Undertaking innovation despite constraints: The case of Scottish Food SMEs

PhD Thesis

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Declaration

“This thesis is the result of the author’s original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree”.

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Abstract

While it has been recognised that SMEs are constrained in their ability to innovate, little is known about how they innovate despite their constraints. Based on 30 in-depth discussions with food SME participants, this thesis seeks to advance knowledge by developing a theory to explain how low-tech SMEs innovate despite constraints. This study focuses on the low-tech sector given its key contributing role to the economy.

The literature highlights three key themes that majorly influence innovation in low-tech SMEs. These themes are limited resources, large dominant customers, and family business culture. As SMEs, they are limited with resources, deal with a network of large dominant customers, and operate under a family business culture. The findings demonstrate distinct yet interdependent strategies executed by managers such as leveraging external network support, pursuing customer-centric incremental innovation, optimising internal processes and resources; operationalising professional management, building a long-term orientation on business and cultivating superior employee relations; mastering niche and specific markets, pursuing customer alignment, pursuing multiple channels to market. These strategies allow SMEs to resource orchestrate to navigate through, and manage, the challenges and opportunities presented from limited resources, large dominant customers, and family business culture for innovation.

Moreover, identifying a holistic strategy consisting mainly in A) operating in niche markets and collaborating with customers firms can balance the constraining and facilitating effects of dominant customers on innovation; B) operationalising professional management, building a long-term orientation on business and developing greater employee relationships firms can balance the constraining and facilitating effects of family business culture on innovation; C) leveraging external network and community support, pursuing customer-centric incremental innovation, and optimising internal processes and resources firms can limit the effects of limited resources on innovation.

Furthermore, the data demonstrates by identifying a holistic strategy that firms can also manage the interactions between limited resources, dominant customers, and family business culture. Niche focus and product quality, and ability to stay close to market firms can achieve an innovation position of market and brand leadership with limited resources and increase bargaining power thus overcoming the effects of limited resources and dominant customers. Similarly, patient capital of family firms promotes long-term innovation with stamina mitigating the effects of limited resources and customer driven short-term innovation. Long-

term orientation supports cultivating greater employee relations and business community engagements. They further mitigate the effects of limited resources and enable higher quality and non-incremental innovation which also influence the effects of dominant customers.

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Chapter 1 Introduction

1.1 Introduction

It is largely accepted that firms must undertake innovation to survive and grow (Tidd and Bessant, 2020). However, the process of innovation in organisations is often complex. This complexity is more so in low-tech SMEs that are often limited with key resources (Santoro et al., 2017; Capitanio et al., 2010), deal with a network of powerful and highly dominant customers (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005) and operate under a unique family business culture (Institute for Family Business, 2019; Laforet, 2016), all of which constrain innovation. Yet, low-tech SMEs are critical to economic growth and innovation (Nauman et al., 2022; Kirner and Som, 2015).

The importance of these constraints of innovation in SMEs has been highlighted by research (Lorenzo et al., 2022; Love and Roper, 2015; Raymond and St-Pierre, 2004; Fischer and Rueber, 2004). However, there is little known about how SMEs undertake innovation despite these constraints. With regard to resources much of the research focuses on resource constraints of SMEs for innovation, such as lack of sufficient finance and human resource for innovation (Love and Roper, 2015; Madrid-guijarro et al., 2009; Hewitt-Nelson, 2006) but there is less focus on how they actually undertake innovation despite being resource constrained (De Massis et al., 2018). Researchers investigated types of innovation in SMEs (Baregheh et al., 2014, 2012), engagement with external knowledge sources (Lefebvre et al., 2015), but they do not show "how" SMEs actually innovate given their resource constraints. Moreover, prior research has acknowledged that smaller firms are more efficient and creative (Baker and Nelson, 2005), yet empirical studies are limited in terms of demonstrating the how, in particular, the 'strategies' and 'structures' they pursue with regard to undertaking innovation. In addition, in this context many studies concentrate on smaller firms in high-tech sector (Coviello and Joseph, 2012; Harrison et al., 2004; Storey, 1994; Oakey, 1993) but less attention to the low-tech sector.

Studies discuss the importance of customers in the development of innovation in SMEs (Doloreux, 2015; Coviello and Joseph, 2012; Filieri, 2013; Bianchi et al., 2010) but many SMEs, particularly those in the low-tech sector, deal with large dominant customers (Lacoste

et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005) that often constrain innovation activities (Raymond and St-Pierre, 2004; Fischer and Rueber, 2004). The role of customer involvement in SME innovation has therefore been questioned. However, while researchers discuss innovation in low-tech firms (Kirner and Som, 2015; Lefevbre et al., 2015; Baregheh et al., 2014, 2012; Menrad, 2004) they do not thoroughly discuss the influence of large dominant customers in this context, which research demonstrates to constrain innovation (Raymond and St-Pierre, 2004; Fischer and Rueber, 2004), and of those studies discussing large dominant customers in the low-tech sectors (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005) do not study in regard to innovation, except a few that consider knowledge sharing (Lambrecht et al., 2015; Colurcio et al., 2012; Johnsen and Ford, 2001) but not in being innovative. Low-tech SMEs must innovate to survive and grow. Indeed studies confirm much innovation activities in this sector (Baregheh et al., 2016, 2014, 2012; Lefevbre et al., 2015; Menrad, 2004) but researchers still lack understanding regarding how SMEs innovate despite large dominant customer constraint. There are calls to address this gap in existing research (Lacoste and Johnsen, 2015; Colurcio et al., 2012; Fischer and Rueber, 2004). Researchers are often interested in high complexity offerings rather than on low complexity offerings, which is often ignored (Lacoste and Johnsen, 2015) even though commodities of low complexity and innovation play a key role in the economy (Nauman et al., 2022; Scottish Government, 2019).

The majority of SMEs are family-owned and -managed (Institute for Family Business, 2019; Laforet, 2016) and innovation is deemed important to stay competitive (Erdogan et al., 2020). The importance of family business culture for innovation has been highlighted by several authors (Lorenzo et al., 2022; Calabro et al., 2019; Duran et al., 2016; De Massis et al., 2015; Nieto et al., 2015; Laforet, 2013). Family firms pursue social and self-actualisation goals and deep investment in innovation (Duran et al., 2016; Le Breton-Miller and Miller, 2009, 2005) but recent studies suggest they innovate less because they lack willingness to do so (Lorenzo et al., 2022; Nieto et al., 2015; Chrisman et al., 2015). While they play an important role in the economy (Tio and Kleiner 2005) and many are successful businesses (De Massis et al., 2018) they have been majorly ignored within innovation conversations (Calabro et al., 2019; Craig and Moores 2006). In family business research, there is a tendency towards comparing family firms with non-family firms offering limited empirical studies that specifically investigate how family firms innovate despite cultural constraint (Laforet, 2016; Kraus, 2012). Family business and innovation topics are still in their infancy stage with contradictions (Calabro et al., 2019;

Kraus, 2012) and the academic community calls for research to broadly investigate innovation in family firms (Calabro et al., 2019; De Massis et al., 2018; De Massis et al. 2015) including their innovation strategies (Kammerlander et al., 2015; De Massis et al., 2015).

Overall, research has less understanding about innovation in low-tech SMEs, compared to high-tech SMEs (Nauman et al., 2022; Kirner and Som, 2015). Data collected on low-tech SMEs are much less, and of those limited studies conducted in the last several years, findings have indicated that low-tech SMEs are important (Kirner and Som 2015), and they do innovate (Nauman et al., 2022; Lee and Walsh, 2022; Baregheh et al., 2016); however, they lack demonstrating how they innovate despite key constraints. Therefore, there is little known about innovation strategies of SMEs. Innovation in the low-tech context with SMEs is particularly unique, hence the purpose of this study is to investigate innovation in this specific context and explore how low-tech SMEs resource orchestrate to navigate through the key constraints of innovation and achieve a competitive advantage over others in the market (Mirkovski et al., 2023; De Massis et al., 2018).

1.2 Background to research

This section describes the background to the research and outlines the significance of the study. Firstly, it discusses the theoretical background that informs the study following a discussion of the policy and practice.

1.2.1 Theoretical background

This study explores how low-tech SMEs innovate in their unique context. Based on the review of the literature and the context of the Scottish food sector (see Chapter 2) low-tech SMEs are regarded as low innovation or less innovative when compared with other firms in other industries (Eurostat, 2019; Frick et al., 2019). Firms in the food sector in Scotland are typically family-owned and many of the key companies are small to medium-sized enterprises (Scottish government, 2019; Brown, 2011). Another interesting characteristic of this sector is its human capital profile; there is a lack of skills and recruitment (Scottish government, 2019). Additionally, the food supply chain plays an important role to the sector, yet, there is disparity in profits among the members in the chain (Scottish government, 2019). The sector is characterized by low-level skills, recruitment, and low margins. Despite this many low-tech

firms engage with high levels of innovation and are driven by innovation beyond R&D (Baregheh et al., 2016, 2012; Rammer et al., 2011; Laforet, 2011). Research suggests they engage with product, process, organisational and service innovations, and innovation is identified as key to increase competitiveness (Capitanio et al., 2010). Scotland's Economic Strategy recognises the low-tech food sector as one of the six identified sectors to offer particular opportunities for growth. Innovation is identified as one of the three growth pillars to double up the sector's turnover.

Researchers have studied innovation in the low-tech sector in particular concerning the types of innovation (Baregheh et al., 2014; 2012), the external sources of innovation (Presenza et al., 2017; Lefevbre et al., 2015) and the constraints of innovation (Lorenzo et al., 2022; Love and Roper, 2015; Raymond and St-Pierre, 2004; Fischer and Rueber, 2004) but less attention is focused on how firms execute strategies to address their constraints of innovation in the low-tech sector (Som, et al., 2015). It is important to have theorisation around how SMEs navigate through innovation despite multitude of key factors influencing their innovation in a specific context (De Massis et al., 2018). This is important as it can be theorised with application relevant to other similar contexts.

To respond to the gap, the present study will utilise the resource orchestration theory as a lens to understand how low-tech SMEs innovate despite constraints. SMEs often face a paradox because they need innovation to achieve competitive advantage and survive, yet they lack key resources to do so (Love and Roper, 2015; Madrid-guijarro et al., 2009). Nevertheless, firm resources are important for innovation but not enough to innovate. Firms must orchestrate resources to innovate (Carnes et al., 2022, 2017; Sirmon et al., 2011). Their ability to orchestrate resources is likely to represent a primary driver in enhancing or diminishing innovation within SME (Carnes et al., 2022, 2017; De Massis et al., 2018). Resource orchestration theory offers a perspective on effective and efficient orchestration of resources to innovation, enabling firms to overcome their resource constraints as recently suggested in the literature (Mirkovski et al., 2023; De Massis et al., 2018).

However, the literature on resource orchestration and SME is relatively recent with only limited empirical studies (Mirkovski et al., 2023; Yu and Wang, 2021; Wales et al., 2013). Studies on resource orchestration and small firms mainly focus on resource orchestration to create value at the early stage of the development of the firm, especially in high-tech start-ups where most

of the focus is on technology innovation (Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Wales et al., 2013). There is little or no focus on SMEs and innovation in the low-tech sector. Resource orchestration can be even more important for SMEs in the low-tech sector where they clearly innovate but there is a multitude of key factors that influence their innovation. Therefore, the role of managers' ability become even more important in low-tech resource constrained firms to efficiently and effectively resource orchestrate to integrate more innovation than firms with more resources do (Sirmon et al., 2011). Moreover, resource orchestration theory is firm-centric (Nason et al., 2019; Baert et al., 2016) and largely focuses on resources that exist within the firm (Carnes et al., 2022, 2017; Deligianni et al., 2019; Symeonidou & Nicolaou, 2018, Sirmon et al., 2011); however, recent researchers (Nason et al., 2019; Baert et al., 2016) have called for more consideration of resource orchestration across firm boundaries, since resources do not need to be within the firm (Barthélemy, 2017). This notion is relevant to resource constrained firms since they rely on relationships and resources for innovation residing outside of their firm (Mirkovski et al., 2023; Lasagni, 2012). Furthermore, researchers have also called for empirical studies on resource orchestration in innovation since having resources alone are not enough to innovate (Carnes et al., 2022, 2017), but they must be efficiently and effectively orchestrated, particularly in resource constrained firms (De Massis et al., 2018). Therefore, to respond to calls and increase our understanding, this study investigates how low-tech SMEs orchestrate resources to innovate.

1.2.2 Policy and Practice background

Most current economies are majorly composed of small and medium enterprises (SMEs). In the UK and European Union SMEs make up 99% of the industry and account for three-fifth of the employment and around half of the turnover of the private sector (European Parliament, 2021; FSB, 2020; Scottish Government, 2020). As SMEs industry is growing and impacting the economic prosperity of nations (OECD, 2017) the link between SMEs and innovation is important to study (Massa and Testa, 2008; Love and Roper, 2015). SMEs' innovation capability is a key driver of sustainable competitive advantage in the 21st century rapidly changing environments, where continuous development of new products and services is critical to survival, growth and profitability (Tidd 2006; Wolff and Pett, 2006; Tidd and Bessant, 2020). As a result, policymakers in the United Kingdom have been paying closer attention to support innovation within SME sector (Blackburn and Smallbone, 2011; Wapshott and Mallet, 2017; Cadil et al., 2017).

As the largest manufacturing sector within the UK and EU the food industry has undergone significant changes and challenges in the nature of both food demand and supply; it faces price volatility, challenging legal and legislative requirements, product quality and safety requirements (Menrad, 2004; Trienekens and Zuurbier 2008; Wijnands et al. 2008; O'Connor and Kelly, 2017; European Commission 2016; Busse and Siebert 2018). In addition, the changing needs of consumers offered new opportunities caused by new developments in science (Wijnands et al. 2008; O'Connor and Kelly, 2017; Busse and Siebert 2018). Therefore, innovation is deemed to be one of the most important factors if food firms wish to enhance competitiveness (Capitanio et al., 2010). Nevertheless, the food industry has been regarded as a sector where the R&D spending is very low (OECD, 2011; Eurostat, 2017a, 2019a). Reported R&D to sales ratios for food firms are way lower compared to other industries. Moreover, the pace of technological change in this industry, measured by the number of patented inventions, seems less dynamic than in other manufacturing sectors (Christensen et al., 1996; Gulyayeva et al., 2016). Eurostat (2019a) classifies the subsectors of the manufacturing sector according to their 'technological intensity' into high-technology, medium-high-technology, medium-low-technology, and low-technology. Along with various other traditional industries, the food sector is classified as a low-technology sector (Eurostat, 2019; Frick et al., 2019).

While low-tech SMEs have large product market demand compared to other sectors, their growth rates are low due to saturated markets in the UK and EU (European Commission, 2016). For technological opportunity biotechnology and nanotechnology have offered significant research for food firms (Bigliardi and Galati 2016), however, behaviour of the market has arguably impacted the development of radically new products (Grunert et al., 1997; Winger and Wall, 2006). Despite the importance of the sector, innovation remains a low figure compared to other sectors. However, the number of studies examining innovation in food firms are slowly growing (Trippl, 2011; Baregheh et al., 2012) and go beyond R&D (Menrad, 2004; Baregheh et al., 2012, 2016). In fact, the OECD describes innovation as the "implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2005, p. 46). Additionally, much of innovation activity is not R&D-based, relies on a number of other factors, and is an interactive process. Hence, classifying this sector as 'low-tech' may not accurately represent the full innovation picture, and may be better to view innovation as an activity that is often independent of R&D. There is, therefore, a need

to better understand food SMEs' innovation strategies (Sarkar and Costa, 2008; Bayona-Sáez et al., 2013) especially given their strategic significance for the UK economy (Scottish government, 2017 and 2020). How low-tech SMEs innovate despite constraints is the focus of this study.

1.3 Research aims & objectives

The purpose of this study is to investigate innovation in SMEs in a specific context and how they navigate through the key constraints of innovation. In other words, the aim is to gain a better understanding of how SMEs undertake innovation despite multiple constraints and to develop a theory for innovation in a specific context. Therefore, this study research on innovation in SMEs where multitude of important influencing factors are explored.

The objective of this research is to explore innovation in SMEs with 1) limited resources, 2) large dominant customers, and 3) family business culture, within the low-tech sector. Low-tech SMEs operate in a constrained context in their ability to innovate and grow. The first objective is concerned with resource constraints thus to understand how they innovate despite resource constraints (De Massis et al., 2018; Love and Roper, 2015; Madrid-guijarro et al., 2009). Since they are small to medium-sized enterprises, they have limited resources for innovation compared to larger enterprises (Madrid-guijarro et al., 2009; Hewitt-Dundas et al., 2006). This constraint may have consequences on the way they innovate effectively. The second objective is concerned with customer constraint. Many SMEs in the low-tech sector such as food operate in asymmetric relationships (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005). They deal with large dominant customers which impacts the way they innovate (Rueber and Fischer, 2004; Raymond and St-Pierre, 2004). Unlike many studies that show customers are the source of innovation (Doloreux, 2015; Coviello and Joseph, 2012; Filieri, 2013; Bianchi et al., 2010), the asymmetric relationship between SME suppliers – large customers (Lacoste and Johnsen, 2015) may act as a constraint to innovation (Rueber and Fischer, 2004; Raymond and St-Pierre, 2004). Thus, the objective is to understand how they innovate despite their dominant customer constraint. Objective three is concerned with SMEs' organisational culture. Most of the SMEs are family-owned and -managed businesses (Institute for Family Business, 2019; Laforet, 2016), therefore, family businesses have a unique organisational culture and that may impact the way they innovate (Baykal, 2022; De Massis et al., 2015; Carnes and Ireland, 2013). Family firms may have certain advantages over non-family firms (Duran et al., 2016;

Le Breton-Miller and Miller, 2009, 2005), however, they also have disadvantages that greatly limit their innovation (Lorenzo et al., 2022; Nieto et al., 2015; Chrisman et al., 2015). Thus the objective of this one is to understand how they innovate despite family business culture constraint. These three key issues have consequences for innovation in SMEs. Addressing these objectives will help us understand how SMEs effectively undertake innovation and provide new and valuable insights.

For this purpose, this study investigates three research questions, each of which is addressed in the Findings Chapter (Chapter 6). These research questions were developed based on the gaps identified in the literature review and based on the key issues the context chapter explained. The literature identifies low-tech SMEs face resource constraints of innovation (Love and Roper, 2015; Baregheh et al., 2014, 2012), large dominant customer constraints of innovation (Raymond and St-Pierre, 2004; Fischer and Rueber, 2004), and family business culture constraints of innovation (Lorenzo et al., 2022; Nieto et al., 2015; Chrisman et al., 2015). The Context Chapter also highlights firms in the low-tech sector are dominated by family-owned and -managed businesses with the majority are established small to medium-sized enterprises, with limited resources and are reliant on dealing with a network of large customers where there is disparity in profits (see Chapter 2). However, there is a lack of knowledge around "how" low-tech SMEs undertake innovation despite these issues and constraints (De Massis et al., 2018; Carnes et al., 2017; Fischer and Rueber, 2004), which is what the study seeks to address. Hence, it addresses the following research questions:

RQ1: How do low-tech SMEs undertake innovation despite resource constraint?
RQ2: How do low-tech SMEs undertake innovation despite large dominant customer constraint?
RQ3: How do low-tech SMEs undertake innovation despite family business cultural constraint?

1.4 Justification for the research

In comparison with large and high-tech firms, empirical research exploring innovation strategies, the types of innovation and innovativeness in SMEs, particularly those in the low-

tech sector have been limited (Nauman et al., 2022; Baregheh et al., 2016; Lefebvre et al., 2015). The food sector as the largest or second largest manufacturing sector (Bigliardi et al., 2021; Scottish Government, 2020) plays an important if not the most important role for economic development and historically low-tech sectors have been less acknowledged (Nauman et al., 2022). This is due to the idea that the food sector displays low investment in technology and R&D while the food sector continues to innovate (Nauman et al., 2022; Baregheh et al., 2016, 2014; Menrad, 2004). The food sector has recently experienced economic, social, technological changes and characterised by a more competitive environment (Bigliardi et al., 2021). For example, the sector is characterised by a more competitive environment from growing consumer demands and supply chain, and the increasing pressure towards food safety, heath, and sustainability turned innovation into a crucial firm activity (Bigliardi et al., 2021). This development provides incentives to innovate particularly for SMEs to survive and remain competitive (Minarell et al., 2014).

However, most firms in the low-tech sector are SMEs with limited resources for innovation (Love and Roper, 2015; Minarell et al., 2014), deal with a network of powerful and dominant customers (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005), and are established family-owned and-managed businesses (Laforet et al., 2016; Brown, 2011; Laforet and Tann, 2006). This context makes it unique to study SME innovation and scholars have suggested a need for more contextually grounded research on innovation in SMEs where multitude of important influencing factors can be investigated (De Massis et al., 2018; Curado et al., 2018). This research seeks to better understand how low-tech SMEs innovate in this context because research suggests they do innovate (Nauman et al., 2022; Baregheh et al., 2016, 2014; Menrad, 2004) but at the same time they face key issues that constrain innovation activities.

Asymmetric relationships and power dynamics between suppliers and customers are not widely explored with regard to innovation. However, management of relationships is important for SME innovation (Lasagni, 2012) which often involves with partners characterised by different features such as size, power, and resources giving rise to asymmetric relationships (Colurcio et al., 2012). While there is research from power asymmetries of partners in relation to knowledge sharing in innovation networks (Colurcio et al., 2012; Johnsen and Ford, 2006, 2001) there is limited work from the SME perspective around strategies SME managers execute to manage large dominant customer relationships in being innovative (Lambrecht et

al., 2015; Colurcio et al., 2012) particularly on the broader low-tech sector that tend to be ignored (Lacoste and Johnsen, 2015). Limited researchers investigated this topic within the agricultural sector (Lambrecht et al., 2015; Colurcio et al., 2012) but this critical matter for analysis (Colurcio et al., 2012) seems to be neglected in other key parts of the food sector (e.g. food product brands, biscuits, bakery and other key subsectors). There are calls for qualitative research to analyse the perspective of SMEs for innovation in dealing with large dominant customers (Lambrecht et al., 2015; Colurcio et al., 2012). Empirical work studying the effects of asymmetric relationships for innovation from the SME's perspective are still limited especially in the food sector hence calling for research in broader regions and particularly where there is high power disparity (Lambrecht et al., 2015). Therefore, understanding of the sectoral context shaping low-tech food SME innovation can benefit from investigation and allows research that would contribute to the understanding largely around innovation in low-tech SMEs and their ability to undertake innovation despite constraints.

Despite the importance of family businesses in the low-tech sector for innovation (Laforet, 2016), there has been limited empirical evidence regarding the family business culture on innovation in SMEs (De Massis et al., 2018; Laforet. 2016). In fact, family business context is often neglected in innovation conversations by innovation researchers (Calabro et al., 2019; Kraus, 2012). Research suggests family firms' culture often constrains innovation activities (Lorenzo et al., 2022; Nieto et al., 2015; Block et al. 2013; Cassia et al., 2012; Chrisman & Patel, 2012). Despite this belief, studies suggest family firms innovate (Duran et al., 2016), however, knowledge gaps are identified regarding the impact of family business culture on innovation behaviours and strategies of family firms (Calabro et al., 2019; Kammerlander et al., 2015; De Massis et al., 2015) including family SMEs (Laforet, 2016; Kraus, 2012). In other words, research still lacks a very good understanding with regard to how SMEs, particularly those in the low-tech sector innovate despite family business culture constraint. There has been a call for more holistic evaluation of family firm strategies (Kammerlander wet al., 2015) and in specific contexts (De Massis et al., 2018). Further, it has been argued resource management is critical for innovation (Carnes et al., 2017; Sirmon et al., 2011) in family firms (Sirmon and Hitt, 2003) which there is a call for empirical research exploring the effects of family firms' unique characteristics on managing resources to innovation (Carnes and Ireland, 2013). Lastly, while previous research considered technological innovation (De Massis et al. 2013; Rod 2016), there is room for innovation research more broadly in the context of family SMEs.

Therefore, this study will explore innovation in this context and aims to understand how low-tech SMEs undertake innovation despite constraints. The limited research into the nature of innovation within the low-tech SMEs, and their constrained context with regard to innovation, led to the formation of broad, exploratory research questions.

1.5 Contribution to knowledge

First of all, there is less work in SMEs compared to larger firms, and high-tech compared to low-tech. Research tend to focus on large firms and those in the high-tech sector (Nauman et al., 2022; Kirner and Som, 2015). However, SMEs are the key source of economic growth, particularly those in the low-tech sector (Nauman et al., 2022). The low-tech sector is considered a key contributing sector to the economy and most of the economy is run by low-tech product offerings (Nauman et al., 2022; Scottish Government, 2019). There is without a doubt that low-tech firms play key roles to economic growth and more attention to this sector is needed (Lee and Walsh, 2022; Nauman et al., 2022). This study therefore explores innovation in low-tech firms and seeks to address the lack of research into the strategies to respond to the key constraints of innovation in low-tech SME contexts. Low-tech SMEs are different in the way they innovate compared to other firms and sectors (Lee and Walsh, 2022; Baregheh et al., 2016; Hirsch-Kreinsen, 2015), and while we have research on innovation and what it looks like in this sector (Baregheh et al., 2016; Hirsch-Kreinsen, 2015), the picture can be more complete with a study that clearly focuses on how firms in this sector overcome the constraints of innovation. This is important because first, SMEs are unique and have unique considerations around how they innovate, and more so in the low-tech sector (Baregheh et al., 2016; Laforet, 2016; Hirsch-Kreinsen, 2015), therefore understanding how they configure resources to innovate with constraints can be important (De Massis et al., 2018; Som, 2015) and add to the overall study of SME innovation (Love and Roper, 2015), offering more insight and enriching the SME innovation research.

The study first thematically pre-identified key constraints of innovation in this sector as areas with gaps. The constraints of innovation are related to their resources, customers, and organisational culture. These three are considered factors influencing the way SMEs in the low-tech sector innovate. Low-tech SMEs have limited resources because of their size (Love and Roper, 2015; Madrid-Guijarro et al., 2009; Hewitt-Dundas et al., 2006), deal with large

dominant customers where there is an imbalance of power in their relationships (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005; Raymond and St-Pierre, 2004; Fischer and Rueber, 2004), and many being family firms operate under a distinct organisational culture (Lorenzo et al., 2022; Nieto et al., 2015; Chrisman et al., 2015), all which influence their innovation. This state presents a unique context for innovation. The contribution this study makes conveys from empirical data how low-tech SMEs undertake innovation in this context, particularly with those constraints. The study found nine strategies that enabled SMEs to effectively and efficiently resource orchestrate to successfully navigate through their key constraints of innovation, namely limited resources, large dominant customers and idiosyncratic family business organisational culture, and therefore can advance the research on resource orchestration for innovation in resource constrained firms (Mirkovski et al., 2023; Yu and Wang, 2021), SME innovation research (Baregheh et al., 2016; Love and Roper, 2015), dominant exchange and asymmetric partnership research (Lacoste et al., 2023; Fischer and Rueber, 2004), and family business innovation research (Lorenzo et al., 2022; Calabro et al., 2019; De Massis et al., 2018, 2015). The strategies found can enrich the SME innovation research and offer a better picture of innovation in SMEs contexts (De Massis et al., 2018; Baregheh et al., 2016, 2014, 2012). Additionally, the study offers how firms manage the interplay of their constraints on innovation.

The strategies together can offer a more unique picture and context for innovation in SMEs than what the research currently offers (De Massis et al., 2018) where they have focused on the key constraints individually. The resource management perspective of low-tech food SME innovation offers a comprehensive and useful understanding of innovation in a specific context. The study offers a theory that can be widely applied to other similar contexts such as innovating with limited resources (Mirkovski et al., 2023; De Massis et al., 2018), or relevant to contexts that have dominant customers (Lacoste et al., 2023; Raymond and St-Pierre, 2004; Fischer and Rueber, 2004), contexts that have a distinct organisational culture and ownership characteristics (Lorenzo et al., 2022; De Massis et al., 2015), and contexts relevant to low-innovation (Frick et al., 2019; Baregheh et al., 2016). Sector/context specific innovation research is a phenomenon that is unique yet the lessons that come with it are widely applicable. It is useful to have unique contextual boundaries in qualitative research. Therefore, it is important to study firms' ability to leverage resources to innovate and achieve competitive advantage in specific contexts (De Massis et al., 2018) such as contexts with dominate customers, limited resources, and unique ownership characteristics.

The study used resource orchestration theory (Sirmon et al., 2011) as a lens to be the first to show how low-tech SMEs resource orchestrate to innovate. The resource orchestration literature is relatively new and even more so regarding SMEs and innovation (Mirkovski et al., 2023; Yu and Wang, 2021). While there is empirical work on resource orchestration and large firms, there is very limited work on resource orchestration and SMEs (Deligianni et al., 2019; Symeonidou and Nicolaou, 2018). Resource orchestration may represent a useful framework for large firms that hold sufficient resources, but less so for SMEs. Resource orchestration theory is firm-centric and largely considers resources residing within the firm (Nason et al., 2019) yet ventures of small to medium-sized rely on resource orchestration *across* firms to obtain resources (Mirkovski et al., 2023; Nason et al., 2019; Baert, 2016). Recent research even suggests resources do not necessarily require to be owned by the firm (Nason et al., 2019).

Therefore, managerial ability is more important in resource constrained firms to orchestrate resources efficiently and effectively for innovation opportunities than firms with more resources do. According to resource orchestration SMEs suffering from constraints are reliant on their ability to efficiently and effectively structure, bundle, and leverage their limited resources (Yu and Wang, 2021; De Massis et al., 2018; Sirmon et al., 2011). How resources are effectively managed is even more critical in resource constrained firms (Yu and Wang, 2021). Their ability to orchestrate their resources is likely to represent a primary driver in enhancing or diminishing innovation (Carnes et al., 2022, 2017; De Massis et al., 2018). SMEs, offer a particularly relevant context for exploring resource orchestration effects since these firms are frequently constrained by liabilities of smallness (Wales et al., 2013). Therefore, this study applied the resource orchestration lens to SME context, particularly in the low-tech sector, and show how they innovate through resource orchestration. The study adds to the resource orchestration theory and literature by providing knowledge on how low-tech SMEs resource orchestrate for innovation and responded to calls (Carnes et al., 2022, 2017; Baert et al., 2016). Importantly, the study extended the resource orchestration theory by offering new sub processes making it suitable to SMEs, following the work by Mikovski et al., (2023) and Yu and Wang (2021).

1.6 Thesis structure

Following the introduction chapter of this research, this thesis presents the context in which Scottish food SMEs operate in, in particular, the factors that influence their business innovation decision-making. This context chapter discusses the background and characteristics of the food sector and growth pillars of the sector affecting Scottish food SMEs and innovation. Chapters 3 is a review of relevant literature and theoretical underpinning for the study. Chapter 3 aims to understand better how small medium-sized enterprises (SMEs) particularly those operating in the low-technology sector undertake innovation. Therefore, a review of SME innovation is implemented in this chapter. This review includes SME characteristics and the innovation barriers faced by SMEs, innovation in the low-tech firms/SMEs, and finally explaining and framing resource orchestration with regard to SMEs and innovation and examining from research how SMEs overcome resource constraints through resource orchestration. A conceptual framework summarises and depicts the concepts from the literature at the end of chapter 3. Chapter 4 presents the methodology of this research suggesting adopting inductive qualitative exploratory research suitable to this research. Chapter 5 explains in detail the findings of this study from the qualitative data collection interviews followed by analysis and interpretation (Discussion). Consequently, this chapter presents a revised conceptual framework. Lastly, chapter 6 discusses the contributions, limitations, future research and concluding remarks.

Chapter 2 The context Scottish food SMEs operate in that influences decision-making to innovate and grow

2.1 Objective

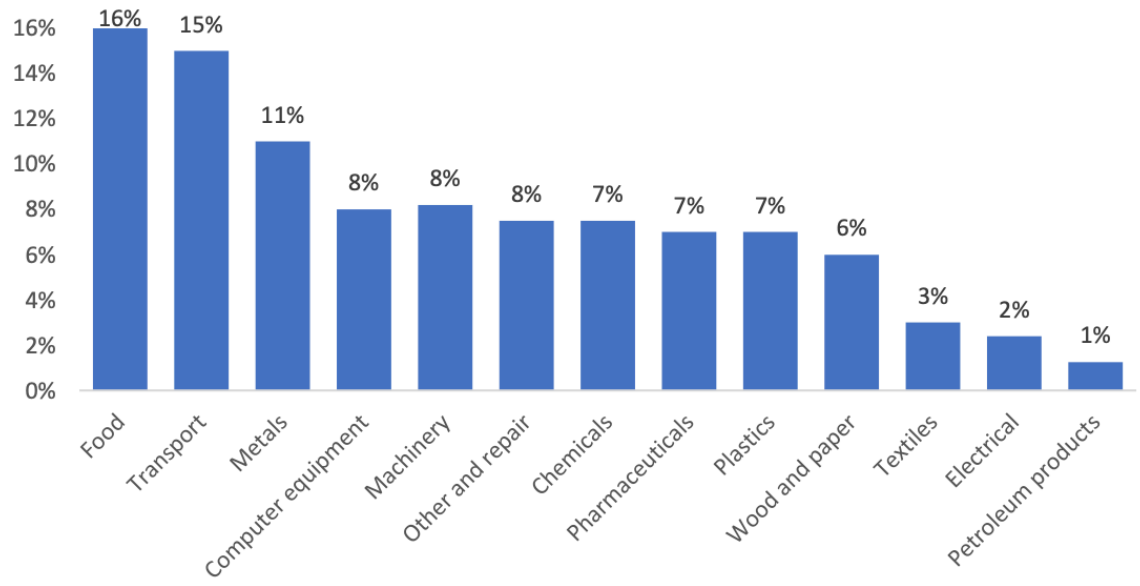
This chapter sets the scene for this research to demonstrate the context in which Scottish food SMEs operate, in particular, the factors that influence their innovation business decision-making. The Scottish government together with Scotland Food & Drink have developed an Ambition 2030 Plan to increase the sector's (together with Drink) turnover to £30 billion by 2030. They plan to achieve this through three "growth pillars" or themes including People & Skills, Innovation, and Supply chain. The sector is categorised as low-tech, but it plays an important role the Scottish economy and its economic growth. Low-tech firms do engage with innovation to drive economic growth, but they may have a multitude of factors influencing their business-decision making. This chapter will focus on each pillar and map out the current support landscape around them to tell a story about the context in which Scottish food SMEs operate in. First, this chapter will discuss the background and characteristics of the food sector. Second, it will discuss in detail each growth pillar – what they mean, what the strengths and weaknesses of each pillar are that affect Scottish food SMEs.

2.2 Introduction

An important subsector of Scotland's manufacturing sector, if not the most important, is food manufacturing. Food manufacturing is the largest contributor to manufacturing employment, the second largest contributor to export and the top five largest manufacturing subsectors in terms of enterprise numbers (Scottish government, 2017; Rhodes, 2020). Over the recent years, it annually provided about 20% of all manufacturing employment and 15% of all manufacturing turnover (Scottish government, 2017 and 2020). Therefore, this is a key sector for Scotland and the overall food industry, which Scotland's Economic Strategy recognises as one of the six identified sectors to offer particular opportunities for growth (Scottish government, 2015). Across the UK, the food and drink manufacturing industry employ over 422,000 people across over 10,000 sites and Food and Drink Federation (2015) claims over 10,000 new recruits will be required by 2022 to meet the demand of this sector (Food and Drink

Federation, 2015; Sheffield, 2020). Food manufacturing contributes to 16% of all manufacturing output in 2014 in the UK (Rhodes, 2020) as illustrated in figure 2.1 below.

Figure 2. 1 Output for the manufacturing sector (Rhodes, 2015/20)



By Rhodes (2020) as part of UK government manufacturing statistics

Manufacturing food SMEs in Scotland are typically family-owned enterprises and many of the key companies in this sector are well-established small to medium-sized enterprises (Brown, 2011; Food and Drink Federation, 2020). Firms in this sector have had a strong turnover (35% increase) in the last decade or so (Scottish government, 2020) [1] compared to other growth sectors and have been the largest contributor to manufacturing employment (Scottish government, 2017) as discussed above. Another interesting characteristic of this sector is its human capital profile. With skills utilisation, the sector has a high polarised human capital skills profile, almost many of the employees have been employed in elementary occupational groupings and managerial roles (Scottish Enterprise, 2007; UK Commission for Employment and Skills, 2014). In addition, labour turnover is also above the Scottish average, subsequently migrant workers have played an important role in meeting the demand for labours in the

[1] The food sector has had an overall 40% increase in turnover from 2008-2018. Crop and animal production, hunting and related service activities sector has increased by about £30% from 2008-2018, fishing and aquaculture sector had a significant increase of 109% turnover from 2008-2018, and manufactures of food products had a 35% increase in turnover from 2008-2018 (Scottish government, 2020).

Scottish food sector, particularly in low-quality jobs (Rolfe and Hudson-sharpe, 2016; Brown 2011).

Third characteristic of this sector is its low innovation. The Scottish food & drink sector combined has about 1-1.5% of the overall Business Enterprise Research and Development (BERD) in 2020 (Scottish government, 2020) and has not changed since 2009 (Scottish government, 2009b). BERD is the most reliable estimate of business R&D spending; it is crucial to the competitiveness of the Scottish economy and is considered to be a key determinant of productivity growth and economic performance (Scottish government, 2019). However, the development in manufacturing systems has led many firms to invest in automating processes to optimise production efficiency and productivity (Tilley, 2017; Alcar and Cruz-Machado, 2019) to deliver volume to better compete and respond to market needs, leading us to the third issue – supply chain.

The food supply chain is a key part of the Scottish economy, and together with the drink sector accounts for almost 20% of total gross value added (GVA) and employs over 350,000 people across Scotland (Leat, 2011; NFU Scotland, 2018). In Scotland, the food supply chain is characterised by low profitability and margins (Scottish government, 2019). This is another characteristic of the sector.

Overall, the food sector contributes significantly to the Scottish economy, the substantial role of the sector in Scotland speaks for itself and that the SMEs in this sector. A favourable regulatory landscape is necessary to address their challenges and opportunities. Scotland Food & Drink together with the Scottish government have plans to increase the sector's (together with Drink) turnover to £30 billion by 2030, a plan known as Ambition 2030. They plan to achieve this target through focusing on three growth pillars namely People & Skills, Innovation, and Supply chain.

2.3 Public spending to support the sector

The public sector plays an important role in shaping the direction of the sector. To support the sector, the government has spent about £100 million over the recent years to support, regulate and assist the growth of the food (and drink) sector (Scottish Parliament, 2017). However, more

recently there is a £10 million investment, jointly with industry, to support the delivery of Ambition 2030. Below Ambition 2030 growth pillars will be discussed.

2.3.1 Growth Pillar 1: People & Skills

Whilst appreciating there are many challenges facing food manufacturing companies and these challenges do vary across the different sectors, one of the main issues regularly arise is 'people and skills' (Food and Drink Sector Council, 2017). Many Scottish food manufacturers have reported being affected by skills gaps with many not 'fully proficient' in their jobs (Food and Drink Federation Scotland, 2020). Skills gaps in Scotland are found among associate professional and technical roles, including engineering technicians, as well as among operatives, skilled trades (e.g. butchers, meat-cutters, fishmongers), sales and management.

Investment in qualifications, skills and training significantly increases the firm's chance of survival (OECD, 2012; Arrighetti et al., 2019) and have a direct link with innovation (Whittaker et al., 2016). In Scotland, small companies that were broader innovators[2] had a higher proportion of employees holding a degree or higher-level qualification, than non-innovators (UK Innovation Survey, 2017). Among non-innovators in Scotland, there was a lower proportion of employees with higher qualifications in science or engineering (3.8%) than in other subjects (8.1%); among broader innovators the reverse was true: broader innovators employed a larger proportion of people with higher qualifications in science and engineering (14.9%) than other subjects (12.0%) (UK Innovation Survey, 2017). Thus, higher training and qualifications can lead to higher innovation.

In 2018, 48% of total SMEs in Scotland arranged or funded training over the year, compared to 54% in 2016 (Small Business Survey Scotland, 2016). Workforce development and training are an important component in promoting productivity, fair work, and growth (Hamilton et al., 2017), but as data shows the proportion of Scottish SMEs investing in staff training and development has declined. However, 62% of manufacturing SMEs including food had engagement with training. This rate is a small rise from 59% in 2016. The most common forms of training that they received included technical, practical, or job-specific skills (88%), health

[2] 'Broad' innovators develop new or significantly improved product or process, new or significantly improved forms of organization, business structures, practices or marketing concepts/strategies, engage in innovation which is incomplete, reduced or abandoned, Investment in internal research and development, training, external knowledge machinery and equipment for innovation (UK Innovation Survey, 2017).

and safety (71%) and leadership and management skills (Small Business Survey Scotland, 2018). Consequently, training is slowly rising among Scottish manufacturing SMEs enabling them to deal with technical, health and safety issues. However, many of them are still struggling with skills and recruitment. To tackle these issues, Scotland's enterprise agencies provide various support which will be discussed below.

2.3.1.1 Analysis of main agencies' skills services

Scottish SMEs had a poorer engagement with formal apprenticeships (i.e. apprenticeships that lead to a recognised qualification) when compared to larger Scottish firms and to the UK. More than half of larger Scottish firms and more than 10% of UK SMEs offered apprenticeships in 2018 compared to 8% Scottish SMEs (Small Business Survey Scotland, 2018; Kik et al., 2019). The number of apprenticeships among Scottish SMEs have declined by almost double in the recent years including food manufacturing SMEs (Small Business Survey Scotland, 2016 and 2018). Recent data from 2019-2020 across the Scottish sectors also show that food and drink have six times less staff who partake in apprenticeship programmes than construction, sports, health and social care (Scotland Development Skills, 2020/2019; OECD, 2020).

The Scottish Funding Council (SFC) provides funding support to the food sector to spend on people and skills. They support in terms of colleges and higher education institutions (HEI), and in 2017-18 their direct funding to food & drink remained at £37 million as well as around £2 million to Skills Development Scotland (SDS) for the Modern Apprenticeship (MA) food training programme. Figure 2.2 outlines SDS' spending costs to support the food and sector. SDS's MA training has funded 1854 modern apprentices for agriculture, aquaculture, food operations and technical, and game and wildlife management (Scottish Parliament, 2017). Other sectors have more staff starting apprenticeship programmes compared to food and drink.

Figure 2.2 Skills Development Scotland - Spending on areas that support food and drink (2016-17 £'000s)

Source: Information provided to SPICe (Scottish Parliament, 2017)

Sector qualifications including New Scottish Vocational Qualifications in Food and Drink Operations (particularly Food Manufacturing Excellence at SCQF level 5 and 6) have been developed to create suitable skills for individuals in the sector. The qualifications, represent a host of proficiency qualifications offering companies in the food manufacturing or supply chain a route to implement continuous improvement programme for the workplace. These qualifications will encourage process innovation in firms by focusing on lean practices to improve productivity. Process innovation is important given the trend in automation and manufacturing complex. Furthermore, SDS launched a programme to help firms with skills shortages such as recruitment and training. However, data suggest many businesses are still struggling and highlight recruitment as a top concern (Scottish Enterprise, 2019). The Scottish Government's Small Business Survey 2018 highlighted staff recruitment and skills as the top three most reported major obstacle to business growth and innovation. Many of the food manufacturers in Scotland are small to medium-sized and family-run businesses who may lack the 'culture' and 'time' resources to search for information and engage with qualifications.

2.3.1.2 Shortage of skills

The growing engineering as well as other skills shortages within food manufacturing has been well publicised (Sung et al., 2008; Skills Development Scotland, 2012; Wagstaff et al., 2018; Royal Bank of Scotland, 2020). In 2019, more than half of Scottish food manufacturers have faced difficulties in recruitment and one of the most frequent causes were a shortage of skilled applicants (Department for Environmental Food Rural Affairs, 2019). The food sector is need of engineers (Ten Live Group, 2015; Skills Development Scotland, 2012) especially with familiarity to manufacturing 4.0 i.e. 'fourth industrial revolution' (Scottish Council for Development and Industry, 2020). However, the Scottish economy sees more engineers being recruited from other sectors, out with food manufacturing, but because of shortage and a realisation of the transferable skills, experienced engineers choose the food sector as a career of choice for job security/safety as well as the developments in automation and technology that the food sector is achieving. With the Ambition 2030 plans Scotland Food & drink aims to make the sector more attractive to increase employment in this sector over the next decade. Moreover, 90% of manufactures including food are now paying Living Wage, which is a key factor in skills shortages. However, only 10% of Scottish SMEs in recent years engaged with Scottish Modern Apprenticeship funded through SDS discussed earlier. Again, this low rate indicates more food manufacturing firms should engage with Scottish Modern Apprenticeship. Greater investment in Scottish labourers and their skills is identified and needed to make the food industry one of the first choice for workers (Scottish government, 2017). Around 25% (27,000) new job opportunities are emerging in the next several years ahead, and an important goal is to raise the profile and image of the food sector to attract new entrants.

2.3.1.3 Productivity

Productivity in simple terms is the total output produced per input within an economy (UK government, 2018). According to OECD productivity recognises how efficiently labour and capital are utilised to produce a given level of input (OECD, 2020). Scotland aims to reach the OECD's top quartile productivity; an extra 20% further productivity is needed to meet this target. Since SMEs account for 99.3% of all private sector businesses and provide 55.4% (estimated 1.2m) employment and 41.5% turnover (Scottish government, 2019) productivity plays a key role for them and the Scottish economy, hence it is crucial for the government to

focus on SMEs' productivity as a way to meet its target. SMEs have been a dynamic part of the economy in terms of their growth, which has been growing faster than other enterprise size bands in Scotland since 2000 (Scottish government, 2018). However, most SMEs do not know what productivity is, how to measure it, and do not have the time to measure it (UK government, 2018). This lack of engagement with productivity is referred to as "productivity illiteracy" (Institute of Directors, 2018), whereby only a handful of SMEs are aware of their own productivity and the gap. Some of the major barriers to improving productivity among the UK including Scottish SMEs are time constraints, skill challenges, and access to finance (Lange et al., 2000; UK government, 2018). The Federation of Small Businesses added that SMEs are usually too focused on profits to consider productivity and what it means for them and the wider economy (UK government, 2018).

A study by BDO (2018) shows that UK food businesses now see increasing productivity as a key priority. In particular, the study showed that 89% of respondents viewed productivity as a major focus area, with 63% looking to make better use of staffing resources and 54% aiming to improve materials utilisation and cut waste (BDO, 2018). In addition, more than 50% of respondents highlighted their companies were increasing investment in automation, a level that dropped from 66% in 2017 (BDO, 2017). Productivity Club Scotland, part of the Scottish Council Development and Industry (SCDI) has recently announced expansion to help Scottish SMEs recover from the impact of Covid-19. According to them, the project funded by the Scottish government has already helped many SMEs improve productivity, resilience, competitiveness and building business connections (Productivity Club Scotland, 2020).

When looking at the Skills Development Scotland's (SDS) spending (see figure 2.2) in relation to 'productivity improvement', a very small amount of funding has been allocated to productivity. Fiscal forecasts predict weaker productivity growth and tax revenues, causing tighter public sector budgets. A study by McKinsey & Company (2017) recognised that Scotland's population is ageing, and the Brexit is causing an inward downturn to inward migration in the UK as EU citizens make a vital contribution to the UK and Scotland's economy. There are over 140,000 EU nationals across low, medium and high-skilled jobs in Scotland's economy making up 6% of Scotland's workforce (Scottish government, 2018). In 2017, the Scottish manufacturing sector employed over 16,000 EU citizens, with many workers from other EU countries in the manufacturing sector employed in the food manufacturing: over 32% of employment in the food industry is made of workers from the EU (Scottish government,

2018). As such, Brexit demographic changes may likely lead to skills shortages and gaps in Scotland and intensify the competition to attract and retain talent (Keller and Meaney, 2017). Similarly, Scotland has a geographical concentration and distribution of employment in the food sector in and around its urban core in the Central Belt (Scottish government, 2020) making it even more challenging for those outside the Central Belt to recruit labour. These challenges and wider recruitment difficulties are likely to be a permanent feature of the Scottish labour market.

