adequate to cook more low-carbon dishes.

Considering governance, place-based actors engage with SME suppliers to reduce Scope 3 food emissions, oversee planning permission, facilitate low-carbon transport, and provide low-carbon advisors, although sector-based actors are taking over in this final role. Sector-based actors also provide roadmaps and information, facilitate communication between actors, have action groups, and lobby for (or against) regulation, and are developing capacities for expert advice-giving. Because of this plethora of initiatives from both place-based and sector-based actors, greater coordination between actors is needed to ensure decarbonisation is accelerated. Finally, this study found that issues of data both for the emissions from food and restaurants pose the greatest challenge for governance. Governance actors should strive to improve the accuracy of data for emissions from food and improving the environmental literacy of SME owner-managers, such as through Further Education, could enable owner-managers to calculate their own carbon footprint, providing them with a starting point for decarbonisation. Ultimately, the heterogeneity and sheer number of SME restaurants makes

decarbonising *every* restaurant to Net Zero extremely challenging; however, decarbonising the supply chain of MLE suppliers, educating consumers around carbon emissions (e.g., through carbon values on menus), and implementing decarbonisation regulation which considers the *practices* of restaurants is a useful starting point for governance actors when attempting to accelerate the decarbonisation of SME restaurants to Net Zero.

This study interviewed 13 restaurateurs from a diverse mix of cuisine types to identify challenges and opportunities for decarbonisation. Since carbon footprints showed that Scope 3 emissions were crucial in determining the emissions from restaurants, future research could focus on other cuisines not included in this study (e.g., Chinese) to capture how cultural diversity affects emissions from food dishes and its implications for decarbonisation. Additionally, interviews with sector-based actors and SME restaurateurs provided an insight into the types of decarbonisation initiatives by place-based and sector-based actors. Future studies could interview place-based actors as well as more sector-based actors, to uncover additional decarbonisation governance arrangements. Finally, regulation is evidently an important decarbonisation tool, but an in-depth analysis of how regulation can accelerate SME decarbonisation is beyond the scope of this study. Therefore, future studies could research the acceptability of different forms of regulation, or the use of more differentiated exemptions from regulation (e.g., so not all SMEs are exempted), in order to further understand how the decarbonisation of SME restaurants towards Net Zero targets can be accelerated.

Chapter 7. References

- Aisyah, S., Triani, M. and Rasgianti, R. (2021) 'Energy efficiency analysis for various type of electric cooker', *Journal of Physics: Conference Series*, 1869, 012175.
- Allen, M.R., Friedlingstein, P., Girardin, C.A.J., Jenkins, S., Malhi, Y., Mitchell-Larson, E., Peters, G.P. and Rajamani, L. (2022) 'Net Zero: Science, Origins, and Implications', *Annual Review of Environment and Resources*, 47, pp. 849–887.
- Aragón-Correa, J.A., Hurtado-Torres, N., Sharma, S. and García-Morales, V.J. (2008) 'Environmental strategy and performance in small firms: a resource-based perspective', *Journal of Environmental Management*, 86(1), pp. 88–103.
- Babakhani, N., Lee, A. and Dolnicar, S. (2020) 'Carbon labels on restaurant menus: do people pay attention to them?', *Journal of Sustainable Tourism*, 28(1), pp. 51–68.
- Betz, A.-K., Seger, B.T. and Nieding, G. (2022) 'How can carbon labels and climate-friendly default options on restaurant menus contribute to the reduction of greenhouse gas emissions associated with dining?', *PLOS Climate*, 1(5), e0000028.
- Blundel, R. and Hampton, S. (2021) 'How Can SMEs Contribute to Net Zero?: An Evidence Review', *State of the Art Reviews*, 51, pp. 1-10.
- Bourdieu, P. (1976) *Outline of a theory of practice*. New York: Cambridge University Press.
- British Business Bank. (2021) *Smaller businesses and the transition to net zero*. Sheffield: British Business Bank.
- Britton, J. and Woodman, B. (2014) 'Local enterprise partnerships and the low-carbon economy: Front runners, uncertainty and divergence', *Local Economy*, 29(6-7), pp. 617–634.
- Bukarica, V. and Tomšić, Z. (2017) 'Energy efficiency policy evaluation by moving from techno-economic towards whole society perspective on energy efficiency market', *Renewable and Sustainable Energy Reviews*, 70, pp. 968–975.

Burger King Österreich. (2022) *Normal oder mit Fleisch? #MeatOption*. 12 July. Available at: <https://www.youtube.com/watch?v=AIT6caarVEo> (Accessed: 12 June 2023).

Burns, C., Gravey, V., Jordan, A. and Zito, A. (2019) 'De-Europeanising or disengaging? EU environmental policy and Brexit', *Environmental Politics*, 28(2), pp. 271–292.

Carvalho, B., Wiek, A. and Ness, B. (2022) 'Can B Corp certification anchor sustainability in SMEs?', *Corporate social-responsibility and environmental management*, 29(1). pp. 293–304.

Cascini, A., Gamberi, M., Mora, C., Rosano, M. and Borolini, M. (2016) 'Comparative Carbon Footprint Assessment of commercial walk-in refrigeration systems under different use configurations', *Journal of Clear Production*, 112(5), pp. 3998–4011.

CCC. (2016) *Next Steps for UK Heat Policy*. London: Committee on Climate Change.

Coles, T., Dinan, C. and Warren, N. (2016) 'Energy practices among small- and medium-sized tourism enterprises: a case of misdirected effort?', *Journal of Cleaner Production*, 111, pp. 399–408.

Cope, M. and Kurtz, H. (2016) 'Organizing, Coding and Analysing Qualitative Data', in Clifford, N., Cope, M., Gillespie, T. and French, S. (eds.) *Key Methods in Geography*. London: Sage, pp. 647–664.

Creswell, J.W. and Creswell, J.D. (2018) *Research design: Qualitative, quantitative, and mixed methods approaches*. London: Sage.

Darby, S.J. and Fawcett, T. (2018) *Energy sufficiency: An introduction. Concept paper*. Stockholm: European Council for an Energy-Efficient Economy.

DBEIS. (2021) *Non-domestic National Energy Efficiency Data-Framework 2021*. London: Department for Business, Energy & Industrial Strategy.

DBEIS. (2022a) *Provisional UK greenhouse gas emissions national statistics 2021*. London: Department for Business, Energy & Industrial Strategy.

DBEIS. (2022b) *Business Population Estimates for the UK and the Regions 2022*. London: Department for Business, Energy & Industrial Strategy.

DECC. (2014) *Research to assess the barriers and drivers to energy efficiency in small and medium sized enterprises*. London: Department of Energy & Climate Change.

DECC. (2015) *The Non-domestic National Energy Efficiency Data-Framework: Energy Statistics 2006-12*. London: Department of Energy & Climate Change.

DECC. (2016) *Potential of Smart Technologies in SMEs*. London: Department of Energy & Climate Change.

Department for Levelling Up, Housing and Communities (DLUHC) and Ministry of housing, Communities & Local Government (MHCLG). (2023) *Live tables on Energy Performance of Buildings Certificates*. Available at: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-energy-performance-of-buildings-certificates#epcs-for-non-domestic-properties> (Accessed: 11 August 2023).

DESNZ, DEFRA and DBEIS. (2019) *Environmental reporting guidelines: including Streamlined Energy and Carbon Reporting requirements*. London: Department for Energy Security and Net Zero, Department for Environment, Food & Rural Affairs, and Department for Business, Energy & Industrial Strategy.

DESNZ and DBEIS. (2023) *Government conversion factors for company reporting of greenhouse gas emissions*. London: Department for Energy Security and Net Zero, and Department for Business, Energy & Industry Strategy.

Environment Agency. (2009) *Evidence: Understanding and improving SME compliance*. Bristol: Environment Agency.