2.3.2 Growth Pillar 2: Innovation

Another important growth pillar in Scotland is innovation. As part of the Ambition 2030 strategy, the government aims to make innovation culturally embedded in the food sector by 2030 through making it easier for companies in the whole supply chain to innovate and promote innovation approaches (Scottish government, 2017). This aim means removing the barriers to innovation and making required resources more accessible to businesses. As such more collaborations are essential (Aarikka-Stenroos et al., 2017). Given the pace of change in technology, markets, consumers, and supply chain Scotland's food sector must create capabilities to make the sector adopt to the new opportunities (Supremem, 2013; Cirillo, 2020). Researchers have recognised the unique characteristics of innovation in the food sector. The food sector is known as a low technology sector (Trott and Simms, 2017). Scotland's share of BERD has always been particularly low in food products (Scottish Executive, 2004; Roper and Love, 2006; Scottish government, 2020). However, the development in manufacturing systems created opportunities for investment in automation manufacturing processes to optimise efficiency and productivity (Tilley, 2017; Alcar and Cruz-Machado, 2019). While R&D is low in the food sector hence known as low-tech, studies reveal firms engage with process innovation (Rammer et al., 2011) product and organisational innovation (Laforet, 2011) where much of innovation is non-R&D (Baregheh et al., 2012, 2014). The low-tech sectors are important to every economy. However the food sector consists of resource constrained firms and low complexity and standardised product offerings creating barriers to investment in R&D. However, biotechnology and nanotechnology have offered significant research for food firms (Bigliardi and Galati 2016) but the behaviour of the market impact the development of innovation (Esbjerg et al, 2016; Winger and Wall, 2006) and while food SMEs have large

product market demand compared to other sectors, their growth rates are low due to saturated markets in the UK and EU (European Commission, 2016). These issues force SMEs to operate on low margin and low growth in real terms. The latest GDP data from 2020 demonstrates that output in the food and drink growth sector decreased by 10.6%, whereas output across the economy decreased by 2.3% (Scottish government, 2020). The sector is also subject to increasing regulation and legislative requirements, product quality and safety requirements (Nayak and Waterson, 2019; Trienekens and Zuurbier 2008; Menrad, 2004) creating both opportunities and challenges for innovation. Innovation is deemed to be one of the most important factors for food firms willing to enhance competitiveness (Capitanio et al., 2010).

2.3.2.1 Collaboration between industry and academia

The Scottish government together with business support organisations have recently invested into a new Food Collaborative Innovation Fund. The fund is a bi-annual competition for groups of businesses within Scotland's food supply chain - with a focus on SMEs. The aim of the fund is to encourage a culture of collaborative innovation by addressing key food opportunities or challenges. Since collaboration is low between food firms in the sector, having a food collaborative innovation initiative will help businesses to work on projects across the sector, share best practice, and create synergies.

According to Interface that act as a middle-man between academia and Scottish firms, organisations have received help with regards to new product development, streamline services and developing processes which have enabled them to increase profits and export. For example, to drive research and innovation in Scotland's food and drink sector, Interface Food & Drink has awarded a total of £75,000 to fund three collaborative projects between Scottish food companies and Scottish universities. The competition attracted a number of high-quality entries from a wide range of companies looking to work with experts from across the universities. Mara Seaweed, Devro, and Lightbody have been announced as the recipients of the inaugural Interface Food & Drink Innovation Competition. Each company benefited from a £25,000 grant to support collaborative projects with leading academics in the food industry, to achieve economic impact and stimulate innovation and the adoption of new technologies within the sector. The successful entrants met the criteria set by experts from Scotland's food businesses. Entries were assessed on supply chain efficiencies; cost and manufacturing

effectiveness; energy and sustainability, new technologies and establishing and developing new global market opportunities.

These activities confirms SME-academia engagement from process innovation, new product development and consumer research. As discussed above, in 2017, the Scotland Food & Drink Partnership launched a new industry-led strategy, Ambition 2030, which in pursuit of accelerated growth aims to double the value of the industry to £30 billion by 2030 through growing intended markets (Scotland, RUK and International), developing food & drink capabilities (People & Skills, Innovation, and Supply Chain) and focusing on behaviours (Responsible, Collaborative, and Streamlined). Most of the mature sectors of the industry such as salmon, seafood, red meat, bakery and dairy already work increasingly collaboratively, but there are few collaboration activities amongst the manufacturers. Manufacturers have common issues and non-direct competitors as a result can benefit from sharing best practices. Nevertheless, as a resource provider, the University of Queen's Margaret is very active in working with Scottish food companies, particularly SMEs and in the manufacturing sector, to exchange knowledge that addresses the fundamental relationships between food and health and the sustainability of the food chain. However, the level of innovation cooperation between businesses and universities in Scotland has been lower compared to the RUK (National Centre for Universities and Business, 2015).

2.3.3 Growth Pillar 3: Supply chain

The third key pillar of Ambition 2030 is supply chains, where over 50% of the funding for the food and drink sector has been allocated to the supply chain support (Scottish Parliament, 2017). This investment highlights that the food supply chain is an important part of the Scottish economy, and together with the drink sector accounts for almost 20% of total gross value added (GVA) and employs over 350,000 people across Scotland. With relatively a small domestic market just over 5 million population, there is a strong orientation towards exports, annually worth around £2 billion.

In their book, The Atlas of Food, Milstone and Lang (2003) map out some of the main global food chain developments over the past 60 years (Ilbery and Maye, 2005). Their research reveals

a canvass of rapid change, in terms of food production, distribution and consumption. (Blythman, 2012, 2004). In Scotland and UK wide, there is a disparity in profit among the supply chain actors. There is a lack of transparency in market pricing further up the chain drastically limits the ability of farmers to produce a profit and secure a sustainable income. Since 2015 the growth of Scottish farming has been low (Scottish government, 2020). Data from Farm Business Survey (FBS) demonstrates that the average Farm Business Income (FBI) sometimes called farm business profit in Scotland was around £39,000 in 2018-19 however when support payments and diversification[3] are excluded the average farm made a loss of around £9,000 (33%) (Scottish government, 2020). Below Ambition 2030's supply chain approaches are discussed to help food businesses with the supply chain.

2.3.3.1 Supply chain collaboration

Supply chain collaboration is a relationship between supply chain partners developed over time to attain lower cost, higher quality, and greater product innovation, reduce risks and enhance market value (Gunasekaran et al., 2015). Collaboration thus is dependent on the provision of mutual benefit. Food producers across the world are a key element of the domestic, international and global supply chain for food and drink and other products. Scotland's farmers supply fresh vegetables and fruit, meat and milk, and eggs and crops. Farmers are important to their communities and collectively invest in them. However, the number of farms in Scotland are falling affecting the role agriculture has in wider society (NFU Scotland, 2018) with many farmers and growers being disappointed not being valued in the increasingly globalised food market (Scottish government, 2017). Scottish agriculture is a dynamic sector which feeds in to a multi-billion-pound food processing industry, creating thousands of highly-skilled jobs (Scottish government, 2016).

Famers across the supply chain in Scotland feel a lack of control in the supply chain resulting in little or no say over the price they receive for what they produce (NFU Scotland, 2018). The price race motivated by downstream competition damages farmers, manufacturers, and

[3] Diversification uses farm resources to provide additional income through non-agricultural activities. It can consist of a variety of activities including tourism, retail and renewable energies. Farm diversification has been becoming increasingly important to overall farm income. In 2018-19, 55% of farms were engaged in diversified activities. The most common diversified activity was renting out farm buildings. The average income from diversification across all farms was around £4,600 in 2018-19. However, not all farms engage in diversified activities (Scottish government, 2020)

processors' profits. As a result, the supply chain growth pillar set by Ambition 2030 aims to improve the communication and relationships between food stakeholders from primary to processors and others. Now due to price, processors and manufacturers have no incentives to establish good working relationships with farmers. A fundamental economic reality that most farmers and crofters are small businesses selling their products to much bigger businesses, remains (Scottish government, 2017). In addition, farmers are concerned where customers are overly prescriptive about where they can source inputs from (NFU Scotland, 2018). This issue distorts farm efficiency and gives farmers less flexibility to manage their own business. However, if there are better relationships and a spirit of collaboration in the food supply chain this will positively impact all (Scottish government, 2017). Some of the benefits include economies of scale in purchasing and selling (Anderson and Lee, 1999), sharing of resources (Cao et al., 2010) including equipment, machinery and staff, market information (Cachon and Fisher, 2000), risk management (Min et al., 2005), logistics (Christopher, 2016), brand and marketing (Kim and Cavusgil, 2009), to name a few.

The stakeholders in the supply chain should be encouraged to adopt a transparent and stable pricing structures approach, thus incentives for food processors are necessary to develop collaborative supply chain efforts (Narayanan and Raman, 2004) and encourage better working relationships so that farmers also benefit from the growth of the sector (Scottish government, 2018). Through this process, farmers are enabled to better produce the volume, quality and specification of products that their customers want (Christensen et al., 2016).

Accordingly, the government is encouraging more businesses to take part in collaboration as well as investing in supply chain improvement programmes via vertical and horizontal collaboration (Scottish government, 2018). The programmes can offer expert knowledge, centres for health, and facilitations. Since Scotland has world-class research should look into knowledge transfers similar to Monitor Farms and Farming for Profit (Scottish government, 2017). In terms of vertical collaboration, commitment, trust and cooperation are organisational behaviours that are important in supporting contractual relationships (Masuku el al., 2003), However, different interests, power levels, and views are barriers to develop good collaboration (Dania et al., 2016). With regards to horizontal collaboration, strategic alliance, farm management as well as some funds may be important to overcome the common problems, including high production costs, low income, and possibly high levels of debt (Malaza and Myeni, 2009; Sarathchandra, 2018). This strategy may then improve the productivity and

competitiveness of the smaller farmers. Horizontal collaborations can also be applied to logistics where smaller businesses that have small orders can develop horizontal collaboration through combining the load among them (Ghaderi et al., 2012). In addition, building on the work of the Grocery Code Adjudicator and the Small Business Commissioner, the Scottish government instigate the supply chain to be better regulated to avoid unfair trading practices (Scottish government, 2018).

Connect Local (CL) and Market Development Supply Chain (MDSC) are linked via collaborative group development as part of the Ambition 2030 strategy to focus on new opportunities. They work with regional food groups to support the UK market development strategy 'Home Advantage'. They provide advice and support to suppliers and buyers to help prepare for trading relationships through capability and capacity-building workshops (Scotland Food & Drink, 2020). Because the supply chain is key to the growth of the sector, half of the sector's funding is allocated to the supply chain. £1 million investment has been made towards strategic research in recent years to focus on building supply chain capabilities. These investments may present an opportunity for SMEs in the supply chain to work closely together i.e. collaborate to share knowledge and remain transparent throughout whilst exploiting specific market opportunities and aligning complementary core strengths. Such alliances will allow smaller members in collaboration projects to achieve benefits of scale and reduce risks and individual control. The collaborative approach can help develop products that are better able to meet the growing consumer demands (e.g. healthy consumers), which also leads us to the last section of this chapter. The last section explains food health and diet as part of food regulation set out by the government in recent years that has already impacted the sector for product development.

2.3.3.3 Food health & dietary – legislative/regulation

Food health and diet is important in Scotland and force food businesses to develop new products and services in line with the government's health and dietary objectives. In Scotland, Food Standards Scotland (FSS) has statutory responsibilities including policy development in relation to food, advising Ministers on the arrangements necessary to meet EU requirements for the protection of public health or other consumer interests. Ministers may issue codes of recommended practice for the guidance of Food Authorities, as regards the execution and

enforcement of the applicable Food Laws and of regulations and orders made under it. Food Authorities are required under that legislation to have regard to this Code when discharging their duties.

Obesity is a significant public health issue. Scotland has some of the highest incidences of obesity for men and women among OECD countries. After a period of rising levels, obesity rates are now stable (Health Scotland, 2020). The government plan in 2018 contained a number of measures to restrict the promotion and advertising of foods high in fat, sugar and salt and actions to tackle childhood obesity. This delivery plan has influenced many food businesses in Scotland that use salt and sugar to make their products. Particularly Scotland is home to some of the best shortbread companies and cakes that are impacted to develop new products. Nevertheless, FSS has a dietary surveillance programme in place to monitor the dietary intakes of the Scottish population and progress towards the Scottish Dietary Goals (Scottish Government, 2016). This monitoring data shows that there has been little improvement in the Scottish diet since 2001 (FSS, 2018) with the exception of salt which has reduced by 13% between 2006 and 2014 (FSS, 2019). The Scottish diet is energy dense, with too much fat, salt and sugar and too little fibre, fruits, vegetables and oil-rich fish, which is why the Scottish Government published 'Scotland's Diet and Healthy Weight Delivery Plan' to improve the balance of promotional activity towards healthier options.

However, last year the Scottish Government undertook a public consultation to invite views on its proposed approach for restricting the promotion and marketing of targeted foods that are high in fat, sugar or salt (HFSS) where they are sold to the public. The aim of the consultation was to gain some sense of the balance of opinion among respondents towards the proposals, whilst also attempting to come to a clear realisation about the breadth and detail of arguments put forward both for and against the proposals (Scottish Government, 2019). In general, there was support for the aim to reduce the public health harms associated with the excessive consumption of calories, fat, sugar and salt and diet-related conditions. However, views were mixed as to whether the restrictions proposed were the most appropriate way to achieve this. Another research by Food Standards Scotland (FSS) more recently has found that while there is widespread acknowledgement of the health risks associated with unhealthy diets, and recognition that these are an issue in Scotland, there are 6 in 10 consumers think their own diet is at least quite healthy suggesting a lack of connection with the issue at a personal level. However, there is room for more information and guidance on which producers and regulators

such as FSS can work together and leverage from new opportunities. Data in the new study shows that awareness of FSS stands at 60% and not all who have heard of FSS feel they truly understand the organisation's remit (The Research Consortium by FSS, 2020). Consumers are aware that FSS works to improve and inspect standards in the food industry. Aspects relating to healthy eating, labelling and sustainability are less widely recognised. This lack of knowledge suggests a greater need for awareness-raising activity that helps build consumer understanding of FSS's role.

In summary, this chapter explored the context in which Scottish food SMEs operate and the subsequent introduction of the Ambition 2030 Plan as a response to the challenges and opportunities within this context. This chapter highlighted the factors influencing innovation business decision-making for Scottish food SMEs. The Ambition 2030 Plan becomes pivotal, as it serves as a strategic initiative by the Scottish government and Scotland Food & Drink to propel the sector's turnover to £30 billion by 2030 through three growth pillars - People & Skills, Innovation, and Supply Chain. The chapter delved into each of these pillars to uncover the specific challenges and support mechanisms surrounding them. It was found that the challenges faced by the sector include skills shortages and recruitment difficulties while underscoring the low-margin impact on innovation for SMEs. However, the government's initiative to support for collaboration in the supply chain is key to address these challenges.

Chapter 3 SME characteristics and innovation barriers

3.1 Introduction

The aim of this research is to understand better how small medium-sized enterprises (SMEs), particularly those operating in the low-technology sector undertake innovation. Therefore, a review of SME innovation will be implemented in this chapter, followed by SMEs in the low-tech sector. This will include SME characteristics, key constraints, and resource orchestration. This study focuses on these topics to better understand how SMEs resource orchestrate to overcome resource constraints with regards to innovation.

3.2 SME characteristics and constraints

SMEs play a significant role in the growth of national economies. They represent a very important area on the development agendas of most governments in both developed and developing economies because most businesses in developed and developing are small-medium in sized (Muriithi, 2017; Amoros and Bosma, 2014; Tadesse, 2009; Kauffmann, 2005). They therefore impact economic development such as creating employment, enhancing business competitiveness, offering consumers a variety of innovative products and services, and contributing to driving economic growth (Poole, 2018; Ratten, 2014; Schneider and Veugeler, 2010; Wiklund and Shepherd, 2005).

However, the relationship between firm size and innovation activity has received much attention from researchers (Agrawal et al., 2021; Martínez-Ros and Labeaga, 2002; Acs and Audretsch, 1991). The discussion over who between large and small firms is more able and successful at innovating has lingered for many years. For example, Schumpeter initially discussed smaller firms as possessing dynamic creativity and therefore the driving force of innovation (Schumpeter, 1934). Later, he shifted focus to large firms that had the wherewithal to finance R&D and implement innovation at scale (Schumpeter, 1942). Some empirical studies in the literature have identified with the latter view that smaller firms may be less innovative (Hewitt-Dundas, 2006; Bugamelli et al., 2002) as smaller firms own fewer resources for innovation, while others believe small firms have behavioural advantages that enable innovation (entrepreneurial dynamism, flexibility, efficiency, proximity to the market, motivation) (Rothwell, 1985; Vossen, 1998). For example, being small and new offers

flexibility and fewer constraints for adopting organisational structure and innovation routines in comparison to larger and more established firms (Collinson and Wilson, 2006).

Nevertheless, there is a consensus in the literature that resource constraints are one of the major issues impacting the performance and growth of SMEs (Amornkitvikai and Harvie, 2018; Ratten, 2014; Taylor, 2013). They do not have enough resources to invest in innovation like larger firms (Presenza et al., 2017; Baregheh et al., 2016; Hewitt-Dundas, 2006). Small firms often lack 'material strength' and are inherently not in a position of advantage from a resource and capability dimension and in their ability to develop resources through learning economies of scale (Hewitt-Dundas, 2006; Rothwell, 1985). Their lack of financial and human resources is widely acknowledged. SMEs do not have sufficient finances to invest in innovation (Love and Roper, 2015). They cannot afford to promote experimentation, risk-taking, and monitoring (Nohria & Gulati, 1996). The SME may not survive if the innovation project fails (Bradley, Shepherd & Wiklund, 2011). These create challenges to internally finance innovation in SMEs and managers may therefore look to reduce or eliminate resource demands by forsaking innovation activities. Should SMEs wish to acquire resources externally, the process relies on outside parties for the resources required, however, due to the high asymmetric of information between the SME and the resource providers resulting in transaction costs (Williamson, 1981) becoming expensive or unavailable. Accessing external finance for innovation is challenging for SMEs (Love and Roper, 2015; Ughetto, 2008).

Apart from the lack of financial resources, SMEs also lack human resources to innovate. SMEs have poor skills and people management that inhibit innovation (Xuemei Xie et al., 2013; Love and Roper, 2015). As small firms, they lack commitment (Zwick, 2002), hold limited knowledge, and depend on the skills of a few numbers of people which may hinder innovative capabilities (Granata et al., 2018; O'Connor and Kelly, 2017; Birdthistle, 2006). Organisational culture conducive to innovation may not be represented, and leading small firms to pursue an informal, ad-hoc approach to innovation (Laforet, 2012). Research has highlighted the negative effects of such kind of approach to innovation (Scuotto et al., 2017) which usually fails to have strategic planning of innovation (Tell et al., 2016) and to seize new ways to follow market opportunities (Love and Roper, 2015), and focuses short-term (Nootebook, 1994; Yu-Lin et al., 2010). Short-term sighted firms also lack formalised HRM systems (Barrett and Mayson, 2008) including offering inadequate training and skills, and are less likely to reap long-term benefits from training and skills which are key to organisational success and innovation

(Wright et al., 2001). SMEs face challenges to attract skill and re-skill qualified managers to integrate innovation into the firm (Freel, 2000). These issues highlight internal skill constraints in SMEs. The Context Chapter also highlighted shortages of skill and people resources as a key issue (see Chapter 2).

The role of government policy in influencing innovation has also received attention (Jugend et al., 2020; Torregrosa-Hetland et al., 2019). In particular, the use of external advice and support via government policies and support may allow SMEs to create their strategies for innovation and growth (Cadil et al., 2017). SMEs' owner-manager characteristics and perception value and quality of services offered by the government and business support organisations are important (Chapman and Hewitt-Dundas, 2017; Chrisman and McMullan, 2004). Research suggests those SMEs' owner-managers with established business networks are more likely to engage in external advice and support from the government and business support organisations because of receiving referrals and recommendations (Hjalmarsson and Johansson, 2003). Mole et al., (2017) found that the gaps between the internal resources of firms and the resources needed to meet business goals inspire obtaining external advice sources, and this is particularly important for SMEs with limited resources (Mole and Capelleras, 2018; Kosters and Obschonka, 2011). However, small firms may be more interested in listening to a known business contact with business and industry experience rather than only interested in the outcome of the advice. They are worried about whether advisors have a sound knowledge of their business requirements (Mole et al., 2017). Therefore, there is inconsistent findings from recent studies as to whether business support organisations are valuable for the innovation and growth development of SMEs.

As discussed above, studies in the literature stressed SMEs are resource-constrained to innovate. However, despite this research shows they still undertake innovation (De Massis et al., 2018; Presenza et al., 2017; Baregheh et al., 2016, 2014, 2012). Research, although limited, highlights innovation in SMEs particularly around innovation types and external sources (Presenza et al., 2017; Lefevbre et al., 2015; Baregheh et al., 2012) yet does not explain *how* they actually innovate and the strategies they execute. We still do not thoroughly know how SMEs innovate despite their resource constraints. While researchers have focused on small firms in high tech sectors (Coviello and Joseph, 2012; Harrison et al., 2004; Storey, 1994; Oakey, 1993) there is less focus on the low-tech sector (Nauman et al., 2022). Research has

called for more work to investigate how SMEs innovate with limited resources particularly in specific contexts (De Massis et al., 2018; Baregheh et al., 2014, 2012).

Many of the SMEs around the world and in the UK especially are family-owned businesses (Institute for Family Business, 2019; Laforet, 2016) and are often managed by the family (Laforet, 2016; Bougrain and Haudeville, 2002). Family firms can be viewed as thriving organisations nurtured by the stewardship of dedicated family owners who pursue social and self-actualisation goals and deep investment in innovation to the benefit of all (Duran et al., 2016; Le Breton-Miller and Miller, 2009, 2005), however, they often agree less to others' advice and less likely to delegate decision-making to others, which may easily result in lower innovation (Calabro et al., 2019; Varis and Littunen, 2010). Strategic decisions are made within the constraints of family and individual objectives rather than maximizing firm potential, which causes the firm to reject changes due to their associated conflict (Blackburn et al., 2013; Dobbs and Hamilton, 2007). The myopic and limited knowledge and capabilities of the family can often be a barrier for their SMEs to pursue innovative activities (Haddoud et al., 2021). The firm is usually the lifeblood of the family, and the family wishes to keep their business over generations and long-term (Le Breton-Miller and Miller, 2006) often view innovation as a threat to the preservation of the family's socioemotional wealth and losing control of the firm (Gomez-Mejia et al. 2007; Perez-Gonzalez 2006). Family firms may therefore invest less in innovation and pursue projects that carry less threat (Block et al. 2013). In this sense, many family firms take a traditional and conservative view, conflicting between family business and innovation. Many family business researchers therefore tend to agree family business culture constrains innovation (Lorenzo et al., 2022; Nieto et al., 2015; Block et al. 2013; Cassia et al., 2012; Chrisman & Patel, 2012).

Nevertheless, family firms play a key role to the economy and wealth creation (Laforet, 2016; Tio and Kleiner 2005) and many of them are successful businesses (De Massis et al., 2018; Laforet, 2016), having unique traits that can potentially encourage innovation (Miller and Le Breton-Miller, 2005). However, the limited studies on the topic of innovation in family businesses are still inconsistent (Calabro et al., 2019), we still have limited knowledge concerning innovation in family firms particularly regarding *how* they innovate despite their cultural constraint. Researchers have called for this (Calabro et al., 2019; Duran et al. 2016; De Massis et al. 2015a) because family firms clearly innovate (Duran et al. 2016; De Massis et al., 2015) but we need deeper insights and understanding around "how" they do it. Innovation has

been studied much in the context of larger firms and those in the high-tech sectors (Koberg et al. 1996; Zahra 1993) but ignored in family business context by innovation scholars and conversations (Calabro et al., 2019; Kraus, 2012; Craig and Moores 2006). Therefore, research can benefit from empirical studies to cover the gap.

Family firms may pursue innovation with the demand side and customers can play a key role (Rajan et al., 2023; Belitski and Rejeb, 2022). The demand for innovations in markets is often highlighted as customers express a demand for innovations (Allman et al., 2011). In some contexts, partner participation and relationships can be more helpful in the innovation process compared to the R&D investment (Colurcio et al., 2012). Working closely with customers is an important source of feedback to develop and improve products and services based on customer requirements (Doloreux, 2015; Filieri, 2013; Bianchi et al., 2010) since SMEs cannot afford to invest heavily in internal R&D activities (Santoro et al., 2017; Capitano et al., 2010), however, the information and engagement with customers may also carry complications to adopt and a loss of control over the innovation process and plans (Fischer and Rueber, 2004). Looking to the needs of customers may prevent fundamental innovations (Christensen and Bower, 1996). In the low-tech sector, SMEs listen too carefully to their large customers concerning innovation partly because customers are powerful and dominate the market (Wijnands et al., 2008). Research strongly highlights the asymmetric and imbalanced power relationships between SMEs and their customers (Lacoste and Johnsen, 2015; Hingley, 2005) where many SMEs are dependent on a few large dominant customers (Raymond and St-Pierre, 2004). The literature on dominant exchange partners offers challenges and opportunities (Coviello and Joseph, 2012; Fischer and Rueber, 2004; Yli-Renko et al., 2001a,b). Nevertheless, the pressure from customers forces SMEs to reduce investments in new product development or to develop incremental new products (Baregheh et al., 2012; Laforet and Tann, 2006; Juriaanse, 2006). Customer dependency and the lack of diversity in the customer base may have important consequences on the innovation activities of SMEs (Raymond and St-Pierre, 2004).

While customer have been widely recognised as a key source of innovation development for many SMEs, they can also constrain innovation in SMEs (Fischer and Rueber, 2004). The constraining aspect has not been acknowledged much in the context of innovation compared to the facilitating aspect. This is important for many SMEs since the management of relationships involves with partners characterised by different qualities such as size, power,

and resources giving rise to asymmetric relationships (Colurcio et al., 2012). A number of studies deduced potential advantages and challenges stemming from power asymmetries of partners in relation to knowledge exchange in innovation networks (Lambrecht et al., 2015; Colurcio et al., 2012; Johnsen and Ford, 2006, 2001) but there is limited work from the SME perspective around strategies SME managers execute to manage the relationship in being innovative. The impacts of dominant exchange relationships on innovation from the SME's perspective are still limited (Lambrecht et al., 2015; Colurcio et al., 2012), particularly on the broader low-tech sector. While research shows SMEs undertake innovation (Baregheh et al., 2016, 2014) we still lack showing *how* they innovate despite large dominant customer constraint. This is a critical matter for analysis (Colurcio et al., 2012) and researchers call for investigation into this topic (Colurcio et al., 2012; Fischer and Rueber, 2004) within the low-tech sector with products and commodities of low complexity and innovation where they are often ignored as researchers tend to focus more on firms that offer customised or unique offerings (Lacoste and Johnsen, 2015).

While the sector categorised as "low-tech" based on the R&D expenditure, research suggests many innovation activities are undertaken in this sector (Baregheh et al., 2016, 2014, 2012; Lefevbre et al., 2015; Menrad, 2004). Recently, the number of studies examining innovation in the low-tech sector, particularly food firms are slowly growing (Bayona-Sáez et al., 2013; Trippl, 2011; Sarkar and Costa, 2008). There is therefore a need to better understand their innovation strategies. Below, the literature on innovation in the low-tech sector is discussed, before discussing the very recent and limited literature on resource orchestration in SMEs and presenting the study's conceptual framework.

3.3 Innovation in SMEs in the low-technology sector

R&D in the last few decades has received much attention in the study of innovation. It is viewed as the main measurement of innovation and for enhancing competitiveness. However, research also highlights many innovative firms not investing in R&D. A study by Rammer et al., (2011) found nearly 50% of the firms that engaged with innovation were in isolation with internal R&D. Their sample included German SMEs. Arundel et al., (2008) and Huang et al., (2011) found many European firms that are innovative do not engage in R&D. In the US data highlighted product innovation was done without R&D and more recently Lee (2015a) found over 40% of innovating firms were not conducting R&D. This highlights non-R&D innovation

in firms where many firms' economic success is not explained through the R&D-centred methods of innovation. The R&D paradigm has been criticized by evolutionary economists and researchers have suggested innovation is generated from new or re-combinations existing resources or solutions from within the firm and those externally available to the firm (Bender et al. 2005). Furthermore, non-R&D low-tech processes and hidden innovations contribute importantly to the success of organisations (Laforet, 2011; Damanpour, 2011). Although there is a tendency for researchers to focus on R&D-based innovations or high-tech firms, there are still many firms particularly SMEs in the low-tech industries that play crucial roles in the global economy, and they undergo significant innovations but are not R&D-focused. Therefore, if there is no focus on this area, the innovation by these firms and industries will not be captured sufficiently enough and thus excluded from the research. Given the importance of non-R&D innovation firms, the academic community should pay more attention to this largely neglected but key aspect of SME innovation and the innovation strategies of non-R&D low-tech hidden innovation SMEs. This would serve the purpose of economic development as opposed to only paying attention to specific niches of R&D as the only way or the one best way to enhance innovation.

Research explains innovation activities of low-tech firms may primarily focus on incremental innovation (Arundel et al., 2008). Research, in addition, highlights the significance of process innovation (Heidenreich 2009; Rammer et al. 2011). This enables integration of new technology into new processes and also pursue innovations concerning production processes to reduce costs resulting in higher efficiency and making firms more competitive (Cox et al., 2002; Heidenreich 2009). Due to the nature of low-innovation offerings and products in low-tech sectors incremental product innovation is pursued, and this way of innovation is often triggered by quick responses to customers which in most cases requires incremental changes. SMEs in this sector lack internal R&D capacities and formal process of knowledge generation, and instead rely on practical and pragmatic approach to innovation, where they focus on application-oriented practical knowledge (Hirsch-Kreinsen 2008) which is a combination of knowledge from design drawing and requirement specifications as well as accumulated experience, all which support product and process innovations (Rammer et al., 2011). However, to compensate for the lack of internal R&D resources a few studies highlighted externally generated knowledge in low-tech firms (Lefevbre et al., 2015; Kuhne et al., 2013; Som, 2012). Lefebvre et al. (2015) found different types of innovation linked to different types of sources of knowledge. They show that information provided by customers enhances product

innovations in low-tech SMEs. Som (2012) found more than 60% of low-tech German SMEs innovate cooperatively with their customers. Information and intelligence from customers such as feedback in the new product development process is valuable to low-tech SMEs in terms of speeding up the process and reducing costs. For low-tech firms compared to research-intensive firms or high-tech firms customers and suppliers play more important roles for low-tech SMEs' innovation (Hirsch-Kreinsen, 2015; Heidenreich 2009; Nieto and Santamaría, 2007). Customers and suppliers are valuable information sources for innovation and innovation capability in low-tech SMEs. They may strongly rely on incremental innovation capabilities linked to customer-specific product development which partly effectively compensates for the lack of proper R&D competence in low-tech SMEs. The closeness to customers and customer orientation may be a key competitive factor for low-tech SMEs but also may come at a cost. The Context Chapter (Chapter 2) highlighted the supply chain as a key theme to grow the Scottish food sector's turnover and address the disparities in the chain.

For firms in the low-tech sector, the literature identifies universities and research centres, and also clusters and networks, intermediaries, consultants, trade fairs and business associations (Nettle et al., 2018; Presenza et al., 2017; Kirner et al., 2010; Santamaria et al., 2009) which are considered within the wider concept of regional innovation system (RIS) important sources of information. For low-tech SMEs collaboration with universities and research centres is shown to be valuable sources of innovation to offer know-how for in-house research and technological developments (Menrad, 2004) which can lead to new ideas and products. Research discusses university collaboration (e.g. heterogenous) helps develop radical and new to market innovations (Nieto and Santamaria, 2007; Hewitt-Dundas et al., 2021). Kirner et al., (2010) find low-tech firms benefit from R&D collaboration, and that sharing resources, risks, and costs are vital for them (Li et al. 2013; Baardseth et al., 1999). Santamaria et al., (2009) find the use of consultants and external R&D personnel as key sources of innovation particularly for product innovation, compared to high-tech firms, whereas high-tech firms tend to use universities and research centres as sources of information much more than low-tech firms (Hirsch-Kreinsen, 2015). Whilst Kirner et al., (2010) found low-tech firms strongly profit from collaboration with universities and research centres, Presenza et al., (2017) found relationships with universities did not produce fruits for SMEs' capabilities due to the distance in the language used. Their study investigated Italian food and drink SMEs i.e. low-tech sector that are generally less active in engaging with academia, because of various cultural differences

that exist between universities and low-tech SMEs demonstrated in social behaviours, attitudes, norms, beliefs and sentiments, and goals create barriers to collaboration (De Wit-de Vries et al., 2018). For example, the scientific community may be keen on the scientific value of innovation as opposed to factors related to the market value, making them differ in their goals. There are therefore mixed results concerning the support of universities and research centres to innovation in SMEs. However, collaboration between low-tech SMEs and the external scientific community seems less than high-tech firms, which may explain the lack of radical innovation and R&D in low-tech SMEs. Firms with generally lower absorptive capacity can find scientific collaboration less advantageous (Belderbos and Gilsing, 2016). In this sense, customers, trade associations, and sector events may be more attractive as alternative sources of information, innovation, and knowledge exchange (Kahl, 2018; Newbery et al., 2016).

Despite potential advantages of R&D collaboration including sourcing knowledge, reducing the costs and sharing the risks, not many low-tech firms take advantage of R&D collaboration to improve their innovation activities. This may be due to the idea that most firms in low-tech sectors are small-medium sized, and products are with lower complexity. Low-tech sectors have low innovation offering making it hard to radically innovate standardised low-complexity products. Thus, they tend to generally collaborate less for R&D. Additionally, as discussed above, the high asymmetry between low-R&D firms and R&D-partners such as differences in language, knowledge culture, and goals are another reason for low-tech SMEs collaborating less in R&D. However, if low-tech firms can orchestrate their resources effectively and efficiently (Peteraf 1993; Sirmon et al., 2011) to address these challenges they may successfully benefit from such collaborations for innovation activities. Research calls to explore such constraints in this context and to identify strategies on how to overcome them (Som et al., 2015). There seem to be mixed results regarding the contribution of external sources of innovation for SMEs, and together with scarcity of research, more empirical studies are needed on how SMEs could leverage external collaboration and relationships for innovation (Lefebvre et al., 2015).

Overall SME innovation literature as well as the low-technology innovation literature highlighted the constraints of innovation. SMEs operating in this sector face a number of constraints that influence their innovation. Next, this chapter discusses how SMEs overcome their resource constraints through resource orchestration.

3.4 Resource orchestration, SMEs, Innovation

Small and Medium Enterprises (SMEs) are widely recognized as crucial drivers of economic growth and innovation. They play a vital role in job creation, economic dynamism, and fostering innovation across various sectors (Lorenzo et al., 2022; Poole, 2018; Love and Roper, 2015). However, SMEs often face significant constraints that limit their ability to innovate. These constraints include limited resources, dependence on large dominant customers, and unique organizational cultures, particularly in family-owned businesses (Yu and Wang, 2021; Nieto et al., 2015; Coviello and Joseph, 2012; Baker and Nelson, 2005; Fischer and Rueber, 2004). The paradox faced by SME owner-managers is stark: they must establish competitive advantages through innovation to survive in the market, yet they operate within these constrained contexts. This section aims to explore how SMEs can overcome these barriers to innovation through the strategic management of their resources, known as resource orchestration (Sirmon et al., 2011).

As previously discussed in this chapter, SMEs face three primary constraints that impede their ability to innovate: resource scarcity, the dominance of large customers, and the challenges posed by family business cultures. These constraints are depicted in Figure 3.3, illustrating the complex environment in which SMEs operate. Despite these challenges, many SMEs, including those in low-tech sectors, continue to engage in innovative activities (Baregheh et al., 2012, 2016). However, the mechanisms by which they achieve this remain underexplored. The emerging concept of resource orchestration provides a potential framework to understand how SMEs can navigate these constraints and drive innovation (De Massis et al., 2018).

3.4.1 Resource Orchestration: A Framework for Managing Constraints

Recent literature has increasingly focused on resource orchestration as a strategy to help firms create value and achieve competitive advantage in the market (Yu and Wang, 2021; Sirmon et al., 2011). Resource orchestration posits that it is not merely the possession of resources that leads to competitive advantage but the strategic management of these resources. This management is achieved through three key processes: structuring, bundling, and leveraging resources (Sirmon et al., 2007, 2011).

Structuring involves acquiring, accumulating, and divesting resources to build an optimal resource portfolio (Mirkovski et al., 2023; Sirmon et al., 2011). For SMEs, structuring is essential to address resource constraints, such as limited financial resources, human resource limitations, and technological gaps. By carefully structuring their resources, SMEs can allocate their scarce financial capital effectively, invest in critical skills, and bridge technological gaps through strategic relationships or incremental investments in technology with stamina (Konig et al., 2013). Similarly, SMEs can structure their resource portfolio through strategic accessing and adding new resources from external resource providers (Mirkovski et al., 2023; Yu and Wang, 2021). Therefore, structuring becomes a necessary process to ensure that these scarce resources are allocated effectively. This process directly addresses the financial and human resource constraints by enabling SMEs to prioritize and strategically invest in areas that will yield the most significant innovation impact.

Bundling refers to the integration and recombination of resources to build and refine capabilities, thereby creating innovations (Carnes et al., 2022, 2017). This can involve stabilizing existing capabilities, enriching them, or pioneering new ones (Sirmon et al., 2011). For SMEs, bundling is crucial to mitigate the effects of large dominant customer constraints. By bundling their resources, SMEs can enhance their capabilities to meet the demands of dominant customers while simultaneously exploring new market opportunities and innovation pathways. This approach allows SMEs to balance the pressures from large customers with the need to innovate and diversify their market reach. Leveraging involves deploying resources to exploit market opportunities, mobilizing, coordinating, and utilizing resources to create competitive advantage (Sirmon et al., 2011). For SMEs embedded in family business culture constraints, leveraging is particularly challenging yet essential. Family businesses often exhibit conservatism and resource allocation decisions influenced by family interests rather than strategic business needs (Varis and Littunen, 2010; Dobbs and Hamilton, 2007). Effective orchestrating of resources allows these SMEs to overcome their internal cultural barriers, redirect resources towards innovation, and capitalize on new opportunities that align with both family values and business growth objectives.

As illustrated in Figure 3.3, these processes—structuring, bundling, and leveraging form the cornerstone of resource orchestration and are crucial for SMEs, particularly those operating in severe constraints, to innovate and remain competitive.

3.4.2 Resource Orchestration in SMEs: Overcoming Constraints

SMEs, by their very nature, are often more dependent on the effective orchestration of their limited resources compared to larger firms. The resource orchestration perspective suggests that SMEs must cultivate proficiency in structuring, bundling, and leveraging their resources to drive innovation (Sirmon et al., 2011; Walers et al., 2013; Carnes et al., 2017). Given the resource-related liabilities faced by SMEs, managers' abilities to efficiently and effectively orchestrate resources become even more critical. The literature highlights several examples of how SMEs have successfully leveraged resource orchestration to overcome innovation constraints. For example, Mirkovski et al. (2023) demonstrate that SMEs can leverage external resources through service intermediaries, such as R&D consultancies and marketing agencies. This approach allows SMEs to access valuable resources and capabilities without the need for ownership, thereby overcoming the challenges posed by resource scarcity and external partner dependence (McKelvie & Wiklund, 2010; Nason et al., 2019). Yu and Wang (2021) propose that resource orchestration may be more crucial for small firms than merely owning resources, suggesting that entrepreneurial bricolage—creating something from nothing—is key to SME success. De Massis et al. (2018) explore how German SMEs, mostly family-owned, continuously innovate despite severe resource constraints. Their study highlights the importance of efficient resource orchestration practices, particularly in environments where resources are scarce. Similarly, Duran et al. (2016) show that family firms can achieve higher innovation outputs through effective resource orchestration, even in traditionally conservative sectors with lower investment in innovation.

SMEs often face significant resource constraints, including limited financial and human resources. To overcome these challenges, SMEs can employ resource orchestration to structure their resource portfolios effectively. For instance, SMEs might engage in strategic alliances or relationships to access external resources (Mirkovski et al., 2023). The dependency on large customers and their significant bargaining power poses substantial risks to SMEs. These large dominant customer constraints can limit an SME's ability to pursue independent innovation. Resource orchestration, particularly through bundling, can help SMEs enhance their capabilities to meet customer demands while also exploring new markets and opportunities. By leveraging their existing resources and capabilities, SMEs can reduce their dependency on dominant customers and diversify their revenue streams (Nason et al., 2019). SMEs with deep-rooted family business culture constraints often struggle with conservatism and resource allocation driven by family interests. Resource orchestration can play a transformative role in

overcoming these internal barriers (Lorenzo et al., 2022). By leveraging the unique strengths of the family business such as long-term orientation and strong networks (De Massis et al., 2018) SMEs can innovate in ways that align with both family values and business goals. Additionally, effective resource orchestration can facilitate more strategic resource allocation, ultimately fostering a culture of innovation within the family business (De Massis et al., 2018).

Despite these insights, there remains a gap in our understanding of how SMEs, especially those in low-tech sectors, structure, bundle, and leverage resources to undertake innovation. This gap is particularly evident in the limited research on resource orchestration across firm boundaries and the role of non-managerial positions in resource orchestration. Further, while the existing literature on resource orchestration provides insights into how SMEs can manage constraints, it is largely focused on high-tech sectors and larger firms (Carnes et al., 2022; Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Sirmon et al., 2011). There is a notable lack of research on how low-tech SMEs, which constitute a significant portion of the economy, orchestrate resources to innovate.

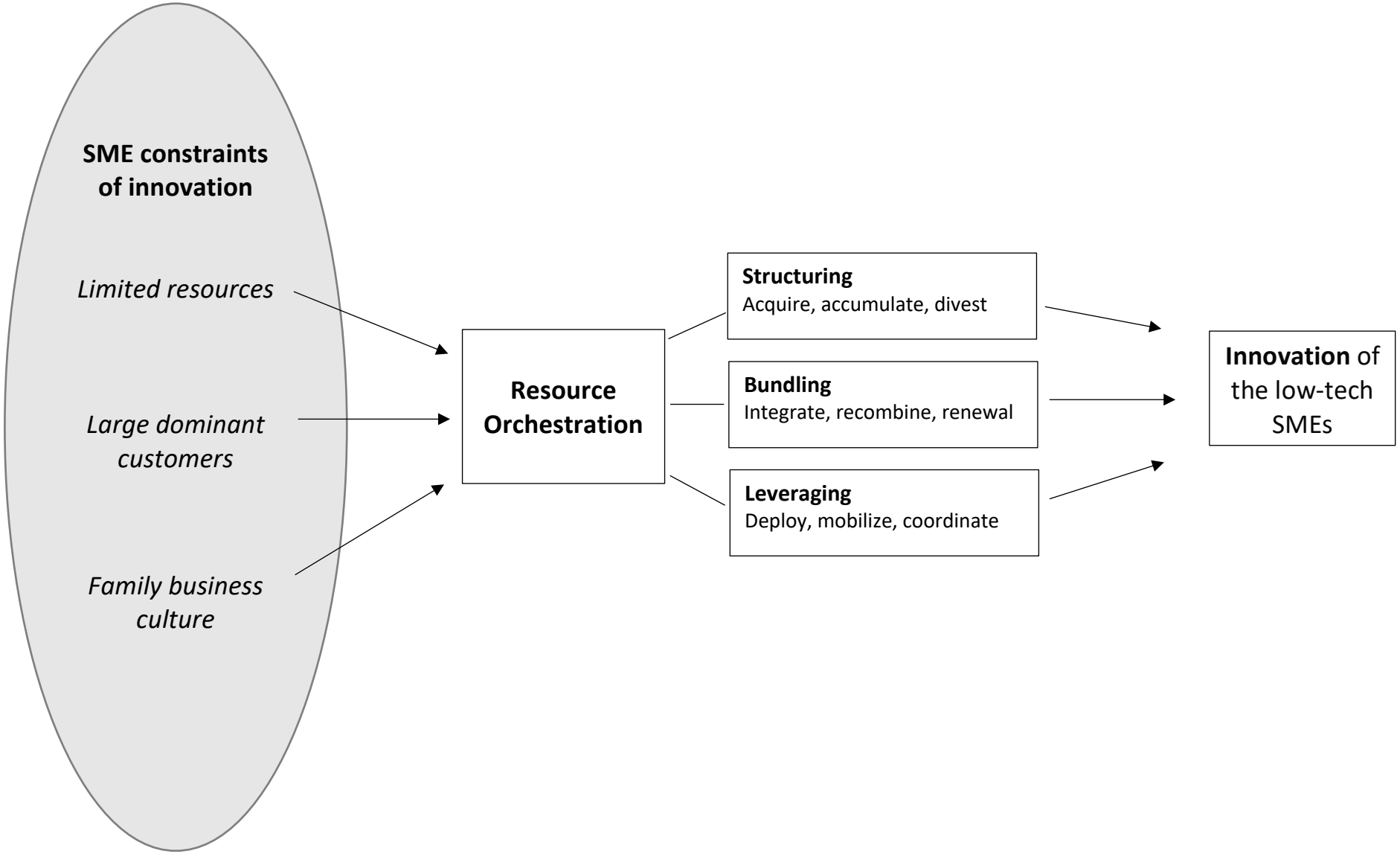
Current studies on resource orchestration are primarily firm-centric, focusing on resources that reside within the firm (Carnes et al., 2022, 2017; Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Sirmon et al., 2011). This narrow perspective does not fully capture the reality faced by resource-constrained SMEs, which often rely on external resources and relationships to drive innovation (Mirkovski et al., 2023; Nason et al., 2019; Lasagni, 2012). More empirical research is needed to explore how SMEs leverage resources across organizational boundaries, particularly in low-tech sectors. Moreover, the literature on resource orchestration has predominantly focused on the role of managers in resource orchestration. However, in SMEs, innovation often involves complex interactions with various internal and external actors, including non-managerial positions and teams (Andersén and Ljungkvist, 2020). The current view of resource orchestration overlooks the contributions of these actors. Therefore, more research is needed to explore the role of non-managers and external actors in the resource orchestration process, particularly in the context of innovation in SMEs.

3.4.3 Resource Orchestration as a Lens for Understanding SME Innovation

The resource orchestration literature suggests that SMEs can manage constraints through effective resource orchestration. However, the application of this theory to SMEs, particularly in low-tech sectors, remains underexplored. This study aims to fill this gap by utilizing the resource orchestration lens to understand how low-tech SMEs structure, bundle, and leverage resources to innovate despite their unique constraints of limited resources, dominant customers, and family business culture.

Recent research has begun to propose resource orchestration in unique contexts, including across firm boundaries, indicating that resources do not necessarily need to reside within the firm (Mirkovski et al., 2023; Nason et al., 2019). This perspective is particularly appropriate for SMEs, which often rely on external resources and relationships to innovate. As such, this study will contribute to the literature by providing empirical insights into how low-tech SMEs orchestrate resources to overcome innovation constraints.

Figure 3.3 Conceptual framework from the literature



3.7 Chapter Summary

This study examined the SME innovation literature exploring SME characteristics and barriers concerning innovation, and explored innovation in the low-technology sector by examining the low-technology / non-R&D innovation literature. It highlighted key constraints of innovation around resources, customers, and organisational culture. Whilst SMEs have certain behavioural advantages due to their size, studies highlighted barriers to innovation because of being constrained with sufficient human and financial resources (Love and Roper, 2015), operating in a consumer goods market being reliant on a network of highly powerful and large dominant customers (Lacoste et al., 2023, Lacoste and Johnsen, 2015, Hingley, 2015, 2005; Fischer and Rueber, 2004), and also operating under the constraints of the family-owned and -managed culture (Lorenzo et al., 2022; Nieto et al., 2015).