Falciano, A., Cimini, A., Masi, P. and Moresi, M. (2022) 'Carbon Footprint of a Typical Neapolitan Pizzeria', *Sustainability*, 14, 3125.

Fawcett, T. and Hampton, S. (2020) 'Why & how energy efficiency policy should address SMEs', *Energy Policy*, 140, 111337.

- Fleitera, T., Schleich, J. and Ployplearn, R. (2012) 'Adoption of energy-efficiency measures in SMEs - An empirical analysis based on energy audit data', *Energy Policy*, 51, pp. 863–875.
- Fresner, J., Morea, F., Krenn, C., Aranda Uson, J. and Tomasi, F. (2017) 'Energy efficiency in small and medium enterprises: Lessons learned from 280 energy audits across Europe', *Journal of Cleaner Production*, 142, pp. 1650–1660.
- Frijns, J. (2012) 'Towards a common carbon footprint assessment methodology for the water sector', *Water and Environment Journal*, 26, pp. 63–69.
- Futtrup, R. and Grunert, K.G. (2023) 'Does organic labelling affect restaurant choice? A study on the Danish Organic Cuisine Label', *Scandinavian Journal of Hospitality and Tourism*, 23(1), pp. 29–50.
- Giddens, A. (1984) *The constitution of society*. Cambridge, UK: Polity Press.
- Gillison, F., Lannon, G., Verplanken, B., Barnett, J. and Grey, E. (2021) *A rapid review of the evidence on the factors underpinning the consumption of meat and dairy among the general public*. Available at: <https://www.food.gov.uk/research/behaviour-and-perception/a-rapid-review-of-the-evidence-on-the-factors-underpinning-the-consumption-of-meat-and-dairy-among-the-general-public> (Accessed 28 August 2023).
- Girella, L., Zambon, S. and Rossi, P. (2019) 'Reporting on sustainable development: A comparison of three Italian small and medium-sized enterprises', *Corporate Social Responsibility and Environmental Management*, 26(4), pp. 981–996.
- Gram-Hanssen, K. (2010) 'Standby Consumption in Households Analyzed With a Practice Theory Approach', *Journal of Industrial Ecology*, 14(1), pp. 150–166.
- Gram-Hanssen, K. (2013) 'Efficient technologies or user behaviour, which is the more important when reducing households' energy consumption?', *Energy Efficiency*, 6, pp. 447–457.
- Green Alliance. (2020) *The local climate challenge: A new partnership approach*. London: Green Alliance.

- Grimstad, S.M.F., Glavee-Geo, R. and Fjørtoft, B.E. (2020) 'SMEs motivations for CSR: An exploratory study', *European Business Review*, 32(4), pp. 553–572.
- Gunningham, N. (2009) 'Environment Law, Regulation and Governance: Shifting Architectures', *Journal of Environmental Law*, 21(2), pp. 179–212.
- Hargreaves, T. (2011) 'Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change', *Journal of Consumer Culture*, 11, pp. 79–99.
- Hampton, S. (2017) 'An ethnography of energy demand and working from home: exploring the affective dimensions of social practice in the United Kingdom', *Energy Research & Social Science*, 28, pp. 1–10.
- Hampton, S. (2018) '“It's the soft stuff that's hard”: Investigating the role played by low carbon small- and medium-sized enterprise advisors in sustainability transitions', *Local Economy*, 33(4), pp. 384–404.
- Hampton, S. (2019) 'Making sense of energy management practice: reflections on providing low carbon support to three SMEs in the UK', *Energy Efficiency*, 12, pp. 1473–1490.
- Hampton, S., Blundel, R.K., Fawcett, T. and Shaw, C. (2019) 'Growing Greener: Creating a New Values-based Environmental Engagement Toolkit for SME Intermediaries'. *Earth and Environmental Science*, 329, 012056.
- Hampton, S., Blundel, R., Eadson, W., Northall, P. and Sugar, K. (2023) 'Crisis and opportunity: Transforming climate governance for SMEs', *Global Environmental Change*, 82, 102707.
- Hampton, S. and Fawcett, T. (2017) 'Challenges of designing and delivering effective SME energy policy', *ECEEE Summer Study Proceedings*, pp. 189–199.
- Handley, K. and Molloy, C. (2022) 'SME corporate governance: a literature review of informal mechanisms for governance', *Meditari Accountancy Research*, 30(7), pp. 310–333.
- Hendrichs, H. and Busch, T. (2012) 'Carbon management as a strategic challenge for SMEs', *Greenhouse Gas Measurement and Management*, 2(1), pp. 61–72.

Henriques, J. and Catarino, J. (2016) 'Motivating towards energy efficiency in small and medium enterprises', *Journal of Cleaner Production* 139, pp. 42–50.

Hillary, R. (2000) *Small and Medium-Sized Enterprises and the Environment: Business Imperatives*. Sheffield: Greenleaf.

Ho, J.-L., Lin, C.-F., Lai, M.-Y., Tseng, L.-Y. and Chiang, T.-Y. (2021) 'Building Theory From Practice: Mapping Executive Chefs' Menu Planning Processes Using a Flowchart', *SAGE Open*, 11(4).

IEA. (2015) *Accelerating Energy Efficiency in Small and Medium-Sized Enterprises, Policy Pathway*. Paris: International Energy Agency.

IPCC. (2018) 'Summary for Policymakers', in Masson-Delmotte, V., Zhai, P., Pörtner, H.-O., Roberts, D., Skea, J., Shukla, P.R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., Connors, S., Matthews, J.B.R., Chen, Y., Zhou, X., Gomis, M.I., Lonnoy, E., Maycock, T., Tignor, M. and Waterfield, T. (eds.) *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Cambridge: Cambridge University Press. pp. 3-24.

Isensee, C., Teuteberg, F., Griesse, K.M. and Topi, C. (2020) 'The relationship between organizational culture, sustainability, and digitalization in SMEs: a systematic review', *Journal of Cleaner Production*, 275, 122944.

Janda, K.B. (2014) 'Building communities and social potential: between and beyond organizations and individuals in commercial properties', *Energy Policy*, 67, pp. 48–55.

Johansson, M.T. and Thollander, P. (2018) 'A review of barrier to and driving forces for improved energy efficiency in Swedish industry— Recommendations for successful in-house energy management', *Renewable and Sustainable Energy Reviews*, 82, pp. 618–628.

Jouven, P. and Schmidt, A. (2022) *Survey: small businesses face recurring barriers to carbon reduction*. Available at: <https://smeclimatehub.org/sme-survey-barriers-to-climate-action/> (Accessed: 28 July 2023).

Kesidou, E. and Ri, A. (2021) 'Drivers and performance outcomes of Net Zero practices: Evidence from UK SMEs', *Enterprise Research Centre Research Paper*, 95.

Kuzemko, C. and Britton, J. (2020) 'Policy, politics and materiality across scales: A framework for understanding local government sustainable energy capacity applied in England', *Energy Research & Social Science*, 62, 101367.

Laes, E., Valkering, P. and De Weerd, Y. (2019) 'Diagnosing Barriers and Enablers for the Flemish Energy Transition', *Sustainability*, 11, 5558.

LEPNetwork. (2023) *Government announcement on the future of LEPs*. Available at: <https://www.lepnetwork.net/news-and-events/2023/july-2023/government-announcement-on-the-future-of-leps/> (Accessed: 10 August 2023).

Levine, D. and Baertlein, L. (2011) *Fast-food lobbies U.S. states on "Happy Meal" laws*. Available at: <https://www.reuters.com/article/mcdonalds-toys-idUKN0412112120110509> (Accessed 21 August 2023).

Liqin, Y. (2011) 'The Analysis on Carbon Footprint of Catering Products in High-star Hotels during Operation: Based on Investigation Conducted in parts of High-star Hotels in Ji'nan', *Energy Procedia*, 5, pp. 890–894.