However, SMEs must find ways to overcome their constraints to innovate and grow. Recent studies point to the importance of efficient resource orchestration to undertake innovation (Carnes et al., 2022, 2017; De Massis et al., 2018; Sirmon et al., 2011) but we still lack understanding concerning how SMEs who face key constraints of innovation efficiently manage their resources to innovate, to survive and grow in competitive markets.

Research needs to investigate a key contributing context to the economy such as the low-tech sector (Nauman et al., 2022; Scottish Government, 2019), which is dominated by family-owned and -managed SMEs that are confronted with constraints yet their innovation for survival and growth plays a vital and critical role to economic growth (Nauman et al., 2022; Scottish Government, 2019). There is therefore a need to explain how they innovate despite facing key constraints where resource orchestration can provide a suitable lens as a result.

Chapter 4 Methodology

4.1 Introduction

The purpose of this chapter is to discuss the usefulness of qualitative methods to justify the objective of this study. As with all empirical research, a philosophical position and a methodological approach are implemented to meet the purpose of the research (Jennings et al., 2005). This will be discussed below. Further on, the research design, data collection, and analysis will be described and justified.

As discussed in Chapter 3, from reviewing the literature, the way SMEs, particularly those in the low-technology food sector, undertake innovation is still not well-researched (Adams et al, 2016; Damanpour, 2010; Baregheh et al., 2012). More specifically, while we know a little bit about the innovation types and the sources of external knowledge for innovation in the low-tech sector, we still do not have a very good understanding and story of the influences of innovation and how low-tech SMEs navigate through them to innovate. Addressing this would help paint a better picture and story of innovation within a specific context, which qualitative research can benefit from. This study thus explores how low-tech SMEs orchestrate their resources to navigate through innovation. This led to the forming of broad exploratory research objectives to offer rich accounts for this inquiry. Additionally, the parameters of the research inquiry are not clear, therefore, this research is adopting a qualitative approach.

The methodological approach of this exploratory research involves conducting in-depth semi-structured qualitative research to gain a deeper understanding of innovation within low-technology SMEs. Conducting a qualitative method with an in-depth and open-ended research design enables a deeper insight into the complex nature of innovation in low-tech SMEs. Discussions can go in-depth over topics of interest and be thoroughly explored. While the food sector is categorised as a low-tech sector based on the R&D expenditure, innovation according to OECD goes beyond R&D to include “implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD, 2005, p. 46). An in-depth qualitative study creates a suitable approach concerning this wider definition of innovation, as it offers deeper insights into the different factors that might affect or facilitate innovation in SMEs. For example, research highlights the importance of relationships and

networks for innovation in SMEs (Lee et al., 2009; Lasagni, 2012). If low-tech SMEs rely on relationships and networks for innovation, an in-depth qualitative study can offer a deeper understanding of firms' set of relationships and interactions with other actors which might facilitate innovation. The broad definition of innovation may be more suitable to the objective of this study and justifies a qualitative approach.

4.2 Research Philosophy and Approach

Researchers position their research within philosophical perspectives concerning ontology, epistemology, and human nature, and that includes positivism, interpretivism, realism, and pragmatism (Jennings et al., 2005; Saunders et al., 2016). This is important because the research philosophy adopted may be the assumption concerning how one views the world. Such assumptions then impact the research strategy and consequently, the methods to undertake as part of that strategy (Saunders et al., 2016). These assumptions provide fundamentally different approaches to interpret and analyse social phenomena.

The philosophical stances relate and suit to what one is looking to achieve. For example, philosophical stances are dependent on the research questions one is seeking to answer. Although, research questions can be answered with more than one philosophical domain (Saunders et al., 2011). For example, positivism and interpretivism are two very different and opposing philosophical perspectives with regard to ontology and epistemology. Before discussing positivism and interpretivism, it is important to discuss ontology and epistemology. Ontology considers the nature of reality helping scholars think about the way the world operates. Two parts of ontology are objectivism and subjectivism, where the former represents the position that social entities are present (in reality) independent of social actors, and the latter represents how each individual attaches their meanings to things. In the business context, subjectivism relates to managers ascribing their meanings to their jobs and how they think and behave. Social phenomena are generated through the actions of social actors. It is important to study the details of situations to know better what is happening, which is more known as social constructionism, where reality is socially constructed (Saunders et al., 2016).

Epistemology constitutes what is acceptable knowledge embracing both positivism and interpretivism philosophies for the development of knowledge. Positivism emphasises description and explanation and concerns the collection of data focusing on observable reality

seeking regularities and casual relationships from the data set to come up with generalisations similar to what scientists produce (Duberley, Johnson, Cassell 2012). One would use existing theory or prior observations to develop hypotheses to then be tested and confirmed or refuted. Positivism takes a neutral position without its value involved. This means more specifically that they remain detached from the object of the research, this way they do not bring their feelings, emotions, and personal experience, thus focusing on reason, logic, and rationality instead as their approach to their research and analysis. They predominate in science and quantify independent facts about a reality having value-free data and analysis since they are being observed, thus scholars understand the world as a "one-way mirror" (Healy & Perry, 2000; Kraus, 2005). Scholars use a structured methodology to enable replication highlighting quantifiable observation using quantitative analysis (Saunders et al., 2016). While the benefits may include a swift turnaround in data collection and economy of design, making it valuable for addressing macro-level questions concerning organisations at an aggregated level, positivism may provide a depthless exploration of organisation-level processes and activities.

Table 4.1 Snapshot comparison of different research philosophies

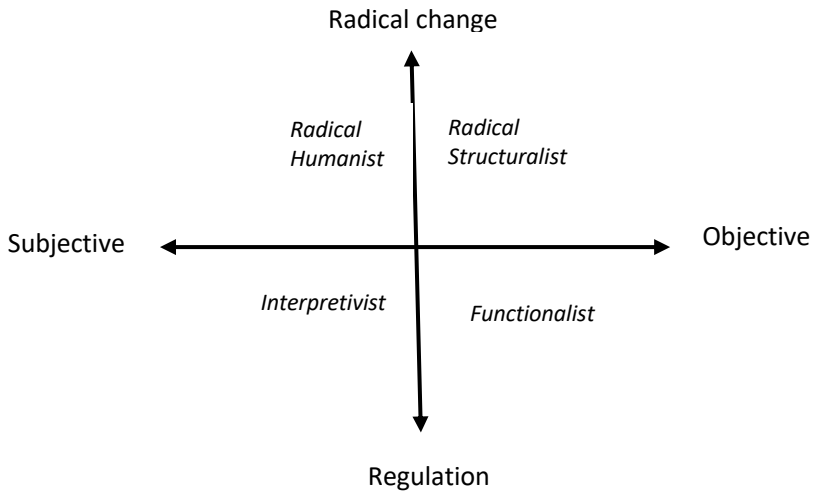
	Pragmatism	Positivism	Realism	Interpretivism
Ontology: researcher's perspective on the nature of reality	External, multiple, views are chosen to best answer RQ	Objective and independent of social actors	Objective, and acts independently of human views yet is interpreted via social conditioning	Socially constructed, subjective, multiples views of reality and changes
Epistemology: Researcher's perspective on what may be agreed as acceptable knowledge	observable phenomena and subjective meanings…can offer agreeable knowledge based on RQ. Emphasis on practical study	Focused on observable reality for reliable data, Considers causal relationships and law-like generalisation	Observable phenomena offer credible data. Focus on contexts	Subjective meaning and social phenomena. Understand the details of the situation.
Axiology: Researcher's perspective on the role of values	Values are key to interpreting, and adopting both objective and subjective views	Considers value-free way approach, the researcher is independent of the data	Research is value-laden, elements of bias from world views, culture	Research is value bound, the researcher is included in the research/study and is not subject to separate, thus subjective
Most frequent data collection methods	Mixed methods can even be multiple	large samples, and quantitative,	Methods to suit the subject matter. Qual or quant	Small or can even sometimes be large samples, in-depth qualitative interviews

Adopted from Saunders et al., (2016) and John and Duberley (2000)

Interpretivism acknowledges multiple realities and that the social world (e.g. of business) is too complex to lend itself to theorising by law-like generalisations similar to physical sciences. It is necessary to understand differences among humans and the meanings they give, according to interpretivism. Phenomenology and symbolic interactionism are two strands of interpretivism, where phenomenology relates to the way humans understand the world around them, and symbolic interactionism is about the persistent procedure of interpreting the social world around them by interpreting the actions of other people with whom they interact with (Saunders et al., 2016). In addition, ethnography, case study, and hermeneutics are also approached from interpretivism, making interpretivism highly relevant for organisational behaviour research.

To explore research philosophies further concepts of research 'paradigms' are also discussed (Kuhn, 1962). Burrell and Morgan's (1979) paradigmatic taxonomy (four paradigms) helps researchers to make sense of the type of research more easily than they are reading and provides an appropriate way of locating one's frame of reference. Figure 4.4 below Burrell and Morgan's (1979) paradigmatic taxonomy is often applied to place research into subjective-objective and radical change-regulation (Pittaway, 2005), used in social science and entrepreneurship research.

Figure 4.4 Burrell and Morgan (1979) paradigmatic model (Adapted from Grant and Perren (2002: 187)



Researchers in the social science and entrepreneurship field have called for paradigm experimentation and greater methodological multiplicity in the context of entrepreneurship and

innovation research (Grant and Perren, 2002; Jennings et al., 2005; Blackburn and Kovalainen, 2009; Shaw and de Bruin, 2013). Research believes studies in SME innovation and entrepreneurship are mainly conducted with a functionalist approach (Grant and Perren, 2002; Suddaby et al., 2015). However, due to the nature of this study's research inquiry as an exploratory study seeking to understand 'how' low-tech SMEs innovate key despite constraints, an interpretivist thinking and qualitative approach may be better situated to help explain the present study's phenomena. This is because qualitative inquiries involve asking questions that focus on the how and the why (Agee, 2009). With a qualitative study, the researcher is inquiring about how managers experience an outcome i.e. innovation within a constrained context, and looking for answers to help uncover their perspectives. The researcher is therefore seeking to understand what is happening with managers in particular situations i.e. innovating with constraints. For example, how do they engage in social interactions and external relationships to access resources for innovation (Lasagni, 2012).

Since most of the research on innovation, and those studying the low-technology sector in the SME context are quantitative (Baregheh et al., 2012,2014; Lefebvre et al., 2014; Presenza et al., 2017), this research is more interested in the process of innovation and the perceptions of SME managers, thus seeking 'explanations' about factors that impact the role of innovation (Deakins and Bensemann, 2018). The qualitative approach facilitates in-depth insights into SME decision-making behaviours concerning innovation (Baker and Nelson, 2005; Löfqvist 2017) and resource management (De Massis et al., 2018). There is potential and call for significantly more probes into the study of SME innovation broadly, and in the food sector (Baregheh et al., 2012,2014), including external sources, partner collaborations, different network behaviours (Sarkar and Costa, 2008; Lefebvre et al., 2015), and the influences of innovation in a specific context (Huang et al., 2022; Baregheh et al., 2012), to consider a more detailed approach (Lefebvre et al., 2015) where qualitative would offer great depth. This way, it is possible to capture personal experiences and insights including external and internal interactions and relationships in firms (Mello and Flint, 2009). Research, therefore, suggests a qualitative approach, to enhance insights concerning the low-technology sector, supply chain collaboration (Aggarwal and Srivastava, 2016), and family business ownership characteristics (Calabro et al., 2019) suitable for the present study's research questions.

4.3 Research Strategy

A strategy is a plan of action to achieve a goal. More specifically, it relates to how a researcher seeks to address the research question. According to Denzin and Lincoln (2005), it is a methodological relation between one's philosophy and the selection of a research approach concerning data. Apart from its link to philosophy, research strategy is also related to the inductive and deductive approaches.

4.3.1 Research approach

Qualitative research is more interested in the meaning of things and includes a detailed description of events, situations, and interactions between people and things, offering depth and holisticness compared to the positivist stance.

Researchers have long discussed whether it is best to go to the field without prior knowledge to be unbiased or is necessary to have some level of knowledge. Strauss and Corbin (1990) are the proponents of no prior knowledge and existing theories, to help develop 'new' theories. They argue it is better to make sense of a situation without imposing pre-existing information. Others find it challenging to pursue theory-free research and favour the idea that some framework at hand is necessary when starting to collect data to help with the interpretation of bulky data (Miles, 1979). The data is an influential part and process of the research in the sense that it can change the research problems. Miles and Huberman (1994) believe that starting the research process with broad RQs is a good way, to ensure not change the research vision. To have a better understanding of firm processes, prior knowledge, and insights may be useful (Collis and Hussey, 2013). With regard to the current research, the researcher had a reasonable prior knowledge by exploring the literature (Chapter 3). The next section will discuss the research methods of this study.

4.3.2 Research Methods

The researcher conducted a literature review concerning innovation in SMEs which helped frame the broad research question. Additionally, the researcher reviewed government and policy reports and articles to better understand the context Scottish food SMEs operate and influence decision-making to innovation. Further, the researcher conducted primary research

in the form of semi-structured in-depth interviews with key participants in low-tech SMEs on how innovation takes place. Below broad characteristics of this type of qualitative method will be considered.

4.3.2.1 Semi-structured interviews

Research interviews are the most common source of qualitative data (Charmaz, 2015). Saunders et al., (2016) suggest research interview is a "purposeful conversation between two or more people" (P:372), where the interviews need to build rapport ask clear and purposeful questions, and carefully listen to the answers to explore them further. Marshall and Rossman (2016) share that the benefit of in-depth interviews lies in the idea of the potential to gain a person's perspective of a particular topic of interest and offer meaning, explanations, and accounts of things, which in this case helps illuminate and facilitate deep and detailed insights into decision-making behaviours, interactions between people and things, and strategies of SMEs concerning innovation (Deakins and Bensemann, 2018). It also enables the gathering of reliable data relevant to the research questions and the goal of the study. Interviews can additionally help refine the researcher's ideas where there is yet a research question and research goal to be formulated.

There are different types of interviews, that relates to the aim of the research and strategy. They can either be structured and formalised asking standardised questions to each participant, or semi-structured where a list of themes along with key questions will be covered, in the form of an interview guide (Taylor, 2005), or unstructured which is informal to explore in detail a broad area of interest.

Semi-structured style interview is the most popular and often used interview technique in qualitative research (DiCicco-Bloom & Crabtree 2006; Kallio et al., 2016). They are in-depths and exploratory interviews (Cooper and Schindler, 2008), for example as part of a case study or grounded theory approach, as the data obtained to enlighten understanding in terms of 'what' and 'how' and 'why' (Saunders et al., 2016).

In-depth semi-structured interviews further enable understanding of the reasons for the decisions research participants have taken and also offer to investigate answers where the researcher may need further clarification or explanation to build on responses (Saunders et al.,

2016). This may be valuable through an interpretivist stance where the researcher is interested in "understand[ing] the meanings that participants ascribe to various phenomena" (Saunders et al., 2016. P: 378). For example, participants may use words or ideas that the researcher may not be as familiar with, therefore, being able to follow up or 'probe' those meanings can be very important and add depth to the data. They may lead to conversations that the researcher was not expecting thus offering new insights to help better answer the research question, or help the researcher formulate a question. For business and management, exploratory and in-depth semi-structured interviews will help explore an organisational issue from multiple perspectives, whereas on the other hand, theory-based semi-structured interviews help the data to gather to lead to developing a theory in which the interview guide is arranged thematically around theoretical aspects of organisational phenomena. Apart from this research shows interviews are also in the form of narrative, event-based, and biological to suit the research objective and strategy (Saunders et al., 2012, 2012). The next section will discuss the study's research design.

4.4 Research design

Yin (2014) suggests research design helps researchers with collecting, analysing, and interpreting data and information. The research at the very start had a general objective, nevertheless, reviewing the literature helped to refine the research's goal and objective more clearly to be in a better position to offer a unique contribution to knowledge. The literature review facilitates the development of an initial conceptual framework but also helps to develop the research questions, in which the conceptual framework aims to address the overarching research question of this study.

The semi-structured interviews were themed based on the literature on factors influencing firms concerning innovation. Therefore, topics were explored in semi-structured interviews data collection. The interviews were with food SMEs based in Scotland to explore in-depth how they engage with innovation.

When designing the research, a couple of issues needed to be considered. This research will concentrate on Scottish firms for data collection and analysis. In terms of accessibility, these firms are based in Scotland where the researcher is based. Also, since this study considers innovation, the quality of the research is not limited to Scottish firms only but is universal. All

firms must consider innovation in one way or another. The empirical context of this study will be discussed further below.

4.4.1 Empirical context

The physical context for the research is Scotland, it explores issues concerning innovation decision-making in SMEs, particularly with Scottish firms in the food industry. Almost all the firms in Scotland are SMEs and this is especially the case in the food sector. The food sector plays a significant role in the Scottish economy as per the Context Chapter (see Chapter 2). In particular, Scottish food manufacturing is the largest contributor to manufacturing employment, the second largest contributor to export, and the top five largest manufacturing subsectors in terms of enterprise numbers (Scottish government, 2017; Rhodes, 2020). The Context Chapter highlighted that food manufacturing in the last few years provided annually about 20% of all manufacturing employment and 15% of all manufacturing turnover (Scottish government, 2017 and 2020). Therefore, this is a key sector for Scotland and the overall food industry, which Scotland's Economic Strategy recognises as one of the six identified sectors to offer particular growth opportunities (Scottish government, 2015). All of these are discussed in depth in the Context Chapter of this study (see Chapter 2).

The Context Chapter further highlighted a few characteristics in this context. It highlighted that food manufacturers in Scotland are typically family-owned SMEs (Brown, 2011; Food and Drink Federation, 2020). Another characteristic of this context is its human capital profile. Firms reported people and skills as a key challenge, they face skills gaps with their staff not being fully capable in their jobs. The Literature Review chapter highlighted lack of skills and poor people management as one of the barriers to innovation in SMEs. Skill gaps within the food sector can influence innovation and the Context Chapter explains public and enterprise agencies in Scotland are working to support the companies with skills in this sector. Another characteristic of this context is its low R&D yet studies show firms here actively engage with innovation. Due to their lack of resources efforts are mainly incremental product innovation and process-driven innovation (Baregheh et al., 2012, 2014). Furthermore, innovation is largely driven by customers and consumer demand to emphasize convenience, health, and less expensive (Figiel, 2016; Busse and Siebert, 2018). The Context chapter further highlighted an interest in collaboration practice between food SMEs and research/academia to explore ground-breaking concepts. The interest is further extended to the supply chain focusing on a

collaborative spirit to build a better functioning supply chain, which is a big issue at the moment and a target for the government to tackle in the food industry. Food firms across the supply chain feel little control over the supply chain impacting growth and future survivability. The Scottish government and other relevant parties instigate the supply chain to be better regulated and are offering support for the capability building of small firms.

4.4.2 Participant selection and Access

In the methodological literature, there are three popular types of sampling strategies: random, convenience, and purposive sampling. Random sampling is mainly used in quantitative research with a focus on surveys to support empirical generalisation (Daniel, 2012). Convenience sampling is also known as ad hoc sampling or opportunistic sampling where cases are selected based on availability (Schreier, 2018). Research generally views this sampling poorly in both qualitative and quantitative as it may fail to provide information richness (Schreier, 2018). Purposive sampling also known as purposeful sampling relates to a group of sampling strategies prevalent in qualitative research. This type of sampling selects occurrences with the potential to provide rich information focused on answering the research question (Emmel, 2013; Patton, 2015). Purposeful sampling strategies include theoretical and snowball samplings for example, and the information richness relies on the research question and objective of the study. Interpretivist analysis recommends undertaking 'purposive' sampling (Patton, 2002).

In this study, firms were selected from those identified from the Financial Analysis Made Easy (FAME) database that were operating in the food industry, considered SMEs based on the EU definition, and were Scottish-owned. This sampling was used to select food SME producers/manufacturers participants, to ensure the collection of richer and more illuminating data (Patton, 2015). Next, the list of firms selected via FAME was populated into an Excel sheet and categorized based on size, age, turnover, ownership, location, and the type of food. The first 100 SMEs were subject to desk research taking the form of a review of their website and any relevant documents that were available from this source (i.e. annual and bi-annual reports of publicly listed firms), a review of press coverage and social media presence for any other information. The purpose was to increase knowledge about the SMEs to then be able to promote the research and obtain interviews.

Following this, the researcher contacted all the 100 SMEs to obtain interviews. However, only 22 of the SMEs agreed to participate in the research and be interviewed. The total number of participants from the 22 SMEs included 30 because some of the interviews involved more than one participant in the interview. Overall, this research was based on 30 semi-structured in-depth interviews with 22 food SMEs in Scotland. Respondents included CEOs, Directors (MDs, FDs, etc), Operations, and Technical managers. For the sample, frame characteristics refer to Table 5.9 below. The researcher interviewed a sample of different types of SMEs, encompassing family firms, privately owned, and subsidiaries. SMEs in the sample operate in different sectors within food ranging from biscuits, chocolates, ice cream, and pastries to meat, seafood, and vegetables, and varied both in terms of size (majority 70 – 200 employees) and turnover (majority £10m – £25m p/y). This allowed for multiple views offering a more well-rounded and comprehensive understanding of the SMEs in the food sector.

Most of the interviews took place on the respondents' sites and lasted an average of 1.5 hours. The researcher sought to cultivate interpersonal relations based on rapport and trust together with the interviewee participants, as advocated by research (Dingwall, 1997; Alvesson and Ashcraft, 2012). This enabled participants to more freely express themselves which resulted in a deeper and fuller understanding of the subjects the researcher was interested in learning. Interview skills are important for quality empirical data (Charmaz, 2003; Alvesson and Ashcraft, 2012). At times, when participants said relatively little, the researcher paused to indicate further response was welcomed or simply showed interest and asked to elaborate more or offer examples.

The researcher used a one-page interview guide (see appendix) during the interviews. An exploratory interview guide driven from the literature allowed exploring a range of topics on innovation during the interviews, for example, a strategic priority of innovation; culture and structure; resources; and external factors on innovation. These topics especially revolved around innovation due to the purpose of the research. The researcher collected and studied factors that may impact innovation and from the literature, sought to design key questions and topics as a base to guide the interview. Questions were formed thematically based on the topics from the literature on innovation. The researcher created the primary questions and then tried to think about secondary questions that would help to clarify things. The questions were set up around key topics appropriate to the study. As a result, the interviewer gained a more in-depth understanding to be able to produce intensive, rich, and valuable data (Saunders et al., 2016).

Questions were open-ended creating an in-depth discussion-type "dialogue" with many follow-up questions, demonstrating flexibility and opportunity for interviewees to elaborate on certain topics providing new information, and enhancing the quality of the data. interviewees were very open and engaging which made the interviews a positive experience. While the exploratory interview guide was supportive, adjustments to the questions were made, when necessary, especially after the first few rounds of interviews, to ensure that the most relevant data was obtained. For example, the researcher based on the follow-up questions in the first few rounds of the interview reframed some of the questions to obtain better and deeper data. The recorded interviews thereafter were transcribed. The transcription of the interviews totalled over 200,000 words of data.

Table 4.2 Sample Frame Characteristics

Participant firms	Employee Size	Turnover	Ownership	Supermarket Customer Business Model
Firm 1	220	£30m	Owned by Group	Private label
Firm 2	205	£17m	Family Business	Brand
Firm 3	150	£17m	Family Business	Brand
Firm 4	130	£17m	Private Co	N/A
Firm 5	71	£10m	Owned by Group	Private label
Firm 6	130	£9m	Family Business	Private label
Firm 7	50	£4m	Owned by Group	N/A
Firm 8	90	£20m	Owned by Group	Private Label
Firm 9	70	£7.5m	Owned by Group	N/A
Firm 10	50	£7.5m	Family Business	N/A
Firm 11	200	£29m	Private Co	Brand
Firm 12	170	£22m	Owned by Group	N/A
Firm 13	200	£25m	Private Co	Both
Firm 14	120	£3m	Family Business	Private label

Firm 15	130	£25m	Coop Business	Private label
Firm 16	110	£15m	Family Business	Brand
Firm 17	125	£13.5m	Family Business	Both
Firm 18	158	£10m	Owned by Group	Private label
Firm 19	85	£9.5m	Family Business	Brand
Firm 20	200	£11m	Private Co	Both
Firm 21	20	under £2m	Private Co	Both
Firm 22	43	under £2m	Family Business	Brand

Table 4.3 Participant firms: Profiles

Participant firms	Profile
Firm 1	Scottish smoked salmon producer in Scotland, selling under the brand and own-label products to major premium retailers globally.
Firm 2	Third-generation family business manufacturer of pies, cakes and pastries mainly in the UK.
Firm 3	Family-run biscuit manufacturer in the UK for nearly 40 years.
Firm 4	Scottish independent food business, they supply food across the UK and Europe to hotels, restaurants and other service businesses.
Firm 5	Scottish pate producer in the UK, grown from a small operation to a major national force working with top supermarkets in the UK.
Firm 6	Family business shortbread manufacturer in Scotland providing selling to the UK retailers and certain places abroad.
Firm 7	Family business independent food processing firm in Scotland supplying freezing and packing of vegetables to supermarkets thought out the UK.
Firm 8	Processing and export seafood firm with a focus on high quality fish products.
Firm 9	Producer of salmon and seafood products to the UK supermarkets and catering businesses.
Firm 10	Family business butcher supplying meat to the businesses and public sectors.
Firm 11	Producer of oats and gluten-free in the UK. They sell to the major retailers in the UK and export abroad.
Firm 12	Smoked seafood processor of whitefish and salmon. They have a large factory with multiple production lines and are also able to do traditional hand-cut fillets.
Firm 13	Shortbread producer selling internationally to major retailers across the UK.
Firm 14	Family-run food production company operating in Scotland.
Firm 15	Shellfish producer supplying to supermarkets, wholesalers and restaurants.
Firm 16	Producer of meat-related products for major supermarkets across the UK.
Firm 17	Family business ready-meal manufacturer in Scotland producing chilled and frozen products to the retail and foodservice market in Scotland.
Firm 18	Pizza manufacturer in Scotland producing 25,000,000 pizzas per year for the retail industry.
Firm 19	Family business manufacturer of condiments and seasoning in the UK to major retailers in the UK.
Firm 20	Pastries and rolls manufacturer in Scotland working with the major retailers in Scotland.
Firm 21	Chocolate company making high quality range of chocolates for businesses and corporate organisations.

Firm 22	Biscuit company focusing on hand-baked gluten-free and vegan biscuits and breadcrumbs in Scotland.

The researcher also was in regular contact with Scottish Enterprise, Scotland's leading economic agency, who funded this research, and as a result, the researcher was able to increase his knowledge of the food sector, the available support, and services for Scottish companies, particularly SMEs, and in general receive other perspectives in terms of innovation in SMEs. The researcher had an opportunity to attend several meetings with representatives of Scottish Enterprise, share the research, create discussions, and obtain feedback. All of this helped to make the study information-rich (Saunders et al., 2016).

To gain a better understanding of innovation activities it is important to identify appropriate participants in each company. Since data collection concentrated on firm-level competencies, activities, and processes, the researcher was dependent on the data gathered from key informants in the sample frame, and helped to keep the discussion relevant and focused more on the firm-level activities. To better understand firm-level competencies, activities, and processes impacting innovation activities it is necessary to choose participants that would add the most value to the research inquiry. The participants should possess information and knowledge of high-level strategic planning such as innovation activities, in addition to good knowledge of the day-to-day business activities, including with customers. In SMEs typically managing directors or someone on the innovation side can be potential informants, since they have a very good knowledge of the innovation activities of the business. In SMEs, most senior staff will be aware and have a link to innovation, as well as dealing with the day-to-day operation of the business such as dealing with customers.

In addition, as discussed earlier, most of the firms in the sample frame had a close relationship with Scottish Enterprise and all of them were account managed. This potentially has helped to establish better relationships with informants. Nevertheless, the process of recruiting participants (e.g. key informants) was more challenging than expected. While most firms' contact details were available online the researcher's goal was to speak directly with those who influence innovation decisions, such as CEOs, Directors (MDs, FDs, etc), Operations, and Technical managers. Besides the fact that it was not easy to be able to speak to key individuals since their contact details were not publicly available, many firms, in general, were reluctant to take part in research-related activities as many were either not interested due to different

reasons or were under the impression that this research was a typical survey or did not have the time. Researchers believe the decision-maker or gatekeeper is concerned about confidentiality and may question the credibility of the researcher (Saunders et al., 2007).

Nevertheless, emailing a letter outlining the research, requesting an interview, indicating the scope of the discussion, and attaching marketing material helped to create some interest. Furthermore, a short discussion over the phone with some firms helped them to be interested in being interviewed. Another challenge was while firms verbally or in writing accepted the researcher's request for interviews, some later changed their mind or no longer had the time due to their busy schedule or forgot about it together. However, follow-up emails or telephone calls were conducted as a reminder. In terms of numbers and interviews, out of 100 firms approached 22 firms responded positively to participate in the research. While 22 firms were interviewed, key informants totalled 30 participants as some interviews included 2 key informants. Most of the interviews were conducted face-to-face while some were through video calls. Face-to-face interviews were conducted at the firms' premises which further gave the researcher insight as the informants gave the researcher tours of their business units, factory and manufacturing processes, and gave samples of their products. As a result, field notes were generated to help add to data collection.

The role of the researcher needs to be acknowledged for the practice and documentation of research (Finlay, 2006; Haynes, 2012). Reflexivity is important in qualitative research and researchers engage in it to explain how subjectivity shapes their research inquiry, and make ethical decisions in the complex work of producing data reflecting participants' experiences (Finlay, 2006). This way they show openness concerning the researchers' perspective i.e. 'bias' and attend to reflexivity to ensure data quality remains. It is "a continuous self-critique and self-appraisal where the researcher explains how his or her own experience has or has not influenced the stages of the research process." (Olmos-Vega et al., 2022, P:3. Originally from Dowling, 2006). This reflexive attitude encourages the researcher to consider alternative accounts for phenomena allowing for superior analytical cognizance (Alvesson and Sandberg, 2013). Nevertheless, the focus needs to remain on the participants rather than the researcher.

4.4.3 Ethical concerns

Before commencing the interviews, the researcher obtained ethics approval from the university. It is important to acknowledge ethical concerns and issues (Easterby-Smith et al., 2012) when obtaining sensitive and confidential information. The researcher also as part of recruiting participants ensured voluntary participation and informed consent. When emailing the marketing materials to potential participants for recruitment it was also clearly stated data will be confidential and anonymous and that their participation is voluntary.

Additionally, the researcher presented the participants with a participant information sheet reiterating that their participation is voluntary and that they can opt out from the study at any time without a reason. Further, it highlighted that the information they provide will be confidential and anonymised. As such, participants allowed the interviews to be recorded only as part of this study.

4.4.4 Research validity

In qualitative research, epistemological grounds carry certain evaluation methods different to that of quantitative research. The researcher is important in qualitative research, especially his/her skills and competence as important as the observer (Creswell, 2016). Qualitative studies enable in-depth investigation and understanding of research issues (Alvesson and Sköldberg, 2000; Carcary, 2020) yet the credibility of qualitative studies continues to be a controversial topic and discussion (Cutliffe and McKenna, 2004). The research argues they lack scientific rigour, reflect personal interpretations and anecdotes, and are subject to much bias (Carcary, 2020). Nevertheless, four criteria are considered to review the trustworthiness of qualitative research credibility, transferability dependability, and confirmability (Guba et al., 1994). Credibility is discussed as the confidence in the truth of the study thus believing findings as significant criteria (Polit and Beck, 2014; Connelly, 2016) and resembles the positivist approach of internal validity (Gunawan, 2015). For research to be credible research highlights engaging lengthily and following up with participants to verify the data i.e. member checks (Guba & Lincoln 1994), helps reduce the researcher's own bias and explore alternative explanations (Kornbluh, 2015). Research also highlights reflecting on journaling as a key technique to increase credibility (Connelly, 2016). Researchers are also concerned with the applicability of their findings to their situation to make them transferable (Polit and Beck,

2014). It is important to thoroughly describe the research context and its applicability beyond its context to transfer the research outcomes (Seddon et al., 2006). Dependability is another factor to check the trustworthiness of qualitative research which refers to the stability of the data over time and the condition of the study. Research suggests maintaining an audit trail of process logs or notes of activities occurring during the period of the study and decisions about the aspects of the study and interviews. Lastly, in terms of confirmability research highlights the degree to findings in the qualitative study are consistent and can be repeated (Connelly, 2016) including keeping notes of analysis as research progresses which can be reviewed by other experts helping reduce the researcher's own bias. While qualitative research provides a deep explanation and understanding of research issues (Alvesson and Sköldberg, 2000; Carcary, 2020) yet credibility of qualitative studies continues to be a controversial topic (Cutliffe and McKenna, 2004). However, table 4.5 defines in more detail the four criteria for evaluating trustworthiness in qualitative research, how to identify them, and how they have been used in this study to demonstrate scientific rigour, and eliminate personal anecdotes and bias.

Table 4.4 Four criteria for evaluating trustworthiness in qualitative research

Criteria	What it is	How to identify	In this research
Credibility	Trustworthy and truthful-ness of research findings (Saunders et al., 2016)	There is alignment between the different parts of qualitative research i.e. the research question of the study, collection of data, the theory of the study, as well as analysis (Stefors et al., 2020). Also, the depth and volume of data, as well as any analytical steps done	-selected firms were subject to desk research, looking up their online presence i.e. websites, social media and financial information on Company House.
Transferability	Findings can be applied or conveyed to other studies in a different context	Considering the detailed description of the context of the research and in the way, it influences the results of the study	Description of Scotland's food sector and the funding landscape concerning innovation (see Context Chapter), and description of SME manufacturers. Data collection and analysis strategies are discussed in detail to offer a thorough description of the adopted approaches and methods in the study. The findings also offer detailed discussion related to the context of

			the study enhancing understanding.
Dependability	The research can be replicated in similar conditions or with similar respondents with the same findings (Saunders et al., 2016)	Sufficient information is offered that another researcher may be able to follow the same process and potentially find dissimilar conclusions	Couple of transcripts were coded by principals of this research and were later discussed.
Confirmability	Clear link between data and findings	The researcher demonstrates how he/she generates findings via detailed descriptions and the use of quotes	A highly rigorous qualitative analysis technique known as the Gioia model was used in the study to help analyse and link to data. The process offers 1st order constructs (similar to the informant language), 2nd order constructs (researcher language) and aggregate dimensions (Gioia et al., 2013). This process helps data and interpretations to be rooted in events as opposed to the personal biases of the researcher. Data is tracked to the sources through the Gioia model and provides trustworthiness and creditability. In addition, participant quotes are heavily used to validate this process further.

4.5 Data collection and Analysis

4.5.1 Data Collection Approach

First, the researcher had the opportunity to engage in several meetings and key informant interviews with Scottish Enterprise looking at general structure, and context and exploring key problems from an informed perspective. This helped to gain empirical insight into the context and general structure of the issue the researcher was seeking to explore. Second, before meeting each company, the researcher conducted background checks to learn more about each company and to be more prepared for each interview. The researcher reviewed secondary sources and publicly available data from Company House (e.g. annual statements), social media channels, the companys' website and news channels. These helped with pre-interview preparation and to augment the interview guide as a way to provide background information

and background data collection. For example, the researcher shared with the participants that he is aware of the awards they have won, based on information available online. The researcher having looked at their annual statements through Company House also discussed some of the investments they made and or anything else that was flagged up for the researcher. By researching on the internet about the interviewing companies, the researcher learned and took notes of any key information generated from news articles and or social media sites (i.e. Tweets or Facebook posts). Some examples include collaborations with other companies and research bodies, changes to key human resources, and the introduction of new products, all of which were brought up for discussion during interviews.

In an interview having done prior online research about the company, the researcher became aware of the significant re-branding the participant had done to the business and the researcher brought this up in the interview to learn more about this issue. The participant discussed re-branding for marketing strategy and brand proposition to shift and diversify their markets. All of this helped as part of pre-interview preparation. It also demonstrated the researcher's interest in the interviewing companies showing researchers have done some background checks.

Next, the researcher moved to the in-depth semi-structured interviews with individual companies from the food sector. Data collection from semi-structured in-depth interviews with participants was conducted with the managers and directors of the businesses as well as some non-manager employees who were key personnel for innovation and product development. In-depth interviews with 30 key informants provided rich data and helped reduce bias. Lastly, the researcher re-visited publicly available information for corroborating data. This is a process to confirm statements made during interviews. For example, a participant discussed a major collaboration with a leading advanced research centre for process innovation, where the researcher searched the news coverage to confirm it happened.

The four steps described here highlight the process of the researcher's interview product. The researcher would like to clarify that there is no claiming triangulation as such. The researcher used secondary and publicly available data to strengthen the semi-structured interviews and to hold a degree of preparation for interviews, based on the sweep of data, however, the source of analysis and the main focus of the data is all times the semi-structured interviews with food companies.

4.5.2 Semi-structured interviews

The aim of conducting interviews was to gain a better understanding of participants' perspectives and how they view things from their own perspectives (Collis and Hussey, 2009). The interviews were conducted over three months, and the theoretical-based semi-structured interview method was based on the context of innovation decision-making from the literature.

It is important to suit the needs of participants when setting up interviews (Bryman, 2015). Researchers should find out where would be the most convenient place for participants to partake in the interviews. Given the busy schedule of participants, most of the interviews were taken on their company premises and some over the phone and Skype. Since these interviews were also being recorded researchers must prepare for technical requirements and test the equipment for recording interviews (Flick, 2018). The researcher in this study used his smartphone as the device to audio-record interviews. Recorded interviews were transcribed after interviews, analysed and coded as shown in the next sections. Applicable quotations in the Findings Chapter will be used to support the discussions, which helps the reader to assess the quality of the work. As discussed earlier some of the interviews were group discussions rather than one-to-one/interviews and helped enrich the data by offering multiple and new key insights.

4.5.3 Data Analysis and Interpretation

The approach of this study is ultimately abductive thematic analysis (Thompson et al., 2023; Tomasella, 2022). While the exploratory nature of the study calls for an inductive approach to analysis, the consultation with the literature makes the study abductive research in that current theory and data are considered in tandem (Gioia et al., 2013; Alvesson & Karreman, 2007). That said, the process of thematic analysis enabled the creation of categories and themes that emerged from the empirical data (Gioia et al., 2013). It used the analytical procedure developed by Gioia et al., (2013) to hook the empirical observations with existing theoretical concepts to generate new insights (Sydow et al., 2022).

The main goal of analysis is to explore the influences of innovation, specifically, activities and behaviours concerning innovation projects in the food SMEs. The study mainly focused on identifying statements regarding innovation projects and influences of innovation. In particular

the researcher was keen to see the managers' actions. The initial phase of the coding process involved open coding, where first-order codes were enabled to naturally emerge from the data and were continuously adjusted and refined according to their relevance. This step led to the identification of 26 first-order codes (note: they are only for the Resource Constraints RQ / topic), such as modifying existing products, accessing external resources, improving manufacturing capabilities, obtaining new ideas from customers, reaching out to friends and business contacts, collaborating internally, nurturing relationships with the business support community, conducting insight type research and market analysis, and creating internal open forums (see Fig. 5.5).

The researcher aimed to develop a more abstract conceptual insights by first grouping similar codes into broader, higher-level categories through a process of data reduction. To maintain both the internal consistency and distinctiveness of these categories, the researcher assessed each code for its resemblance to others within the same group, as well as its differences from those in other groups[4]. This method led to the identification of nine distinct categories of SME actions. In the final phase of coding, the researcher analysed how these nine categories were interconnected (Braun and Clark, 2012). For example, the researcher observed actions explaining the process of how SMEs leverage *external* resources while others were linked to the actions explaining the process of exploiting *internal* resources. This step resulted in the identification of three overarching theoretical dimensions that capture the essence of how resources are orchestrated to drive innovation despite limitations (Carnes et al., 2022, 2017; De Massis et al., 2018; Sirmon et al., 2011). The data structure presented in Figure 5.5 illustrates how the research progressed from identifying initial first-order codes, which represent specific actions taken by managers, to developing more abstract second-order constructs, and finally, to deriving broader theoretical dimensions. This process showcases the analytical journey from concrete descriptive observations of managerial actions to the development of deeper, theory-based insights into how innovation can occur when resources are limited.

[4] To elaborate, codes that captured actions managers took when interacting with business support organizations were grouped together to create a specific category of first-order codes. Similarly, another set of first-order codes was formed by combining codes that represented the actions managers took in their dealings with science-based entities. In the same way, codes that described actions managers carried out through their informal social connections were grouped into a separate category, forming another distinct set of first-order codes. This method of categorization allowed for a structured and coherent organization of the data based on the different types of interactions managers engaged in.

4.6 Chapter Summary

The chapter described and explained the research design and methods of this study. The research position was outlined, along with the qualitative approach to data collection, with references to the research process, and data analysis. The data analysis in this chapter explained the process and treatment of data. The following chapter will discuss the findings of this thesis stemming from the empirical research. The findings will address the three constraints of innovation, which are innovating with limited resources, large dominant customers, and under a unique organisational culture. It will report how low-tech SMEs navigate through each of them to innovate.

Chapter 5 Finding and Discussions

5.1 Finding and Discussions 1: Innovation with limited resources

5.1.1 Introduction and overview

Using the resource-based theory each of the findings chapters explores different constraints that low-tech SMEs face in their ability to undertake innovation. This chapter focuses on the actions of the firms concerning strategically obtaining and leveraging resources (internally and externally) to undertake innovation before the following chapters examine the influence of large customers, and family business culture on innovation. Given the scarcity of research into innovation in resource-constrained firms compared to large firms, this chapter seeks to advance knowledge by addressing the following research question: *How do low-tech SMEs undertake innovation despite resource constraints?*

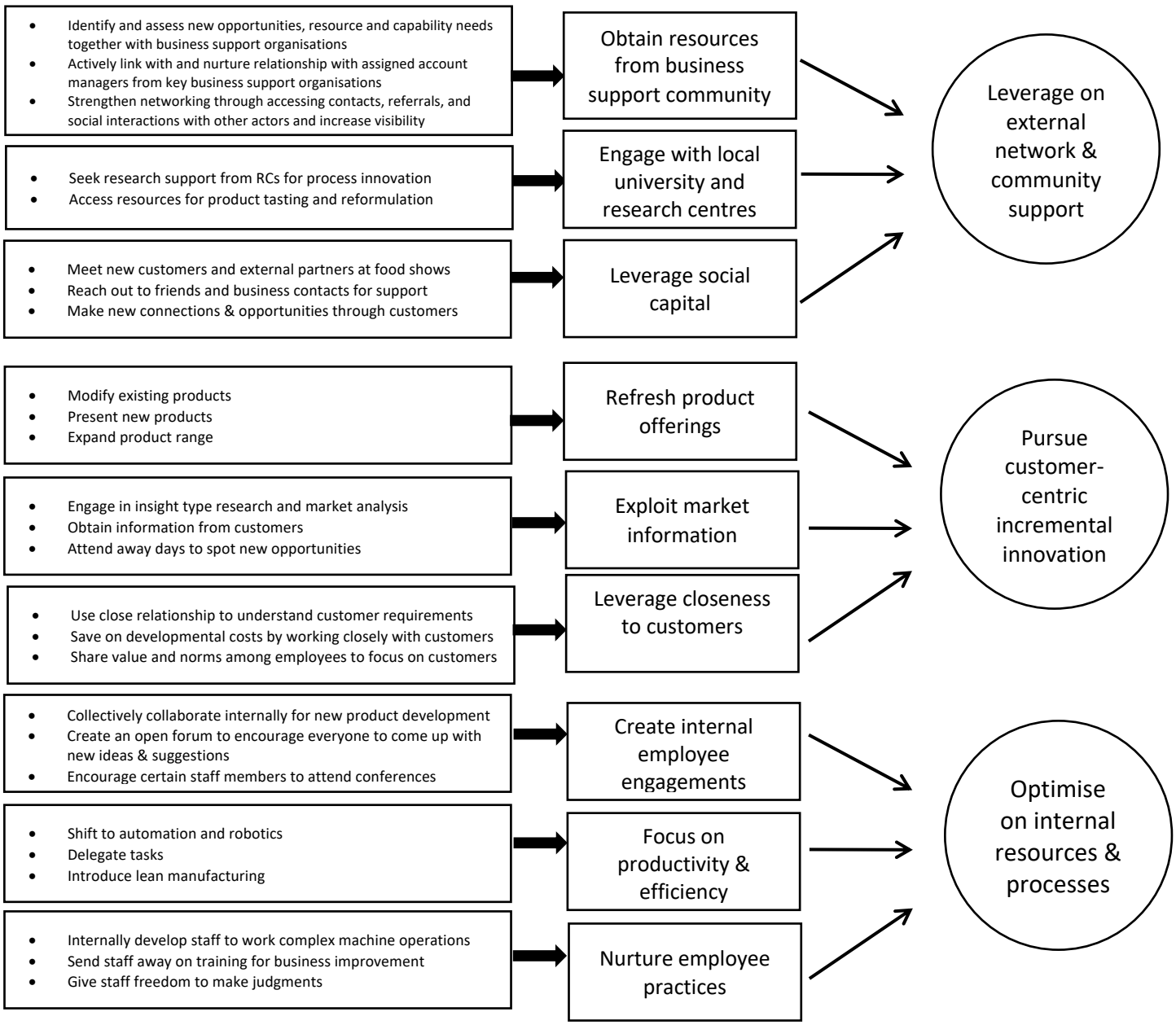
This chapter is structured to demonstrate the distinctive strategies that resource-constrained firms undertake concerning innovation. First, it discusses how they leverage external network and community support, revealing their relationship with the business support community, engagement with local universities, inter-firm collaboration for product innovation, and their social capital as ways to compensate for shortages of resources. Second, it examines how they optimise internal resources and processes revealing their strong internal employee engagement and nurturing practices, along with their focus on efficiency and productivity as ways to compensate for resource limitation to innovation and build up competitive advantage. Lastly, it explores customer-centric incremental innovation, illustrating constant incremental product innovation by refreshing product offerings, exploiting market information, and leveraging customer closeness, to deliver customer value. This chapter demonstrates the importance of these three strategies in enabling SMEs to overcome their resource constraints and foster innovation. Consequently, they establish continuity and stability long-term.

Figure 5.5 below is the built-up data structure representing the full set of 1st order concepts, 2nd order themes and aggregate dimensions for research question 1. The data structure visualises the data to better demonstrate how the raw data has progressed to terms and themes in conducting the analysis showing robustness in the qualitative research work (Tracy, 2010; Gioia et al., 2012). The iterative process of coding and theme building as well as engaging in discussions with principals of the research (e.g. supervisors) has helped better develop

interpretations. On one occasion a couple of transcripts were coded by supervisors. Below are the research findings from the analysis of perspectives of participants for the research question.

RQ1: How do low-tech SMEs undertake innovation despite resource constraints?

Figure 5.5 Data structure



5.1.2 Leverage on external network & community support

5.1.2.1 Obtain resources from the business support community

The first theme of leveraging on external network and community support is obtaining resources from business support community. As SMEs all the firms in this study identified themselves as having fewer resources compared to large firms. They operate in a resource constrained context with regards to innovation (Baker and Nelson, 2005; De Massis et al., 2018). Being mostly family and privately owned SMEs, they are limited with financial resources and lack research and development (R&D) labs and adequate technical human resources. They undertake their innovation activities with a small technical team (1-3) making them limited to what and how they can innovate. Thus, to manage resource constraints to innovation, most firms in this study seek to structure and bundle resources such as finance, and technology/technical externally (Sirmon et al., 2007). Almost all the firms discussed pulling on social relations particularly with business support community to assist with managing their resource constraints and achieving innovation. Thus, a characteristic of many of the resource-constrained firms in this study highlights the importance of networks and external relationships (Lasagni, 2012).