Loorbach, D., Frantzeskaki, N. and Avelino, F. (2017) 'Sustainability Transitions Research: Transforming Science and Practice for Societal Change', *Annual Review of Environment and Resources*, 42(1), pp. 599–626.

Mole, K., North, D. and Baldock, R. (2017) 'Which SMEs seek external support? Business characteristics, management behaviour and external influences in a contingency approach', *Environment and Planning C: Politics and Space*, 35, pp. 476–499.

Moss, J., Lambert, C.G., and Rennie, A.E.W. (2008) 'SME application of LCA-based carbon footprints', *International Journal of Sustainable Engineering*, 1(2), pp. 132–141.

National Food Strategy Team. (2021) *The National Food Strategy: The Plan – July 2021*. Available at: <https://www.nationalfoodstrategy.org/> (Accessed 17 August 2023).

- Nelson, P., Beckie, M.A. and Krogman, N.T. (2017) 'The "Locavore" Chef in Alberta: A Situated Social Practice Analysis', *Food, Culture & Society*, 20(3), pp. 503–524.
- Nikula, P.-T. (2022) 'Beyond compliance – Voluntary climate mitigation by New Zealand firms', *Corporate Social Responsibility and Environmental Management*, 29, pp. 1456–1464.
- Noguer-Juncà, E. and Fusté-Forné, F. (2022) 'Marketing environmental responsibility through "green" menus', *Journal of Foodservice Business Research*, 1–10.
- Oktadiana, H., Pearce, P.L. and Mohammadi, Z. (2020) 'Special dietary requirements: Restaurant sector responses across six tourist cities', *International Journal of Tourism Resources*, 22, pp. 507–517.
- Olarewaju, T., Dani, S. and Jabbar, A. (2023) 'A Comprehensive Model for Developing SME Net Zero Capability Incorporating Grey Literature', *Sustainability*, 15, 4459.
- ONS. (2022) *Restaurants in the UK 2020 to 2022*. Available at: <https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/adhocs/15151restaurantsintheuk2020to2022> (Accessed: 21 April 2023).
- ONS. (2023) *VACS02: Vacancies by industry*. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/unemployment/datasets/vacanciesbyindustryvacs02> (Accessed: 26 August 2023).
- Özgen, I., Binboğa, G., Günes, S.T. (2021) 'An assessment of the carbon footprint of restaurants based on energy consumption: study of a local pizza chain in Turkey', *Journal of Foodservice Business Research*, 24(6), pp. 709–729.
- Parag, Y. and Janda, K.B. (2014) 'More than filler: Middle actors and socio-technical change in the energy system from the “middle-out”', *Energy Research & Social Science*, 3, pp. 102–112.
- Petersson, T., Secondi, L., Magnani, A., Antonelli, M., Dembska, K., Valentini, R., Varotto, A. and Castaldi, S. (2021) 'A multilevel carbon and water footprint dataset of food commodities', *Scientific Data*, 8, 127.

Petts, J., Herd, A., Gerrard, S. and Horne, C. (1999) 'The climate and culture of environmental compliance within SMEs', *Business Strategy and the Environment*, 8, pp. 14–30.

PIA. (2017) '*Property Data Report 2017: Facts and figures about the UK commercial property industry to year-end 2016*'. London: Property Industry Alliance.

Poore, J. and Nemecek, T. (2019) 'Reducing food's environmental impacts through producers and consumers', *Science*, 360 (6392), pp. 987–992.

Quinn, I. (2022) *Truss government urged to stick to promises on mandatory food waste reporting*. Available at: <https://www.thegrocer.co.uk/supermarkets/truss-government-urged-to-stick-to-promises-on-mandatory-food-waste-reporting/671203.article> (Accessed 14 August 2023).

Reiss, P.C. and White, M.W. (2008) 'What changes energy consumption? Prices and public pressures', *RAND Journal of Economics*, 39(3), pp. 636–663.

Royal Geographical Society (RGS). (2020) *Financing net zero: how can investment meet the climate challenge?* Available at: www.rgs.org/impact/FinancingNetZero (Accessed: 21 August 2023).

Sahakian, M. and Wilhite, H. (2014) 'Making practice theory practicable: Towards more sustainable forms of consumption', *Journal of Consumer Culture*, 14(1), pp. 25–44.

Scarborough, P., Clark, M., Cobiac, L., Papier, K., Knuppel, A., Lynch, J., Harrington, R., Key, T. and Springmann, M. (2023) 'Vegans, vegetarians, fish-eaters and meat-eaters in the UK show discrepant environmental impacts', *Nature Food*, 4, pp. 565–574.

Schatzki, T. (1996) *Social practices: A Wittgensteinian approach to human activity and the social*. New York: Cambridge University Press.

Shin, Y.H., Im, J., Jung, S.E. and Severt, K. (2019) 'Motivations Behind Consumers' Organic Menu Choices: The Role of Environmental Concern, Social Value, and Health Consciousness', *Journal of Quality Assurance in Hospitality & Tourism*, 20(1), pp. 107–122.

Sivaev, D. (2013) 'How should we help business grow? Delivering business support', *Local Economy*, 28, pp. 906–910.

- Shove, E. (2003) 'Converging Conventions of Comfort, Cleanliness and Convenience', *Journal of Consumer Policy*, 26, pp. 395–418.
- Shove, E. (2017) 'Energy and Social Practice: From Abstractions to Dynamic Processes', in Labanca, N. (ed.) *Complex Systems and Social Practices in Energy Transitions*. Green Energy and Technology. Cham: Springer. pp. 207–220.
- Shove, E. and Walker, G. (2014) 'What Is Energy For? Social Practice and Energy Demand', *Theory, Culture & Society*, 31(5), pp. 41–58.
- Shove, E., Pantzar, M., and Watson, M. (2012) *The Dynamics of Social Practice: Everyday Life and How it Changes*. London: SAGE.
- Sloan, K., Klingenberg, B. and Rider, C. (2013) 'Towards sustainability: Examining the drivers and change process within SMEs', *Journal of Management and Sustainability*, 3(2), pp. 19–30.
- SME Climate Hub. (n.d.) *Join thousands of businesses tackling climate change*. Available at: <https://smeclimatehub.org/> (Accessed: 28 July 2023).
- Sovacool, B.K. and Hess, D.J. (2017) 'Ordering theories: Typologies and conceptual frameworks for sociotechnical change', *Social Studies of Science*, 47(5). pp. 703–750.
- Spaargaren, G., Oosterveer, P. and Loeber, A. (2012) *Food Practices in Transition: Changing Food Consumption, Retail and Production in the Age of Reflexive Modernity*. New York: Routledge.
- Spaargaren, G., van Koppen, C.S.A., Janssen, A.M., Hendriksen, A. and Kolfshoten, C.J. (2013) 'Consumer Responses to the Carbon Labelling of Food: A Real Life Experiment in a Canteen Practice', *Sociologia Ruralis*, 53(4), pp. 432–453.
- Sugar, K., Mose, T.M., Nolden, C., Davis, M., Eyre, N., Sanchez-Graells, A. and Van Der Horst, D. (2022) 'Local decarbonisation opportunities and barriers: UK public procurement legislation', *Buildings and Cities*, 3(1), pp. 895–911.

Threpsiadi, A., Wilkinson-Dix, J., Biele, E., Herce, C., Martini, C., Salvio, M. and Toro, C. (2022) *Best Policy Practices for Supporting Energy Efficiency in SMEs in UK*. Paris: Energy Evaluation Europe 2022 Conference.

Trianni, A. and Cagno, E. (2012) 'Dealing with barriers to energy efficiency and SMEs: Some empirical evidences', *Energy*, 37, pp. 494–504.

UK Energy Research Centre (UKERC). (n.d.) *SME governance for net zero*. Available at: <https://ukerc.ac.uk/project/sme-governance-for-net-zero/> (Accessed: 3 March 2023).