Different to larger firms who typically choose to arrange their transactions through market mechanism at their market price, resource constrained firms here tend to organise their exchanges through networks of relationships. This is because their resource constraint doesn't enable them to purchase at the market price. This led them to not only build strong ties with customers but also with business support community for product, process, organisation and packaging innovation support (Sirmon et al., 2011; Marcon and Ribeiro, 2021). The business support community directly supports SMEs with growth and innovation plans with most SMEs in this study having received direct financial support. This is particularly achieved by being assigned to an experienced and knowledgeable account managers from a leading business support organisation who have very good understanding of the account managed companies, markets and industries. The reason firms are account managed is identified by their desire to grow their business and become innovative. The relationship with account managers helps account managers to strategically critique and challenge the firm's innovation and growth capabilities, which is positively valued by the firms. The relationship also results in access to various available external resources such as finance (RSA, SMART, etc) (Mirkovski et al.,

2023; Nason et al., 2019). Thus, their on-going relationship with business support organisations is a key finding that plays an important role in obtaining support and engaging in beneficial transactions that do not incur market costs enabling innovation and growth-related activities and behaviours. Other businesses may ignore or take less advantage of such available resources (Baker and Nelson, 2005; Vanacker et al., 2011). The strategic relationship with business support community is relational rather than solely transactional.

In particular, many of the manufacturing SMEs in this study obtain funding and grants through business support organisations for process innovation investments to automate packaging and wrapping capabilities to increase efficiency and reduce costs thus achieving competitive advantage (Sirmon et al., 2011). This is very important for SMEs operating in a competitive and price sensitive supermarket industry. They also obtained financial and technical support to develop new products and packaging as part of product and packaging innovations, and upskill staff as part of organisational innovation. Therefore, business networks are a key resource for SMEs' innovation implementation and the type of innovations they pursue (Lasagni. 2012; Marcon and Ribeiro, 2021). The type of innovations to pursue is influenced by their external business networks and relationships. Business networks in the form of having an account manager from business support community is important enabling process innovation activities in resource-constrained firms. Thus, business support organisations can be strategic partners for many resource-constrained firms.

During the interview with an operational director of firm F, a large SME that manufactures popular biscuits in the UK and abroad, he discussed tapping into the external business network in this case business support community to access grants for investing in a process innovation project:

"We've got a nice contribution through [business support organisation name] on our robotics project. Our account manager went and looked at it and we filled in the paperwork, and we got the money" (Firm F: operational director, biscuit manufacturer).

Company F expressed a personal desire to grow the business and to remain competitive in their industry, as reasons to consider investments in robotics and automation project. However, the close relationship with their account manager enabled them to bundle external grants (Sirmon et al., 2007) to achieve their desire i.e. robotic project.

Company B making the country's favourite pastries also highlighted obtaining funding support for process innovation, the MD made the following comments during the interview:

"The cost is high; however, [business support organisation name] has part-funded it. When we got the indicative cost we thought that's a lot of money to invest in that area but [business support organisation name] has part-funded it to a degree which gave us the confidence to sign up. Had [business support organisation name] not part funded we would have probably not have gone ahead" (Firm B: MD, pastry manufacturer).

Company B's assigned account manager from a leading business support organisation has been with company B for more than 8 years and thus possesses a high knowledge of company B's business, products, and markets. The management team and their long-lasting account manager regularly interact and share ideas and opportunities with each other. Their account manager strategically critiques and challenges company B's growth capabilities, something which is positively valued by company B, resulting in company B looking into new opportunities and accessing available external resources to invest in new projects.

Lastly, company M, a top shortbread brand in the country, discussed investments in process innovation in particular artificial intelligence and receiving technical support from business support organisations. They too have an account manager that they discuss opportunities together. Company M's MD and innovation manager in the interview discussed the artificial intelligence support they received from a leading business support organisation:

"…we have engaged with [business support organisation name] a bit and they did a good job for us and think through our artificial intelligence agenda and where priorities should be. That was quite a good piece of work." (Firm M: MD and Innovation manager, shortbread manufacturer)

Despite the low-tech sector being known as low in innovation (Roper and Love, 2006; Scottish government, 2020), firms here do engage with process innovation, as highlighted in the innovation in low-technology sector literature (Rammer et al. 2011). Resource constrained firms in this study find business support organisations' assistance important for investment in innovation and consider them as their 'growth partners' or 'external partners'. In this case, external partner can be extended beyond customers, suppliers as discussed in the SME research (Lasagni, 2012; Nijssen et al, 2012), and to include universities and the business support community, for some of these resource constrained firms here. The growth success of resource constrained firms in this study can be majorly due to their external network support / partner i.e. business support community. The Context Chapter (Chapter 2) highlighted Scottish

Enterprise, Scotland's main economic development agency supports, and account manage around 300-500 food & drink companies, of which most are SMEs.

5.1.2.2 Engage with local universities and research centres

An aspect of embedding with local communities has been the growing partnerships with local universities and research centres. Many of the SMEs here work with non-market actors to structure and manage their innovation process (both product and process). Internal resources are bundled to train employees and consult with university staff to absorb technical and expert knowledge. They work closely with Advanced Forming Research Centre (AFRC), Queen Margaret university, Abertay university as well as Scottish Manufacturing Advisory Services (SMAS) to access research, knowledge, and equipment during the developmental and market phases. This is also evidenced in Chapter 2 highlighting government's effort to increase collaborations between Scottish universities and industry, addressing industry-defined challenges in areas of transformational opportunity (see Context Chapter).

Resource bundling is achieved due to the proximity between the SMEs and the university/ research centres. AFRC usually provides support for process innovation for these firms whereas Queen Margaret and Abertay universities provide mainly product innovation support such as product tasting and flavour reformulation (reduce salt/sugar) all which are considered as incremental innovation and often during developmental phase. Queen Margaret university's food science centre is home to Scottish Centre for Food Development and Innovation acting as a knowledge exchange addressing the fundamental relationships between food and health and the sustainability of the food chain. Some of the firms in this study actively seek academic expertise to support product and process innovation helping bundle resources (Sirmon et al., 2007, 2011) and reduce investment risk.

During the interviews it became apparent that universities and research centres are considered important knowledge sources for driving product and process and new to market innovation (Nieto and Santamaria, 2007; Hewitt-Dundas et al., 2021). Through engagement and cooperation with science-based actors many firms are able to bring a flow of new knowledge into their firm. Due to the complex nature of innovation process these firms increasingly engage with science-based actors to carry through their research and development initiatives.

Heterogenous and diversity in collaborations enable resource constrained firms here develop higher quality innovations going beyond incremental in some cases (Hewitt-Dundas et al., 2021). Apart from engaging in vertical collaborations (see RQ2 and or the last theme here) with their customers to increase commercialisation rates and innovation is mostly incremental (Laforet and Tann, 2006), they also collaborate with local universities and research centres to access resources unavailable internally and driving non-incremental and higher quality innovations.

Interviewing company B's non-family MD who is a successful family-owned pastry and bakery manufacturer he describes how working with AFRC helps reduce the risks in process innovation investment. As an industrial firm, they are engaging in a heterogenous collaboration with a leading technical local university to increase the quality of their innovation by carrying out research into leading technologies. The MD commented:

"…budget for this year for capital investments is £1.5 million, that's a lot of money. So the robotics out of that will probably be in the region [of] it'll be certainly plus half a million pounds if not slightly more … so that is a big risk for us, but it's got to work. So, we've spent a disproportionate amount of time researching with the help of AFRC and others trying to see that this will work because even a company the size of [us as a larger SME] can't afford to invest half a million pounds plus for the project."

The local council's enterprise team also initiate collaborations between local businesses and the AFRC concerning robotic, automated and technical advances, and round table discussions on barriers to innovation, collaboration and funding. Diversity in collaboration also allows identifying new opportunities and pushing technology boundaries within resource-constrained firms. Firms also reported greatly benefiting from accessing technical manufacturing know-how from Scottish Manufacturing Advisory Services (SMAS) (e.g. local agency's manufacturing advisory support) to improve and innovate their manufacturing processes, and wish to continue working with them on more projects to enable them to reap benefits, the non-family member MD of company B commented:

"We have been dealing with SMAS for 8 years, so what I'm interested in once a project is finished it is not the end say with SMAS, [but] what's the next area of improvement can we look at with SMAS. SMAS is the best one in terms of making a genuine impact at operation level in terms of improvement and innovation" (Firm B: MD, pastry manufacturer).

Company B as a larger SME accesses knowledge from multiple external channels leading to greater innovation (Lefebvre et al., 2014) . Company A, a top-quality smoked salmon producer in the UK makes it clear that as SMEs they highly value engagement with local universities for

accessing resources unavailable internally, the production director makes the following comment during the interview:

"We do get some engagement with the university, that's key for us in terms of being able to tap into equipment and knowledge that we couldn't be able to afford on site" (Firm A: Production director, smoked salmon producer).

The physical and technical resources from universities and research centres are thus especially important for SMEs that are resource constrained, universities and research centres have the infrastructures to help SMEs conduct initial testing and prototyping.

New product development includes incremental changes related to flavours and reformulation, as well as the health and safety side of food. Company K, a leading oatcake brand in the UK and with exports to international markets actively engages with a local university for product innovation support. During the interview with the new product development director, he discussed contacting a local university to obtain research, surveys, and product flavours and reformulation assistance, the innovation manager commented:

"We work with [university name] university. There's a food innovation there, people are trained up to do taste panels so we're able to then send the products there. They do the taste panels and then we can get feedback from them which is actually qualified, it's in a pack report and that will tell us a lot about those three flavours, which will they prefer, and the reason why they prefer, so what is a flavour texture you know after taste was it you know all these different things and it will give us all that information and then we use that quantified in the survey to basically then develop the product further" (Firm K: NPD director, oatcake manufacturer).

Many of the firms in this study bundle the structured resources from universities during their developmental process to 'enrich' or extend capabilities beyond the current state (Sirmon et al., 2007, 2011). Company N, an ice-cream family-owned manufacturer also discussed partnering with the same local university for product innovation:

"We did a project with [university name] university and that qualified for an innovation voucher. We looked at bringing a new product to the market" (Firm N: director, ice-cream manufacturer).

Company B and N as family businesses access valuable resources from local university and research centre partnerships to undertake innovation. They integrated complementary resources creating higher-level capabilities. This is because they wish to engage in innovative activities to both survive and thrive. Further, being involved in business networks such as engagement with the business support community offers further opportunities to engage with local universities. For example, company N as said above partnered up with a local university that qualified as an innovation voucher, helping with the cost of the project, thus creating a

higher incentive to engage with external partners. This supports recent emerging research which highlights innovation vouchers as useful tools to increase innovation in SMEs (Sala et al., 2016; Chapman and Hewitt-Dundas, 2018). These family businesses also cultivate relationships with universities and research centres for innovation and do not solely rely on cultivating employee relations as often considered in the family business literature (Sirmon and Hitt, 2003). In fact, the business relationship with universities and research centres along with the business support community can be a strategic resource for resource-constrained family and non-family businesses and representing their innovation ecosystem (Moore. 1993; Granstrand and Holgersson, 2020) enabling them to pursue and develop SME-specific product and process innovations and improvements.

5.1.2.3 Leverage social capital

While previous themes discussed embedding in local communities such as business support community, university and research centre partnerships as the external networks to structure and bundle resources, this theme focuses on the ways in which personal contact and friends, business networks (trade associations and third-party networking), customers, and end-user consumers enable many of the resource-constrained firms in this study access and develop resources concerning innovation.

Friends and personal contact

Participants reported using their own personal contacts and friends to support the business concerning innovation. As resource-constrained firms, they seek help from friends and personal contacts to compensate for the shortage of resources (Winborg and Landström, 2000; Sullivan, Marvel, and Wolfer, 2021). For example, a smoked salmon company with 70 employees was able to contact his friends to help with innovation i.e. tasting new product flavours and product launch inquiry, and business growth activities such as exporting. During the interview, the general manager commented:

> "People around the table might try the product or even go back to [university name] for another session or supply some to friends of mine who have catering. So there are different ways we can do product tasting … [also] last year when we were looking to launch a whisky brand smoked salmon, I had a word with a friend who runs distilleries" (Firm I: general manager, smoked salmon producer).

At another point in the interview, he further responded concerning the motivation for exporting:

"I used my own contacts to bring an export expert, he is probably the best person to help us. Through that we established a direct contact with an agency in Italy" (Firm I: general manager, smoked salmon producer).

Company B, a family business run by a non-family managing director discussed how he has been getting valuable information and insight into the latest developments through speaking with another managing director of another company whom he knows as a personal contact. In the interview he described this:

"I have been in contact with the MD [of another company] and chatted about things that are common to both of us like robotics, innovation, product quality, productivity, because there are lots of SMEs at differences have the same challenges" (Firm B: MD, pastry and bakery manufacturer).

Another company, Company D in the wholesale and producing food leveraged their good friendship with a senior member of a leading business support organisation to access financial help at a critical time, the financial director in the interview commented the following:

"[The] chairman of [business support organisation] is a good friend of [the owner name]. They supported us at the time of [a] tipping point for us. We had [a] real challenge with [the] local council where we looked for support, we didn't feel it was forthcoming and that's when [business support organisation] stepped in" (Firm D: financial director, wholesaler).

Third-party and business networks

Third-party and business network roles have been found especially valuable to many resources constrained firms in this study. By being members of trade associations and in general the business support community, the memberships have offered opportunities to obtain a variety of resources such as learn new information, make connections and expand contacts, gain new customers, and collaborate (Brüderl and Preisendörfer, 1998; Davidsson and Honig, 2003; Casson and Della Giusta, 2007), making it valuable to resource-constrained firms (Grichnik et al., 2014).

Memberships in business networks provide members with reduced rates for tangible resources, access to funding, showcasing products and picking up new customers, and forming collaboration opportunities. Network members and account-managed members are also able to receive referrals and introduction to new suppliers and customers locally and internationally.

Company B a successful family-owned bakery and pastry business run by a non-family MD, has been able to leverage its business network to obtain subsidised training for staff through its industry/sector associations. During the interview the managing director explained:

"We [have funding] through association, we do get funding in terms of staff training for lean manufacturing … so we do get subsidized training through because of [leading bakery association name]" (Firm B: MD, pastry and bakery manufacturer).

Company B trains employees concerning innovation because they wish to enhance their employees' personal and professional development and at the same time help the company grow long-term. The MD is also a board member of a leading bakery association, thus obtaining information regarding resources such as training and funding. Another family-owned business, company N, half of company B in size and run fully by family members, was able to pick up new customers by joining the food & drink industry's main association/agency i.e. becoming a member and attending their events, the director explained:

"We also joined Scotland Food & Drink where we picked up some new customers at some events" (Firm N: director, ice-cream manufacturer).

This company attended food and tradeshows for networking purposes to pick up new business. Due to their desire to grow the firm and serve more customers with its top-quality ice cream they picked up new customers at third-party events. Apart from picking up new customers at business networking third-party events, some firms have been able to form collaborations. Company I, a niche smoked salmon producer with 70 employees explained:

"We met a Dutch company [at a food show] and got chatty and are now collaborating on a new product together or even branding/packaging. Something that takes [us] to a new area" (Firm I: GM, smoke salmon producer).

Companies in the food sector have a desire to collaborate on innovation and it seems that attending third-party events offers a valuable networking opportunity for innovation activities. Another company, Company K manufacturing oats and crackers, was also able to leverage its business contacts through attending third-party events to engage in collaboration (explained further in the immediate theme/section above), NPD manager commented:

"I think a lot of the time it's about going to shows, about going to conferences or speaking to people you know with their suppliers are just like you know folks that you know within the business" (Firm K: NPD director, oatcake manufacturer).

All of these companies have managers/directors that are active with business networks which create new business opportunities and expansion of resources, thus creating competitive advantages. Some of the firms in this study as family businesses go beyond developing social

capital with their stakeholders, and establish formal economic networks as shown above. They purchase memberships in networks (Lin et al., 1981; Davidsson and Honig, 2003). Participants also discussed obtaining referrals through their business networks and memberships. Company B explains how their business network enables this:

"[Account manager name] has been our account manager for 7, 8 years he knows the business. If we say [account manager name] we are thinking about going to robotics then he would say here is the person to speak with at [business support organisation name]." (Firm B: MD, pastry and bakery).

Company O also explained leveraging social capital with a leading business support organisation to obtain European funding as well as other resources, the relationship is also a valuable resource for them. Social capital in business networks leads to innovation and growth of SMEs, the commercial director explains:

"We know our account manager [account manager name] for more than 10 years. That was during the movement of the factory. So that was European funding through [business support organisation]. we had plenty of grants from [business support organisation], on people, kit etc, we would have been [a] small business with a growth we had, £5, £6m started out"

Although firms engage with business networks and third-party events, because they are resource constrained, they also discussed their barriers from engagement with third parties:

Firm B also explains the challenges of accessing resources through business networks:

"It can take a disproportionate amount of time. And there are lots of hurdles you have to go through to find out what was actually available, in terms of support for SMEs … some of our staff have got the time but if you take a smaller baker for example who's perhaps maybe got 12 staff, the owner could be full time working, he or she could be working six, seven days a week from five in the morning till 4 or 5 p.m., and they will find it difficult to find the time. [But] we have been fortunate we've got resources and people that we can do that. But not every SME has that time and resource to do that." (Firm B: MD, pastry and bakery).

Company N also explains a similar issue:

We don't need to call on SE too much, but Scotland Food & Drink [SFD] is more about the time, a lot of SFD we haven't been able to focus on … I think you get out of it what you put into it. We may not have the time but the support is always there … It's just there are so many hours in my day, which is why we haven't taken up fully everything we can do, just the lack of time resources.

Customers

Some participants in this study also discussed their dealings with customers enabled them access to resources. For example, company A, a large and successful SME producing niche products such as high-quality smoked salmon has said due to their increased customer relations

new opportunities have risen for them. The production and innovation managers during the interview mentioned this example:

"It's difficult to find out the access point for those services. [Customer name] probably knows more about that than which they tend to tell us to speak to someone in [university name] or etc because they are doing this project" (Firm A: Production and innovation managers, smoked salmon producer).

This company also works with another customer in the US and has been able to tap into their customer's network to develop new products, innovation manager explained:

"Our customer who is Seattle-based is doing work with Starbucks, so we did some smoking work with coffee, tea" (Firm A: production and innovation managers, smoked-salmon producer).

The increased relational social capital created has led to increased innovation projects between the customer-supplier. These firms are able to leverage their customer relationship to access resources concerning innovation. In many instances, they are forced by their customers to innovate in certain ways, customers regularly demand innovation and new concepts.

Company E even makes international travels with their customers for new product development (NPD) and market research. They take trips to markets to spot new ideas and trends that they can then develop together. This way they explore and bundle resources and capabilities helping SMEs overcome resource constraints to innovation (Sirmon et al., 2007, 2011). Not many suppliers have the opportunity to travel with their customers. The close relationship may be a valuable resource unavailable to other firms, it provides SMEs with access to better quality information and customer voice in NPD, particularly here in identification and ideation phase or the initial phase of NPD The close working relationship also create an emotional bond during the innovation process (Liao and Welsch, 2005). Company E, a high-quality pate producer described their high relational capital with customers enabled them to travel together for market research and NPD activities which may act as a united and social-emotional bond:

"We take trips with some of these retailers [customers]. We develop [a] good relationship with the retailers we work for … and collaborate together on products … we've gone into a [business improvement] program with [customer name] for 5, 6 7 years." (Firm E: innovation and marketing members, pate manufacturer).

End-users / consumers

Another source of social capital that some of the resource-constrained firms pull on to access additional resources is their end-users / consumers (e.g. brand community). For example, to gain inspiration or new ideas or even obtain feedback on recipes and flavours, some of the

branded firms in this study connect with their end-users via online social media networks and or focus groups. SME K producing oatcakes and crackers explained this:

"What we can do is we know we've got so many Facebook, Twitter and Instagram followers. So those people are already our consumers. So that's a good insight into your own customer base because they know our brand. So, we can ask them". (Firm K: NPD manager, oatcakes manufacturer)

Another brand also engaged with consumers via focus groups to assist with new product development. During an interview with company M which manufactures biscuits and has 200 employees, the MD explained:

" We will say ok what sort of margin can we, what sort of retail price do we need to hit for, what's the consumer willing to pay, we would do some market research about that, focus groups, what the consumers look for and the price they pay for, we show them the different recipes, and we take the consumer research and factor it in. So we will understand consumer preferences and what price they are willing to pay" (Firm M: MD, biscuits manufacturer.

The lack of R&D resources force these SMEs to connect with their und-user or consumers for new product development both in person and online. Engaging with end-users help some of these firms to launch products with the most popular flavours. It also helps them when they present new products to supermarket customers, as it shows the supplier has done market research and there is a good market for the products based on the surveys and feedback from social media and focus group consumer engagements. Thus, end-user consumers can be a source of resource for resource-constrained firms in this study to assist with product flavours and other product-related issues, while at the same time such a consumer relationship strategy enables competitive advantage and negotiation power in the long run.

5.1.3 Pursue customer-centric incremental innovation

5.1.3.1 Refresh product offerings

Firms in this study reported refreshing product offerings in response to customer requirements and remaining competitive. Customers do not wish to stock the same product over a long time, they seek variety and new and better products every now and often. Suppliers are forced to continuously develop new and attractive products. If they do not offer new products to customers, they may lose those customers. Therefore, product innovation plays a key role in customer relationships and competitiveness (Reguia et al., 2014; Liu and Atuahene-Gima, 2018). Firms reported that the challenge is to constantly be making products more attractive

and evolving. Company C, a successful biscuit manufacturer during the interview explained the following:

"Over the long-term, you should make some progress but you've got to be constantly pushing in that direction trying to improve what you're doing and that's the real bottom-line you're trying to improve but you do try to make your products more attractive to consumers you're trying to make your products more attractive to the categories so that's an ongoing quest really". (Firm C: Founder, biscuit manufacturer)

In this way, they survive and move forward in the competitive and fast-moving supermarket industry. However, firms here modify existing products as a way to offer new products to customers and manage resource constraints (Carnes et al., 2017). Essentially, the new products are variations of existing products, yet the flavour is new, or the shape and packaging of the product are different making it more attractive (Oke et al., 2007; Baregheh et al., 2012). Company Q a leading ready meals manufacturer and a family business commented:

"We produced a macaroni cheese smoked salmon as a meal, a higher tier product. That involved taking current recipe, modifying it, adding more flavour and texture to it, so its looks different, trying to grab different customer to the product." (Technical manager, ready meals manufacturer)

Company Q incrementally innovates products to refresh product offerings providing something incrementally new to customers thus meeting customer needs, wants and demands. They also develop something that they are familiar with which already has been tested in the market. This way they often use existing capabilities to innovation and manage shortages of resources (Sirmon et al., 2011; Carnes et al., 2017, 2022). Company M, the number one shortbread brand also echoed this:

"A lot of new products that make it to market are variations of existing products so we may alter the size of an existing product… we are limited in our resources; we don't have as big R&D team spending hours and hours. We are not doing pure research we are more on the development end of [the] R&D spectrum."

The innovative ideas and concepts are driven from both internal resources and customers. Customers have a big say in terms of driving innovation and they usually send 'innovation briefs' to suppliers detailing the kind of innovation they would like to have which in most cases involves incremental changes to existing products. Company O producing seashell products discussed this issue:

" In essence with the pressure in the supermarkets around NPD there are windows four times a year or development like Christmas window, valentine window, summer window, you know, you will be sent a brief by them to say we want to look at muscle sauce with champaign sauce for Valentines, this is brief and that's when development starts for us. A lot of innovation is driven by retailers themselves so they tell us we want this can you do this we will look at it design the packaging and the product."

Company E producing high-quality pate also explained how much of their innovation is customer-led:

"At the moment we are own label led, that decision is almost made by retailers, so there is certain kind of a year when they send you a brief … we are quite led by what the retailer needs and wants, they come up with innovation and concepts sent around the brief."

Participants also discussed sending or presenting customer-requested products to customers for review. Technical managers usually meet with customers' buying team to present new products. The meeting becomes an opportunity for the firms to showcase their new products hoping the customer would choose more than one or two products thus increasing product range and business with customers. The technical manager of Company M, the number one shortbread brand in Scotland explained:

"We have got a big business across the range of coffee shops and each year you go through the process of re-tendering for your existing lines and then it will give you the opportunity to present new ideas and concepts. Sometimes you could be presenting 20, 30 samples to them and will pick the two that are already listed … so we want to present as many ideas so hoping to get a couple of those picked from them."

Keeping customers satisfied and remaining business continuity is one of the main reasons why many firms in this study refresh their product range. Customers wish to move forward with the market trends and continue evolving as a successful and innovative retail business, therefore innovation plays an important role resulting in suppliers regularly renewing products.

Refreshing products also help with sales. Products usually have a life cycle, at the beginning due to newness new products have a high life and sell well but eventually, sales drop and thus products may need refresh, which is another reason why many firms in this study reported refreshing product ranges. This strategy enables to increase sales again thereby generating profit leading to competitive advantages. Company B explains this,

"With regards to the cake, we launched that because that particular range we had need a refresh, with existing product sales were declining and were tired so we thought to refresh the range to get the sales going again. So two different reasons" (Firm B, MD, pastry & bakery manufacturer)

Product life cycle has become shorter in the fast-moving consumer goods particularly in retail, this means firms in low-tech sectors such as food must develop new products even more, which explains why they are always on their toes launching products. However, most resources required for the type of innovation undertaken are available internally. They do not require

ground-breaking innovation. On the one hand, customers seem to be demanding concerning innovation yet requests involve incremental innovation, on the other hand, incremental innovation works well for many of the firms in this study that are resource constrained. Therefore, this story plays a big part in the innovation type and activities of many low-tech firms in this study (Oke et al., 2007; Baregheh et al., 2012; Hirsch-Kreinsen, 2015). Refreshing product offering creates opportunities for interactions between suppliers and customers and can improve business relationships leading to more business together, a topic to be explored in the following theme below.

5.1.3.2 Leverage closeness with customer

While many of the firms in this study are resource constrained i.e. absence of proper marketing function and marketing expertise, they have close interactions with their customers (Nooteboom, 1994). Being customer focused not only helps to faster respond to their needs but also obtains high-value information, and a spirit of cooperation, related to innovation (Nijssen, et al., 2012), highly valuable to resource-constrained firms.

Participants discussed product ideas and concepts come majorly from customers. The small to medium size of the firms in this study enables better communication channels with their customers, they do not face the liability of complex processes to not closely communicate with customers, therefore, this allows a higher percentage of employees within many of these firms to have regular interactions with customers. They regularly visit customers for catchups, new product presentations, and in some cases travel together on business. Therefore, the information and insights gathered from customers in this context can be an extremely valuable and unique resource to the firm to help develop customer-oriented innovation highly suited to customer needs, leading to competitive advantage. Some firms even collaborate with customers (Nijssen, et al., 2012), which will be discussed further under RQ2. In essence, they are able to leverage the interactive NPD process with customers to deliver high-value innovation. The closeness to customers enables customer voice and input into the making of the product (McEvily and Marcus, 2005; Carbonell et al. 2009; Feng and Wang, 2013) and as small firms they efficiently manage external coordination. For example, sales and commercial teams would interact with customers regularly for new product ideas and concepts. Based on the participants' interviews, they seem to have both informal and formal discussions with

customers on innovation. Seashell fish producer company O discusses how either party picks up the phone to discuss innovation and new products together. The commercial director said:

"…[Customer] calls us on the phone and says to us see that product you do its worth a million pounds to us could you change the pack to that rather than that, we actually like the garlic one because consumers say there isn't enough garlic on it."

Company J a family business meat supplier discusses something similar, holding close conversations with customers on new product development, the MD mentioned:

"Effectively that idea came from [a customer] … from [the] conversation with them they were looking for [an] alternative to the current menu and that was the obvious one that stuck out, we came back and ran with it all."

Due to less hierarchy to the customer, there is a close distance between the employees of these firms and their customers (Sundbo, 2008). Company R, a successful small to medium-sized pizza manufacturer, discussed all their employees including the MD get involved in the development meetings, and interestingly members of their customers also participate. The technical manager said:

"Because we are too small all have to be involved, our managing director is already involved in all the development meetings with us as well. MD will then make the decision. We have got a development and technical manager at [customer name]."

In the case of company R many employees from different departments, not just sales, have the opportunity to meet and interact directly with customers on innovation which creates closeness to customers and also adds to process efficiency. At the same, time such open and decentralised systems of closeness to customer enables customer to feel more trust, open, and invested in the supplier thus influencing the relationship further, all of which impact innovation. The closeness to customer entails the absence of proper R&D, inefficient market intelligence and scanning, and excessive financial needs. SMEs integrate customers and blend them with their in-house resources for NPD purposes. Managers hence greatly save on developmental costs and additional financing sources and successfully obtain feedback and leverage new products into the market. This results in their efficient resource orchestration (Sirmon et al., 2011).

Company B, a leading pastry and bakery brand, also relies on members of staff for new product ideas, thus rather than having one team such as marketing or sales to only deal with new product ideas and concepts and market research, many of the firms in study develop a cooperative spirit for new product ideas and concepts for customers, they are also in touch with customers. Many firms in this study are therefore rely on existing resources and integrate customers to manage constraints to innovation and provide value to customers.

While this process seems informal i.e picking up the phone and speaking to customers, many participants in this study discussed a more formal process as well where customers send their 'innovation brief' to suppliers detailing the innovation they require for a specific year or season. Suppliers will then engage in cross-functional interactions internally as part of their internal alignment (Horn et al., 2014) and orchestrate resources accordingly to respond to customer inquiries/requirements. For example, during the interview with producer O in the seafood business, the commercial director explained:

"Carla [the NPD person] gets a brief [from customer], she sits with us in the commercial. We sit together, [and] see the Asda brief they want us to come down and present our products. We look at the briefs and the ones can provide we will look into it, [and] talk through it internally, [and] then Carla will get into the kitchen to work, work with the factory with technical. We have a big technical team we have maybe 7 technical people working here."

Apart from NPD interacting with the customer, company O's commercial, sales and account management colleagues also engage with customers. Company R has different departments coming into the NPD meetings with the customer present. Company R producing pizza also highlights how the customer tells them each year what sort of innovation they would like for that year, the technical manager explained:

"[Customer name] tells you each year they have categories for each development and that year health was their top priority to try and push. So, we came back and try and think what we could develop healthily."

During this process, customers may also get involved as discussed earlier, and the two parties interact back and forth with each other, thus integrate, and re-configure resources for innovation (Van Echtelt et al., 2008; De Massis et al., 2018). Having a customer involved has helped developmental costs hugely (Bonaccorsi and Lipparini, 1994). Firstly, it was discussed that many firms in this study do not face the risk of new product failure thus new products have a great market acceptance chance. Secondly, many firms save time and information and other key resources during the developmental process. Therefore, not only do ideas and concepts that are generated by the customer greatly help resource-constrained firms in this study with research costs and reduce new product failure chances but also the constant interactions with customers throughout the process. However, on the other hand, CEOs or managers of these small firms face a struggle with their dominant customers to maintain control over the direction of innovation (Fischer and Reuber, 2004).

The new products or ideas or concepts that get generated with one customer, if successful and attractive, firms also present them to other customers, this way they benefit from the innovation beyond one customer. This advantage further helps resource-constrained firms as they maximise and capitalise on product innovation. Alternatively, some firms discussed changing the packaging and presenting the same product but different packaging to other customers, which further creates an advantage for resource-constrained firms with innovation costs. These ways they efficiently orchestrate their limited resources to undertake innovative activities (Sirmon et al., 2011; De Massis et al., 2018).

However, firms discussed that there are instances where they were unable to respond to customer's innovation inquiries due to either lacking resources or not being commercially viable based on what the customer is prepared to pay. In those instances, they either turn down the request or work very hard to come up with a similar innovation based on available resources (Sarasvathy, 2001) or if possible, obtain external technical support i.e. collaborate with an external supplier that can help them develop that new product. By acquiring resources from the external suppliers to structure and establish an improved resource portfolio (Sirmon et al., 2011; Hitt et al., 2016) to successfully respond to customer inquiries helps build better customer relationships and value. Firm O producing seashell fish products explained how customer request for a new product concept made them work with an external supplier to develop customer requested product:

"[Customer wanted] little shells with sauce and scallop in it, they actually brought a little pastry, pastry with sauce and scallop in it for Christmas and eat the whole thing rather than out of a shell. So pastries. [Carla the NPD] worked with a pastry supplier and we are launching into Asda and is quite a weird concept and it's launching … it took 6 months to develop that. That product it's going to Asda in the next few months. We never got into pastry, never dealt with pastry."

Company A high-quality seafood producer also explained when they sought a supplier to assist with NPD for a customer:

"Commercial team wanted to offer something new and different to [customer]. Commercial told me if we can do this but we didn't have any capacity at all, we decided to look at companies who can reduce the time on a traditional gilt which then had the capacity."

These relationships with customers are important and many firms reported investing in and maintaining those business relationships, which is why many firms in this study pursue customer-centric incremental innovation enabling them to alleviate resource constraints (De Massis et al., 2018). Finally, in addition to innovating based on customer requests, many firms

in this study also identify new ideas and concepts to offer new products to customers which will be discussed in the following theme. Nevertheless, most of the innovation is pulled by the customer/market and customers are mainly focused on current products and offer information with regards to incremental improvements from the existing lines of products (Kwaku Atuahene-Gima, 2005; Sirmon et al., 2007).

5.1.3.3 Exploit market information

It became clear that many firms in this study exploit market information to develop new products. Market knowledge is extremely important for new product development success, therefore many are very close to the market and have deep market knowledge. They exploit the market information through six means. They exploit market data and analytics to observe trends, gaps, and growth opportunities; obtain information from customers; hire consultants; communicate with consumers; obtain surveys from local universities; attend away days such as supermarket visits and other national and international markets visits for spotting new opportunities, and simply speaking to people from the industry.

Exploit market data and analytics

Market knowledge is extremely important for new product development success, many firms in this study are therefore very close to the market and have deep market knowledge. While they have a "feel" for the markets with their trends and customer needs, nevertheless, they also pursue quantitative data, when possible, to give them confidence, and to help better convince the management for back-up on NPD investment. As such, they rely on market data analysis in order to observe and better understand consumer trends and behaviour and spot gaps for new product opportunities. Most participants discussed buying information and data from Kantar a leading retail consulting and market research firm. Some also discussed using market research from the Bank of England, Scottish Government, Scottish Enterprise and other institutions. This way they systematise market research, even though they have a small marketing department for example with one or two members running it i.e. lacking the professionality. This way they manage innovation with limited resources (De Massis et al., 2018).

Company B, specialising in pastry utilised bakery press and data to identify a gap in the market to offer a new product that customers would benefit from:

"Well, we spotted a trend for premiumisation of product. The bakery press and data suggested that there is an opportunity to introduce pusher and more premium products for Christmas, so we developed the product specifically for Christmas, [the] premium was more expensive so it wasn't an everyday pie, so we recognise the gap in the market that we thought our customers would like" (Firm B, MD, pastry & bakery manufacturer).

Company B utilised bakery press and data to identify a gap in the market and launch a new product. Supermarket customers regularly demand for new products and concepts particularly for special occasions such as festive periods as there are an opportunity to offer consumers innovative products for Christmas. Consumers are looking for new concepts to buy for Christmas, thus company B used the data to spot a gap and offer a new concept. Company R a bakery manufacturer specialising in pizza discussed acquiring information (Sirmon et al., 2007) from Kantar for data on consumers to identify market gaps and trends to help develop new products:

"We buy information from Kantar agency, data from supermarkets and trends we get information from them to see what they think and if things are going ok."

Obtain information from customers

Participants gather information from speaking to customers to better understand market needs. This is both during the ideation and development phases of NPD. Being close to the market enables them to develop new products suitable to customer needs. Company L producing seafood products, mainly fish, explains this in that they regularly receive customer inquiries with regards to new product ideas. The operational director comments:

"…customers come to us and say we were thinking about this product. I deal with new inquiries 5, 6 times a month from different customers looking at different products. We work with customers; we work it out how to do a product … it's customer specific, they might come to us with an idea, can you do this".

Through its closeness to the market, customer L is able to obtain valuable information and requests from customers and respond accordingly. In many cases, firms work closely with customers for product innovation. Also, due to their smallness and lack of complex processes they are able to have better communication and interactions with customers leading to higher innovation. They are able to exploit customer information and needs and develop customer-oriented products. Company R specialising in pizza also highlights:

"We have our customers who come back and say to us we're looking for a product that does like this".

The innovation resources they obtain from customers are about product requirements and insights, as well as prototype testing (Marcon and Ribeiro, 2021).

Hire consultants

Some of the firms engage with consultants and advisors to assist with formal market research. Sometimes they cover the costs themselves or obtain grants from the business support community to pay for consultants and advisors. Company L specialising in seashell fish take up the opinions of external advisors (Johnson and Webber, 2007; Mole et al., 2013) since they have high-level industry knowledge. Company D a food wholesaler uses consultants to help with what customers are looking for and what is trendy, the production director explained:

"There are people out there doing that research. We also have a consultant chef who is down in London and let us know what people are looking at. So they are out there and consistently see what's new."

Company E producing pate has been getting consulting support with the help of the business support community, the marketing and innovation members explained:

"[Business support community name] is beneficial because they give us access to experts, consultants, the program is called improve like a R&D programme."

Taking advice at a low cost is a way to enable SMEs to overcome constraints and engage with business growth and innovation activities leading to competitive advantage (Pergelova and Angulo-Ruiz, 2014).

Obtain information from end users

Some firms leverage their brands to engage with the end-users / consumers to assist with new product development and product launch (Von Hippel, 2005). This helps reduce new product failures and offers confidence and assurance on new products. They arrange focus groups and leverage social media channels to engage with end-users and gather information concerning new product development (Palacios- Marqués et al., 2015). Company M a leader in UK shortbreads explains the process of market research, in particular, involving consumers and conducting focus groups for new products development:

"We will say ok what sort of margin can we, what sort of retail price do we need to hit for, what's the consumer willing to pay, we would do some market research about that, focus groups, what the consumers look for and the price they pay for, we show them the different recipes, and we take the consumer research and factor it in. so we will understand consumer preferences and what price they are willing to pay. You have to ask the right questions to get the right answers or information."

Company M and others as SMEs ensure to have a very good understanding of the new market or product they wish to develop while reducing the market risks, they have a process where

they ask questions concerning market research and engage with end users to better understand their needs and obtain feedback. Company K producing oatcake regularly leverage its brand to obtain feedback from its social media followers. For example, before launching new product flavours they do consumer research proposing different flavours and obtain the top three, the NPD manager explains:

"We're launching a new biscuit and later this year probably July actually will launch it and we did the exact same thing where we offered consumers and just you know various people. So 10 different chocolate or you know apple or tropical or banana or and we got a lot of feedback and we have the top three."

Obtain surveys and data from local universities

Interestingly, some of the firms in this study bundle with local universities to assist with market research (Sirmon et al., 2007, 2011). For example, some universities have a food innovation department with food experts helping SMEs with market research including surveys for product and flavour tasting. This way they systematise their research giving them and the management confidence in going ahead with the new flavour because the data from universities suggested it. Company I producing smoked salmon products explains:

"…we engage external bodies like Queen Margaret university, they did a lot of work for me in the past, [and] I have been part of some of their projects. They said costs about £3,000 and do some market research and provides you with useful feedback."

Company K also took up the resource offered by a local university concerning surveys and feedback on a new product, which aimed to prove company K's new product quality compared to a competitor. The NPD manager said:

"So we've developed a product that was better than Mrs Campbell's and we used it. And it was because we went to university they did a completely separate independent survey and we had feedback to see that it was better than Mrs Crampbell's".

Visit supermarkets, national and international markets

Many firms in this study also attend away days such as visiting supermarkets, national and international markets, and food shows to spot new opportunities (McAdam et al., 2016). Sales and commercial teams visit and check what new products are on the shelf, at what prices and so on. They also attend markets to see what direct or non-direct competitors doing, and what new flavours and recipes are they doing that they can get inspiration from (McAdam et al., 2016). While sales teams are normally on the visits nonetheless employees from different departments also actively explore the market for new ideas to support identifying market gaps

to offer new products to customers. Through such close knowledge of the market, they compensate for the lack of professionalisation of marketing, and orchestrate resources for innovation ideas (Sirmon et al., 2011; Carnes et al., 2017). Company E discusses their internal hunger for idea generations and also attends shows and other markets to identify new ideas or gaps in the market to potentially consider for development. Company E making pate explains:

"We've got an internal hunger for new products too, we got quite big development team looking on the internet for new ideas. Internally we got a good covering of idea generation. Although a lot of time retailers send us briefs, we also go to shows [and] events".

Company B a producer of pastry and bakery products and a family business regularly visits markets to obtain information on new products and share together what they have seen, the non-family MD explains:

" Our sales team are actively in supermarkets to see what's on the shelf, whether that's what price is selling, what new product. We also have a CRM, a network. We are part of a CRM system, if we see something in a supermarket or on a shelf, then we photograph it take notes of it and share it. So we share good information, and then we will review that periodically, and we say what we have seen in the market."

Speaking to people from the industry

Finally, some of the firms in this study leverage their connections and people they know in their network as a form of information gathering. Company B a family business pastry and bakery brand explained:

"…attending conferences or even informal lunches or dinner and chatting to like-minded companies … I have been in contact with the MD [of another large company] and chat about things that are common to both of us."

Due to limited internal R&D resources, most of the firms here engage with all of these six-market information and knowledge sources for product innovation. Nevertheless, most of these low-cost external sources of market research and knowledge have been found as valuable for generating ideas for many of the resource-constrained firms in this study (Lefebvre et al., 2015; Pergelova and Angulo-Ruiz, 2014; Mole et al., 2013; Kang and Kang, 2009). They utilise external or outside-in knowledge and information via formal and informal contacts important especially for product innovation (McAdam et al., 2016). In addition, the research and knowledge provided also helps them during the bundling and commercialisation/market process and negotiation with supermarket customers offering reassurance that new products are well researched and have a hunger for in the market. Attitudes of managers is important

concerning innovative capacity in their SMEs thereby appreciating the significance of integrating external sources of information and knowledge with in-house source and resource and especially adopting these to their specific and distinctive innovation processes.

5.1.4 Optimise internal resources and processes

5.1.4.1 Create internal employee engagements

Due to a lack of material resources (e.g. financial and human) and formal processes such as hierarchy and structure system, many of the firms act more entrepreneurially and innovatively concerning business growth and innovation activities. For example, employees have higher and more effective engagements and interactions with each other leading to internal collaboration regarding new product development from idea generation to commercialisation. This means the business pulls resources across the organisation to support with the innovation process. Members from each department such as NPD, technical, marketing, sales and commercial, production, finance, and sometimes operations meet and consistently communicate concerning new product development (Lepak & Snell, 2002; Andersen, 2021). During this process intelligence and information flow between inter-departments support to ensure the success of the new product development from different angles (e.g. finance calculates the feasibility and commercial viability and shares with the rest of the team). Thus, while these firms have a small NPD team, they also pull resources from the wider part of the organisation and engage in NPD activities together (Gibson and Gibbs, 2006) highlighting resource orchestration for team-based innovations (Andersén and Ljungkvist, 2021)

For example, company B a leading family business manufacturing pastry and bakery explained this:

> "In terms of products we have what is called PDR 'Product Development Request', it is a document whoever generates the idea whether its sales team or operations or I have seen something, it is a document that says here is a potential new product … so there is a process that goes through sales & marketing, finance, operations … technical department looked at it, fits our profile, operations looked at it yes we can manufacture … eventually cross my desk and as a collaborative approach."

Company B and many others operating as SMEs work collaboratively concerning NPD. The lack of resources and formal processes enables easier and high interactions between employees making synchronisation and coordination between resources more important (Carnes et al., 2022). Company O a successful seashell fish product echoes that in small businesses there are

high interactions between employees concerning innovation. The Commercial director explains:

"…in small businesses because there are so many interactions between each other, it's different if you have 20 people NPD and you got layers within it. Everything is so interactive in that bubble."

Both the management and employees organise open forums and informal discussions where employees from different departments are encouraged to proactively partake in idea generations and decision-making concerning innovation (Andersén and Ljungkvist, 2021). They meet once a month or bi-monthly as a big group to discuss any new ideas both for overall business improvement and product concepts. If a staff member has been on holiday and he or she has come across a new product or concept, he or she can bring it up in the meeting and show a photo. If it's worth progressing further, they will explore and eventually present samples to customers. During an interview with company K producing the country's leading oat products, the innovation manager explained this:

"…there's two of us here working on doing innovation. But there's probably a larger team that works sort of on innovation. So, we're trying to involve as much of the business as we can… just about two weeks ago we had an ideation meeting and this was the second one, it was a follow-up to the original one where we encourage people and from NPD obviously, from marketing, from sales, from technical, from production, and to come into that meeting with ideas for new products for within the business and that can be based on you know what they've seen in supermarkets or what they've seen and have been on holiday or what they've read on."

During an interview with company B, the senior manager also explained organising and coordinating regular activities to encourage employees at different levels of the business to come together and discuss any innovation-related issues (Sirmon et al., 2007; Carnes et al., 2021). The non-family MD explains:

"This is where we rely on certain people within the business at a certain level to be able to look at things and say I can change things for the better, whether its process, machine or product. We have regular sessions, meetings, and team briefings. We also have a listening group where we give people at all levels of the business an opportunity to exchange information."

Because of their flat culture and lack of human resources firms in this study rely heavily on existing employees for innovation and improvement (Freel, 2000; Henrad and McFadyen, 2012; Chadwick, 2017). As a result, they regularly organise open forums and meetings for employees to have the opportunity to exchange information and also interact. This also helps employees to increase their engagements with the business and come up with ideas and suggestions to improve things.

Further, cooperative and collaborative efforts offer diverse ideas for innovation leading to creativity and lower innovation risk due to collective decision making and team-based innovation (Andersén and Ljungkvist, 202), as well as creating bonds, trust, social relations, and a team spirit between employees enabling employee satisfaction and commitment. Such strategies and structure have enabled employees to initiate new ideas resulting in new product and process innovation thereby bearing fruits. These ways they effectively and efficiently manage their internal resources for innovative capacity (Sirmon et al., 2007; Carnes et al., 2017). Company F a successful shortbread manufacturer in particular engaged in an external collaboration effort for innovative packaging design that generated strong financial success for the company, and the idea came from an employee who simply suggested it to the team. This is because this company have shifted from a hierarchical culture to a flat culture enabling them to be more open to others' ideas and encourage them for innovative ideas and behaviours. Due to high interactions, employees increasingly support each other to cover the shortage of resources. This helps boost employee morale and create employee engagement leading to discretionary effort. It seems employees in many of these firms interviewed do not necessarily work just for a pay check or promotion but work on behalf of the firm's goals. The employees have care, which is why they are engaged and willing to go beyond their job description. For example, during the interview with Company I, a smoked-salmon SME, the general manager discussed that because they have only one person running the NPD, they therefore seek help from the rest of the organisation. For example, the NPD person sometimes seeks to obtain feedback from colleagues in other departments (in marketing and sales) concerning tasting flavours of new sauces. Even though those colleagues are not experts or qualified to provide adequate feedback, nevertheless, they are able to support them.

There is therefore an element of co-working and support. Employees not only actively look for new product ideas but, some of the mid and operational level managers and front personnel also for explore continuous business and technology improvement in general, to create and maintain competitive advantages (Deligianni et al., 2019). This means they dedicate time to research and explore new opportunities and share with the rest of the employees, for example attending away days once a month to spot new and trendy ideas in the market both for product and process innovation (attending conferences and tradeshows), or even if they are at a non-work-related social event that they come across new knowledge or ideas that might be useful to the company they keep a note of that information and share with the rest of the employees. All of this help many of these SMEs better manage the lack of human resource capital. They

overcome shortage of resources through combining and deploying current resources in ways that create value (Sirmon et al., 2011).

5.1.4.2 Focus on productivity & efficiency

Many of the firms in this study reported the importance of efficiency and productivity to improve business. Since they are resource constrained they create efficient processes in the business in order to save time, costs, and resources, and increase productivity. They introduce processes that enable the business to operate efficiently and productively thus offering customer value and gaining competitive advantages. They resource orchestrate for process innovation efficiency (Sirmon et al., 2011). They do this via automating processes and workflows, delegating tasks, and introducing lean methodologies.

Many of the firms in this study automate processes and workflows for manufacturing efficiencies and productivity. Although automation has high upfront costs and effect employee jobs nevertheless many of the companies access large grant money along with their own patient capital i.e. profit from the business to make the business processes more efficient that bears fruit long-term. Therefore, it is a long-term strategy suitable for many of the firms in this study (Sirmon and Hitt, 2003). Company F making shortbread describes a personal desire to automate processes and workflows to achieve efficiency:

"There is more personal desire for us to be more innovative, where processes in the factory to make those processes more efficient, to reduce costs so we can be more competitive in the market and have additional sales." (Operations Director, shortbread manufacturer)

Because many of these firms operate in a very price-sensitive market it is important for them to maximise their competitive edge by being as efficient as possible. Some describe due to the pressure from customers pushing down prices, to offset lower prices they automate to gain more efficient processes and thus reduce costs. Thus, customer relationships can be a driver to invest in process innovation. Company M also making shortbreads explains:

"…we have taken price reductions from our retailers and price they pay us, not the £1, they pay us a price which allows them to. We have accepted some price at [a] reduction in order to retain the business, we have a margin reduction, and we try to offset that through efficiency."

In addition, some of the firms in this study engage with Scottish Manufacturing Advisory Services (SMAS), part of Scottish Enterprise, a leading business support organisation that provides training and support concerning manufacturing processes that have been extremely

helpful as the training has helped many of these firms' employees to better work with the complex and advanced manufacturing machine processes. Although the figures are still low the Context Chapter discussed some engagement for skills development from the food sector. This is important as the sector is facing shortages of skills and recruitment.

Apart from automating processes and workforce for efficiency and productivity, owners, and senior managers of some of these firms trust the teams to accomplish their jobs, they, therefore, delegate tasks to the teams and encourage autonomy. This way the owners can focus on other things of the business that may be more important without worrying too much. At the same time, employees / team members learn to grow within the business and take responsibility and initiatives. Company J, a family business SME with less than 50 employees for example have delegated tasks to other teams and trusted that they take responsibility and initiatives to accomplish the jobs, while, the owner focuses on other things of the business thus being productive and efficient. During the interview he explained:

"He is operations, he became an operations director and freed me to do more MD work with my dad doing more sales & account management. Our operation has grown vastly it is such a big organisation that [I] and Craig work hand on hand, with good support from people like Karen and [the] operation manager … Karen's done good innovation recently with our food waste to be eco-friendly."

Some of the manufacturing firms in this study operate with lean methodologies in order to increase productivity (Achanga et al., 2006). While lean manufacturing was mainly inspired by Toyota production systems, some of the firms in this study reported implementing it as a strategic weapon to build competitive advantage. Due to the shortage of resources, many of the firms in this study encourage employees to strategically identify new opportunities and practices that would help the business save money and enable building competitive advantage. Through their agility and getting management support and commitment, some of the SMEs from this study explained implementing lean practices across the organisation. They have management on board with productivity improvement ideas, and also minimize financial commitment through their business networks thus implementing feasible practices which are within their control and manageable with limited resources. Company B a leading pastry and bakery SME with around 200 employees explains how the leadership and management are keen to push the business forward and as a result embrace and reap benefits from lean practices. During the interview with a non-family managing director, he explains,

"…we have recently delved more into what is essentially lean manufacturing … we also spend [and] invest quality time in terms of staff training particularly in terms of lean manufacturing … so we've provided some training, I went to Strathclyde university to do some lean manufacturing training as well. That was useful too."

Unfortunately, those businesses with owner-managers who lack tactful management know-how were hindered by the lack of strategic leadership traits and thus did not invest in formal lean concepts. Nevertheless, implementation of lean manufacturing has been voiced by participants to build a stronger foundation for success through reducing costs and improving the use of resources, which are valuable to many SMEs. In line with this, research finds a positive association between SME leadership and management and implementation of lean manufacturing (Achanga et al., 2006). A study by BDO (2018) highlighted food businesses now see increasing productivity as an important priority and the Scottish government has already supported many SMEs improve productivity, resilience, competitiveness (see Context Chapter).

5.1.4.3 Nurture employee practices

Existing employees are important resources for resource-constrained firms. Many of the firms in this study reported their long-term approach to business allows them to create long-term relationships with employees that is why they invest in training and development. Long-term commitment coupled with superior training, active participation of employees concerning decision-making and a flat culture enable many of these firms to nurture staff practices helping to get the better of human capital resource constraints to innovation. Such practices over time allow greater tacit know-how leading to specific or new knowledge only available to individual firms i.e. difficult to imitate making it a valuable resource (Hit & Ireland, 2002) which some participants discussed "resource leveraging" to offer better product and service quality to customers, and in the development of process and product innovations. To put this into perspective, their organisational structures enable better coordination and input concerning customer-oriented innovation (Sirmon et al., 2011; Carnes et al., 2021). Employees are better nurtured with a better flow of information among them to create higher-value innovation for customers.

With the development of technology in manufacturing such as automation, robotics, and lean methods, as well as increasing food safety and hygiene concerns, many firms in this study provide superior training for staff. Directors, managers, and employees are diligently given to training so that they are well trained, upskilled, and fulfil their tasks more effectively and

efficiently due to the market changes. Research on SMEs has identified a positive relationship between upskilled employees and innovativeness (Whittaker et al., 2016).

With the long-lasting connection with the business support community, many of the firms are able to obtain financial and technical assistance to train and develop the workforce (Pergelova and Angulo-Ruiz, 2014). Participants discussed regular engagements with local organisations and associations concerning technical, practical or job-specific skills, health and safety, and leadership and management skills. Due to remaining close to local communities some of the firms have also been able to access grants for training concerning experiments and research outside of daily tasks to attain new skills or obtain new knowledge or characteristics to better manage market changes. Managing director of Company B, a leading pastry and bakery brand in Scotland participated in a course at a local university concerning lean manufacturing with the aim to spread and promote that knowledge and thinking across the entire workforce to achieve higher productivity. In addition, they have been bundling both financial and technical assistance from a number of local organisations in the community to train and develop their workforce, to not only improve existing knowledge and skills but also attain new ones, and at the end, he concludes that investment in training is not merely for growth but also security. He explains,

"[We work with] Scottish Enterprise, SMAS and Scottish Bakers because they do a lot of training, AFRC, Motherwell college in terms of training and development … We have tried to expand innovation and change into some of our staff's thinking as well. So we've provided some training, I went to Strathclyde university to do some lean manufacturing training as well … its personal development and development for the company … the innovation investment and training are not purely for growth, it is also security as well … employment and education are key to success for everybody, government, employers, and people."

This company has been active with the local community to obtain support for training and development. As the MD discussed that employment and education are key, they enhance training concerning innovation with formal education for both the development of the company and personal development. Company R in the bakery sector also pursued a similar approach and during the interview with the technical manager, she explained,

"...there are about 120 people [here] doing training at Scottish Bakers and other things. We try and do lots of training with people so it's not just for our benefit but also for the people that work here too". (Technical manager, pizza manufacturer)

Such investments enable these firms to retain valuable capability enabling long-term stability and continuity. Through this they can combat recruitment issues and shortages of skills facing the sector and outcompete competitors. This strategy is not purely considered a corporate

citizenship behaviour yet an opportunity to manage shortages of resources and build competitive advantage (De Massis et al., 2018; Sirmon et al., 2011). The Context Chapter (Chapter 2) discussed shortages of skills and training in the food sector, nevertheless, data in this study suggests some firms actively connect with business support organisations and associations to obtain support for training and skills development. The business support organisations, particularly Scotland Food & Drink as part of Ambition 2030 chose innovation as a growth pillar to remove barriers to innovation and make valuable resources more accessible to SMEs. This will also help increase productivity in the sector, as Scotland is behind compare to peers.

Concerning active participation of employees in decision making and a flat culture, participants explained employees openly communicate and feel deeply invested making them more likely to participate in training, conferences, exhibitions, and the likes to help advance the business and themselves. Employees participate in regular meetings to exchange information which is a valuable opportunity to voice opinions on training and development, or alternatively, employees can simply approach a manager about a training course they would like to attend to improve and upgrade their skills. Because they are doing the hands-on work, they, therefore, are better informed of the training and development needed to better function, thus, their high involvement in the business and the flat organisational culture enables autonomy and self-initiatives leading to increased training and development. For example, company B a successful family business in the bakery and pastry sector explained,

" …We have regular sessions, meetings, team briefings we also have a listening group where we give people at all levels of the business an opportunity to exchange information. Some people turn up do their absolute best work hard make good products, that's where they see their own [work] done, whereas others would come to their manager and say you see that machine I think if we had done this or that or if you send me on a training course I want to learn about how we do this".

Bundling and nurturing practices to develop and empower employees in the organisation is an important strategy to gain competitive advantages compensating for many of these firms' human capital constraints and enabling for spotting and engaging with innovation despite lack of resources (Sirmon et al., 2007). Given the struggle of recruitment and shortage of skills (See Context Chapter) training and employee development play important roles in the sector.

5.1.5 Analysis and Interpretation

Leverage external network and community support

The resource orchestration theory (Sirmon et al., 2011) considers 'acquiring' resources as part of resource structuring but does not consider firms with limited resources who are often unable to 'acquire' resources. Since SMEs may not internally develop or externally acquire required resources, they seek different and strategic ways to 'access' resources as part of their resource orchestration for innovation (Mirkovski et al., 2023; Lasagni, 2012). Therefore, this suggests accessing is central to the understanding of resource orchestration in SMEs, which resource orchestration theory overlooked. Thus, findings contribute to the resource orchestration theory's structuring subprocess to also include access resources, particularly in the context of SMEs. 'Accessing' is a feature relevant and important to SMEs to obtain the required resources since they are constrained for innovation. It also highlights the impact of external resources and relationships on SME innovation and how SMEs manage these resources (Mirkovski et al., 2023; De Massis et al., 2018, Lasagni, 2012). Additionally, the finding here also responds to a recent call concerning achieving a competitive advantage despite a lack of resources (De Massis et al., 2018).

The findings in this section highlight how firms with limited resources can innovate, by leveraging on external networks and community support. Firstly, it showed firms here engaged with the business support community to access funding, knowledge, advice, information, and referral support which enabled them to develop process, organization, and product innovations. While there are mixed results about the impact of business support services on SMEs (Mole et al., 2017) it was found here that the business support community plays an important role in the development of innovation in low-tech SMEs since they offer key resources (De Martino and Magnotti, 2018; Mole and Capelleras, 2018; Cadil et al., 2017; Kosters and Obschonka, 2011).

However, what is interesting was that low-tech SMEs were account managed by a leading business support organization. They were assigned to an experienced and knowledgeable account manager who had a very good understanding of the account managed companies, markets, and industries and have been working together for over 5 years or more already. The account managers often identified and assessed new business opportunities and the resource and capability needs of their clients. The relationship enabled account managers to strategically

critique and challenge the firm's innovation and growth capabilities and helped owner-managers to obtain direct funding, and knowledge, or engage in favourable transactions that do not incur high market costs which encouraged owner-managers to innovate. Focusing on account managers was an alternative way to access required resources. The finding showed SMEs can leverage external resources and capabilities for innovation on demand through their business support community account manager and without having to engage in long-term partnerships that need them to have some resources and assets that are valuable to partners (Mirkovski et al., 2023; Bradley et al., 2011; Narula et al., 2004). With the provisional support of the service offered by account managers who often acted as co-orchestrators together with the owner-managers for complementary external resources, low-tech SMEs overcame resource constraints and successfully engaged in innovation activities. This finding is important because studies highlighted managers often lack capabilities and knowledge which may often hinder SMEs from pursuing innovation (Mirkovski et al., 2023; Haddoud et al., 2021). This is a key finding for innovating with limited resources and perhaps suggests having a well-developed business relationship with experienced, knowledgeable, and trustable external account managers who have a very good understanding of their client's needs is a key and liability-free external contact or "co-orchestrator" for SMEs enabling them to 'access' valuable resources to structure and bundle their resource portfolio for innovation without having to engage in long-term partnerships. This finding is similar to a recent study that found small firms can leverage external resources and capabilities through short-term contracting of professional service firms (Mirkovski et al., 2023) but they did not focus primarily on innovation and the role of account management.

Engage with local universities and research centres

Current research has mainly examined how managers resource orchestrate within a single firm to develop capabilities (Sirmon et al., 2011), however, how resources might be orchestrated in contexts where firms engage with external companies to 'access' resources or 'co-develop' capabilities is overlooked. This responds to calls to understand resource orchestration in unique contexts (De Massis et al., 2018; Carnes et al., 2017), and found SMEs 'access' resources and or 'co-develop' innovations with science-based actors as a result of their lack of R&D resources. Access and co-develop can be a subprocess and phase in the structuring and bundling process of resource orchestration (Sirmon et al., 2011) suitable to SMEs who may often co-develop with other actors due to shortages of internal resources. Resource

orchestration process by Sirmon et al. (2011) refers to resource management in a single firm context, whereas the finding here focused on resource orchestration in SMEs and found co-developing resources and capabilities thus involves subprocesses apart from only within a single firm context as presented by Sirmon et al.

It was found that the growing engagements with local universities and research centers played a role in innovation in SMEs (De Massis et al., 2018; Nieto and Santamaria, 2007), particularly in terms of product and process. The locality and proximity facilitated personal interactions leading to contract or collaborative research, short-term consultancy projects, access and use of facilities and equipment, as well as some professional education and training. Interestingly, a couple of Scottish universities had a separate food innovation department. These channels created tacit knowledge which was likely more important where absorptive capacity was lower (Hewitt-Dundas, 2013). Engagements were mostly ad-hoc on-demand and opportunistic, but they were growing as a result of a broad range of new scientific approaches and technological opportunities (Menrad, 2004) such as process automation, advanced food processing, and packaging methods (Fatima et al., 2022), growing and new consumer needs (Bigliardi and Galati, 2013), changes to the regulations (Ranieri and Silvestri, 2006) , and surprisingly some due to internal desire (von Hippe, 2005).

Research centers provided support for incremental and radical process innovation and improvement, whereas universities mainly provided product innovation support such as product tasting and flavor reformulation (reduce salt/sugar) where some were considered incremental innovation while others radical or new to-market products (Hewitt-Dundas et al., 2021). The heterogenous and diversity in their collaborations compared to their usual closeness to market and customers enabled SMEs to develop higher quality innovations going beyond their usual incremental innovations. Diversity in collaboration also allowed identifying new opportunities and pushing technology boundaries. The finding is important as local universities and research centers appear increasingly relevant to innovation in low-tech SMEs helping them to drive process innovation and new-to-market product innovation (Hewitt-Dundas et al., 2021; De Massis et al., 2018). Although the role of the market took a major role (Lefebvre et al., 2015), and studies highlight the incremental nature of innovation in SMEs (Baregheh et al., 2016; Oke et al., 2007) and the food sector (Presenza et al., 2017; Lefebvre et al., 2015; Baregheh et al., 2014, 2012), nevertheless, some firms growingly engaged with local science-based actors, where at times led to developing radical innovations.

This way they leveraged external resources and capabilities for tacit knowledge and innovation on demand when necessary and without having to enter strategic long-term partnerships for codified knowledge, enabling them to overcome resource, language and cultural barriers to innovation which often hamper SMEs, particularly in the low-tech sector to engage with science-based actors (De Wit-de Vries et al., 2018; Presenza et al., 2017).

Leverage social capital

Managers here leveraged social capital to access resources and capabilities from personal contacts and friends, trade associations and third-party networking, as well as customers, and end-users to structure and bundle resources for innovation. This shows managers' role and action to access required resources to successfully compensate shortage of resources important to implement innovation, particularly in SMEs. This is a response to Sirmon et al., (2011) who called for how managers' external social network and the social capital embedded with those networks affect their growth strategy.

With regards to personal contact and friends, data showed they tapped into those close contacts to receive word of recommendations and advice and access to certain resources regarding product tasting. Friends and personal contacts were considered trustable contacts (Leana & Van Buren, 1999). With regards to trade and business associations and third-party networking, SME owner-managers discussed actively attending trade and business association events. They paid a small membership fee but accessed key resources such as funding, picked up new customers, and found new business partnerships for NPD (Brüderl and Preisendörfer, 1998; Davidsson and Honig, 2003; Casson and Della Giusta, 2007). Data thus suggested the importance of associations for SMEs' business development, and in particular, findings confirm research that describes business associations as valuable tools to stimulate inter-firm cooperation (Newbery et al., 2016). Surprisingly, business associations created innovation collaboration opportunities that occasionally led to radical and new-to-market product innovations. This is an important finding and suggests informal knowledge sources and events can stimulate radical innovation, a finding that the literature has not effectively recognized as a source for radical innovation. This way SMEs manage resources for innovation.

Findings showed suppliers leverage their social capital with key customers to tap into their network for innovation and new products (Yli-Renko et al., 2002). This created new opportunities for suppliers to develop new products and capabilities for customers. Research discussed this concerning high-tech firms (Stam, Arzlanian, Elfring, 2014; Yli-Renko et al., 2002) but there is less work on low-tech firms (Bandera and Thomas, 2019). This may be because social capital correlates greater with performance in environments where there is uncertainty and knowledge are rapidly changing (Stam et al., 2014), which is more attributes of the high-tech sector than the low-tech. Nevertheless, this study found social capital is important and managers actively leverage that to obtain required resources for innovation.

Interestingly, findings showed some of the suppliers leverage social capital and take trips with their customers for new product ideas. They visited international markets to spot new and unique ideas for product innovation. This offers the opportunity for product differentiation and enhances market competitiveness (Santoro, Vrontis, Pastore, 2017). Travel is a significant finding that is not given much attention in SME research. Travel can be a valuable external source of knowledge and innovation capacity suitable for firms with limited resources. Both the supplier manager and customer can identify new opportunities, assemble and orchestrate resources and exploit those new opportunities for innovation. Additionally, not many suppliers can travel with their customers. The close relationship may also be a valuable resource unavailable to other firms, it also provides SMEs with access to better quality information and customer voice in NPD (Fidel et al., 2018), particularly in the identification and ideation phase of NPD. The close working relationship can also create an emotional bond during the innovation process (Liao and Welsch, 2005) valuable to firms with limited internal innovation resources.

Firms also leveraged their social capital with their end users to access resources for new products. Due to a lack of R&D resources and departments, SMEs here obtained quick feedback from consumers concerning recipes and flavors at focus groups or from their followers on social media channels such as Facebook and Twitter for innovation (Palacios-Marqués et al., 2015). SMEs here strategically used their online social networks to connect with their online followers to obtain new ideas, share their thoughts, receive feedback, and gather direct market intelligence as part of structuring and leveraging their resources for product innovation. End users have not been considered in the resource orchestration process previously. This is particularly important for SMEs with limited resources to orchestrate and

tap into end users and internet-based resources wisely to support innovation. This may therefore suggest online social networks can be considered a source of competitive advantage and innovation for firms with limited resources. Findings here support previous research that suggests online social network can improve innovation capacity and performance (Palacios-Marqués et al., 2015).

Pursue customer-centric incremental innovation

Findings showed firms with limited resources pursued customer-centric incremental innovation. Studies highlight the importance of customer for innovation in food SMEs (Laforet, 2012) as they provide feedback to better meet their needs (Bianchi et al., 2010). It was found in this study that firms regularly refreshed product offerings, actively exploited market information for new opportunities, and leveraged closeness to customers as part of their product innovation strategies with limited resources. However, this highlights much of the new products were not actually "new products" as such but rather variations of existing products. For example, the flavour was new or the shape and packaging of the products were slightly different highlighting incremental product innovation (Baregheh et al., 2012; Laforet and Tann, 2006; Oke et al., 2007). They did not develop new products themselves rather brief and specification for new products were provided by their customers. As a result, they heavily relied on customer instruction for product innovation. This suggests customers are central to the understanding of the drivers of product innovation in low-tech SMEs and that they are almost always incremental in nature. While research suggests high dependency on customers carries certain risks (Fischer and Rueber, 2004; Raymond and St-Pierre, 2004) customer-centric incremental innovation can be affordable for SMEs with limited resources.

To reduce their vulnerability and consider their limited resources, findings also showed that apart from customers providing specifications for new products, SMEs in addition relied on their own market research and analysis. They often analyzed secondary sources and travelled to local and international markets to search for new and trendy opportunities for new product concepts and ideas. This was also perhaps partly driven by their ambition for growth (Mosey et al., 2002) and partly by their strong emphasis on product quality and product innovation to increase competitive advantage in a mature sector characterized by the need to offer a differentiated and innovative range of products to overcome market saturation (Giacosa et al., 2017). Conducting secondary research and attending away days for product innovation was at

the expense of the lack of formal marketing and R&D capabilities, confirming previous research that found food SMEs are not able to invest heavily in internal R&D activities (Santoro et al., 2017; Capitano et al., 2010), and reduced some of the dependency on customers. The concept of attending "awaydays" and "travel" are not adequately acknowledged in the literature as external sources for innovation, however, they are the way of doing things and important innovation capacity for low-tech SMEs.

These ways SMEs were still able to innovate with limited resources and interestingly perhaps balance or counter some of the impact of customer dependency and lessen their vulnerability. These findings are important because they show strategies for innovation with limited resources but also reduce the influence of major customers and reduce vulnerability. Thus balancing the need to innovate and manage customers. The findings show innovation management with customers in a specific sector.

Lastly, the findings also contribute to resource orchestration (Sirmon et al., 2011), showing that to structure resources for product innovation SMEs access new product specifications from customers, access secondary sources online, and travel as part of resource orchestration with limited resources and with dominant customers. This suggests as resource-constrained firms they avoid acquiring resources (acquire is a structuring process of resource orchestration theory) for new product development ideas but rather seek entrepreneurial ways to access them with less costs. The findings also respond to previous research on resource orchestration for innovation in small firms (De Massis et al., 2018; Carnes et al., 2017).

Optimize on internal resources and processes

This section found important aspects of the management of internal resources that strengthened their innovation. For example, they heavily optimized internal knowledge assimilation and utilization for innovation and leveraged on empowerment approach (Maes and Sels, 2014; Vermeulen, 2005). In practice, this meant many of the employees were not directly part of the innovation team or were not specialists, but they belonged to the "wider team" where their knowledge and skills were important and utilized through the innovation process. A high degree of internal knowledge transfer and integration capability drove innovation as a collective approach (Maes and Sels, 2014; Collins and Smith 2006). This meant every member was highly involved to combat shortages of resources and skills for innovation (De Massis et

al., 2018). This suggests resource orchestration as a team effort for innovation in the structuring, bundling, and leveraging process, rather than only focusing on top managers as orchestrators suggested by Sirmon et al., (2011). The flat structure and lack of resources created complex interactions between various actors including interactions with customers for innovation (Cui and Wu, 2016; Coviello and Joseph, 2012). This allowed teams to optimize internal resources and processes to overcome shortages of resources. This finding supports previous research that found firms orchestrate resources for team-based innovations highlighting interplay between teams, external customers, and top management (Andersén and Ljungkvist, 2020).

The cross-departmental arrangements, high involvement of employees, and on-the-job learning, together with a focus on productivity and efficiency orientation created internal knowledge sharing and flow practices for innovation-coordinating capability. The knowledge-sharing and diversity of resources from different departments created valuable routines for exploitation for innovation activities enablee firms here to reduce costs and achieve competitive advantage in the short-to-medium term. However, the flat structure brought by their organizational size also created opportunities for employee participation in firm issues related to both HR and strategy where employees often informally voice their entrepreneurial and innovative ideas for knowledge exploration. The role of the knowledge management process in firms here as with most SMEs was informal but deliberate and strategic (Becker et al., 2015) and importantly teams were responsible for joining capabilities and additional training if needed. A big aspect of training involved on the job learning in the form of tacit knowledge which is typical to SMEs in the food sector (McAdam et al., 2016). This way the teams resource bundled. Findings also showed the engagements of team members with the customers' new product development focusing on customization and providing samples to customers for feedback, where new information and insight were shared and coordinated to then be deployed by the team.

This highlights that resource orchestration is key to the understanding of internal innovation capability in SMEs as a team and self-managed, as well as engaging with customers. These ways SMEs not only optimized internal resources and processes for exploitation innovation but also nurture employees to overcome resource constraints to innovation and build up long-term competitive advantage (De Massis et al., 2018).

5.2 Findings and discussion 2: Innovation in dealing with dominant customers

5.2.1 Introduction and overview

The Context Chapter highlighted issues with regards to the food supply chain (see chapter 2 more details). However, this section focuses on the actions of the Scottish food SMEs concerning strategically dealing with dominant customers to undertake innovation before the following section to examine the influence of family business culture on innovation. Given the scarcity of research into low-tech SMEs in dealing with large customers on innovation, this chapter seeks to advance knowledge by addressing the following research question: *How do low-tech SMEs undertake innovation despite customer constraints?*

This chapter is structured to demonstrate the distinctive strategies that resource-constrained firms undertake when dealing with dominant customers on innovation. First, it discusses how they master specific and niche markets, revealing their focused strategy on nicheness to lead their narrowly defined markets with high-quality product and service innovation thus achieving competitive advantage. Second, it examines their pursuit of customer alignment revealing their customer customisation, investment in capability building, and their long-term relationship and partnership with customers as ways to balance power dynamics. Third and last, it explores the pursuit of multiple routes to market to reduce dependence on a single/a few large customers for sales. This chapter demonstrates the importance of these three strategies in enabling SMEs to overcome their customer constraints and foster innovativeness. Consequently, they lead their markets through innovation and establish continuity and stability long-term.

Concerning the analyses, this study has followed the Gioia methodology to offer 'qualitative rigour' while maintaining the creative, revelatory potential for generating new concepts and ideas (Lincoln & Guba, 1985; Gioia et al., 2012). This study follows inductive research and employs a systematic conceptual and analytical discipline to provide creditable interpretations of data and theory building followed by robust conclusions.

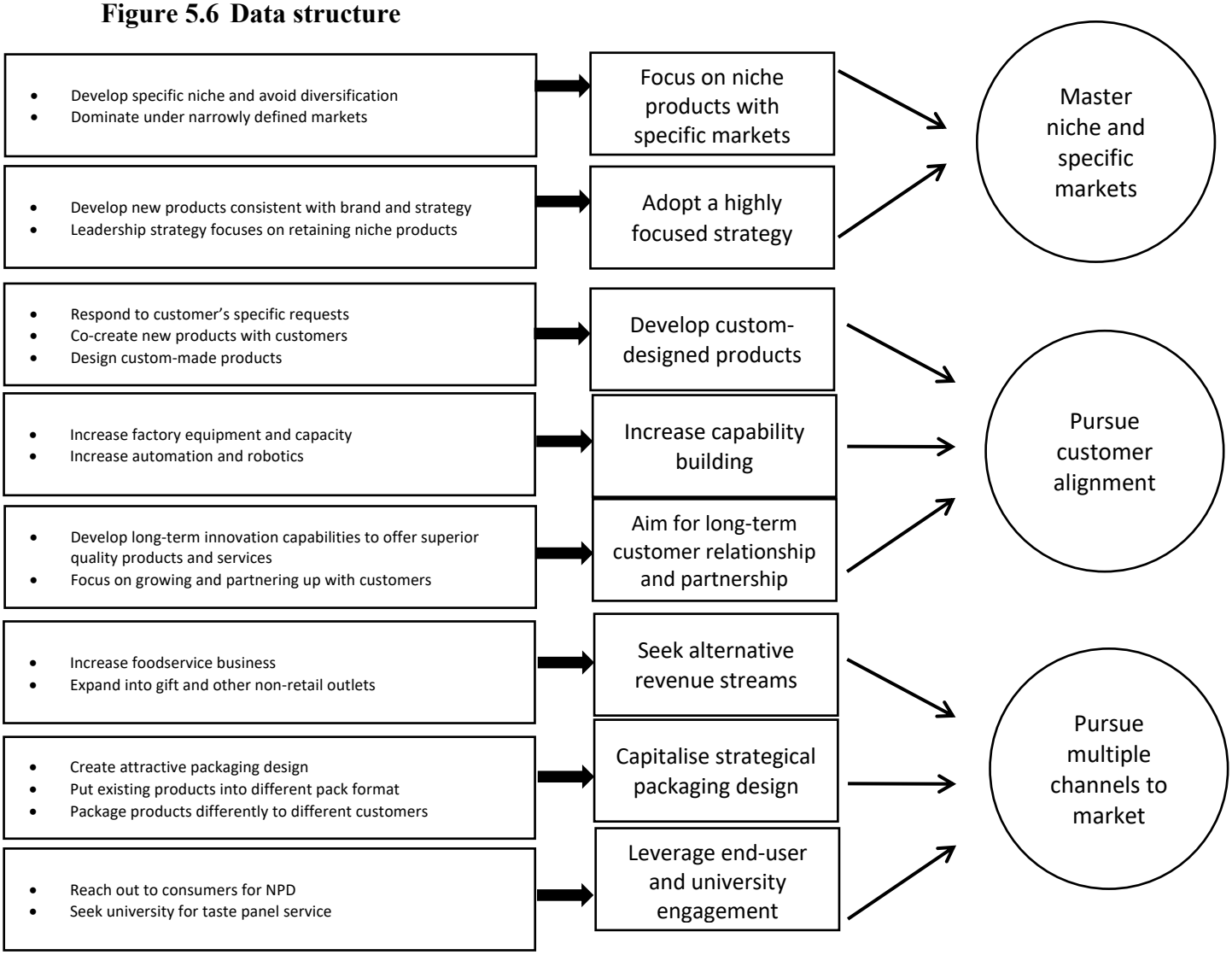
The systematic presentation of evidence follows a "1st order" analysis (i.e., an analysis using informant-centric terms and codes) and a ''2nd-order'' analysis (i.e., an analysis using researcher-centric concepts, themes, and dimensions) as well as "aggregate dimensions". Combined, enabling reporting of participants' voices along with the researcher provides

qualitative robustness of the bridge between data and induction of 'sense-giving' (Gioia et al., 2012) but also for new insights that are in line with high-quality qualitative research. The data offered many 1st order categories from the interviews but as the research developed, patterns started to emerge among the categories (comparable to Straus and Corbin's (1998) axial coding). However, the 2nd-order analysis which moves from the participants' voices to the theory realm enabled it to suggest concepts from the theories that describe the phenomena, before distilling the emergent 2nd-order themes further into aggregate dimensions.

Figure 5.6 below is the built-up data structure representing the full set of 1st order concepts, 2nd order themes and aggregate dimensions for research question 2. The data structure visualises the data to better demonstrate how the raw data has progressed to terms and themes in conducting the analysis showing robustness in the qualitative research work (Tracy, 2010; Gioia et al., 2012). The iterative process of coding and theme building as well as engaging in discussions with principals of the research (e.g. supervisors) has helped better develop interpretations. On one occasion a couple of transcripts were coded by supervisors. Below, findings from the analysis of perspectives of participants for research question 2 is included.

RQ2: How do low-tech SMEs undertake innovation despite customer constraints?

Figure 5.6 Data structure



5.2.2 Master niche and specific markets

5.2.2.1 Focus on niche products and markets

Customers are extremely important to these firms. These firms do their best to keep business continuity with customers. They, therefore, focus on niche and specific markets enabling them to lead their focused and specific market concerning innovation while limiting investments needed. Through this, they become experts in their specific market and create efficiencies enabling them to offer products and services with quality, cost-competitiveness of innovations and customisation. Such strategy may not require complex systems and processes nor additional financing sources resulting in efficient resource orchestration (Sirmon et al., 2011). They, therefore, focus on what they are good at thereby generating competitive advantage.

Results revealed that manufacturers from producing shortbreads, and oatcakes to sausages, and fish all focus within the core of their business model and do not deviate much from that enabling them to continually innovate despite constraints. Some of them have managed to remain top brands for many years. For example, an oat producer has been producing only oat products over 125 years. While they have not diversified out from their niche in a traditional sense, they have had high innovations in adopting and increasing their product range to satisfy the growing consumer demands. The leadership strategy focusing on retaining oat products had made them the largest producer in the UK. During an interview with Company K, the NPD manager/ director explained:

" I suppose the first thing [in developing a new product] is having oats. So as to always have oats. I cannot develop products here for us if it doesn't have oats. That is the number one ingredient ... as it stands just now that's our point of difference. What's good is that touch wood there are not a lot of other companies out there doing that. I think they just left us to do what we want to do" (Firm K: NPD manager, oatcake manufacturer)

Company K has a resource advantage strategy (Sirmon et al., 2011) in leveraging capability configurations that produce high quality oat products. Targeting a niche market, company K has used oat ingredient that structured in capabilities enabled the best oat-snacks in the UK. Company K is like a big fish in a small and growing pond. They avoid too much distraction from their core business but keep a close eye on their market for faster and more effective responses to customer requests and changes in the market. Their size and lack of resources can offer higher flexibility. Due to niche focus and specialisation along with their close eye on the market to effectively respond to customer needs and market changes including undertaking

ceaseless innovation enables many of the firms to achieve sustainable competitive advantage and thus stronger bargaining position in the market (Yli-Renko and Janakiraman, 2008; Ahern, 2012; Audretsch et al., 2018). Being niche and specialised help them to invest in narrower set of resources and processes and develop efficiencies leading to keeping costs low yet their closeness to market forces constant update of products to meet new trends and consumer changing demands to remain competitive hence achieve both cost leadership and differentiation strategies through their resource orchestration (Sirmon et al., 2011). Their strategy consistently provides high quality and captures a relatively high share within their narrow focus markets. They are more attractive to customers and gain stronger bargaining position (Ahern, 2012).

Company P in order to grow and expand moved away and divested from supplying to 200 hotels and restaurants to focus on a handful of supermarkets with over 3000 stores across the UK. They have much less overheads and far better geographical reach. However, they kept 30% of their business with food service. During the interview with the founder of the company, who has established a high-quality brand in the UK it was discussed that in order to survive they had to be a bit different than just a meat supplier, thus they specialise in niche products and markets yet achieve a large percentage of their narrow markets, the founder explained:

"If we are simply making a sausage or a burger or a pudding, which are big UK products, we would not have survived, if we were just a meat supplier with my name on it, it had to be a bit different … we have spent a long time, we are number one in the UK selling haggis. It is only a £5m category, so it is not that massive, but we have 70% of the market. We are UK's number 2 selling black pudding [we have 30% of the market], £15m pounds product and selling really well" (Firm P: Founder, meat, haggis & black pudding producer).

This company moved away from serving way too many customers as part of resource structuring i.e. divesting (Sirmon et al., 2007, 2011) to a handful of supermarkets yet at the same time specialised in niche products and dominate those narrow and specific markets with regards to innovation. He further explained:

"So these products are very good for us and we realised that we would like to narrow our SKUs [stock keeping unit] and take a bigger presence in bacon and black pudding and sausage" (Firm P: Founder, meat, haggis & black pudding producer).

Because of niche focus and narrowing markets (Simon, 2007) they can focus more on the customer offering higher value, they master their product quality due to nicheness and exploit innovation. At the same time, they leverage their brand and expertise to expand and innovate into trendy niche markets "vegetarian haggis" to not limit growth opportunities and further provide value to customers. They, therefore, leverage their brand, quality, and innovativeness

in negotiation with large customers, and deploy their capabilities to exploit new opportunities as part of their market opportunity strategy (Sirmon et al., 2011). The founder explained a recent negotiation on a new product with a large customer:

"…we can get a nudge with customers and say to them we are thinking about this, some of them would say, bring that to me first, don't take it to anyone else, I will give you exclusivity on that, I will list it, but I want 6 months on my shelves, but it can't be on Aldi or Lidl. Aldi would say we want that, but we don't want it on Lidl and we would say, okay, but we need you to guarantee that you would list it in 300 stores. Yes, we will do that, that's fine, a deal." Firm P: Founder, meat, haggis & black pudding producer).

Their niche and high-quality products created wider reputation with customers giving them more negotiation power. Another company, Company A, which only focuses on processing smoked salmon, have had similar success. This company has pursued niche strategies including product specialisation in specific markets enabling them above average returns and competitive advantage. During the interview with both the NPD manager and the production manager they explained:

" [The company] started with niche smoke salmon business ... We work with States, Canada and far East, we work with Australia currently. What we want to do is working with top tier retailers in those markets, that's a nice niche for us, traditional Scottish smoke salmon in those markets." (Firm A: Production manager, smoked salmon producer)

This firm has been able to leverage traditional Scottish smoke salmon i.e. differentiated products appealing to certain customers / markets. Firms like K, P, A and the likes offer niches enabling them to be isolated from other players in the market thereby serving narrowly defined target segments. However, Company E, producing pate for 30 years and making profits from their niche has had business taken away from them recently by a bigger company who does other products too. During the interview, Company E explained:

"We built a small factory to make pate for retailers. We supply to Waitrose, Sainsbury, and Tesco … we develop [a] good relationship with the retailers we work for. We have been making these products for over 30 years … [however] 3 years ago we were probably the main supplier of the UK for retailers own label products, but a competitor came 3 years they obviously make other products so they are a bit more competitive. So that kind of took a bit of our sales away" (Firm E: innovation and marketing managers, pater producer).

Therefore, new competitors can enter niche markets if it becomes too profitable. To avoid this as much as possible many of the firms pursue continuous improvement of business capabilities to remain competitive and provide superior quality of products and services (Sirmon et al., 2011). Being niche focus and avoiding diversification may be valuable to resource-constrained firms which require their ability to manage and structure a narrower set of resources whilst also being more manageable making it easier to succeed in commercialising their customer innovations. They continually seek to identify gaps and niches not yet satisfied and thereby

exploiting them for their specific customers through innovation, leading to customer loyalty and overcoming the weaknesses of smaller resource portfolio. This niche approach has not only resulted in efficient resource orchestration and allowing them to dominate their specific markets with regards to innovation but also as experts in their specific markets and creating efficiencies they have been offering products and services with quality, cost-competitiveness of innovations and customisation thereby gaining reputation and collaborative relationship, related to innovation (Nijssen et al., 2012; De Massis et al., 2017; Carnes et al., 2017).

5.2.2.2 Adopt a highly focused strategy

The data demonstrated that the leaders and executives of most of these firms are highly focused on business strategy. Although they are ambitious and wish to grow the business, at the same time their success has been identified partly to their focused strategy (Simon, 2007). For example, participants discussed that to structure and develop new products or enter new markets they always assess whether the new products or markets truly represent their strategy and brands or not. They therefore wouldn't necessarily expand into other markets; they make sure the new markets are in line with what their strategy and the brand represent. Therefore, based on their focused strategy and goals, together with customer and specific market needs they orchestrate resources accordingly. The niche strategy and customer-oriented nature of these firms influence the innovation process (De Massis et al., 2017) and how managers manage or orchestrate resources. Particularly, before structuring the firm's portfolio for innovation they search and consider opportunities (Helfat et al., 2007) that are in line with their target market and the brand they represent as part of their resource management for innovation. This relates to the company vision for growth and innovation and thus influence resource management.

Company C, a successful biscuit manufacturing-brand explicitly explained that while they are a biscuit maker, they would not expand into the digestive biscuit market as it does not represent them. They have had success with their focused strategy for more than 30 years. The founder and family-CEO/MD explained:

"[For developing a new product] I think we would be looking at whether it's something that our brand really represents so you are trying to look at if it is on brand if you like. You wouldn't do digestive biscuits because it's not part of our DNA so you wouldn't like to do something that doesn't represent your brand." (Firm C: MD, biscuit manufacturer)

Rather than diversifying, many firms in this study have product specialisation through their niche focus. In fact, some of company C's products are UK's most favourite. The leadership and top management emphasise on a focused strategy. During an interview with the MD of company M another biscuit manufacturer who is the "shortbread guy" in the UK he highlighted a similar strategy as Company C above:

"[If we want to develop a new product we always ask] is it consistent with our strategy … we want to make potato-chips, we are not a potato-chips [company], ok well we can go and buy the machinery to make it, again is it consistent with our strategy and the market we are in." (Firm M: MD, shortbread manufacturer)

Two companies are leaders in their respective specific markets, they have high market shares. Their focused strategy has enabled them to establish successful brands in their respective markets giving them leverage against large customers. Company M for example is the number one shortbread brand in the UK explained:

"Being the number one brand helps. Most retailers want to stock number one brands … we have a secret recipe that allows us to be more competitive than them [competitors] … we already have 50% of the branded shortbread market. The shortbread is a subsector of a biscuit market so it's relatively small." (Firm M: MD, shortbread manufacturer)

Whilst company M is the number one brand, they are also competitive in terms of the retail price, the MD further explained:

"Price of butter has increased over the last few years significantly influencing manufacturers' margins but our shortbread is not butter shortbread which is why we are not impacted the same degree. It allowed us to hold our retail price at a pound per pack. We've held that for 5 years!" (Firm M: MD and Technical members, biscuit manufacturer)

Company M along with many others have pursued a competitive price strategy or 'fighter brand strategy' (this term was discussed in the interview) compared to competitors. The less complex systems and processes along with automating manufacturing create efficiencies and cost reductions enabling competitive advantage (Sirmon et al., 2011). They further attract customers and keep business continuity.

Company N, a 4th generation family-run business, the management has focused on retaining only ice cream for over 113 years. They have been going with only ice-cream products since 1908, however, they also actively adopt trends making them suitable for new consumers (e.g. vegan). Their focused strategy and adopting to new trends has enabled them to become experts in their niche offering higher quality products and services compared to competitors, which resulted in customers wanting to continue working with them and taking up new customers from competitors (Sirmon et al., 2011). In fact, customers travel far to pick up their orders.

Moreover, because of focusing mainly on one-product one-market, they do not require complex equipment and processes thus limiting investments. During the interview with the family director, he explained:

"Over 111 years … we use ice cream base for everything, so most of the stuff or new stuff we try out works out because we use the same base and the packaging is also similar … usually all of our products can be produced in 2 or 3 machineries there is thus no requirement for new machineries … we have a very good reputation … and we know we have good products … [customers] have to travel to us to get it, that's when we didn't distribute to anyone. Customers tell us how they had to travel all the way to us to get the ice cream" (Firm N, director, ice-cream producer).

Customers would travel far to pick up their orders from company N, even though they can work with another supplier with better access. Adopting a highly focused strategy enables some of the firms in this study to master niche products and services with regards to high quality and innovation thus creating competitive advantage.

Moreover, working with a focused strategy and niche products over a long-time enables these firms to build a strong internal human resource foundation to lead customers concerning innovation. company E who produces pate products only explains:

"We built a small factory to make pate for retailers. We supply to Waitrose, Sainsbury, and Tesco … we develop [a] good relationship with the retailers we work for. We have been making these products for over 30 years we have a good resourceful team who can lead them [customers] from development to launch". (Firm E, Innovation and Marketing members, pate producer).

All the team that works on customer projects have been with company E long enough that they have the right experience and knowledge concerning products to facilitate innovation (Sirmon and Hitt, 2005; Duran et al., 2016). They understand the business and customer needs very well. Company C also explains:

"[Company C name] employ more than 170 people, who all come together to produce beautifully crafted biscuits".

With their focused strategy, they overcome internal resistance. They share a vision and make it easier to establish a well-aligned and focused innovation strategy. This enables greater efficiency and competitive advantage. Also, the "not invented here" syndrome is less frequent among many of the firms here. They pursue flexible strategies by producing products based on customers' requirements (Bhide, 2000). Flexibility to respond to customers' requirements has shown to be an advantage for many of the resource-constrained firms in this study. Their operational flexibility has been identified with their skilled labour, particularly within their development team; they have technical resource who are able to work out new product development to respond to customer needs such as customisation and personalisation. Because

there is an openness and they all focus on the same goal together, where a strategy is accepted by all employees across departments and levels leads to better solutions and effective resource orchestration (Sirmon et al., 2011). Together, being focused, they pursue continual improvement and innovation both for the firm and the customer.

These firms not only are able to compensate for the shortage of resources through their strategy discussed in this theme so far, but also build a strong reputation, brand and customer loyalty with their target customer base. This way they look attractive to the eyes of their customers and use that strategically to gain more benefits in their relationship and exchange with large customers (Tanskanen, 2015).

5.2.3 Pursue customer alignment

5.2.3.1 Develop custom-designed products and services

These companies offering innovative products and services are able to build close relationships and pursue customer alignment on innovation. Building innovation-related capabilities in their niche attracts and protects close business relationships, linked to innovation (Lasagni, 2012; Nijssen et al., 2012). Customers trust these suppliers, resulting in potential partnerships making bigger and custom-designed products and business together (Cummins et al., 2000). Such close relationship and collaboration with customers help balance the relationship and power dynamic that exist in the relationship.

With regards to developing custom-designed products, many of the firms reported regularly doing this for their customers. As discussed under RQ1 Findings' *Leverage closeness with customers* that many of the large supermarket customers send their suppliers an innovation brief detailing their desired product innovation requests. Based on customer interactions whether through the brief, telephone or in person, many firms can develop custom-designed or bespoke products for customers to enhance business relationships and cooperation. Custom-designed products are often requested by the customers, but they are not exclusive in most cases. Customers might have seen something new in the market or from their own research suiting new trends, thus requesting their supplier to develop that product or concept for them. Company D explains how they respond to developing a product for a specific customer:

"From concept when [a] customer turns around and says here is what I like this is the product that I like and then what will happen the development chef will go and make that product." (Firm D, Finance and Production directors, food wholesaler).

SME S, a condiment manufacturer with leading sauce brands in UK developed a cheaper or as the MD calls it 'fighting brands' for their customer based on their requests, which he referred to that as innovation, the CEO explained:

"[Competitors] try to match certain products of ours, [they try] to come up with a cheaper version. We just say [to our customers] that is the specs for that brand, I am not prepared to move that but if you're looking for a fighting brand then we may come up with something else. That's where innovation come from, prices that might have cheaper specs." (Firm S: CEO, condiment manufacturer)

While making custom-made products for customers help develop stronger customer-supplier relationships yet customers can be forceful. However, in this case the CEO of SME brand S was not prepared to sell at lower prices but agreed to develop custom-made products suitable to customer with enabled company S to develop it with cheaper specification, in other words at a lower cost. This way some of the firms here manage their large customers.

Company J a family business also holds close relations with its customers and were able to offer a bespoke product based on customer requirement, the MD explains:

"…effectively that idea came from … conversation with [customer], they were looking for [an] alternative to the current menu and that was the obvious one that stuck out, came back it and ran with it all." (Firm J: MD, meat producer).

The MD who is in the top management in this family business, company J, have very good personal contacts with their customers as he regularly meets with them and often times himself takes a leading role in developing customers' product innovation (in this case recipes…see *6.2.3.2 Increase capability building*) which promotes a message to the rest of staff that customer orientation and integration is very important. The close customer-supplier relationship also allows customer feedback and integration as resource bundling (Van Echtelt et al., 2008; Sirmon et al., 2007, 2011) supporting the supplier development process enabling more effective bespoke products. Below company R working with a key customer took a sample of a potentially new concept or idea to their customer for feedback and if positive to then develop it further together, the technical manager said:

"We would probably take it to our customers and say to them if they would be interested in this product and if they say yes we can develop it further with them". (Firm R: Technical manager, pizza manufacturer)

The close business relationship allows a collaborative NPD process and resource configuration particularly related to development and design of the products. Managers or the owners of these small firms along with key and relevant personnel directly communicate and coordinate with customers for mobilising and coordinating the process to leverage the new product into the market.

However, from the data, it was found that custom-designed products are not ground-breaking or secret innovations yet variations of existing products that many of these firms already have, and in addition, after some time they offer those bespoke products to other customers too if they turn out a success. During the interview with a successful medium-sized biscuit manufacturer who specialises in shortbread, Company M, the technical and product manager explained this:

"Every customer like to have something of their own, there could be one product but 30, 40, 50 different packaging formats. So, we can offer exclusive weight break to one particular customer". (Firm M: MD and Technical manager, shortbread producer).

Company B explains introducing a new product to a customer at first and from the success out of that they roll out the new product to other customers. The MD explained:

"…we needed to introduce something different, what could we introduce as special. So, we introduced a steak pie with parmesan cheese and black pepper. We decided let's introduce it, and we only introduced it to one supermarket, and it sold so magnificently. So last December we sold to multitude [of] supermarkets and sales were tremendous". (Firm B: MD, pastry and bakery manufacturer).