UK Government. (2019) *Explanatory Memorandum to The Climate Change Act 2008 (2050 Target Amendment) Order 2019: 2019 No. 1056*. Available at: https://www.legislation.gov.uk/uksi/2019/1056/pdfs/uksiem_20191056_en.pdf (Accessed: 21 July 2023).

Valentine, G. (2005) 'Tell me about...: using interviews as a research methodology', in Valentine, G. (ed.) *Methods in Human Geography: A guide for students doing a research project*. 2nd edn. Harlow: Pearson. pp. 110–127.

Vickers, I., Vaze, P., Corr, L., Kasperova, E. and Fergus, L. (2009) *SMEs in a Low Carbon Economy*. London: Department for Business Enterprise & Regulatory Reform.

Weatherall, D., Wilkinson-Dix, K., Bill, E., Wilkinson, T., Blundel, R., Hampton, S. and Horne, S. (2022) *How can policy better support SMEs in the pathway to Net Zero? A report to the Climate Change Committee*. The Climate Change Committee: London.

Welch, D. and Warde, A. (2015) 'Theories of practice and sustainable consumption', in Reisch, L. and Thøgersen, J. (eds.) *Handbook of Research on Sustainable Consumption*. Cheltenham, UK: Edward Elgar Publishing, pp. 84–100.

Welch, D. and Yates, L. (2018) 'The practices of collective action: Practice theory, sustainability transitions and social change', *Journal for the Theory of Social Behaviour*, 48, pp. 288–305.

Wertheim-Heck, S.C.O. and Raneri, J.E. (2019) 'A cross-disciplinary mixed method approach to understand how food retail environment transformations influence food choice and intake among the urban poor: Experiences from Vietnam', *Appetite*, 142, 104370.

Williamson, D., Lynch-Wood, G. and Ramsay, J. (2006) 'Drivers of environmental behaviour in manufacturing SMEs and the implications for CSR', *Journal of Business Ethics*, 67, pp. 317–330.

Wilson, C.D.H., Williams, I.D. and Kemp, S. (2012) 'An Evaluation of the Impact and Effectiveness of Environmental Legislation in Small and Medium-Sized Enterprises: Experiences from the UK', *Business Strategy and the Environment*, 21, pp. 141–156.

World Bank. (n.d.) *Small and Medium Enterprises Finance: Improving SMEs' access to finance and finding innovative solutions to unlock sources of capital*. Available at: <https://www.worldbank.org/en/topic/smefinance> (Accessed: 1 July 2023).

Zheng, Y., Li, C. and Liu, Y. (2021) 'Impact of environmental regulations on the innovation of SMEs: Evidence from China', *Environmental Technology & Innovation*, 22, 101515.

Chapter 8. Appendix

Appendix I: Number of enterprises in the UK for 'UK SIC 2007' sub-classes in group '56.1 restaurants and mobile food service activities' (note: count is rounded to nearest 5). Data from ONS (2022).

<i>Year</i>	<i>Licensed restaurants</i>	<i>Unlicensed restaurants and cafes</i>	<i>Take-away food shops and mobile food stands</i>	<i>Total</i>
2020	29,135	23,670	38,170	90,975
2021	29,680	24,820	40,570	95,060
2022	31,425	26,655	43,705	101,785

Appendix II: Restaurant types of and number of restaurateurs interviewed in sample.

<i>Type of restaurant</i>	<i>Number of restaurateurs interviewed</i>
British inn	1
British restaurant	1
British seaside restaurant	1
British steakhouse	1
Greek	1
Indian	2
Italian	1
Mexican	1
Pizzeria and pub	1
Spanish	1
Rural British inn	2

Interview Questions

1. Start off with an ice-breaker and ask some simple questions about the type of restaurant (e.g., specialising in seafood?), how long they have been in business, the number of employees, and customer characteristics.