To pursue customer alignment Company E, a leading pate producer sought external support in developing custom-designed packaging for their key customer. The innovation member said:

"We brought a packaging expert when we were doing something for [key customer name]." (Firm E: Marketing manager, pate manufacturer)

Company E and company O collaborate or integrate external resources (Van Echtelt et al., 2008; Sirmon et al., 2007, 2011) to their existing in-house capabilities hence bundle capabilities to develop customised new products for their customers.

Company O also pursuing customer alignment explained:

"If [key customer name] says we are working with a packaging and we want you to work with them…" (Firm O: Commercial director, shortbread producer).

Company O further explained:

“A lot of innovation driven by retailers themselves so they tell us we want this can you do this we will look at it, design the packaging and the product. We provide a packing with [customer name’s] own label. They give it to a designer to design a package and we look at it and we agree”. (Firm O: Commercial director, shortbread producer)

Custom-designed products are variations of existing products that are often only a new look or new recipe and are generated from the close relationship and conversations between the two actors i.e. customer and supplier and thus generates a bundling and integration of resources helping alleviate suppliers’ constraints to innovation. Suppliers benefit from customers input and additionally sought external help from other companies for NPD support particularly in developmental phase. Therefore, they work with external members such as customers and often times experts for developing customised products.

5.2.3.2 Increase capability building

As part of managing close and cooperative relations with large customers, many of the firms in this study invest in increasing their capability building particularly upgrading and advancing factory operations to improve product quality for customers (Sirmon et al., 2011). Many suppliers increase capabilities to gain power and create a more balanced and cooperative relationship (Hingley, 2002, 2005ab, Pulles et al., 2014; Lacoste et al., 2022). As one supplier (company O) explains this:

"...Do we have the capability to do it, if not what would cost us – time, people and expenditure to get capability? If we can get [the] capability that’s good, make us strong, we become more important [to customers]. For me innovation, can you do it, what’s the cost and if you do it remember your capability increases." (Firm O: Commercial Director, seafood producer)

Several supplier capabilities with regards to their large customers concerning innovation are explained below:

Cultural capability

Participants reported that they would like to represent a culture of high-quality suppliers. They would like to try their best to respond positively to customer requests, thus one company D a medium-sized wholesaler explained:

“There were signs over the buildings that said the answer is always yes.” (Firm D: finance and production directors)

Data showed that suppliers discussed their large customers paid close attention to consumer needs which had great implications on the way many of the suppliers behaved towards a

growing consumer culture. Suppliers were influenced by the government and society, consumers and customers towards developing healthier products with less salt and sugar content and high nutrition, as well as environmentally friendly products and packaging to suit the climate change. Such culture enabled SMEs to build better customer relationships because they both mutually contributed to the society, representing "corporate citizenship" or CSR (Stern and Ander, 2008). Business relationships can therefore encourage SME involvement in social responsibility concerns but also bundle resources to meet market and societal needs. Company E shared:

During an interview when asked about innovation activity contributing to society company E explained they are in partnership on an environmental programme together with a key customer:

"We look to reduce our environmental impact and do things sustainably as we can. We supply to [customer name] who is one of our biggest customers, we've gone into a program with them … and part of that is improving the environmental impact. That's not particularly innovation but something as a supplier to [customer name] and as a business ourselves. That's I would say from that view we certainly help the environment". (Firm E: Marketing member, pate producer).

Moreover, participants also voiced the importance of quality. During all the interviews when asked top three priories in the process of new product development, over 90% of the participants mentioned quality, this is because customers highly care for quality, and thus they can maintain close and cooperative business relationship long-term. Company S explains:

"We always look to improve the quality of our products … our products are well recognised, we get very very few complaints about our products, [they are] well received [and] popular … the last thing we want to do is to let customers down." (Firm S: MD, food producer).

Company I also explained:

"BRC [British Retail Consortium] which is a quality accreditation, we are in that this year. That will help us again, allows us to get into more different business. Because a lot of supermarkets require you to have a certification over your products." (Firm I: Director, sea foods producer).

Overall, dominant, and larger supermarket customers' cultures impact their smaller suppliers in the food sector.

Branding and image capability

Some of the SMEs in this study highlighted the significance of image to their branding and marketing activities where being top producers and leading suppliers in their specific markets enable customers to work with them (O'Dwyer , Gilmore, and Carson, 2009). These firms have a solid reputation among their customers due to high-quality products and services and their narrow and niche markets. Company B, specialising in pies as the largest pastry manufacturer in the UK and number one brand in Scotland discusses:

"Our customers buy our products for a reason … we are the Scotland's number one brand in pies. But actually, number two brand in the UK. We are also the UK's largest manufacturer of pastry .. according to the Scottish Grocer, we are the fourth most recognised food brand In Scotland" (Firm B: MD, pastry and bakery manufacturer).

Customers prefer to keep top brands on their shelf due to popularity and customer loyalty, thus these firms invest in their brands and image in front of their large customers. Company M, the number one shortbread brand in Scotland also made the following comment:

"Being the number one brand helps. Most retailers want to stock number one brands … we have a secret recipe that allows us to be more competitive than them … our brand manager spends 50% of their time on innovation with [the technical team]." (Firm M: managing director, shortbreads manufacturer).

Many of these top brands socialise the customer with the brand and its elements which enable a key role in understanding the value of relationship marketing. They manage brands by not going down the route of private label work rather investing in innovation capabilities (such as technology) through their patient capital and external funding below market prices, to be able to offer superior product quality to customers.

Technology and technical capability for product innovation

Many of the firms here build up resources internally through 'accumulation' to create more value to customers (Sirmon et al., 2007, 2011). Company R, which is a small medium-sized manufacturer specialising only in baking pizza, explained investing £6m to increase capacity to offer more products to their customer, they have been working for over 20 years with a single customer in the UK, the technical manager said:

"Our capacity was not big, that's why we built a [£6m] bakery to increase in capacity, [to do] more toppings [for the customer]" (Firm R: Technical manager, pizza manufacturer)

Company B, a leading pastry and bakery, discussed improving their freezing capabilities to deliver the best possible product quality to customers:

" We are trying desperately hard, so last year we innovated in terms of our freezing capabilities and introduced some sort of leading-edge freezing technology to help us get our products, our pastry products to our customers at the right temperature and at the best possible product qualities." (Firm B: MD, pastry and bakery manufacturer).

Company A, a large SME specialising in smoked-salmon products describes investing in quality capabilities to offer fresh salmon (product quality) that others are unable to thus having differentiation strategy and gaining competitive advantage (Sirmon et al., 2011):

" We did two things to get [key customer name] contract, two basic [things] we used to gain [key customer name]. One was the quality of the product we produced especially on the texture side, especially having smoking equipment and understanding how the process really works. But the other was that we promised them the fish will never be frozen, we give them freshly slaughtered salmon, freshly smoked and freshly dispatched … I think that is one of the things that sets us apart from others in the market". (Firm A: Production director, smoked salmon producer).

Technology capability for process innovation

Some of the firms particularly in the manufacturing and dealing with large supermarket customers increased process innovation capabilities such as automation and robotics enabling them efficiency and offering more competitive price to large customers thus gaining competitive advantage. During an interview with a medium-sized shortbread specialist manufacturer, company M the MD and Technical explained:

"We have taken price reductions from our retailers and the price they pay us, not the £1, they pay us a price which allows them to. We have accepted some price at reduction, in order to retain the business we have a margin reduction and we try to offset that through efficiency. And another [form] of innovation is process innovation, process to improve yields, install new equipment to improve the wrapping capabilities." (Firm M: MD, shortbreads manufacturer).

Customers pay prices that allows them resulting in suppliers lose on margin, and they offset losses through investment in efficiency. Company F also increased process capabilities to maintain competitive in the market. In 2017 they got approval from the board and invested in robotic capabilities as a personal desire to be more innovative but also make processes more efficient to remain competitive and more powerful in front of their customers. The operational director commented:

"I would be saying to board we need to automate, change our process, the way we do things now it's too expensive, our customers are going elsewhere because other companies are saying we can do them cheaper because we have all these automation processes which we were struggling to compete with … we installed [package robot] in march 2017 now I managed to get approval from the board to do this … so we can be more competitive in the market and have additional sales. (Firm F: OD, shortbreads manufacturer).

Company B, a leading bakery and pastry medium-sized manufacturer have also embraced process innovation to offer superior product and service, the MD explains:

"We are a highly automated bakery, there are a lot of bakers and food manufacturing companies, the reason we are doing [process innovation] it will increase our efficiency, productivity, and so to gain that competitive advantage and to maintain profitability we need to be faster, slicker, more nimble. We need to produce faster at the same quality standard … [and] our products are priced very competitively in the marketplace." (Firm B: MD, pastry and bakery manufacturer).

These firms invest in technology capabilities for product innovation to improve quality for customers, and invest in technology quality for process innovation to offer more competitive prices. Thus pursue both differentiation and price strategies through resource orchestration (Sirmon et al., 2011).

Human capability

Participants increase human capability concerning innovation for customers, they pull and combine resources from different parts of the organisation to support the innovation process for customers (Sirmon et al., 2011). Such strategy and structure provide more capacity thus offer more to the customer. For example, Company E who are a medium-sized specialist in pate discussed that while they may have 6 or 7 staff members that deal directly with innovation but when during the innovation process human capability doubles up to offer better and more to the customer. Innovation member describes:

"Probably around 6 or 7. everything we want to make we have to take it in the factory and there might be 10 or 12 people working on it. But for coming up with ideas and things probably around 5 or 6 of us .. although there 5 or 6 development there is a wider team, technical, purchasing, procurement, Ops manager, GM, HR facilitate all that." (Firm M: innovation and marketing members, pate producer)

They have a human resource department that orchestrates and coordinates this process. They also discussed speaking with colleagues such as sales and upper management too. Therefore, it is very interactive, inter-functional thus knowledge is stretched to lead customer innovation forward. Some participants also discussed that these employees also interact with customers. Thus, it's not just the sales team that communicates with the customer. For example, company O a seashell fish producer with 130 employees has only two NPD /technical employees but receives support from other departments such as commercial, sales, and account management all of which are customer-facing roles. Further, this company is looking to increase its human

capability further by bringing new staff to help. During the interview the commercial director commented:

"It's a small team at the moment, sounds ridiculous but there are 3 of us – myself commercial director, account manager and NPD manager … we talk about [the] technical team, Danielle and Michelle who get split with the customers … [but] we are looking for a developmental chef and looking to take graduate. We are looking at taking on a development chef and looking into bringing another account manager so increasing the team to 5 or 6 we are at 3 at the moment."

Internal human resources integrate and bundle together for innovation. They also integrate customers in their NPD activities and meetings with employees across different departments and levels thereby support resource orchestration (Sirmon et al., 2011). In addition to the above, data also revealed some firms particularly among the family businesses the senior members get very closely involved in the innovation for and with their customers which signals to the rest of the employees to take customer orientation and closeness seriously, thus a source of motivation. Company J, a family member managing director explains how he and his brother make the sauce. This is a meat producer and wholesaler with about 50 employees, the MD explains:

"From myself [managing director] meeting with the [customer]. They are talking about menu planning and food ideas for the next term time at school. Talking about wanting leaner product, everything in media healthier kinds etc. and chicken sausage, turkey sausage, we bring it back, Karen [H&S person] feedback, she can speak to our supplier to look at that to sort it. Then myself, Craig & my brother get to work to make the recipe. From that, I think on Friday we created something we are happy with and the next day is to take that to the customer if successful to see if they are happy with it." (Firm J: MD, meat producer).

Financial capability

Many of these firms also leverage their social capital with the business support community to increase their financial capability to undertake innovation for their customers. During the interview with company O a seashell fish producer, the commercial director discussed meeting with the head of innovation at a leading business organisation to discuss bundling external funds from their business networks with the business support community and their board, the commercial director explains:

"when Ian came in last week, [business support organisation name] will give us £200,000 towards innovation. We need to also match that we have to also put £200,000 towards it we are meeting with Ian next week to understand, are we able to substantiate our spending on NPD on that region like £400,000 a year. Can we attribute that before we are applicable? I will sit down with Ian, with our finance guy and talk about our NPD process." (Firm O: CommD, seafood producer).

To increase the financial capability, some of the firms here leverage social capital to obtain funding to undertake and expand innovation activities and capabilities thus stronger customer relationship. This is an example that many of the firms in this study followed. They orchestrate external resources to undertake innovation for customers. More specifically, they bundle financial resources (internally and externally) to invest in innovation and create value to customers.

Service capability

Many of the firms in this study also look to provide superior services to enhance customer relationships. Having superior service capability can help reduce over-dependence and create more trust and reliability for the supplier. This enables more power leading to cooperation within their relationships. This is especially important in the supermarket industry as goods must be delivered on time and at the best quality. All of this explains why some of the firms in this study do view service as an adjunct to their products business, rather on its own. Therefore to a degree, such services can contribute to less risk as with the increased attention and care towards food health safety and quality offer opportunities to expand services thus reduce risk. In many cases, customers depend on suppliers' stock which is an opportunity for suppliers to differentiate themselves and shine. These companies, therefore, leverage this aspect to offer superlative servicing to reduce high customer dependence risk and shine:

Company J a family business firm with about 50 employees explains:

"Our tag line in the company is the service you can rely on. It's really like this. If a customer needs a second delivery, we do everything to do that. We fix for them. We run up and down the coast, if our boat doesn't get on time we get another man up, we do all these little things, although it's a pain in the [process] we do it with a smile. It's really the only thing hand and heart we live by that. It's always customer first trying to find a solution to try to make everyone happy."

Company B, another family business emphasises their service capability:

" We literally get orders Monday that need to be delivered to our customer's shelves tomorrow" (Firm B: MD, pastry and bakery manufacturer)

Company D also describes their service capability leads to competitive advantage for them in the market and the customer may have difficulty replacing the supplier making the switching cost expensive. The finance director and production director in the interview explained:

" There are a couple of competitors who do what we do but they are not national because they tend to be regional but we have capacity all over the United Kingdom we deliver to London [customers] every day. We deliver our own vans to customers. We supply them". (Firm D, Finance and Production directors, wholesaler)

5.2.3.3 Aim to develop long-term customer relationships and partnership

Just above, findings explained suppliers make investments in building and expanding capabilities for innovation to offer innovativeness and thus value to customers and create healthier and long-term relationships with them. Some they make these investments for their key customers because they understand and appreciate commitment and trust from both sides. Such investment allows them to differentiate them from competitors and appear more attractive to customers. Participants discussed developing symbiosis relationships and combining resources with their key customers concerning innovation and enabling value co-creation. They deal directly with each other and aim for trust-based and long-term relationships, which plays a strength in managing customers, particularly larger ones (Coviello and Joseph, 2012). Company R, specialising only in manufacturing pizza work closely with one single large customer and their relationship has been profitable and long-lasting, the technical manager highlighted:

" We supply to [key customer name] for over 20 years … we only supply to [them] … if you go through [key customer name], you are the UK and Ireland wide … if you supply them with products that they like and sell well you might start with 400 stores and then it might go to 8000."

Company A, specialising in smoked salmon products also echoed its commitment to a key customer:

" We are dedicated to [key customer name], so no other retailers … we gave clear commitment from the beginning to [key customer name] [that] we won't be working with other retailers in the UK" (Firm A: Production and NPD directors smoked salmon producer).

According to research commitment needs stability and sacrifice because it enables building social relationships and encouraging supportive behaviours between customer-supplier (Wu et al., 2014). Offering niche and innovative products as well as the commitment for cooperation enabled some of the suppliers in this study to enter long-term business relationships with key customers (Wu et al., 2014). Commitment and trust as social behaviours play an important role in dyadic relationships (Tanskanen, 2015; Cortez and Johnston, 2020) and literature highlight this, because they can signal and impact on members decision on resource selection, allocation, and thereby deployment. Company A just above said they are dedicated to their customer and no others. This is a sacrifice they made. Company R had a similar commitment communicating social behaviour which led their customer to make certain investment and resource share with company R. They have had closer relationships and attended meetings and conferences

together. Company E and its customer make international business travels together visiting different markets to generate ideas and concepts for NPD. Although it is suppliers' job to do the researching and developing new products for the customer, yet their close business relationship and interaction brought by their mutual trust and commitment created opportunities for collaboration and joint-decision process on NPD. They both seek to maintain a relationship with the expectation to obtain a net positive value where rewards exceed costs (Walter, Ritter, & Gemünden, 2001; Lee and Cadogan, 2009). In fact some of the customers view their suppliers as part of their business. Company D highlights:

"I think the customer sees us as now that we are a key part of their business … It's about growing these partnerships and building partnerships. We want them [customers] to see us as we want to work with them". (Firm D: Production and Finance directors, food wholesaler)

Such social interaction and viewing suppliers as part of their own company, results in company D and the likes to reciprocate and verse versa. Niche and innovative products make them attractive to customers and signal long-term relationships. However, it also comes at a cost. Participants reported key customers are highly demanding with complex requirements. These firms end up becoming 'solution providers' to their customers to cultivate the relationship. Customers are closely involved in the NPD process of their suppliers and offer feedback which is valuable for firms with limited resources (De Massis et al., 2018). Company R, which is working for more than 20 years with its single large customer, and its cooperative and collaborative relationship, allows close interaction concerning innovation such as regularly attending customer meetings and events on NPD and doing online training provided by customers to better understand and meet customer requirements. Responding to larger customer inquiries and requirements thus enables technical communication and engagements between customers and suppliers to enhance innovation. Company R SME supplier describes the attendance of their NDP meeting:

"Because we are too small all have to be involved, our managing director is already involved in all the development meetings with us as well. We have got a development and technical manager at [customer name]". (Firm R: technical manager, bakery manufacturer)

As discussed above this supplier also attends customer events such as conferences regarding technical, safety and innovation. The business reciprocity i.e. mutual access to resources for innovation in structuring shifted to technical reciprocity where company R and its customers here joined and bundled capabilities for innovation, which resulted in market reciprocity where

NPD leveraged profitable new markets and product lines creating a win-win rewards. Below, large customer advises company R their SME supplier on aspects and attributes of a product and the innovation that they require particularly in relation to the technical side of things, the technical manager explains:

"[Key customer name] tells you each year they have categories for each development and that year health was their top priority to try and push … we went to a [key customer name] conference, [and following from that] … we came back and developed a product that no one else had, it was low sugar low-fat high fibre and one of your five a day and we took that to [key customer name] they did like that and now that product sells for them about 5 million pounds a year."

The cooperation and collaborative relationship for innovation further allowed supplier Rs customer to offer reciprocal benefits (Narasimhan et al., 2009; Wu et al., 2014) to supplier R by inviting them to their conference. The customer engaged in reciprocity as they collaborate for mutual goals. Company A's customer also share information and contact with company A as part of reciprocal bonds, for better managing the innovation process. Relationships here involve commitment, trust, and reciprocity based on exchange of information and knowledge concerning innovation as value in exchange gave company R and company A the ability to select and assemble the necessary resources required immediately to develop the new product innovation for a new markets and product lines. The new market and product line gave supplier R's customer £5 million sales per year, thus rewarding both members. Company R structure and bundle customer input to develop a product that no one else had offered in the market. Customer input and their bundling capabilities together allowed extending and creating new NPD capabilities for novel innovation (Sirmon et al., 2011). Additionally, innovation process especially in SMEs creates more joint communication both externally and internally across units within company R and the likes, that often unconnected. As SMEs, to overcome resource constraint and create better customer relationship, innovation is necessary which requires combining resources of different departments as well as the customer enable them together to achieve their goals thus value co-create via reciprocally valuable relations (Komulainen, 2014; Cortez and Johnston, 2020).

Attending large customer events is thus helpful to enable interaction/communication and a better sense of understanding of customer requirements for innovation. Thus, it fosters supplier innovativeness, leading to value co-creation (Ulaga, 2001; Komulainen, 2014). Their close relationship enables development of supplier resource for mutual benefits. Additionally, through their social relationships being dependent on one another i.e. customer remains

dependent on high quality niche products and services whereas supplier is dependent on customer's innovation resources (e.g. product requirement etc) whereby their interdependence cultivates the process of exchanging and combining resources (Garner, 2017) valuable for innovation. Technical manager's company R is regularly combined and bundled with customers resources and capabilities i.e. training and development for innovation (Sirmon et al., 2011; Carnes et al., 2017). Apart from attending their customers' conferences as discussed shortly above, company R also regularly integrates with training and development provided by the customer, for example regarding codes of practice, she said:

"If you want to get something into the supermarkets, you'll have to also know their system. I have to read and understand them [their information], and all the layers and other different things. You constantly have to do new codes of practice and development things coming out from [customers]. They will send you information there's a new code of practice about this, there's a new procedure about that."

The relationship between many of the firms and their large customers is not purely transactional, rather the close relationship has enabled technical and other non-sales employees to also interact directly with customers creating bonds, a relational type of relationship that thus engages in collaborative innovation projects.

Company A, as mentioned further above, which specialises in producing smoked salmon products, has greatly benefitted from their close business relational type relationship with their customer and aims to keep that over the long-term. Their customer is extremely demanding to the point that company A has incurred losses in the beginning of the relationship because of the overheads in meeting customer food safety and quality standards. Nevertheless, they were willing to pay the price to grow with their customer. During the interview with NPD and Production managers they explained this:

" [Our customer] wants to keep working with us, growing with us. They put a huge burden from an overheard point of view in terms of everything you need to have in place in order to trade as their food safety and standards are none like the industry. So unless you get to certain turnover you won't cover those overheads, now that was the investment we made right from the start and they understand that. We have been with them in this growth phase since then, we are at a point now that's now paying off for us". (Production manager, smoked salmon producer)

Due to the cooperative and collaborative nature of their relationship on innovation i.e. between company A and its customer, the customer trusts the supplier and provides advice and recommendation. For example, to benefit both actors thus value co-create through reciprocal and mutually beneficial relations, the customer recommended supplier A to get in touch with

the customer's contact at Stirling university to support them on their joint innovation project, thus co-creating value (Komulainen, 2014). They thus combine the resources of different firms within their relationships and contacts that enable customer-supplier as partners achieve their innovation goals that would not be achieved alone. Their reciprocity and interdependence cultivated the resource orchestration (Sirmon et al., 2011).

Company T a successful bakery that produces over a million morning rolls per week has recently secured a six-figure deal with a large supermarket customer to supply high-quality products and an exclusive new range of products. Company T has been producing products for this large supermarket customer for nearly 20 years. In a recent newsletter for the public, the supermarket customer's head of buying praised their long-lasting relationship with supplier T:

"Our long-standing and close relationship with the team [company T] has enabled us to strategically explore exciting new product lines and bring them exclusively to our shelves." (Head of buying, large supermarket customer)

The commitment among members created strategic alignment and alliance and the rewards leveraged new markets and product lines benefitting both parties (customer and supplier).

Since many suppliers provide niche products and operate in narrow markets, they become attractive to customers, especially when they offer higher quality products and are willing to respond to complex customer requirements in terms of safety and innovation. These firms are able to suffer the upfront costs of innovation investments based on customer requirements knowing they will be able to reap the benefits down the line. Customers are also supportive and offer to share and exchange resources making possible value co-creation through their jointly positive ties which also results in customer-supplier resource orchestration for innovation.

Company E also explains their partnership with one of their biggest customers and how they collaborate on innovation and have also gone into an innovation programme together over the last 7 years:

" We work with customers which is [a] customer relationship and collaborate together on products … we supply to [customer name] who is one of our biggest customers, we [have] gone into a program with them for 5, 6 7 years which is called plan A basically look to improve lots of aspect of your business … we develop [a] good relationship with the retailers we work for, we have been making these products for over 30 years we have a good resourceful team who can lead them from development to launch".

Due to having fewer resources and capabilities, Company R, A, E and the likes discussed here can compensate them through relationships with other firms such as their larger customers (Johnsen and Ford, 2006) and their source of innovation (Duran et al., 2016). Company E's enhanced relational capital with their customers enabled them to travel together for innovation activities and co-create value together. Building and sharing knowledge between firms in this study and their customers seem to have created commonly agreed behavioural conditions inhibiting conflicts and in turn creating value congruence among them resulting in shared value, vision, culture and objective, leading to more effective and long-lasting relationships, positively impacting innovation.

Strong social interaction between these firms with their key customers has encouraged them to commit to innovation development (Campbell and Cooper, 1999; Tsai et al., 2013). This is also partly because their social interaction fostered social and emotional bonds leading to better innovation, as seen with Company E.

Many of the customers and suppliers here had established a complimentary climate to willingly to structure and bundle their resources via informal and reciprocal bonds. Although customers were much larger in size the niche strategy and customer alignment and commitment by suppliers created collaborative and cooperative behaviours. The smallness of suppliers meant that commitment was mainly based on cost reduction, yet it shifted to strategic alignment and alliance related to innovation and complex product health and safety. Therefore, this also showed team trust based on joint knowledge and decisions thereby creating reciprocal bonds where customers-suppliers here voluntarily offered mutual access to resources for structuring, joining capabilities for bundling, and thereby creating new markets and product lines for the leveraging process.

The customer collaboration may help create healthier supply chain and respond to the current dysfunctional Scottish supply chain in the food industry (See Chapter 2).

5.2.4. Pursue multiple channels to market

5.2.4.1 Seek alternative revenue streams

Apart from a close relationship with selective customers, suppliers growingly pursue multiple channels to market to expand customer base and reduce the risk of over-reliance on a particular customer for business sales. 'Foodservice' sector, for example, provides an alternative revenue stream in addition to the retail sector in which these firms are expanding into as part of their business growth strategy and developing relationships to continue innovation and business growth enabling them to both survive and thrive. During an interview with a leading biscuit brand, company C, the CEO commented the following on this issue:

"We looked at how to diversify into other markets and other channels and we identified [a] sort of mini packs of biscuits, so catering to the foodservice sector and that's probably helped to do a third of our business. Same product but different packaging going into different channels. We also do very well in the gift sector, again the same product but different packaging going into slightly different channels, people selling the same core product in a number of areas, and I think that [has] allowed us to spread out some of the business in that sort of fashion. [We] don't have a single customer that we account [for] more than 10% of our sales".

This company is a successful biscuit brand in the whole UK. Although they have diversified into different channels and markets, yet products are the same. They have been able to remain within their niche products while exploiting and or creating specific markets with those niche products. In particular, they have been able to leverage packaging to succeed, which will be discussed further in the following section/theme.

Company K producing oatcakes is also expanding into foodservice and other non-retail outlets to obtain alternative revenue streams and overcome growth barriers in their narrow market. The NPD manager adds:

"…we've got a sales team that can start to get our products into hotels or airplanes you know and Virgin trains. So it's just about the more and more those avenues that we can get our product into " (NPD manager, oatcake manufacturer).

Company F, producing well-known and high-quality shortbreads, is also ramping up into the non-retail sector to create more growth opportunities. This family business after having a conservative family member removed from the board has been more active concerning growth and innovation activities, thus expanding into the food service, the non-family operational director comments:

"We do a lot of gift outlets, we do a little food service, which is an area we are about to ramp up."

Another shortbreads brand, company M has roughly 50-50 retail and foodservice and has also expanded into major coffee shops. Although many of these firms pursue multiple channels to market yet offer the same products.

The idea behind soft diversification is both reducing dependencies on one market with a handful of dominant customers but also overcoming growth barriers. One of the routes to continued growth is thus soft diversification. However, they diversify most successfully when they stay true to their philosophy i.e. representing the brand and the strategy.

5.2.4.2 Capitalise on strategical packaging design

Innovating with the 'look' of the product is a strategy many resource-constrained firms in this study pursue concerning product innovation or as some participants put it 'packaging innovation'. Many reported that packaging is what customers see first and thus plays an important role. They, therefore, capitalise on packaging to offer new products to different customers. Each target market or even customer may have its own. They customise packaging to make products relevant to their respective markets and customers' needs. For example, they put the same products into different pack formats and sell them to foodservice customers. They strategically capitalise on packaging design and format for entering new markets. Company F after having a conservative family director removed from the board and business have been more active in business growth and innovation, they recently collaborated with a Scottish artist and designer to put their artwork and design on their packaging. This was a creative concept in the market that generated significant sales. In addition, they have been making individual and twin packs (different formats compared to their retail products) for the foodservice sector such as hotels, planes, and conferences as part of their strategy. The non-family operational director of this shortbread family business explained:

" Packaging is what people see first. If [the] packaging is attractive, there is a far greater chance that you will achieve sales. Food service products are little individual packs or twin packs you would find them on airplanes or hotel rooms or conferences. You would find them on counters in shops." (Operational Director, shortbread manufacturer)

Many of these firms leverage existing products with different pack formats as part of innovation in the food service sector. The MD of company C also highlighted:

"For example in [the] retail market we looked at doing innovation in the food service sector we were able to leverage existing biscuits we were making put them into different pack format." (MD, biscuit manufacturer)

Company M, which specialises in shortbreads with a large non-retail business uses existing products and packs them differently and presents them in different formats to their customers ranging from first-tier and second-tier supermarkets to hotels and coffee shops across the UK and worldwide. During the interview the technical manager commented:

"[We are] using existing new products and packaging them differently and presenting them in different formats to different customers."(Technical manager, shortbread manufacturer)

Putting existing products into different pack formats also reduces the product failure rate as the products are already accepted in the market, thus they leverage their existing products for new target markets i.e. non-retail. If they develop completely new products they may lack the leveraging involved, thus they combine something that is familiar or interesting with something that is new.

Company P which is a meat supplier with a focus on niche products such as haggis and black pudding also capitalises on the packaging. Speaking with the founder, he explained:

“People pick up the product, not because of the type of food, but because they like the packaging. We know that people buy with their eyes, and we know that females would not buy the same cosmetics if they were sold in the white package. They want to be sold the dream. They say, don’t sell me cosmetics in plain white packaging, I want it to look amazing, I want to open it almost like a gift. So I want people, when they open their fridge at home and see our product, to say, yes, I like the look of that … it is an important part of the buying experience … so we focus very hard as a business on product innovation and delivery” (Firm P: GM, smoke salmon)

In addition, many of these firms are growingly considering environmental issues when packaging which they also convey on packaging as marketing, as well as other issues i.e. % of fat and colouring, to appeal to the growing health-conscious consumers. Company R producing pizza in collaboration with a large customer described:

We actually have pizza out there that’s got all green traffic lights, it’s got on the front of the pack. The green traffic light on the pack shows you have got fat at less than 3%. Healthy version! So if you see something that got green traffic light [on the pack] that’s the one you are meant to go for to look at a healthy alternative.

Other companies in this study also discussed working with their customers concerning packaging or working with an external company to help with packaging. Packaging innovation

may help create more interaction between suppliers and customers and in some cases collaboration, and if innovative and successful leads to better business relationships.

Company I producing smoked salmon considers packaging as an important part of the product development, and when asked how they put together resources for NPD he also discussed having a packaging manager:

" [We have a] group packaging purchasing manager who advises on [the] latest packaging issues." (Firm I: MD: smoke salmon producer)

With the growing pressure on environmental issues with packaging, more companies are taking a proactive role in meeting the demands and good citizenship whilst also leveraging it to their benefit. Company C, manufacturers of the UK's favourite biscuits have added the following on their online presence:

"… we have outlined our commitment to the environment by eliminating 90% of plastic from our core retail packaging as part of a wider £1.6 million investment into our products and processes. This 90% reduction in plastic saves 537 tonnes of CO2 from the manufacturing process each year; the equivalent of 895 homes improving their energy efficiency through installing better insulation as well as smarter lighting, appliances and heating systems. [We are] among the first to proactively change [our] packaging to achieve a positive environmental impact". (Firm C, source: from the website)

The packaging process is becoming more important and many of the firms here have incorporated it as a strategy and a key stage in terms of putting together resources for new product development. Once firms are happy with the product, they then accelerate to develop the packaging, labelling, all the nutritional details and the brand and then launch into selective markets such as foodservice and so on.

5.2.4.3 Leverage end-user and university engagement

Apart from engaging and developing new products with customers as discussed in chapter 4 and chapter 5 above, the study found that some of these firms also engage with consumers 'end-users' and local universities as part of NPD such as product tasting and receiving valuable information and feedback that they implement in product development to increase product and market success. This strategy not only compensates for the shortage of resources in SMEs, but also offers large customers confidence and assurance that the new product or concept has been tested and positively received by end users so far. Firm K, producing oatcakes discussed

communicating with their followers on social media channels and obtaining feedback to help with the NPD process. The NPD manager explained this in more detail:

What we can do is we know we've got so many Facebook followers, Twitter followers and Instagram followers. So those people are already our consumers. So that's a good insight into your own customer base because they know our brand. [Recently] we offered consumers and various people ten different flavours and we got feedback; we have the top three. We used them at Queen Margaret university, there's a food innovation there, people are trained up to do taste panels so we're able to then send the products there … it gives us all that information and then we use that quantified survey to basically then develop the product further and go to launch and because we've got the information the sales team can use that when they go into the supermarkets to try and sell the product." (NPD manager, oatcake manufacturer)

Company K and the likes leverage consumer-brand relationship to develop products. End users appear to build feelings towards the brands, they sense a closeness to them, thus firms benefit from this interaction for innovation (Von Hippel, 1986; 2005; Barlatier and Josserand, 2016). They obtain information such as the top 3 new flavours and with the help of local universities develop a quantified survey and research to increase the product and market success rate. This way they have a higher chance of selling the product to large supermarket customers. Supermarkets gain assurance and more confidence that the new product will sell well on their shelf.

Company I producing smoked salmon products have pursued a similar strategy. They engaged with a local university to access potential customers to sample their new products and offer feedback. The GM explained this:

"...ten days ago we were at Stirling university, the chef allowed us to try these [new potential products] there with potential customers. We gave a number of questionnaires to the samplers on endurance, texture, choice of flavour, where they expect to buy it, tomorrow we will assimilate the information and discuss in the meeting and next step is to decide from there ... eventually when we have a story to tell we will take it to our major retailers." (GM, smoke salmon producer)

Some of the firms use their brands to maintain relationships and bonds with their end users as there is a relationship formed between consumers and product brands, especially when directly dealing with each other. Their brand community offers support and or socialising the customer/consumer with brand elements helping realise the value of relationships. Consumers/end-users being important to these branded firms, they play the role of brands' agents within the community. This way resource-constrained firms leverage brand community and university concerning product innovation development to have a story to tell when presenting and negotiating new products with their large customers.

5.2.5 Analysis and Interpretation

This study showed a power dynamic in the nature of the relationship and how firms can orchestrate resources. SMEs are resource-constrained (see RQ1) and resource orchestration is a way for them to overcome their constraints. This process is particularly unique in the context of dominant exchange partnership, and what the study had done was to explain how they resource orchestrate in dealing with their large dominant customers for innovation, and in particular explaining the constraining and facilitating effects that occurred during the resource orchestration by SMEs. Firms must orchestrate their resources to overcome constraints, and part of that resource orchestration concerns the enrolment or exchanges with external stakeholders (Mitchell, 2021).

The findings showed resource orchestration in imbalanced contexts. Part of resource orchestration for SMEs trying to innovate is managing the tension between facilitating and constraining in relationships. To manage an exchange relationship there is a need to balance the constraining effects and facilitating effects. Balancing the constraining effects versus facilitating effects suggests a universal principle of managing exchange relationships.

This study supports previous studies that found niche focus strategy (Sidali and Hemmerling, 2014; Kvam et al., 2012; Ilbery and Kneafsey, 1999) to combat resource constraints (De Massis et al., 2018) but the present study also suggests niche focus as a strategy to deal with large dominant customers. Being niche and focused enabled small suppliers bargaining power with customers. Niche strategies have the potential to lock-in customers (Audretsch et al., 2018). This is therefore important as a strategy to mitigate not only the effects of resource constraints but also dominant customers as findings suggested. This finding is not adequately acknowledged in SME research in dealing with customers, customer management, dominant exchange partnership, and imbalanced relationship literatures. As a result, it is a significant finding that can be given more attention to in SME contexts with dominant customers or in imbalanced relationships.

The findings further suggested niche focus and the ability to stay close to the market for faster and flexible responses to customer requests with continuous innovation resulted in resource orchestration to overcome the influences of limited resources and dominant customers for innovation. Continuously identifying and exploiting gaps not yet satisfied within their already

niche and narrow markets (Sidali and Hemmerling, 2014; Kvam et al., 2012) for their specific customers through innovation led to customer loyalty because customers seek product innovation and quality (Baregheh et al., 2014), and allowed increase in product offerings to customers thereby gaining more bargaining power with limited resources. This way they achieved supplier differentiation and competitiveness (Sarkar and Costa, 2008). As a result of niche focus and product quality (McAdam et al., 2016; Baregheh et al., 2014) these suppliers became top brands where large retailers often preferred to stock their products over others.

Brands also enabled firms to access internet-based resources from social media "followers" to support and build up innovation capacity (Palacios- Marqués et al., 2015). Being niche focus and ability to remain close to market for innovation i.e. travel and away days to markets, analyze secondary sources (McAdam et al., 2016; van Hemert et al., 2013), and end-user engagements (Lefebvre et al., 2015; Von Hippel, 2005) as low cost external sources of innovation enable firms to efficiently orchestrate resources to increase their innovation capacity as a result of the lack of internal R&D resources and overly dependent on large dominant customers. These thus concerns ways firms orchestrate resources to overcome resource constraints in a unique context of dominant partnerships. Related to RQ1 findings more specifically, data suggests having a highly focused strategy helps to overcome internal resistance. This is because every organizational member shared the same vision made it easier to synchronize and deploy as a collective and team effort during the innovation process to overcome resource constraints while creating higher customer value (Andersén and Ljungkvist, 2020). This suggests resource orchestration as a team effort for innovation rather than only focusing on top managers as orchestrators suggested by Sirmon et al., (2011) in SME contexts with demanding customers. Managing resources for innovation in SMEs often involves a collective approach and complex interactions between various actors. This finding supports previous research that found firms orchestrate resources for team-based innovations highlighting the interplay between teams, customers, and top management (Andersén and Ljungkvist, 2020).

Apart from resource orchestration concerning the constraining effects of dominant customers, the findings also suggest customer alignment and collaboration as a facilitating effect of dominant customers for innovation (Coviello and Joseph, 2012). It can be interpreted that the niche strategy and dominating in narrow markets created opportunities for customer alignment and collaboration moving from a transaction-based exchange into a partner-based exchange

whereby obtaining customer feedback and ideas in the initial stages of new product development to structure their innovation resource portfolio, and co-developing or co-creating new products which were often unique and custom-made for specific customers as part of bundling and leveraging their innovation resources and capabilities. The resource orchestration in a customer-supplier setting for innovation highlighted "accessing" or "sharing" and "co-developing" as additional subprocesses of structuring and bundling resources respectively as part of resource orchestration theory (Sirmon et al., 2011) suitable to SME and relational exchange contexts. SMEs most often access, share, and co-develop resources than acquire or develop alone (Carnes et al., 2017). These are SME versions of getting resources. Engaging with large and dominant customers who have complementary resources and capabilities allowed resources to be shared enabling SMEs to "dance with gorillas" (Prashantham and Birkinshaw, 2008). Access and co-develop are considered more SME relevant and interpretation of resource orchestration. The dominant exchange relationship feature indicates it is a specific type of access and co-develop, that is SME unique. SMEs are far more susceptible to facing that type of extreme power disparity and access and co-develop are more relevant than to acquire and develop alone. In the SME context dominance of power is a major defining feature of that access. These findings suggest resource orchestration is important to the understanding of innovation with dominant customers and aims to extend new concepts to the resource orchestration theory making it suitable to SME and relational/stakeholder exchange contexts (Mitchell, 2021).

The findings support previous studies on customer collaboration on innovation with limited resources (De Massis et al., 2018). Studies show large dominant customers facilitate innovation when working with smaller firms in the high-tech sector (Coviello and Joseph, 2012). On the other hand, Fischer and Rueber (2004) found SMEs face a challenge with dominant customers to maintain control over innovation. Research lacks how SMEs deal with this issue in the innovation context. Imbalanced and contractual relationship literature (Lacoste and Johnsen, 2017, 2015; Hingley, 2007, 2005) strongly highlights the power dynamic issues in a supply chain context but pays less attention to being innovative. The present findings responded to this debate of whether large dominant customers facilitate or constrain innovation, and provided valuable answers on how SMEs innovate in the low-tech sector where there is extreme customer dominance. Interestingly, the findings suggest both can be important and what is significant is the findings explain balancing the constraining and facilitating effects of dominant customers on innovation by SMEs. Part of resource orchestration to manage an

exchange relationship there is a need to balance the constraining effects and facilitating effects which is pertinent and important for SMEs.

How firms overcome and navigate large dominant customers in being innovative is not well acknowledged in the SME innovation literature and researchers should pay more attention to it for a comprehensive and holistic understanding of innovation in SME contexts. Moreover, the findings in this study coincide with the Context Chapter that the food sector faces an imbalanced power in the supply chain and provides some solutions to help smaller members particularly the suppliers/producers to better manage their relationships with large supermarket customers in being innovative.

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5.3 Findings and discussions 3: Innovation under unique family business culture

5.3.1 Introduction and overview

Using the resource-based theory each of the findings chapters explores different constraints that low-tech SMEs face in their ability to undertake innovation. This chapter focuses on the actions of the firms concerning strategically innovating under unique family business culture before the following chapter examines the burden of regulation on innovation. Given the scarcity of empirical research into innovation and innovation types under unique family business culture (Kraus et al., 2011; Laforet, 2012; Calabro et al., 2019), this chapter seeks to advance knowledge by addressing the following research question: *How do low-tech SMEs undertake innovation despite family business cultural constraints?*

This chapter is structured to demonstrate the distinctive strategies that resource-constrained firms operating under family business culture undertake concerning innovation. First, it discusses how they operationalise professional management, revealing their employment of outside professional managers, implementation of a bottom-up and externally focused approach to innovation, and professionalisation of management members as ways to manage unique family business culture to innovation. Second, it examines how they employ a long-run mindset to innovation revealing their pursuit of patient capital and the concentration on brand building as ways to manage unique family business culture to innovation and build competitive advantage long-term. Thirdly, and lastly, it explores how they cultivate employee relations

revealing their long-lasting employee relationships, shepherding development and empowering of employees. This chapter demonstrates the importance of these three strategies in enabling SMEs to innovate despite operating under a unique family business culture. Consequently, they establish superior competitive advantage along with continuity and stability long-term.

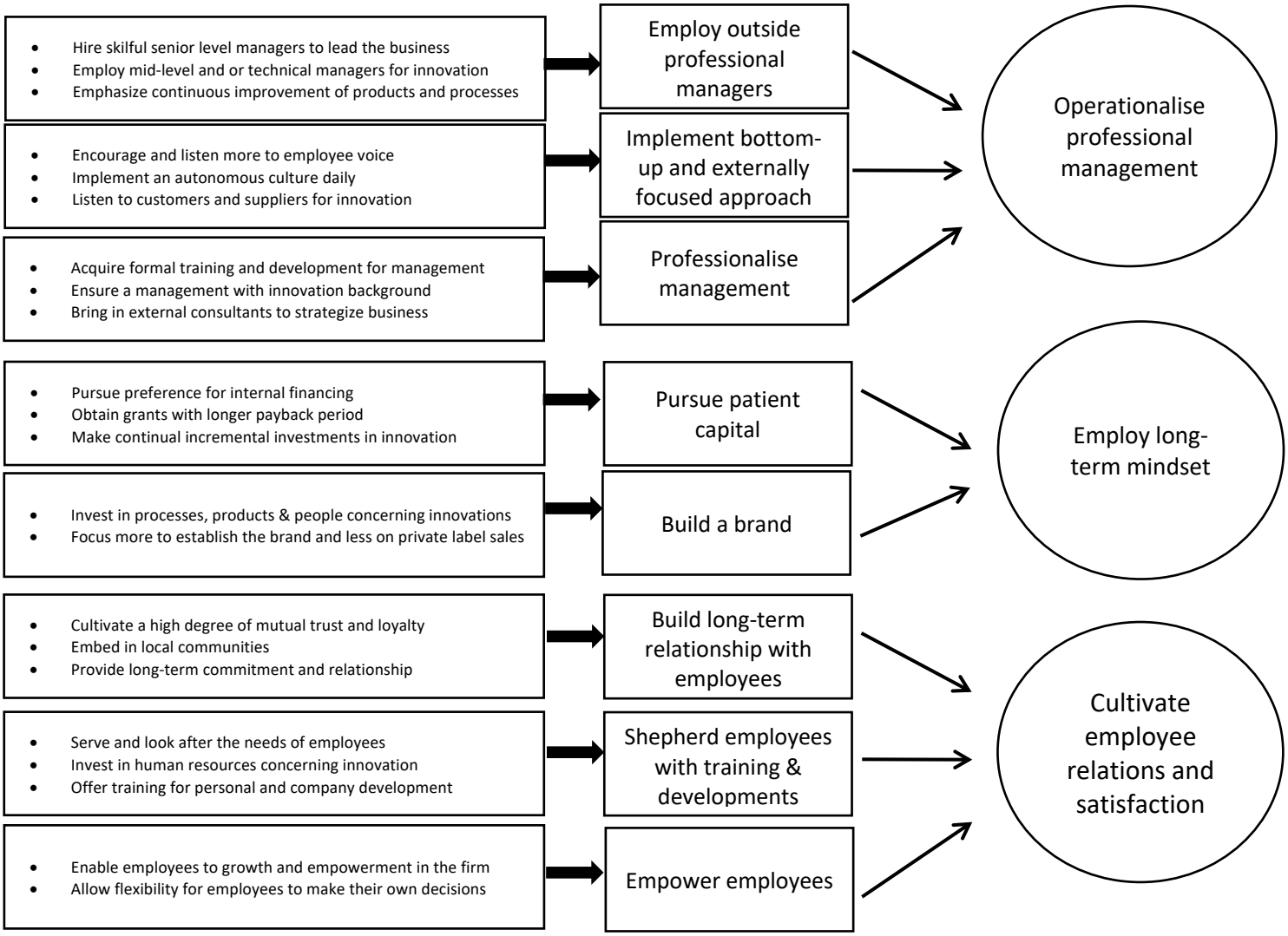
Concerning the analyses, this study has followed the Gioia methodology to offer 'qualitative rigour' while maintaining the creative, revelatory potential for generating new concepts and ideas (Lincoln & Guba, 1985; Gioia et al., 2012). This study follows inductive research and employs a systematic conceptual and analytical discipline to provide creditable interpretations of data and theory building followed by robust conclusions.

The systematic presentation of evidence follows a "1st order" analysis (i.e., an analysis using informant-centric terms and codes) and a ''2nd-order'' analysis (i.e., an analysis using researcher-centric concepts, themes, and dimensions) as well as "aggregate dimensions". Combined, enabling reporting of participants' voices along with the researcher provides qualitative robustness of the bridge between data and induction of 'sense-giving' (Gioia et al., 2012) but also for new insights that are in line with high-quality qualitative research. The data offered many 1st order categories from the interviews but as the research developed, patterns started to emerge among the categories (comparable to Straus and Corbin's (1998) axial coding). However, the 2nd-order analysis which moves from the participant's voice to the theory realm enabled it to suggest concepts from the theories that describe the phenomena, before distilling the emergent 2nd-order themes further into aggregate dimensions.

Figure 5.7 below is the built-up data structure representing the full set of 1st order concepts, 2nd order themes and aggregate dimensions for research question 3. The data structure visualises the data to better demonstrate how the raw data has progressed to terms and themes in conducting the analysis showing robustness in the qualitative research work (Tracy, 2010; Gioia et al., 2012). The iterative process of coding and theme building as well as engaging in discussions with principals of the research (e.g. supervisors) has helped better develop interpretations. On one occasion a couple of transcripts were coded by supervisors. Below includes the research findings from the analysis of perspectives of participants.

RQ3: How do low-tech SMEs undertake innovation despite family business cultural constraints?

Figure 5.7 Data structure



5.3.2 Operationalise professional management

5.3.2.1 Employ outside professional managers

Many of the firms in this study were family owned. They were able to innovate by having a professional management orientation (Chua et al., 2003; Gedajlovic et al., 2004). The professional management orientation enables these family businesses to avoid the negative influence of family business culture on innovation. This has allowed the firms to make

decisions in favour of both the business and the family. Data showed they employed outside professional directors and/or managers as part of their resource structuring (Sirmon et al., 2003, 2007; Chirico et al., 2013; Duran et al., 2016). Company F, a successful biscuit brand has had lost businesses to competitors and avoided growth opportunities because a family member director had a risk-averse behaviour and thus greatly limited innovation investments. However, once the family member was replaced by a non-family member, things changed. The company started to be more proactive towards growth opportunities and innovation resulted the firm to generate financial success. During the interview with the non-family member, he said:

"There is only one family member of the business left, and when I joined in, I replaced his brother. Difficult process to go through as you can imagine. [He] was very controlling, [but he] has been removed just recently and we are now at a point where we had the handcuffs removed, it's quite an exciting phase. There was a lot of negativities around sales. This is from the person who was in charge of sales, so it was a bit difficult. But now that we are in this new phase there is some exciting stuff coming out". (Firm F: operations director, shortbread manufacturer)

Resource accumulation may often create a negative effect or inertia to innovation, thus family firm F balanced it with releasing or shedding a family member and adding new resources (Sirmon and Hitt, 2003; Sirmon et al., 2011; Carnes and Ireland, 2013) to break path dependencies leading to innovation (Lorenzo et al., 2022). The skilful non-family director has since persuaded the board to invest in robotics and automation manufacturing processes that has enabled the business to make huge savings and generate new revenues. He has also obtained appropriate funding from his close business network with a leading Scottish business support organisation in order to fund process innovation projects. In addition, he and his team have within a period of three months designed and ready to lunch a new foodservice product. This all shows excelling in resource orchestration (Sirmon et al., 2011). The active mindset of this non-family member director encouraged the firm to decide on innovation even though when not all resources were available (Sarasvathy, 2001; De Massis et al., 2017). Family business close contact to the business together with having professional management enables a healthy balance for innovation in many family businesses in this study.

Similarly, company B Scotland's leading third-generation family business manufacturing 50 tonnes of pastry per week across the UK and being around nearly 100 years have operationalised a professional management in place. They too have hired a non-family managing director, operational director, and a sales & marketing director. They therefore have a mixed board consisting of both family and non-family, with most working full-time at the

company. During the interview with the non-family managing director who has been with the family business for over 30 years (e.g. long enough to influence the business culture and identity) with a background in accountancy, health & safety, and HR, he explains:

"[Company name] is a family-owned company, it started in 1931. Still is family owned although we have got some professional management in place to support." (Firm B: non-family managing director, pastry & bakery manufacturer)

Firm B has been actively engaging with product and process innovation. The non-family MD is particularly in favour of efficiency and productivity manufacturing as ways to gain competitive advantage. As a result, the company has been actively collaborating with outside organisations such as Scottish Manufacturing Advisory Services (SMAS) and university of Strathclyde's Advanced Forming Research Centre (AFRC) to support with process innovation (e.g. manufacturing processes) (Feranita et al., 2017) including automation and robotics, and lean manufacturing to extend existing and create new manufacturing capabilities (Carnes and Ireland, 2013). He himself has been attending a number of external manufacturing courses, brought on board an operational director with blackbelt in manufacturing, and has provided both inside and outside manufacturing training for staff as part of structuring and bundling resources and capabilities (Carnes and Ireland, 2013).

In addition, some of the outside professional directors of these companies sit within the board of industry trades and associations. For example, company B's MD is the president of the Scottish Bakers (e.g. association representing and promoting the interests of the bakery trade in Scotland), which further demonstrate his passionate advocate of training, education and people development. Leveraging his network of business relationships i.e. social capital (Sirmon and Hitt, 2003; Arregle et al., 2007; Zahra, 2010), obtains funding and consistently make investment in training. In conjunction with Scottish Bakers more than half of their staff have achieved the Scottish Vocational Qualification (SVQ) in Food Production at SCQF level 5 which allows staff to demonstrate competence in job-related skills in their area of work and expertise also signalling commitment and non-bifurcation bias (Verbeke and Kano, 2012). Valuing staff and being externally oriented particularly to employees, this professional director has established good communication with employees via forums including listening groups giving people at all levels of the business (including the board / family members) an opportunity to exchange information and interaction between employees, leading to accumulation of tacit knowledge (Sirmon and Hitt, 2003) fostering the transfer of valuable

ideas across the firm and thus help the resource orchestration within the firm (Sirmon et al., 2007, 2011). As a steward he made the following comment:

"The key things are for me is security and growth [here], there over 200 people working here, I see as my job to create employment and create wealth and create secure environment for them".

As such, all the above help increase product quality and innovation in these firms. The open culture also further fosters entrepreneurial action and innovative behaviours thus positively influence recombination of internal and external resources (Chirico and Nordqvist, 2011), which will be discussed in the following theme.

These firms seek to reduce risks in other areas of the business, for example, they pursue self-financing or access grants as much as possible to keep the debt-level low. This way, they successfully manage business risks while spur innovation and growth enabling them to achieve competitive advantage. The desire to build a legacy further demands change and encourages the family business to pursue continual innovation to survive and thrive. Therefore, operationalising professional management in the business enables these firms to ensure a good fit between the family and the business while persistently innovate.

5.3.2.2 Implement a bottom-up and externally focused approach

Many of the family firms here have moved away from the conservative, centralised and authoritative leadership style in favour of participative style of decision-making, where employees in the firm resolve issues and cooperate with the management to address innovation, product quality, and customer satisfaction. This was evident using regular weekly/bi-monthly NPD and similar type meetings which required combination of mobilisation and coordination of multiple levels and departments to use their different yet complementary knowledge resources for leveraging new products or processes (Chirico et al., 2011; Carnes et al., 2021). This was important to avoid conflicts and poor information flows but also employees' cooperation and commitment to the mobilizing vision. It seems like the owners, or the leadership resource is not the only person running the firm neither always involved in the entire NPD process. Rather, a flat culture and participative approach is embraced.

Company P, a successful supplier of meat products with specialty in haggis and black pudding has introduced a flat culture where they have regular meetings and employees are able to run

with ideas. This company also includes the customers regarding NPD (see further below). During the interview with the founder and first generation-CEO discussing how decisions are made with regards to NPD, he responded:

" Very flat, very quick, spot decisions. My sales director would come and says we have found this, we have checked this, obviously, [I say] push on, crack on … but I don't want it to be all about what I see. This business is not [um] I am an important part of the decision-making process, but oftentimes they would come and say I want to spend this money and I say, okay convince me, sell it to me, if you make a good case, why would I not do it. It is a flat structure. " (Firm P: Family founder and CEO, meat including haggis and black pudding supplier)

Company J another family business meat supplier with around 50 staff have non-family members involved in innovation-related meetings and decisions. During the interview with the family-managing director and the two other non-family managers, the family-managing director explained the participative approach they have adopted with an open and flexible culture:

"We have a senior management team with half a dozen folks who have been longstanding with the business we bring them in. People like Karen and Craig [both non-family members] have been involved in these discussions looking at how we do things. Karen done good innovation recently with our food waste to be eco-friendly … me and Greg [brother] work on hand on hand with good support from people like Karen and operation manager. If you agree Karen, we have an open dialogue between, we try not to have me and Greg doing things but it's flexible, people are allowed to make their own decisions and we just kick them when they are wrong." (Firm J: MD, meat supplier)

This company has empowered staff, provided training and development, as well as ensures employees grow within the business, they explained most of their staff started from the bottom and have been promoted up, an area to be expanded further under the Cultivate employee relations and satisfaction theme.

During an interview with another family business making successful shortbreads in the UK, company F, the non-family operational director explains how the family-owner has shifted away from a top-down to a bottom-up culture and as a result they are open to new ideas from team members across the organisation. In fact, this family business encourages open idea generation format where staff are encouraged to put forth suggestions and ideas, which enabled innovativeness. This also gives the team strength and satisfaction that improves team/employee morale and satisfaction. During the interview he explained how ideas get generated from within the team, NPD meetings, management meetings, from different types of meetings held within the business, nevertheless more specifically he elaborated the following:

" [That innovation] idea came from a member of the team. We always look for new ideas. We try to encourage [innovation] to open idea generation format. Before people didn't give ideas because they thought it's not much point mentioning new ideas because they get stopped by someone. But now you can actually see within the team '*why don't we try this why don't we try that'*." (Operational Director, shortbread manufacturer)

The operations director further makes the following comment about their innovation process which also involves the customer:

" So in the innovative process we have also the sales team, marketing and brand manager, we have NPD involved, we have board level people involved, we might have production and technical manager involved, HR. We don't have a group of people and say you are innovators, but at the moment it is an open forum but there is a lot of stuff that is generated at the back by customers who say they like a specific product, so we go and develop that for them. Some of them are driven by customer requirement and some of them are by our own aspiration and ideas." (Operational Director, shortbread manufacturer)

From data, while NPD is a small team, it became clear it involves a 'wider group' where employees from different functions cooperate and collectively participate, feed and decide on NPD. Thus, it is not a 'one person' job rather it's a team where 'all are involved' including senior staff in some cases (Duran et al., 2016). The participatory and bottom-up approach to NPD is important for family SMEs to manage authority structure and limited resources (De Massis et al., 2018).

Many of these firms involve their customers in NPD. Particularly smaller ones greatly involve outside members such as customers and suppliers, and larger family SMEs involve more end-users in the NPD process especially more so in the idea generation and product evaluation stages. Thus, not only employees are part of the innovation process but also customers and end-users 'outside members' in many of the family businesses in this study, factor that foster innovativeness in small family firms (Laforet, 2012, 2016) and demonstrate external resource integration during the NPD phase (idea generation and product evaluation) as part of bundling resources and capabilities (Carnes and Ireland, 2013; De Massis et al., 2018; Marcon and Ribeiro, 2021).

Company P, family meat supplier who was discussed earlier above, commented:

"…we find that customers are very engaging and keen to hear new ideas." (Firm P: Family founder and CEO, meat including haggis and black pudding supplier)

Similarly, company N Family-owned ice-cream producer leveraged product innovation ideas from their suppliers and during the interview said:

"The idea of this products came from the machinery supplier, and we researched to see if its viable and went for it." (Firm N: family member commercial director, ice-cream producer)

Externally focused culture and family firms' social capital (Sirmon and Hitt, 2003) enabled customers, suppliers, markets and in some cases competitors to be considered as important sources of information for innovation. In addition, innovation goes beyond NPD to also include process innovation or continuous improvements where due to the participative, flat, open and decentralised culture and structure many employees also greatly contributed to both NPD and non-NPD innovations including organisational problems. Whether that's through internal forums, informal or formal lunches, meetings, listening groups, seminars or conferences, and or simply talking to others, many are encouraged to contribute to the betterment of the company. As such, they actively look at ways for improvement. Examples in this theme included NPD, process, environmental and packaging innovations, all which are highly relevant to resource-constrained family businesses, leading to competitive advantage. Being externally focused concerning their culture enables dedication of resources to create capabilities allowing to obtain information from multiple external sources and thus increase innovation (Zahra et al., 2004; Laforet al., 2016).

5.3.2.3 Develop management and operations

With regards to leadership skills and relevant training for the management, participants discussed attending courses offered by business support community and/or universities to enhance managerial skills (Sirmon et al., 2007). Courses were related to management and also manufacturing. Non-family managing director of a leading pastry and bakery manufacturer, during the interview discussed attending manufacturing related courses at a local university (e.g. Strathclyde) as a way to enrich i.e. extend current innovation capabilities (Sirmon et al., 2007, 2011) in the broader organisation. He also said how himself and other members of management are educated, trained, and experienced concerning innovation. The MD made the following comment:

"Some of our management have got sort of education and training and experience in innovation and background in innovation … our operations director is a black belt in manufacturing … my background is accountancy, health & safety personnel HR … [and] I have attended some courses are Strathclyde mainly about manufacturing." (Firm B: MD, pastry & bakery manufacturer)

The manager attending the manufacturing course at Strathclyde spilled over the knowledge gained to the manufacturing staff making them professionalised as well, he explained:

"At one point I gave them all calculators let's work it ourselves they were shocked, because it means we are producing thousands of additional products and over the course of a year, just by reducing that changer over from 40 minutes down to 30 minutes. That was more for staff in terms of innovation in terms of teaching them about SMED (single minute exchange of diet) change overs. So that has a massive impact." (Firm B: MD, pastry & bakery manufacturer)

This way this outside professional leader professionalises their operations to best position the company for continuous improvement and success. He further explained buying knowledge from outside to structure intellectual capital portfolio (Sirmon et al., 2007, 2011), which comes across as a further act of professionalising of the family business. Rather than relying on existing limited knowledge he said:

"Engineering is a big thing for us we are doing an obsolescence review just now and we are buying that expertise in, so area where we feel we don't have the knowledge we can buy". (Firm B: MD, pastry & bakery manufacturer)

This way this family business achieves competitive advantage and enables success across future generations. This also shows the firm's external culture orientation which place greater value on signals from their external environment and insights into emerging innovative and entrepreneurial opportunities. Family business J a growing meat supplier with around 50 employees, discussed attending courses on management to improve on management capabilities. During the interview with the managing director, he said not only himself attended the course but also his brother when he became the operational director. The family member managing director said:

" I even went done a course partially funded by [business support organisation name] on management stuff. When Greg [brother] was introduced into the management, sent him on a course through [business support organisation name]. (Firm J: MD, meat supplier)

This family business firm professionalised family members with formal management courses helping the family members running the family business with formalisation of specific structure elements coupled with management behaviours and norms that are in attribute to a more professionalised working environment (Sirmon et al., 2007; Carnes and Ireland, 2013). This family business also recruited non-family employees and managers, and provided training and development for them too, which further institute formality, and enabled the firm to reduce the risks and constraints concerned with a more informal and family-focused setting thereby to support resource orchestration (Sirmon et al., 2011). At the same time the family members

have strived to obtain competitive advantage through their 'stewardship-mindset' and 'loyalty' that has empowered staff, which will be discussed under last theme in this section.

In addition, company N a fourth-generation family run ice-cream business operating over 111 years and have doubled up turnover in the last few years discussed a number of triggers behind this growth. Due to ownership issue, the family business had gone through a tricky period where it had no focus. However, with funding support and external consultants coming to assist with strategic direction company N was able to professionalise the business and focus on growth. For example, the family accountant took up the role of a commercial director focusing on expanding customer base and product ranges supplied to them, attending tradeshows, updating the website, re-branding, all which helped create better awareness and making things more professionalised. During the interview with the commercial family director, he explained that their relationship with business support community helped create an organisational structure to assist with strategic plans and family constitution. Since many family SMEs are doing multiple jobs offering less opportunity to cultivate innovation which may result in low management commitment and a culture that does not support innovation, yet this family firm explained how external consulting support helped create a structure enabling the family to be more focused, the commercial director commented:

"Because we are a family business, we have a lot of people like myself who are doing multiple jobs that's why we are not able to focus on our real goals, long-term and even short-term goals, because we are too busy with the day to day operation of the business. We did a review of a company and [external consultant from business support community] identified where we needed to move people around or employ new people or what skill gap, basically putting together a proper structure to the company." (Firm N: comm director, ice-cream producer)

The organisational structure idea came from the family member commercial director's cousin who is another director. This firm recently implemented the changes as discussed above and in addition employed a non-family manager in production to assist. As a result, they have engaged in a project with a local university which qualified for an innovation voucher and led to bringing a new product to the market. Although family businesses historically tend to be reluctant change (Flinders et al., 2010), fostering a professionalised and externally oriented culture open to innovation can be important to innovation success in family SMEs (Laforet and Tann, 2006; Laforet, 2016).

Company P a successful family business supplying high quality niche meats to major retailers in the UK discussed having business relationship with business support community for more

than 20 years which has been instrumental to growth and innovation activities of the firm, enabling them to access funding to professionalise staff as part of structuring particularly accumulate and develop human resources and bundling particularly update and extend capabilities (Sirmon et al., 2007, 2011), the founder said:

"We have worked with [business support organisation name] since 1995. We have been account managed by them … he comes here a lot, I've been in [their office] … [I received] small grants for helping train people, develop people, we have £18k to develop the people that were going to use the new equipment from FMPG [funding name]." (Firm P: Founder, meat supplier)

These family businesses also attend innovation related courses, events, and shows organised by business support community. Business networks particularly with business support community has helped many of the family firms in this study not only with growth but also with professionalisation fostering innovativeness.

5.3.3 Employ a long-term mindset

5.3.3.1 Pursue patient capital

Aside from achieving higher levels of innovation through operationalising professional management which also support family businesses to survive long-term, participants further structure resource portfolio with a long-term mindset by accumulating patient capital to acquire valuable resources or make suitable investments for innovation. Family SMEs here offer an effective structure to orchestrate financial capital/stability as they denoted possessing a longer time horizon (Sirmon and Hitt, 2003; Sirmon et al., 2007, 2011). They avoid unsuitable short-term objectives enforced by external capital market and dominant customers, allowing them to invest in innovation more creatively. Many of the participants discussed re-investing business profits and saved up money back into the business to grow through innovation-related activities. This thus highlights their inclination towards internal financing to sustain a longer-term perspective (De Massis et al., 2018). Company P, as a farmer's son the owner evolved from working as an apprentice butcher in a small shop to becoming the fourth fastest-growing Scottish brand supplying high quality niche meat products to major supermarket retailers in the UK. During the interview with the founder and family-CEO he explained leveraging internal financing to fuel innovation and growth activities:

"We raise money with profits, we save up, we don't borrow from VCs and banks, when we need we save up." (Firm P: Founder, meat supplier)

Company G a successful food processing family company also discuss the family's mindset to re-invest the profits into building the business to encourage innovation, the non-family managing director explains:

"The chairman is the head of the family that has largest stake of the business and he's very much into building the business rather taking profit out of it. From that he basically encourages innovation". (Firm G: MD, food processing)

Third-generation family business B producing top quality pies re-invested profits into the business to pioneer process innovation capabilities (Carnes and Ireland, 2013). The non-family MD discusses that shareholders, who are majority family members, are keen to invest their profits back into the family business to undertake innovation and continue pushing:

"If we take robotics, why do it, firstly the shareholders of the company and the board have always been keen for [company name] for keep pushing for [company name] and investing back in the company. The family for example could say let's not re-invest lets get the money as dividends. SMEs is finding that balance between keeping shareholders happy in terms of return in their investments, but also always ensuring that you always invest in the business". (Firm B: MD, pastry and bakery manufacturer)

They thus utilise their accumulated patient capital resource as a source of competitive advantage allowing them to invest in innovation with a long-term perspective and strategy rather than maximising short-term-oriented profit. This strategy has helped resource constrained family firms to expand and extend current manufacturing operations and capabilities and build new ones (Carnes and Ireland, 2013) as part of their long-term-oriented and continuity-focused strategy. Some, particularly larger family SMEs have also engaged with research centres to facilitate further process innovation as their long-term strategy. Investment in process innovation through their patient capital has enabled family SMEs to possess control and continuity over their business long-term and across generation. With their limited resources they aim to build their business with a long-term mindset from which they create patient capital and encourage innovation with stamina (Konig et al., 2013). Such idiosyncratic financing and growth preference can be a valuable source of competitive advantage over firms with short-term mindset (Sirmon and Hitt, 2003) and allow higher quality of product and service to customers. On their websites[5] they explained how they have won various "awards" as well as

[5] For confidentially purposes names are anonymous

being “BRC [British Retail Consortium][6] certified” highlighting their long-term mindset for investment in innovation and quality capabilities (Carnes and Ireland, 2013). Thus, they use their appropriate time horizon for effective resource management due to patient capital, and engage with process innovation, with limited resources.

Safeguarding the longevity of the firm is in fact more important than seeking short-term pays off. Many of the firms in this study operate with a 5 year or more pay-off period for key and strategic decisions including purchasing machineries or building a new factory, a strategy different to other companies who mostly pursue a 2 year pay-off period[7]. Managing director of a successful third-generation family-owned business with professional management, who have a leadership position in specialising pies echoes their long-term perspective on business and financing:

"Payback periods for us [is] 5 years and occasionally it is stretched over 5. The innovation and investment are not purely down to growth and turnover. That is part of it, but also if you are continually investing and innovating also provides security for the company also." (Firm B: MD, pastry and bakery manufacturer)

Company B’s orientation strategy (e.g. long-term) has paid off. Company B has grown from a small bakery with a hot plate baking scones and pancakes and selling door to door locally, to the largest pastry manufacturer in UK manufacturing 50 tonnes of pastry per week to every corner of the UK. Their long-term is also highlighted by their leadership with longer tenures, which has helped many of the family firms’ leadership to focus long-term and concern little about being sacked or replaced in times where short-term goals are not satisfactory (Arregle, Hitt, Sermon, and Very, 2007). They have a desire to leave a legacy particularly family-member MDs/CEOs, or non-family MDs/CEOs who have been with the business long enough (e.g. 30 years for firm B) are further driven to pursue continuous investment approaches to innovation, which is discussed in more detail in the following theme. The long-term mindset helps these firms to overcome short-term pressures and follow a strategy of persistent product and process innovation. Despite their resource constraints on investments, their patient capital enables many of these family-owned businesses in this study to invest with stamina, bringing about greater innovation. Patient capital has also enabled family firms to overcome path

[6] It is a globally recognised UK trade organisation. Gaining this certification offers brand an internationally recognised mark of food quality, safety and responsibility. It is a certificate that shows products are accepted by big retailers and ensures customers have confidence in the products.

[7] See Barton and Wiseman (2014)

dependency by acquiring new resources i.e. professionalising the business (discussed in the previous section) which shown important to innovation and their survival.

5.3.3.2 Build a brand

Most of the family businesses in this study focus on building brands. The implication for this is their ability to employ a long-term outlook and represent their family history and values. Company N a third-generation ice cream and pastry brand had been going through a tricky period, however, they plan to establish themselves as a recognised brand in the UK and possibly Europe as a long-term strategy. They wish to leverage their brand to enter new markets, the commercial director explained:

"a long-term goal – we want the brand to be recognised through UK and possibly through Europe and the US." (Firm N: commercial director, ice-cream and pastry manufacturer)

During an interview with a non-family MD of a third-generation leading family bakery and pastry brand in the UK, Company B, he boasted about their brand and further below discussed how they are at the top:

"We are the Scotland's number one brand in pies. But actually, number two brand in the UK. We are also the UK's largest manufacturer of pastry. Last year I think we made about 34 million pies. So that's a lot. But we're also, according to the Scottish Grocer, we are the fourth most recognised food brand". (Firm B: MD, pastry and bakery manufacturer)

These family firms focus on building brands as part of their long-term mindset on business and as a mean to achieve competitive edge and influence customer. As family firm B said, they capitalise on brand for potential benefits, where brand helped them here to obtain more sales (financial benefits), and help businesses hold a stronger position and reputation in relation to customers/retailers (strategic benefits) (Riezebos, 2003). Employing a long-term perspective, family businesses here discussed less keen to sell private labels products (i.e. under supermarket brands). They have worked hard building successful brands thus avoid going that route, enabling longevity. Company B while they do little private label work, they are much more focused on selling branded products, their branded products are sold in every supermarket. Company C, a successful leading family business biscuit brand discussed only selling branded products. He comments how this has enabled them to survive long-term:

"We managed to survive for 30 years 35 years and we have been able to make progress, what has helped us really is we have been focused on brand, [we] don't really do private label work". (Firm C: MD, biscuit manufacturer)

Some of these family brands hold a stronger position when dealing with customers as some reported being price giver than price taker. Company F a high-quality second-generation family-owned shortbreads brand has had previously done quite a bit of private label work, however, during the interview the non-family operational director discusses plans to move away from that into focusing more on selling branded products, especially after a successful collaboration project they've done with their brand, the operational director is more confident:

"Historically over the last decade most of our innovation have been dictated by supermarket customers. So they drive innovation. Its good in some ways because the company has experienced some growth but it's bad in other ways because what we found is our NPD resource which is not the biggest, is been eating up by products which didn't have the [company] name on them, you see, so I guess going forward is put more resource towards [company name] brand, it needs to be much higher circulation and availability. As we have been demonstrated innovation with the [name] project sales have gone up from nothing to 100 of 1000s in less than years." (Firm F: operational director, shortbread manufacturer)

As family business F highlighted, dominant customers force them to sell under private label rather than their own family business brand resulting in dictating and driving innovation, and consume managerial and technical resources and attention, limiting these family businesses' attention capacity available for long-term innovation. They view themselves in a continuous struggle with their large dominant customer to maintain control over the direction of innovation (Fischer and Reuber, 2004). To maintain control over the direction of innovation and survive long-term they thus seek to build brands and avoid doing private label as a long-term-oriented strategy making even if they lose short-term business with a customer. This is what family business C has clearly done and as a result turned down supplying to a major customer in the UK. Family business P supplying high quality niche meat to large supermarket customers has also focused on establishing their brand with customers, they do not do any private label work, and have been able to survive over 20 years in a competitive supermarket industry, the founding CEO explained:

"So we essentially established ourselves as a credible meet supplier to supermarkets, of branded products, so when I say branded, I mean my name on it. So essentially during the period of 1999, in 20 years, we have concentrated well on growing our brand in supermarkets." (Firm P: founding CEO, niche meat supplier)

Having more control over the direction of innovation and resources required, have allowed family businesses to establish their brands and survive long-term, while at the same time focusing on building brands have enabled them to avoid private label work and have more control over the innovation. As a result, these successful leading family businesses have been

innovating in terms of product, process, and people to survive and thrive long-term in the competitive supermarket industry. Third-generation family business B echoes:

" The reason why [company name] are number one brand in Scotland is the continual investment in its products, people and processes. (Firm B: MD, pastry and bakery manufacturer)

Family firms focusing on branding is their ability to differentiate and create strong associations long-term. In addition to making continual investment in innovation which strengthens their brand, they also leverage their brand to create collaborations with other firms for marketing capabilities and successfully introducing new products and packaging design into the market. They manage their brands to communicate their uniqueness and source of differentiation strategy (Sirmon et al., 2007, 2011). They are in a distinctive position to leverage their brand as an additional familiness resource and family firms' uniqueness (Botero and Blombäck, 2015). This shows they manage their resources appropriately to producer greater value. Focusing on brand building and avoiding private label work enables family businesses to more efficiently and effectively allocate and utilise innovation-related resources and capabilities that may be more dynamic and with appropriate time horizon, thus successfully resource orchestrating (Sirmon et al., 2011; Duran et al., 2016).

5.3.4 Cultivate employee relations and satisfaction

5.3.4.1 Build long-lasting relationships with employees

Many of the family firms' long-term perspective in this study also allows them to develop long-term relationships with employees enabling superior relations and managing constraints to innovation. Participants discussed being in rural areas with many local employees who have been long standing with the family businesses (Miller & Le Breton-Miller, 2005). As a result, these family businesses invest in developing both the employees and the communities. They also work hard to retain employees long-term even in tough times. Company F in the shortbread business with over 130 employees discussed they do not make anyone redundant unless employees leave on their own. During the interview with the operational director, despite bringing into the factory robotics and automation machines to produce more efficient resulting in relying less on human labour, he explained:

" For us we have a permanent team here and that's our resource that we tend to invest time into that ... one of the things I won't do is bring a machine to get rid of people. Sounds daft, but it's a great way to destroy people's confidence. If you are innovating and bringing fancy equipment and then what you say is right, now indeed 3 people leave the business. People just get scared. All the people since we brought the machine are all here unless left for their own personal reasons." (Firm F: Operations Director, shortbread manufacturer)

Company N producing ice cream and pastry with 120 employees also discussed a similar strategy, the commercial director said:

"Yes we will have to invest more in machinery but I don't think we will stop our labour growth." (Firm N: commercial director, ice-cream and pastry producer)

Company N is in the same location over 111 years partly because the location is "*good for staff*" (Firm N: commercial director, ice-cream and pastry producer). Consequently, these firms also develop superior relations with their local council and access resource (e.g. finance), leading to overcome constraints to innovation (Sirmon et al., 2011; Carnes et al., 2017; De Massis et al., 2018).

Family business J with around 50 employees discussed having employees who have been long standing with the business. These employees have started from the bottom and are now heads of functions. They establish greater commitments leading to tacit knowledge (Sirmon and Hitt, 2003). The MD of company J during the interview discusses long standing employees participate in important meetings:

"We have management meetings, we have a senior management team with half a dozen folks who have been longstanding with the business, we bring them in. (MD, food producer)

This strategy in return enables offering deeper and more experienced knowledge to customers and suppliers leading superior innovation and valuable competitive advantage. Long standing employees play a valuable role for resource-constrained family firms who employ a long-term mindset. The family firms strengthen employees to gain competitive advantage through their long-term devotion and commitment. As family businesses, their mindset is not purely turnover and growth driven, but also socially driven with superior care for community including employees ensuring they provide security and a secure environment for them, which helps overcome resource constraints and builds competitive advantage in the long run (Henard and McFadyen, 2012; De Massis et al., 2017). Third-generation family business in the bakery and pastry business with just slightly over 200 employees describe this in the following:

"So the key things are for me is security and growth for [company name], there over 200 people working here, I see as my job to create employment and create wealth and create secure environment for them. The second key driver for me is also the shareholders, it's my job also to keep them happy and the business provides adequate return for them." (Firm B: MD, bakery & pastry manufacturer)

Employment may take precedent over shareholder return. The fruit of this has paid off for these family firms. In fact, employees remaining with the family business in both good and bad times compensates human resource constraints to innovation and has led company N to see good growth. The commercial director explained:

"We also have loyal staff who've been with us through thick and thin, we were lucky to cope with the demand and supply, that's why we have seen good growth!" (Firm N: commercial director, ice-cream and pastry)

5.3.4.2 Shepherd employees with training and development

Long-term commitment to employees allows many of the family businesses to provide continual training and development, and 'shepherding' to nurture employee development, skills and knowledge, this way family firm managers accumulate and develop their human capital and bundle them into capabilities (Sirmon et al., 2007; Carnes and Ireland, 2013). Their desire for continuity enables them to perform stabilising process and strengthen existing human resource capabilities. This includes aspects related to manufacturing, and or qualifications (e.g. food health and safety). Company J family business meal supplier with around 50 employees have recently invested in training courses for a long-standing staff to be upskilled and qualified with food safety and quality. The family business believes the training is a long-term investment that will bear fruits for the business, which is why they are making those investments. If they believe employees leave after a couple of years, they may be reluctant. This company thus provides sponsored courses for them to be fully qualified in their jobs, to maintain their current position and remaining up to date with the market requirements. This way they manage resource constraints and ensure stability and continuity log-term. Company B third-generation family bakery and pastry brand with slightly over 200 staff discussed sending a few of their staff away on business improvement academy, as an act of care for their future needs. This company being a large SME is able to afford sending staff away to trainings that are not for necessarily for necessity reasons but for exploring new possibilities and or learning ways to enrich their existing capabilities, leading to innovation (Carnes and Ireland,

2013). The non-family MD who is been with the family business over 30 years being a fan of business improvement and continual investments and lean techniques, describes:

"…[attending training,] are the [employees] going to make small incremental changes that will benefit the company? Yes! It's personal development and development for the company. There are fantastic SMEs generating employment, taxes, income for the government. Employment and education are key to success for everybody." (MD, pastry manufacturer)

Family firms focus on non-economic goals (Chrisman, Chua, Pearson, and Barnett, 2012) such as personal development of employees can lead to high levels of human capital and may thereby facilitate innovation in their firms (Duran et al., 2016). Family business B has also invested in lean manufacturing trainings for many of its employees, to broaden their horizon and thinking as part of expanding into innovation, he himself attended external courses to then be able to directly teach and shepherd them concerning innovative thinking, he said:

"So, in terms of innovation we've done quite a few things but as I say it's not purely machinery. We have tried to expand innovation and change into some of our staff's thinking as well. So we've provided some training, I went to Strathclyde university to do some lean manufacturing training as well." (Firm B: MD, pastry and bakery manufacturer)

This way they extend current capability (Sirmon et al., 2007). Additionally, they work closely with a number of external organisations to obtain resources to nourish employee development, such as company B states:

"Scottish Enterprise, SMAS [Scottish Manufacturing Advisory Services] and Scottish Bakers because they do a lot of trainings, AFRC, Motherwell college in terms of training & development." (Firm B: MD, pastry and bakery manufacturer)

In conjunction with Scottish Bakers Association, many of the family firms achieve qualification regarding their jobs demonstrating employees are competence in skills related to their area of work and expertise. More than half of family business B's employees have achieved the Scottish Vocational Qualification (SVQ) in Food Production at SCQF level 5 which allows staff to demonstrate competence in job-related skills in their area of work and expertise. Family firm F with 130 employees, who was discussed earlier in this theme, has made no redundancy despite implementing robotic machines which can act as labour replacement. However, senior managers leveraged the machines to provide formal training and upskill employees, demonstrating further commitment, non-bifurcation bias and non-financial goals (Mejia et al., 2007; Chrisman et al., 2012; Verbeke and Kano, 2012). As discussed such investments has led to long-term relationships, employee engagement and commitment, and

high levels of experience, enhancing innovation long-term. This way family firms engage in resource orchestration (Sirmon et al., 2011). The operational director explains:

"Now that we have put on a bigger robot, we have been able to further demonstrate the value of that technology and that innovative approach ... [and] the full-time guys are now being up-skilled working complex machine operations. Their skills and knowledge are growing, they are having more formal skills". (Firm F: Operations Director, shortbread manufacturer)

Many of the family businesses in this study keep long-term relationships with employees and cultivate those relations through regular training and development for both professional and personal care. This is not only a source of competitive advantage for them and allows superior innovation in the long run, but also they are able to shepherd their workforce and leverage their high-involvement and decentralised structure, and bonds to better engage with innovations, despite lacking of resources. Particularly, the deep task, product and market knowledge among the employees, as a result of their longer tenures. This characteristic of family businesses is valuable to innovation as their interaction accumulates tacit knowledge between employees sharing key ideas across the firm's functions and departments further supporting resource orchestration (Sirmon et al., 2011).

5.3.4.3 Empower employees

Participants in this theme further discussed cultivating employee relations through empowerment, which is also linked to their long-term orientation. Many family businesses in this study explained providing meaning, autonomy, competence and ensure the job is impactful. This way they accumulate human resources as part of structuring (Sirmon et al., 2007). For example company J a family firm meat supplier with 50 employees discusses empowering employees through promoting from within leading to effective innovation, the family-MD explains:

"We definitely as a business, or as board rather, we definitely try to empower our management team as much as possible. One of the big things we are not sure if it is innovation, we always try to promote from within. Karen originally came in to work with Craig in the office but within 2 years she is getting qualified on the job getting sponsored on the courses to be a fully qualified health & safety officer and quality control manager. And Craig himself came to set up a website for me and is now office manager for 5 years. Head of transport came as a driver [but] recently promoted to head of transport ... I would say in every area of the business we've got someone who came in to fill position in lower level and promoted from within." (Firm J: MD, meats producer)

The family business open and autonomous culture coupled with training and development, enabled employees to feel a deeper commitment to the business thereby hold a longer tenure. They have professionally "grown up" in the business and have experiences across different levels and functions and departments in the firm. They know the customers and other stakeholders in addition. Longer tenures and deep tacit knowledge help these employees to be able to recognise how existing resources may be recombined to elaborate existing capabilities for innovation (Carnes and Ireland, 2013). Karen, a long-standing non-family employee in family business J has done this, the family-MD explains:

"…Karen's done good innovation recently with our food waste to be eco-friendly." (Firm J: MD, meat supplier)

Family business F's non-family employees as a result of empowered culture and being with the business long-term recognised new opportunities for recombination activities that led the company extend their capabilities through working with an external designer as part of packaging innovation, the non-family operations director explains:

"[Project name] idea came from a member of the team … [Project name] collaboration, if you like was almost like creative innovation as nobody ever done it before, nobody worked with somebody who does designs, artists, see if we can get their permission to put their art on our packaging". (Firm F: operational director, shortbread manufacturer)

These employees working for family firms with long tenures are able to recognise opportunities for recombination or integration activities leading to innovation in family firms. This way they improve their competitive advantage. Family owner F was very open to new ideas and encouraged his team members to come up with ideas for recombination activities that may lead to innovation. Together with the non-family operational director they have been able to empower employees through meaning and autonomy, and competence. The informal NPD process further motivates and empowers employees for participation with new ideas. As opposed to before where their ideas and suggestions had shutdown, they are now bringing more new products to the market that are idea-generated by employees, and when well received in the market, employees find more meaning and are impacted with regards to their job. Family business F explains:

" [Family owner name] himself is a very creative individual, loves new ideas, designs, projects, if someone says we have got this new idea he says yes lets do it … we can bring products to the market and give our customers something exciting and grow the business and give the team satisfaction from it. This doesn't sound innovation but at the moment for us this is part of innovation, something that has changed and it's an innovative situation. You can actually tell there is a lot of people who have taken motivation and strength from it." (Firm F: operational director, shortbread manufacturer)

Thus, an open and decentralised approach to innovation can be an empowering strategy which many of the family businesses in this study pursued. Particularly, if the management are listening and encouraging employees with ideas and suggestions for innovation. This open and decentralised culture to innovation creates more support and dedication of employees for cooperation and collaboration leading to effective internal alignment and knowledge exchange across hierarchies and departments which positively influence mobilisation and coordination of resources for leveraging new products and services (Chirico et al., 2011; Carnes et al., 2022).

Company B with slightly over 200 employees in bakery and pastry sector ensures to psychologically empower employees through competence development. For example, the MD explained sending staff away on a lengthy business improvement academy to learn about new manufacturing techniques to help improve the business, which make them to believe they are fulfilling their proficiency with their jobs:

"Two of our staff going to business improvement academy which is again SMAS, run couple of times a year I believe, only last about 12-16 weeks. But essentially take staff for a day in a week they get introduced to some lean manufacturing techniques essentially". (Firm B: MD, pastry and bakery manufacturer)

Not many organisations, particularly, SMEs would want to or can afford sending their employees away for a few months training course. Employees in firm B and others feel invested in the business leading to empowerment. Company B and others operate with a level of autonomy on a daily basis and as such employees can make judgments and decisions. Company B further explains employees have freedom to obtain further training:

"…[employees] would come to their manager and say you see that machine I think if we had done this or that or if you send me on a training course I want to learn about how we do this." (Firm B: MD, bakery and pastry).

The culture empowers employees concerning training and development to increase their skills as part of bundling resources (Carnes and Ireland, 2013), which also enables employees to feel doing less routine-work and yet there is actually development with purpose and goals to reach, helping create more value and impact for themselves, the firm, and the family. As opposed to paternalistic and a founder culture, the flexible and open culture emphasised here employee empowerment and change through commitment to training and development, cultivates innovation in these family SMEs (Laforet, 2016).

5.3 5 Analysis and Interpretation

Analysis of low-tech family SMEs has enabled this study to identify behaviors and strategies that allow them to orchestrate their resources to innovate under a unique family business organizational culture. The empirical research conducted enabled to extend the resource orchestration theory by including further phases and sub-processes, demonstrating the different practices and approaches that family SMEs in this study undertake for resource orchestration related to innovation activities.

A significant finding concerns investment in process innovation in family firms and highlights the role of managers as orchestrators. It suggests the importance of effective resource management to achieve the full value of resources and the managers' role is perhaps key to increasing the likelihood of achieving efficiency and productivity by implementing a process innovation strategy (Sirmon et al., 2011). However, since family firms in this study demonstrated external orientation (Laforet, 2016; Zahra, 2004), particularly having nourishing business relationships with the business support community which allowed them access to funding and technical knowledge to implement process innovation, the study suggests business support community as an external actor or manager of the firm can be considered as orchestrating actors. They do not necessarily need to reside within the boundaries of the firm (Nason et al., 2019; Baert et al., 2016). It thus following the work of Mirkoviski et al., (2023) extends the resource orchestration theory and considers key external actors as external managers orchestrating innovation in SMEs.

Similarly, findings highlighted that family firms sustaining external relationships with their long-term customers and suppliers were important (Le Breton-Miller and Miller, 2006) for innovation (De Massis et al., 2018). It showed they focused on product innovation and quality (Giacosa et al., 2017; McAdams et al., 2015) and involved customers and suppliers in generating and evaluating ideas for new products to satisfy market demands and meet competition in the competitive supermarket industry. Contrasting with existing resource orchestration research that largely focuses on resources residing within the boundaries of the firm (Carnes et al., 2017; Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Wales et al., 2013), this study found external customers were key acting members in the resource orchestration for product innovation in family SMEs, often breaking their path dependencies

to innovation (Lorenzo, et al., 2022) and enabling them to create new product varieties (Guiné et al., 2016).

Family firms in this study expanded their resource portfolio by accessing and sharing key resources from external customers and suppliers for product innovation, and from the external business support community for process innovation. These external actors played a key role in innovation in family SMEs and this study suggests they can be external orchestrating actors residing outside the family business (Barthélemy, 2017). They thus extend the resource orchestration framework by considering it in a family SME context and the role of external actors in orchestrating innovation. Furthermore, unlike studies examining process and product innovation in isolation (M Cucculelli et al., 2016; De Massis et al., 2015) this study focused on both product and process innovation in family firms important for their competitiveness (Capitanio et al., 2010; Damanpour and Gopalakrishnan, 2001).

Apart from operationalizing professional management to access and acquire resources externally as part of efficient resource orchestration for innovation and managing the constraining effects of innovation under family business culture, family SMEs here also often avoided acquiring financial resources but instead 'accumulated' *patient capital* to facilitate their long-term investments in innovation projects (De Massis et al., 2018) such as process innovation. Investment in long-term and sustainable innovation also gave more control over innovation projects and helped balance the short-term short-sighted innovation investments often demanded by dominant customers which only involve incrementally innovating (De Massis et al., 2015). This suggests patient capital played an important role in facilitating innovation in family firms with limited resources and dominant customers, particularly in balancing between short-term and long-term innovation investments, between product and process innovations, and to between keeping customers happy while innovating with a degree of stamina (Konig, et al., 2013) and surviving long-term (De Massis et al., 2018). Patient capital of family firms interestingly can help mitigate dominant customer reliance and offer more control over the direction of innovation plans (Fischer and Rueber, 2004). Finding also offers support to managing dominant customers for innovation as highlighted in RQ2 and also managing limited resources for innovation as highlighted in RQ1 for family firms.

Focusing on building brands and branded products further reflected their long-term orientation and represented their family history and value (Giacosa et al., 2017) as an accumulated

resource, to facilitate and leverage innovation. This thus suggests focusing on brands as a long-term strategy facilitates the effects of family business culture for innovation. Findings showed they were able to hold a stronger position and reputation with regards to their large dominant customers (Riezebos, 2003) because family firms wish to maintain control over their business and to survive long-term, thus sought to focus on selling branded products as much as possible rather than going completely down the root of selling under private label. Some did a bit of both but preferred selling under their own brands. This is perhaps because private label locks the family business under the constraint of customers and lose control over their innovation plans (Fishser and Rueber, 2004). Family businesses due to their socioemotional wealth wish to keep the business over generations under the control of the family thus losing control over the direction of innovation plans may lead to following customer objectives rather than the family suggesting less likely to deeply invest in the future for product, process and organization innovation. Moreover, customers in the long run prefer to stock branded products with strong product innovation and product quality focus and reputation to differentiate themselves from competitors. Focusing on brand building and avoiding private label work enables family businesses to more efficiently and effectively allocate and utilize innovation-related resources and capabilities that may be more dynamic and with an appropriate time horizon (Sirmon et al., 2011; Duran et al., 2016). Therefore, effective management of resources and control over the direction of innovation plans perhaps enables family SMEs to overcome the effects of limited resources and dominant customers while benefitting from their idiosyncrasies, thereby achieving superior and long-term competitive advantages.

Another facilitating effect of the family business culture for innovation was their superior employee relations and satisfaction. Their focus on non-economic goals (Chrisman, Chua, Pearson, and Barnett, 2012) such as empowerment and personal development of employees led to high levels of human capital and long-standing with the family firms even in tough times (Miller & Le Breton-Miller, 2005). The level of innovation around organizational practices such as continual training for improvement, high involvement of employees in entrepreneurial and innovative activities, flat structure, and on-the-job learning were deep investments for the future which enabled family SMEs to overcome their human capital resource constraints to innovation and built-up competitive advantages in the long run. This finding supports previous studies that found superior employee relations help family firms overcome shortages of resources for innovation (De Massis et al., 2018; Henard and McFadyen, 2012).

The lack of sufficient innovation resources brought by their size in terms of the number of employees may suggest an aspiration for a superior degree of organizational innovation to support the unstructured innovation process. For example, they collectively participated in idea generation meetings and events where employees from different departments were encouraged to share ideas and heavily engaged in cross-departmental collaboration for innovation because of their limited innovation capabilities. The open and flat culture together with superior training and high involvement of employees created a tacit knowledge exchange, typical to these firms (McAdam et al., 2016) enhancing resource orchestration for innovation (Duran et al., 2016). Some family businesses in particular in the study sought external training of several key employees related to enhancing innovation.

In summary, the findings suggested resource orchestration to navigate the constraining and facilitating effects of family business culture for innovation. Unlike other studies showing either, this study showed how family firms can navigate and balance between both through effective and efficient resource orchestration to undertake innovation. Professionalization to manage the constraining effects of family business culture on innovation such as nepotism allowed acquiring and accessing external resources to support product and process innovations, whereas the long-term orientation and superior employee relation as facilitators of family business culture for innovation, in particular accumulated patient capital allowed longer-term and process innovation investments with limited resources and helping to balance between the short-term customer driven incremental innovation increasing competitiveness and surviving long-term, and accumulated and built up top brand names reflecting family history and value to hold a stronger position and reputation in the market against competitors and large dominant customers enabling them to have more control over the direction of their innovation plans.

Balancing the constraining and facilitating influences of family business culture on innovation allows family businesses to efficiently and effectively allocate and utilize innovation-related resources and capabilities that may be more dynamic and with an appropriate time horizon. Their management of resources offers better control over the direction of their innovation plans and allows family SMEs to overcome the effects of limited resources and dominant customers for innovation while benefitting from their idiosyncrasies, thereby achieving superior and long-term competitive advantages. It is not just resources that influence the way SMEs innovate but

also their organizational culture as a result of being family businesses, and their dominant customers, in particularly in the low-tech context.

The influence of family business on innovation is double-edged yet through resource orchestration they can maximize the positive effects and minimize the negative effects to innovate successfully and achieve competitive advantage. Some researchers argue family business involvement and culture on innovation is useful while others argue against this however findings from this study suggest navigation of constraining and facilitating effects of family business involvement and culture to innovation. This study thus joins and uniquely contributes to the family business research in particular the hot debate concerning family business and innovation.

5.4 Revised conceptual framework

Following a review of the literature on SME characteristics and constraints to innovation, and thereafter how resource orchestration can help them overcome, a conceptual framework was presented in Chapter Three (Figure 3.3). It sought to thematically isolate key constraints of innovation and highlight resource orchestration to achieve innovation. A revised conceptual framework is also presented in Figure 5.8, based on the findings of this study. The new framework incorporates strategies that emerged from the study's findings, showing/allowing SMEs to resource orchestrate to navigate through, and manage the challenges and opportunities exhibited from limited resources, large dominant customers, and family business culture for innovation.

While recent studies highlight the importance of resource orchestration to achieve innovation (De Massis et al., 2018; Duran et al., 2016; Sirmon et al., 2011) there is limited empirical work addressing this issue, particularly concerning SMEs. In contrast to extant resource orchestration research that largely centers around resources that exist within organizational boundaries (Carnes et al., 2022, 2017; Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Wales et al., 2013) the revised framework through the findings of this study identified strategies that highlight SMEs access resources residing 'outside' of their firm boundaries to undertake innovation. The framework of strategies encompasses both internal and external approaches to manage resources for SME innovation. Resources do not necessarily need to reside internally (Nason et al., 2019) particularly for SMEs who are limited with resources and are often dependent on accessing them externally. Following the work of Mirkovski et al., (2023) this framework extended the resource orchestration theory.