RQ1 (challenges and opportunities to decarbonise):

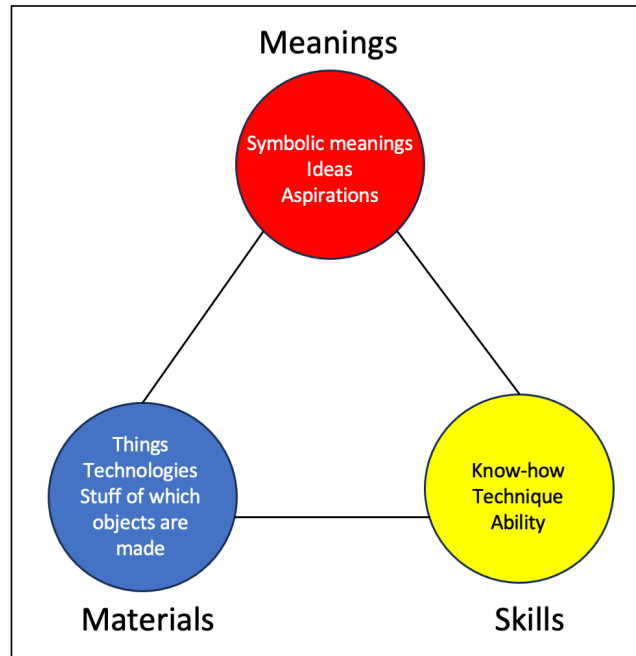
2. Awareness: In which ways does the owner-manager think the restaurant impacts the environment, and which impacts do they think are the greatest?
 - a. Follow up around responsibility: do food impacts count as the restaurant's emissions, the producers', or the customers' emissions?
3. Prioritisation: Where does environmental impact fit within the broader priorities of the restaurant?
 - a. Follow ups: Does it come into play when they're thinking about sourcing ingredients? Do they try and save energy? Are staff a driver of environmental awareness?
 - b. If they were to reduce carbon emissions, what would be the reasons behind this (e.g., to save money, looks good to customers, government regulation)?
 - c. Has environmental impact changed as a priority over time (for instance, after the UK declared Net Zero in 2019, or in response to increasing energy prices?)
 - d. (If not already answered) What are the challenges that restaurants face to decarbonising?

RQ2 (governance)

4. Governance: When thinking about how to decarbonise, where would the owner-manager go for information about this? Who would they consult?
5. Governance: Are there any areas of additional support (or regulation) from the government which the owner-manager thinks can or should be provided to help small and medium-sized restaurants reduce their emissions?

RQ1 (using SPT to uncover opportunities for decarbonisation):

Explain that this diagram is simply a tool to try and uncover some of the *practices* (the way things are done), to explore current areas of high energy use, and areas for potential decarbonisation.



Show the owner-manager the diagram above and explain to them that *practices* are made up of three elements: *materials* (things, technologies, tangible physical entities, and the stuff of which objects are made); *skills* (know-how, technique, and ability); and *meanings* (symbolic meanings, ideas, and aspirations). Explain it through the example of car driving in the 1970s vs car driving now.

6. When considering the diagram (SPT), what are the elements and linkages for the restaurant's energy (electricity and gas) use, and how could changes to *practices* change the elements?
7. When considering the diagram (SPT), how does it relate to food? (E.g., why is local food (*materials*) a main selling point (*meanings*)?)
8. If they were to do a radical overhaul of the menu to reduce carbon emissions, what *materials*, *meanings*, and *skills* would have to change to do this?
 - a. Follow up: To what extent would restaurants be willing to change their menus to reduce emissions? How many menu options (*materials*) would need to be changed before the type of restaurant changes (*meanings*)? I.e., would a steakhouse adding 4 vegan meals no longer make them a steakhouse?) Would they have the *skills* to do this? I.e., would the chefs be able to cook more vegan meals?

Appendix IV: The response outcomes of the different recruitment processes. Note, the numbers refer to the number of restaurants. It is clear that telephoning is the best method of recruitment.