The recent resource orchestration literature highlights resource orchestration with constrained resources (Mirkovski et al., 2023) but empirical work is still limited in this area, and, moreover, there is no empirical work on *dominant customer* and *family business culture constraints* in the SME innovation context. This is what the revised framework builds upon the initial framework. It offers a more comprehensive approach considering a multitude of key constraints SMEs face and the strategies that enable them to overcome those constraints, as opposed to being limited to only resource constraints that current research mainly focuses on (Mirkovski et al., 2023; De Massis et al., 2018). This is important because the family business culture and dominant

customers highlighted the contextual issues that characterize the limited resources and skills, supply chain disparity of profit, and the fact that most firms are family-owned SMEs, which impacts innovation. The model also ties these three themes together by showing their interplay to theorize innovation strategies of low-tech SMEs. The framework of strategies is holistic and interdependent which means SMEs can mitigate the effects of multiple constraints simultaneously to innovate more effectively and efficiently. This is important as SMEs are constrained in nature compared to large firms (Love and Roper, 2015) they thus are dependent on making unique innovation strategies that enable them competitive advantage.

Further, the revised conceptual framework offers constraining and facilitating effects of dominant customers, limited resources, and family business culture to innovation suggesting how firms balance or manage between constraining and facilitating effects to successfully innovate, especially important for SMEs operating in constrained contexts concerning innovation. As discussed earlier, unlike existing studies in the dominant exchange partnership, SME innovation, and family business innovation literatures that focus on one (constraining) or the other (facilitating), this study sought to demonstrate how SMEs can manage between them to increase innovation. For example, the effects of dominant customers can both constrain and facilitate innovation, and firms seek to manage between these two. To limit the constraining influences of dominant customers to innovation low-tech SMEs focus on niche products and markets to become market leaders and increase bargaining power, whereas customer alignment and collaboration facilitate innovation (Coviello and Joseph, 2012), and low-tech SMEs manage by balancing between the constraining and facilitating influences of innovation. Further, these strategies demonstrate SMEs and firms, in general, can innovate in contexts where there are dominant exchange partnerships.

To limit the constraining effects of family business culture to innovation low-tech SMEs professionalize and become externally oriented (Laforet, 2016) whereas their long-term orientation on business (e.g. patient capital and focus on building brands and reputation) facilitated innovation (De Massis et al., 2018). Such findings relate to the family SME context and show how they navigate between the constraining and facilitating effects of family business culture for innovation. As highlighted, the family business innovation literature suggests either constraining or facilitating effects of family business culture on innovation but the framework of strategies in this study demonstrate how family firms can manage between

the two to innovate. Furthermore, the framework of strategies offer application to contexts where there is a unique organizational culture.

To limit the constraining influences of limited resources to innovation low-tech SMEs leverage external networks and community support to access key resources for innovation (Mirkovski et al., 2023; Nason et al., 2019; Lasagni, 2012) and pursue customer-centric innovation (Laforet and Tann, 2006), whereas they optimize internal resources and processes such as their flat structure and culture to facilitate innovation (Maes and Sels, 2014; Collins and Smith 2006). The framework of strategies with limited resources highlights balancing between the facilitating and constraining effects of limited resources to increase innovation. It therefore suggests the need to examine innovation regarding constraining and facilitating effects in tandem rather than isolation. Moreover, the framework of strategies here is important as it can apply to contexts where there are limited resources for innovation.

In short, unlike existing research that typically focuses on either *facilitating* or *constraining* effects of dominant exchange partnerships, family business culture, and resource limitation of SMEs, the framework of strategies here for the three themes (limited resources, dominant customers, family business culture) highlights the navigation and balance between facilitating and constraining effects on innovation, especially in the context of SMEs. This is important as SMEs can maximize innovation and achieve competitive advantage. Therefore, the revised framework of strategies is more comprehensive than what the current research offers. What this framework of strategies does for SMEs is that it can help them to innovate in contexts where they are limited with resources, where they are dealing with dominant customers and how to innovate in asymmetric settings, and where SMEs operate under unique organizational cultures.

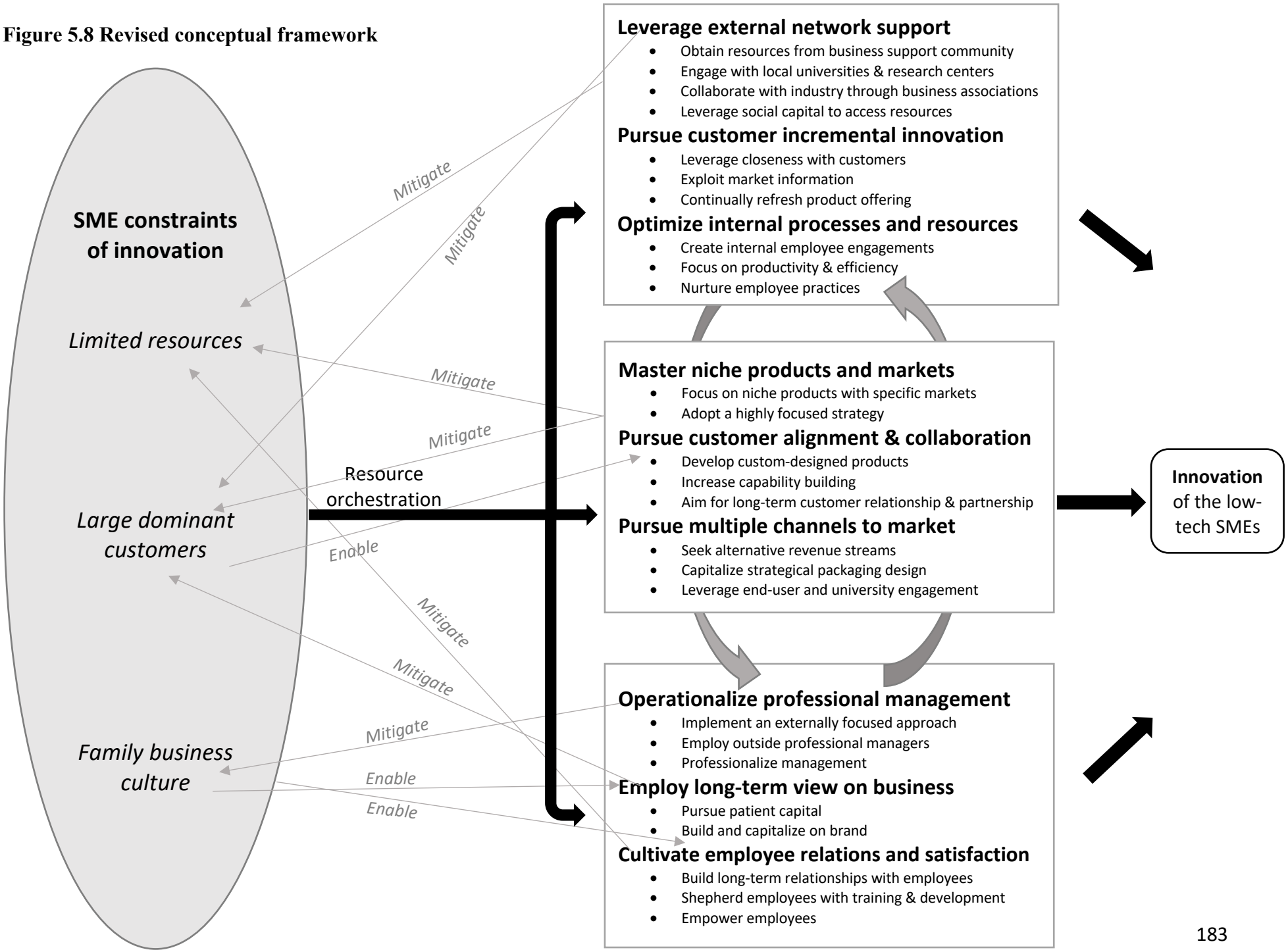
Additionally, as briefly mentioned earlier, the framework offers the interplay between dominant customers, limited resources, and family business culture on innovation suggesting innovation in more unique contexts. This is important since the context highlighted the characteristics of the food sector such as being dominated by small to medium-sized enterprises where many are family businesses, and that the sector faces a shortage of resources and skills, and a disparity of profit in the supply chain. The strategies presented in this context are holistic, for example, niche focus strategy mitigates the effects of both dominant customers and limited

resources for innovation. Similarly, customer alignment and collaboration also mitigate the effects of limited resources and dominant customers. Leverage and access to external resources from the business support community and science-based actors mitigate the effects of limited resources and support radical innovation therefore also limiting short-term incremental innovation driven by dominant customers. This is especially important for many family businesses seeking longevity and control over their innovation plans. The long-term business view of family businesses enables longer-term and higher-quality innovation and more control over own innovation plans, mitigating the effects of limited resources and dominant customers for innovation. Furthermore, the long-term mindset on business supports cultivating employee relations further mitigates the effects of limited resources for innovation.

Therefore, the revised framework highlights innovation with dominant customers and limited resources; innovation with limited resources under a family business culture; and innovation with dominant customers under a family business culture. The framework of strategies present unique contexts to study innovation in SMEs that have not been explored as demonstrated. As highlighted in the literature review (see Chapter 3) prior research regarding innovation in SMEs has mainly concerned itself with identifying the key innovation constraints. There is less work on how SMEs innovate despite those key constraints. In this vein, there is a lack of research concerning how SMEs navigate through the interplay of those innovation constraints since prior research has mainly studied them in isolation (Mirkovski et al., 2023; De Massis et al., 2018). The framework of strategies also addresses these issues and enrich the understanding of innovation in SMEs concerning how SMEs undertake innovation despite constraints and the interplay between those constraints. This contribution is important as it demonstrates filling two needs with one deed, essential for SMEs.

The revised framework attempts to demonstrate efficient resource orchestration to overcome and navigate through the key constraints of innovation. It suggests the need for holistic strategies to navigate and mitigate the effects of constraints and enable innovation in this context. Through resource orchestration firms can navigate through the influences of innovation, manage the constraining and facilitating effects, and the interplay of influences of innovation. The modified framework in Figure 5.8 is hence considerably developed from the initial conceptual framework shown at the end of the Literature Review chapter in Figure 3.3.

Figure 5.8 Revised conceptual framework



Chapter 6 Conclusion

6.1 Introduction

This thesis identified a gap in knowledge in terms of how SMEs in the low-tech sector innovate. The low-tech sector plays a key contributing role to the economy (Nauman et al., 2022; Scottish Government, 2019), but research has focused less on this sector partly for being categorised as low-tech (Nauman et al., 2022; Baregheh et al., 2012), albeit studies show firms actively undertake innovation in this sector (Lee and Walsh, 2022; Baregheh et al., 2016, 2014, 2012; Lefevbre et al., 2015; Menrad, 2004). We have a few studies on innovation types in the low-tech food sector (Baregheh et al., 2012ab), external sources of knowledge for innovation (Presenza et al., 2017; Lefevbre et al., 2015), and the constraints of innovation in SMEs namely limited resources (Love and Roper, 2015; Madrid-guijarro et al., 2009), influence of dominant large customers (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Hingley, 2015, 2005; Raymond and St-Pierre, 2004; Fischer and Rueber, 2004), and family business organisational culture (Lorenzo et al., 2022; Nieto et al., 2015; Chrisman et al., 2015). However, we did not know thoroughly how low-tech SMEs innovate despite these constraints.

The aim was to explore how low-tech SMEs resource orchestrate to navigate through innovation despite key constraints. The geographical context for this study was Scotland. A qualitative methodology, including interviewing low-tech SMEs concerning innovation was adopted to address the research questions.

As discussed, this study from the literature thematically isolated three key influences of innovation in the low-tech SME sector. They were dominant customers, limited resources, and family business culture. Empirical findings showed distinctive, yet interdependent strategies and structures enabling SMEs to effectively and efficiently orchestrate resources to navigate through those constraints to innovate. To innovate with dominant customer SMEs mastered niche and specific markets, pursued customer alignment and collaboration, and pursued multiple channels to market. Innovating with limited resources demonstrated firms leveraged external network and community support, pursued customer-centric incremental innovation, and optimised internal processes and resources. Innovation under a unique family business culture demonstrated firms operationalised professional management, cultivated higher employee relations and satisfaction, and took a long-term orientation on business. Resource

orchestration enabled firms to navigate through their constraints of innovation to survive and thrive (Mirkovski et al., 2023; Baker and Nelson, 2005). What the study's framework of strategies does for SMEs is that it offers a comprehensive approach to navigating the multitude of key SME constraints of innovation. Previous research has mainly considered the issue of resources (De Massis et al., 2018) with regard to SME innovation, but this study shows SMEs' resource orchestration to navigate through their limited resources, dominant customers, and organisational culture for innovation. Many SMEs due to their size deal with unequal relationships and most of them are often family businesses. These matters have also been highlighted on their contextual issues that describe supply chain disparity of profits, lack of skills and people, and that most of the SMEs operate as family-owned enterprises (see Context Chapter). While research identified key constraints of innovation in SMEs, until now we did not clearly know how SMEs navigate through their key constraints of innovation. Therefore, this study's framework of strategies addresses this key gap by demonstrating how SMEs navigate through limited resources to innovate, large dominant customers to innovate, and a unique organisational culture namely family business to innovate. This framework of strategies is significant as it offers a comprehensive and multi-perspective analysis to the study of SME innovation than before to demonstrate SMEs can successfully innovate despite their constrained environment. This is important and it can be applied to SME contexts more widely, as well as contexts where resources are limited to achieve an outcome, contexts where extreme dominance and imbalanced relationship exist and how to navigate to achieve an outcome, and contexts where a unique organisational culture plays an important role and how to navigate through it to reach an outcome.

Importantly, the study showed how SMEs navigated between the constraining and facilitating effects of dominant customers, family business culture, and limited resources for innovation. Firms particularly in SME contexts need to manage the tension between the constraining versus facilitating effects of innovation. The study also highlighted the interplay between the constraints of innovation, for firms to be aware of the potential interdependencies between them and to make better strategies. The resource orchestration view of the low-tech food SME innovation offered a comprehensive and useful understanding of innovation in a specific context and responded to calls (De Massis et al., 2018; Baregheh et al., 2016, 2014).

This chapter aims to highlight and discuss in detail the contributions that this thesis makes, followed by discussing the policy implications and future research avenues for this research.

6.2 Contribution to Knowledge

This thesis makes some contributions and addresses the gaps in the literature as explained in Chapter One and the Literature Review Chapter. This study's contributions are now going to be discussed concerning contribution to the resource orchestration in innovation literature, SME innovation literature, dominant exchange partnership literature, and family business innovation literature. Furthermore, the contribution to the resource orchestration theory will be discussed.

6.2.1 Contribution to the overall research

This study made a number of contributions. It identified from the literature and thematically isolated key influences of innovation relevant to SME contexts, particularly in low-tech sectors. The low-tech sector plays an important role in the economy (Nauman et al., 2022; Scottish Government, 2019), and innovation in this sector has been given less attention (Nauman et al., 2022; Baregheh et al., 2016, 2012). In broad terms, there is a largely limited understanding and empirical research regarding low-tech innovation (Baregheh et al., 2016, 2012), particularly around the strategies they execute for innovation activities (Nauman et al., 2022; De Massis et al., 2018). Therefore, this study contributed to the limited understanding of low-tech innovation strategies by exploring how food SMEs innovate despite facing key constraints. This study has provided a comprehensive understanding of innovation in SMEs as opposed to just considering R&D as innovation which most of the research tends to focus on.

This study makes an important contribution by profiling SME innovation in a unique context with large dominant customers, limited resources, and a family business culture. The majority of the firms in these contexts are family business SMEs (Laforet, 2016) with limited resources and dominant customers influencing how they innovate. Similar to existing research this study found resource constraints of innovation particularly around human and financial resources (Love and Roper, 2015; Madrid-guijarro et al., 2009). The lack of skills and specialist expertise related to innovation and R&D and inadequate financial capacity to invest in innovation impact innovation (Love and Roper, 2015; Madrid-guijarro et al., 2009). However, this study found firms overcome their resource-related weaknesses to innovate. The findings presented in this study showed the strategy to leverage the external network and community support, optimise

internal resources and processes, and pursue customer-centric incremental innovation mitigated the effects of resource constraints enabling the firm to access key resources and capabilities and nurture and exploit internal resources and structure to innovate. This way they resource orchestrated to innovate in a specific context, particularly with limited resources.

Because of their size and in the food sector they engaged in imbalanced relationships where the network of large and powerful customers dominated and drove the direction of innovation decisions and plans in SMEs (Lacoste et al., 2023; Lacoste and Johnsen, 2015; Fischer and Rueber. 2004). The study found the strategy to focus on niche markets and products and to enter into strategic alignment and collaboration with key customers enables bargaining power and mitigates the effects of dominant customers for innovation. This way they resource orchestrate in a specific context, particularly with dominant customers. Many of the firms also operated under unique family business culture which further impacts innovation decisions and plans (Lorenzo et al., 2022; De Massis et al., 2018; Nieto et al., 2015) where the study found the strategy to operationalise professional management, adopting a long-term mindset on business, and cultivating employee relations enable firms to manage the effects of family business culture to enhance innovation. This way they resource orchestrated to innovate in a specific context, particularly in a family business setting.

This study, therefore, contributed to understanding how firms navigated through these constraints to innovate. It is important to have theorisation around innovation in specific contexts (De Massis et al., 2018; Baregheh et al., 2016), particularly around how firms innovate despite large dominant customer constraints; how firms innovate despite resource constraints; and how firms innovate despite family business culture constraint. They can be applied to similar contexts where firms deal with limited resources, dominant exchanges, and unique ownership and organisational culture to achieve an outcome.

Furthermore, regarding the second contribution, while strategies revealed to mitigate the effects of constraints yet working with large customers, with a family business culture, and even with limited resources can also facilitate innovation (De Massis et al., 2018; Duran et al., 2016; Coviello and Joseph, 2012), thus offers insights on balancing between the two (e.g. constrain versus facilitating effects). The framework of strategies balances the tension between the constraining and facilitating effects enabling SMEs to maximise innovation. This

orchestration may explain how SMEs can achieve more innovation thereby competitive advantage.

Thirdly, the study found the strategies support each other within and among each constraint. Employing a long-term business view supports cultivating employee relations which mitigates the effects of a shortage of resources (De Massis et al., 2018) and as a family business resource, the long-term business view allows longer-term innovation which reduces and balances the effect of short-term customer-driven innovation. The long-term business view also supports accessing resources and capabilities from external networks and communities to develop innovation which led to higher quality non-incremental innovations and mitigated the effects of limited resources and dominant customers. Similarly, being established as leaders in niche markets offers stronger bargaining power and further mitigates the effects of dominant customers and limited resources. On the other hand, customer alignment and collaboration facilitate innovation with large dominant customers and limited resources (Coviello and Joseph, 2012). Holistic strategies are important in SMEs' ability to innovation, in other words, to leverage their interdependencies to further mitigate the effects of the set of constraints of innovation. It can also help managers to balance the constraining and facilitating effects to enhance innovation. The study offers a comprehensive understanding and unique picture of innovation in a specific context and how firms resource orchestrate to innovate. These strategies enable SMEs to innovate in different contexts, particularly in constrained and unique contexts and highlight how they can even enhance innovation.

Lastly, the constraints of innovation in the low-tech SME context highlighted can be integrative and the study suggests they may need to be studied together rather than in isolation from one another and that interdependencies between them need to be taken into account. Firms can deal with challenges by understanding the connections between the constraints of innovation and focusing on holistic strategies to limit their effects, which is what this study's framework of strategies offered and presented.

6.2.2 Contribution to the Research Orchestration Theory

This study used a theory in strategic management resource orchestration and refined and enriched it. Simon and colleagues suggested more work and research inquiry on resource orchestration across firm breadth and depth needs examination. Resource orchestration serves

as a starting point to study manager actions to effectively structure, bundle, and leverage resources and capabilities in different organisational contexts. This allowed the researcher to examine resource orchestration in SMEs for innovation. The resource orchestration perspective of low-tech SME innovation offers a comprehensive and useful understanding of innovation in a specific context, which can be applied to other similar contexts.

Resource orchestration in innovation with resource constraint

Prior research has acknowledged the orchestration of resources for competitive advantage (Sirmon et al., 2011) yet empirical studies of resource orchestration are rare particularly for innovation (Carnes et al., 2022, 2017) where researchers have called for empirical studies (Carnes et al., 2022, 2017; De Massis et al., 2018; Lin et al., 2017). This study responded to this and the call to investigate the distinct role of resource orchestration by focusing the study on the SME context (Sirmon et al., 2011).

Moreover, whereas previous research has mainly focused on resource orchestration particularly resource structuring through acquiring, accumulating, or divesting resources (Carnes et al., 2017; Sirmon et al., 2011, 2007), this study builds on key external relationships that enable SMEs to leverage external resources and resource services without owning them internally. It therefore suggests 'accessing' as a unique resource orchestration strategy and responds to the call by Nason et al., (2019). Furthermore, this study also identified 'sharing', and 'co-developing' as resource orchestration strategies through which SMEs orchestrated external resources across their boundaries (Nason et al., 2019; Baert et al., 2016) enabling them to undertake product and process innovations and often developing radical and new to the market innovation (Roper and Hewitt-Dundas, 2015).

Additionally, while managers are often assumed to reside within the firm (Sirmon et al., 2011), a contribution from this study not only highlighted how resources may be orchestrated across the SME boundary but that they can be 'co-orchestrated' by external managers such as the business support community account managers that operate outside of the firm's boundaries. The account managers often orchestrated external resources even though they do not reside within the firm, therefore this finding following the work by Mirkovski et al., (2023) extends resource orchestration that largely considers managers residing within the firm (Deliganni et al., 2019; Carnes et al., 2017; Sirmon et al., 2011).

The third contribution to the evolving literature on the role of resource orchestration in innovation is that the study highlighted actors orchestrating innovations given that innovation in SMEs often involves interactions between various departments and even with customers, thus seldom credited to a single manager or a specific managerial level in which previous research largely considered (Carnes et al., 2022, 2017; Sirmon et al., 2011). This study found innovation as a team and collective inter-departmental efforts and following the work by Andersén and Ljungkvist (2020) it exemplifies the importance of recognising the roles of other actors such as those with non-managerial but key personnel in resource orchestration processes. Furthermore, the study also highlighted the importance of considering external actors such as customers who play a key role during the innovation process of SMEs offering feedback (Cui and Wu, 2016) and specifications for new products (Laforet and Tann, 2006), and some even travelling with their suppliers for new product development. There is a positive and important relationship between cooperation with customers and the introduction of product innovation (Lefebvre et al., 2015) and this study illustrated the pertinence of considering customers as external actors and resource providers important in orchestrating innovation in SMEs, thus further extending the resource orchestrating theory.

Fourth contribution, considering actors residing outside of the firm's boundaries, this study also highlights the importance of accessing resources from end-users and internet-based resources for innovation (Palacios-Marqués et al., 2015), further highlighting innovation in SMEs is not only attributed to resources residing inside of the firm as past research considers (Carnes et al., 2022, 2017; Deligianni et al., 2019; Symeonidou and Nicolaou, 2018; Sirmon et al., 2011). End users and internet-based resources are not organisations which means they are alternative means for firms to leverage external resources as opposed to through inter-organisational relationships as found above. End users and internet-based resources further show mechanisms that blur firm boundaries and respond to a recent call (Nason et al., 2019).

The framework of strategies in this study highlights the need to focus on alternative pathways for SMEs to leverage complementary external resources without having to engage in long-term commitments or to orchestrate the resources themselves.

Resource orchestration in innovation with large dominant customer constraint

The above contributed to resource orchestration in innovation with limited resources, however, the study also contributed to resource orchestration in innovation with large dominant customer constraints. The existing literature argues that in markets characterised by a few dominant large companies with high purchasing powers, innovation in SMEs is likely to be restricted (Fischer and Rueber, 2004; Raymond and St-Pierre, 2004). My findings, however, found that innovation can be found in niche corners of the market facilitated by niche market strategy resource orchestration as the findings explained. This finding contrasts the existing literature by highlighting that niche innovation can enable firms to combat asymmetric relationships and lock-in customers (Audretsch et al., 2018) and SMEs do not need to be limited with innovation under the constrained of customers (Laforet and Tann, 2006) and can therefore persistently innovate. In particular, the study found firms 'identify' niche markets as a new orchestrating process with regard to innovation and achieving market leadership position, and increasing bargaining power with customers. Before the structuring, bundling, and leveraging processes, managers first need to know the target market that they will be exploiting. They thus first 'identify' niche market gaps to target and exploit through innovation to create value for customers and increase bargaining power (Kotlar et al., 2014). Identifying process can be context-specific and important to support the other three orchestrating processes of resources in particular for dealing with and managing large dominant customers in being innovative. The contribution to the theory is firms first 'identify' niche markets as part of their resource orchestration process which enables them to innovate despite large dominant customer constraints. This answers a call to study the role of resource orchestration in the SME context (Sirmon et al., 2011). This process is important for SMEs with a niche focus strategy to persistently identify niche markets for innovation and maintain market and leadership position.

Working with large customers also facilitated innovation (Coviello and Joseph, 2012). This study found niche product quality attracted large customers for collaboration which enabled SMEs to 'access' and 'share' key resources for innovation thereby "dancing with gorillas" (Prashantham and Birkinshaw, 2008). This allowed to often 'co-develop' innovation together, suggesting additional sub-processes of resource orchestration and showing resource orchestration in customer-supplier relationships in being innovative (Lacoste et al., 2023; Coviello and Joseph, 2012). Accessing, sharing, and co-developing contribute to the resource orchestration theory across firm boundaries, following the work of Baer et al., (2016). The

findings respond to a call to examine the negative effects of boundary permeability in the asymmetrical power of resource providers (Nason et al., 2019) which the study suggests niche innovation strategy together with collaboration with large dominant customers as a unique resource orchestration that enabled SMEs control over the accessed resources and bundling them with internal resources for innovation capabilities. SMEs can use this framework of strategies when leveraging complementary external resources. Niche focus and customer collaboration strategies together enable resource orchestration across SME boundaries indicating 'co-orchestration' or even allowing the external customer as the external orchestrator, when leveraging complementary external resources.

Resource orchestration in innovation with family business culture constraints

The above contributed to resource orchestration in innovation with large dominant customer constraint, however, the study also contributed to resource orchestration theory in a family firm context (Ljungkvist et al., 2022; Duran et al., 2016; Carnes and Ireland, 2013). The existing literature suggests that family members aim to keep closer control of their business constrain their ability to engage with external actors (Koltar et al., 2013). However, findings in this study found nourishing external business relationships with the business support community account manager and customers were considered key success factors and important drivers of innovation in family firms (Del Vecchio et al., 2020; Newman et al., 2016) and often participated in orchestrating innovation as the findings explained. This finding contrasts the existing literature by highlighting family firms exchange resources and tacit knowledge with key external actors to develop new-to-market innovation (Belitski and Rejab, 2022). This concept aligns with and adds to the emerging research that suggests resources for innovation do not exclusively reside within firms' ownership boundaries (Belitski and Rejab, 2022; Nason et al., 2019). Therefore, following the work of Mirkovski et al., (2023) this finding extends the resource orchestration theory by considering family firms' key external relationships important for innovation resource orchestration particularly to access resources. This contributes to external actors outside of the family firm who can act as external innovation orchestrators in family firms (Belitski and Rejab, 2022).

6.2.3 Contribution to SME innovation Literature

This section explains contributions to the SME innovation literature generated from RQ1. This thesis has made a number of contributions to knowledge on innovation within the low-tech food SME context. In the broad sense, there is a general lack of insights and empirical evidence on innovation with limited resources (De Massis et al., 2018; Baregheh et al., 2012). While we know SMEs are resource-constrained with innovation (Love and Roper, 2015), we still lack innovation practices and strategies of low-tech SMEs who are limited with resources. There has been limited empirical research exploring innovation strategies and practices of firms with limited resources particularly in specific contexts (Presenza et al., 2017; Lefebvre et al., 2015). This study especially focussed on strategies low-tech SMEs undertake to overcome constraints to innovation. Therefore, this study contributed to the limited knowledge of SME innovation by offering an exploration of how low-tech SMEs successfully innovate despite resource constraints. This study has provided a comprehensive view of innovation in low-tech SMEs and how they resource-orchestrate to innovate with limited resources. This is a key contribution to knowledge since innovation research has largely focused on resources to achieve innovation but not how firms manage resources to achieve innovation (Carnes et al., 2017, 2022).

Leverage on external network and community support

The findings helped to address how SMEs can still innovate with limited resources (Mirkovski et al., 2023; De Massis et al., 2018). While existing research has highlighted firms lacking resources internally pursue joint ventures (Sun and Lee, 2013) and alliances (Mukherjee et al., 2013), my findings, however, highlight the importance of being account managed by the business support community that does not require long-term investments and whose role is to support increase the growth and innovation performance of their client firms (Mason and Brown, 2010). Focusing on the business support community account manager is an alternative pathway for firms with limited resources to access external key resources for innovation on demand when needed without having to engage in long-term partnerships. With the provisional support of the service offered by account managers who often acted as co-orchestrators together with the owner-managers for complementary external resources, low-tech SMEs overcame resource constraints and successfully engaged in innovation activities. This finding aligns with Mirkovski et al., (2023) who suggest service intermediaries or professional service firms can orchestrate external resources on behalf of their client enabling them to access

resources from third parties. Accessing external resources is important since resources do not require to reside within the boundaries of the organisation, as suggested in the literature (Nason et al., 2019), and this approach is a valuable way to access resources externally since SMEs not only lack general resources but also often are managerial resource capability constrained, which can hinder SMEs to innovate (Haddoud et al., 2021).

By uncovering the critical role of the business support community account manager for innovation in SMEs, this study following the work by Mirkovski et al., (2023) as previously cited, extends resource orchestration, which has largely focused on resources particularly managers, that need to reside within the firm (Deliganni et al., 2019; Carnes et al., 2017; Sirmon et al., 2011). This finding further provides insights into how firms can innovate with limited resources and contrasts with the assumptions that having more resources is always better for innovation (De Massis et al., 2018; Baker and Nelson, 2005). It also responds to recent research that calls for innovating with limited resources (De Massis et al., 2018). Further, business support community account managers can be considered as key enablers of innovation for SMEs since they provide access to key resources, and can be a key factor to help explain why some firms, particularly SMEs, are more innovative than others (Carnes and Ireland, 2013).

Similarly, it was found that the growing engagements with local universities and research centers and being members of business associations played a role in product and process innovation in SMEs (De Massis et al., 2018; Nieto and Santamaria, 2007) on demand when necessary and without having to enter strategic long-term partnerships. This finding is however different from existing studies that show SMEs do not engage with such partners due to differences in culture and language (De Wit-de Vries et al., 2018; Presenza et al., 2017; Lefebvre et al., 2015). While engagements were mostly ad-hoc on-demand and opportunistic, they were growing as a result of a broad range of new scientific approaches and technological opportunities such as process automation, advanced food processing, and packaging methods (Fatima et al., 2022), growing and new consumer needs (Bigliardi and Galati, 2013), changes to the regulations (Ranieri and Silvestri, 2006), and surprisingly some due to internal desire (von Hippe, 2005). These resulted in innovating beyond incrementally to include radical and new-to-the-market innovation (Hewitt-Dundas et al., 2021), and therefore raises questions regarding innovation in sector contexts, and challenges existing studies around the incremental nature of low-tech SMEs (De Massis et al., 2015; Baregheh et al., 2016, 2014, 2012; Oke et al., 2007). The finding responds to calls for researching innovation in a specific context for

SMEs (Baregheh et al., 2016) where this study shows contextual factors can offer higher quality and new-to-the-market innovations.

Surprisingly, business associations created innovation collaboration opportunities (Newbery et al., 2016) that occasionally led to radical and new-to-market product innovations. This is an important finding and suggests informal knowledge sources and events can stimulate radical innovation, a finding that the literature has not effectively recognized as a source for radical innovation and therefore contributes to sources of innovation, particularly radical, for SME innovation. Interestingly, findings also showed some of the SMEs leveraged external relationships and took trips with key customers for innovation. The existing literature explains that firms with limited resources build close relationships with customers for innovation (De Massis et al., 2018; Lasagni, 2012), however, to 'travel with customers' is a significant finding that is not given much attention in this context and can be a valuable external source of knowledge and innovation capacity suitable for firms with limited resources, helping to enhance product differentiation and market competitiveness (Santoro, Vrontis, Pastore, 2017). Additionally, the existing literature suggests firms with limited resources are restricted with innovation (Love and Roper, 2015; Hewitt-Dundas, 2006), however, findings found innovation can be achieved through leveraging end-users and internet-based resource wisely to support with innovation (Palacios-Marqués et al., 2015) where SMEs accessed innovation concepts and ideas as part of structuring and bundling resources. Therefore, firms with limited resources can still undertake innovation (De Massis et al., 2018) and this finding aligns with previous research that suggests online social networks can improve innovation capacity and performance (Palacios-Marqués et al., 2015) and external resources can be leveraged for innovation in resource-constrained firms (Mirkovski et al., 2023). These findings extend resource orchestration theory by showing firms access resources externally from different actors following Mirkovski et al. (2023) and Baker and Nelson (2005) as cited before, and that resources are not required to reside within the boundaries of the firm (Nason et al., 2019). However, in addition, while Mirkovksi and others have focused on inter-organisational relationships as part of across-firm resource orchestration, the finding related to end-users is an alternative means to utilise external resources as called by Nason et al., (2019), and such strategy illustrates mechanisms that blur firm boundaries. These are important findings, and the strategies can be used as a guiding framework for SMEs with a lack of adequate innovation resources to engage on demand with and utilise opportunistically user-base resources and other

external resources. These findings also respond to calls for empirical research regarding resource orchestration for innovation (Carnes et al., 2022, 2017; De Massis et al., 2018).

Pursue customer-centric incremental innovation

Customer-centric incremental innovation is another theme found in this study that firms pursued with limited resources. The literature explains SMEs often do not develop new products themselves rather their customers give them specifications for new products (Laforet and Tann, 2006). This study confirms this and finds SMEs heavily rely on customers for product innovation (Raymond and St-Pierre, 2004) which suggests customers are central to the understanding of the drivers of product innovation in low-tech SMEs and that they are almost always incremental in nature (Baregheh et al., 2012; Laforet and Tann, 2006; Oke et al., 2007). However, this study additionally found SMEs also actively conduct their own market research and analysis for new products, helping them to some extent reduce their customer dependency (Raymond and St-Pierre, 2004). This contrasts the existing literature by highlighting SMEs can innovate and are also driven by their own ambition for growth (Mosey et al., 2002) and place strong emphasis on product quality and product innovation to increase competitive advantage in a mature sector characterized by the need to offer a differentiated and innovative range of products to overcome market saturation (Giacosa et al., 2017). This finding is important suggesting resource orchestration with limited resources whilst reducing vulnerability. This extends the understanding of pursing customer-centric incremental innovation while managing dependency (Raymond and St-Pierre, 2004) which is not discussed in the literature. While it was found customer-centric incremental innovation may be a strategy for innovating with limited resources, SMEs may also leverage this strategy in combination with their own active market research as discussed above to reduce the customer dependency concerning innovation. These strategies may enable SMEs to manage the interplay between their constraints of innovation.

Optimise on internal resources and processes

As part of innovating with limited resources findings also found firms heavily optimized on internal resources and processes for innovation. Similar to existing studies in the literature many of the employees were not directly part of the innovation team nor were specialists but

belonged to the "wider team" where their knowledge and skills were important and utilized through the innovation process (Maes and Sels, 2014; Collins and Smith 2006). However, the findings in this study contribute to combating shortages of resources and skills for innovation (De Massis et al., 2018) but also orchestrating resources for innovation as a "team effort" (Andersén and Ljungkvist, 2020), rather than only focusing on top managers as orchestrators as suggested by Sirmon et al., (2011). This finding following the work by Andersén and Ljungkvist (2020) as cited, extends resource orchestration theory by considering non-managerial but key personnel as orchestrators in the innovation process in low-tech SMEs. This is important given that innovation in a flat structure by SMEs can lead to complex interactions between various actors including interactions with customers (Cui and Wu, 2016; Coviello and Joseph, 2012) and that resource orchestration in this context highlights the interplay between teams, external customers, and top management.

Furthermore, while the knowledge sharing and cross-functional engagements created valuable routines for exploitation (Maes and Sels, 2014), the finding here also contributes to employee participation in firm issues related to both HR and strategic where employees often informally voiced their entrepreneurial and innovative ideas for knowledge exploration, where knowledge management was informal but deliberate and strategic (Becker et al., 2015) and "teams" were responsible for joining capabilities and additional training. This further contributes to resource orchestration as a team-based and highlights it as key to the understanding of internal innovation and knowledge capability in SMEs (Becker et al., 2015). Furthermore, the finding also contributes to the research that having more resources is not always better (De Massis et al., 2018) given that many SMEs as family businesses (Laforet, 2016) with a long-term orientation on business (Le Breton–Miller and Miller, 2006) provide nurturing approaches to the unique way of managing relationships with human resources which often acts as a key source of competitive advantage that offsets for their lack of human resources for innovation.

6.2.4 Contribution to Dominant Exchange Partnership Literature

SMEs must resource orchestrate to overcome constraints. Part of resource orchestration in SMEs concerns the enrolment or exchanges with external stakeholders (Mitchell, 2021). This process was especially unique in a dominant customer exchange partnership (Lacoste and Johnsen, 2017, 2015; Fischer and Rueber, 2004). This study showed how they manage large

dominant customers for innovation and explained the constraining and facilitating effects that happened during the resource orchestration by SMEs. To manage an exchange relationship there is a need to balance the tension between them which is an important principle for managing exchange relationships.

The existing literature suggests large dominant customers with power often constrain innovation in SMEs (Fischer and Rueber, 2004; Raymond and St-Pierre, 2004). However, this study found SMEs innovated in niche markets facilitated by their highly niche-focused strategy. This strategy contrasts the existing literature by highlighting that continuously identifying unmet niche markets allows small suppliers market and brand leadership in their niche markets offering better bargaining power and potentially lock-in customers (Audretsch et al., 2018). This finding therefore responds to the calls (Fischer and Rueber, 2004; Lacoste and Johnsen, 2015) and contributes to the dominant exchange partnership literature by highlighting how small firms can innovate and have better control over their own innovation plans despite dealing with large dominant customer constraint (Fischer and Rueber, 2004).

While it is somewhat understood in a few studies that firms focus on being niche (Sidali and Hemmerling, 2014; Kvam et al., 2012; Ilbery and Kneafsey, 1999) to overcome limited resources for innovation (De Massis et al., 2018), this study suggested niche focus strategy can also be orchestrated to combat dominant exchange partnerships for innovation which have not been recognized by previous research. Therefore, resource orchestration brought by niche focus enables firms to overcome the effects of limited resources and dominant partners. Niche focus strategy offers an integrative picture of the constraints of innovation (e.g. resource and large dominant customer constraints) in SMEs suggesting that they can also be studied together and important connections between them should be considered. So far, the existing literatures has mainly focused on innovation constraints in isolation yet the findings here spotted potential interdependencies between them in the SME context and can be applied to different contexts. By identifying the links between them managers can overcome their constraints more effectively. Dominant customers and limited resources are two distinct constraints of innovation yet they can be interdependent. Resource orchestration through niche focus strategy allows firms to overcome the effects of both limited resources and dominant customers. This offers a unique insight into both the SME innovation literature and the dominant exchange partnership.

In addition, while the literature suggests large dominant customers constrain innovation, this study found they can also facilitate innovation (Coviello and Joseph, 2012). Market leadership through niche strategy created opportunities for collaboration and co-developing for innovation enabling the SME to access and share complementary resources and capabilities and "dance with gorillas" (Prashantham and Birkinshaw, 2008). Power and dominance are a major influencing variable that affects access. Accessing is considered more SME relevant and interpretation of resource orchestration. SMEs are far more susceptible to facing that type of extreme power disparity and access and co-develop are more relevant than to acquire and develop alone. These are valuable findings highlighting SME-specific resource orchestration and that resource orchestration is perhaps vital to the understanding of innovating with large dominant customers, and thus aimed to extend new concepts to the resource orchestration theory and making it appropriate to the study of SMEs and relational/stakeholder exchange contexts (Mitchell, 2021) and or the SME innovation research in imbalanced relationship contexts to achieve an outcome (Lacoste and Johnsen, 2017, 2015; Hingley, 2005; Fischer and Rueber, 2004).

This study has a unique positioning in that the researchers have either focused on the constraining effects of dominant customers (Hingley, 2005; Fischer and Rueber, 2004) or the facilitating effects (Coviello and Joseph, 2012), but the present findings suggest to manage an exchange relationship there is a need to balance between the two effects as part of resource orchestration as both are important for innovation and can act interdependently. This view therefore can be a universal principle of managing exchange relationships. This study offered framework of strategies to overcome and manage dominant exchange partners in being innovative and can be given more attention to for a comprehensive understanding of innovation in SME contexts.

6.2.5 Contribution to Family Business innovation Literature

This thesis made contributions to knowledge on innovation in the low-tech family SME context. In broad terms, there is a general lack of knowledge and empirical insights on family firm innovation particularly in specific contexts (De Massis et al., 2018; Kammerlander et al., 2015; De Massis et al., 2015). More specifically, there has been limited research exploring innovation strategies in low-tech family SMEs (De Massis et al., 2018; Laforet, 2016).

Therefore, this study has contributed to the young family business innovation literature by addressing the lack of research regarding 'how' low-tech SMEs innovate under a unique family business culture. The study has provided strategies to manage the constraining and facilitating effects of family business culture for innovation. This is an important contribution to knowledge given that the literature on family business innovation tends to mainly focus on either the constraining effect (Lorenzo et al., 2022; Nieto et al., 2015) or the facilitating effect (De Massis et al., 2018; Duran et al., 2016) of family business culture on innovation.

The framework of strategies as part of the resource orchestration enabled family SMEs to manage the challenges and opportunities presented from innovating under a unique family business culture. The study highlighted efficient resource orchestration by family firms to navigate through the constraining and facilitating effects of family business culture on innovation. The existing literature argues to keep control of their business family firms avoid external orientation for innovation and engage in incremental innovation (Nieto et al., 2015; Koltar et al., 2013). The findings in this study however found family firms 'accessed' key resources externally from key actors such as the business support community and customers for process and product innovation including some radical and new to the market, through external resource orchestration strategy. These actors often acted as external orchestrators or co-orchestrators for innovation in family firms which resulted in non-incremental innovations. Therefore, external resource providers often orchestrated the complementary external resources of family SMEs to enable non-incremental innovation. This finding contrasts the literature by highlighting family firms can develop radical and new to market innovation (Belitski and Rejab, 2022) by incorporating key external actors during the innovation orchestration process. This finding highlights the importance of external resources and actors as part of orchestrating "managers" to allow family firms to pursue radical innovations with an appropriate time horizon. This finding responds to a call and aligns with Carnes and Ireland (2013) regarding how family firms can engage in radical innovation and why some family firms are more innovative than others.

While family firms pursued external orientation to constrain the effects of family business culture on innovation and *accessed* resources externally, findings showed they *accumulated* patient capital to facilitate investment in innovation with stamina (De Massis et al., 2018), which also gave the family more control over the direction of their own innovation plans with a long-term business view further enabling novel and radical innovations, and

balancing/limiting the short-term incremental innovation forced by the market. This finding further contributes to understanding and drivers of radical innovation in family firms and contrasts the existing research that suggests family firms pursue incremental innovation (Nieto et al., 2015; De Massis et al., 2015).

Further, existing literature suggests in markets characterized by a few dominant large companies with high purchasing powers, SMEs have less control over the direction of their own innovation plans (Fischer and Rueber, 2004; Raymond and St-Pierre, 2004). This study, however, found family SMEs leverage their family brand and reputation which not only helps to access resources from key external actors but also to gain bargaining power and allow the family to control the direction of their own innovation plans facilitated by their long-term resource orchestration strategy. This finding aligns with Kammerlander et al., (2015) who found the family brand and stories positively associated with innovation, and Craig et al., (2008) that family brand increases family's ability to persuade customers to make purchasing decisions.

The influence of family business on innovation is double-edged however family firms should resource orchestrate to navigate between the constraining and facilitating influences of family business culture to innovation. This study adds uniquely to the discussion of family business and innovation. Rather than taking a side like most studies, this study suggests managing between the constraining and facilitating influences of family business culture to innovation which firms can achieve through resource orchestration and achieve higher competitive advantage. Additionally, this study also contributes to the family business and innovation debate by showing how family businesses can innovate with dominant customers and limited resources.

The findings in this study also respond to a few calls. First, it responds to a call for studying holistic innovation strategies in family firms (Kammerlander et al., 2015; De Massis et al., 2015). Second, how firms deal with not losing control over their own innovation plans in dominant exchange partnerships (Fischer and Rueber, 2004), and third, how resource-constrained family firms can achieve innovation and competitive advantage (De Massis et al., 2018).

Lastly, the findings in the family firm context showed resource orchestration concerning external actors i.e. external to the firm, and resource orchestration internal to the firm in family SMEs. The long-term strategy including patient capital and family brand, and the superior employee relation strategy enables internal resource orchestration for innovation whereas the external orientation with customers and the business support community enables external resource orchestration for innovation. This contributes to resource orchestration in innovation in family firms (Duran et al., 2016; Carnes and Ireland, 2013) and responds to a call for empirical study (Carnes and Ireland, 2013).

6.3 Contributions to Practice

The findings and conclusions from this study draw clear and practical implications for policymakers to consider implementing to increase innovation in the broader SME base in the food sector and beyond. Policy makers and business support organisations should therefore consider the findings and implications of this study as a useful guide to support SMEs with innovation. Below, there are implications for policy for each research questions' findings.

Implications for policy: Access to resources

Leverage external network and community support

- Industry engagement
    - Increase manufacturing innovation among SMEs through active industry engagement. Leaders from across sectors in manufacturing should share manufacturing best practices with smaller but ambitious SMEs, as well as enable more SME collaboration opportunities.
- Awareness of available support for SMEs
    - Increase awareness of the availability of support for SMEs through creating regular sector-based or cross-sector events and showcasing all the up-to-date services available from all the relevant business support organisations.
- 'Relational' than 'transactional' relationship between SMEs and academia
    - Focus on 'relational' rather than 'ad-hoc/transactional' relationship between SMEs and applied universities/RCs to enable more radical innovations (process and product). Scotland can establish a stronger link similar strategy to

Germany's Fraunhofer Gesellschaft[8] that establishes a key bridge between universities and industry-specific forms and types of innovations. This way, they can also create better/easier access and proximity for far-distanced SMEs to overcome the barriers.

Optimise internal resources and processes

- Employee participation in non-technical innovation in the workplace
    - Employee participation in non-technical innovation should give 'points' towards SME innovation i.e. count as innovation and help make it easier to access innovation grants.
- Complement technical innovation with workplace innovation
    - Provide training for staff to experiment and research outside of their daily task to attain new skills.
- Combine competence development with workplace innovation
    - Offer workplace innovation programmes such as sessions for innovation and creative thinking activities by offering forums and regular employee initiatives sessions. In connection to the previous point, offer workplace innovation programmes (e.g. lean methods) to assist SMEs to build knowledge, skills, and characteristics needed to better manage market changes.

Pursue customer-centric incremental innovation

- Seek to understand customers
    - Since the customer is an important source of innovation, the focus should be to understand the customer and remain close to them.
- Multi-disciplinary teams to deal with innovation projects
    - Encourage more employees from multiple backgrounds in SMEs to deal with product innovation i.e. to identify market gaps (e.g. attend away days, etc).
- Market-driven products

[8] For more information visit: https://www.fraunhofer.de/en/about-fraunhofer.html

- Support SMEs with data-driven decisions to remain close to the market and develop products based on market needs to increase market acceptance and success.

Implications for policy: Dominant customer relationship

Focus on niche markets

- Niche markets with specific products and services
  - Rather than diversification, support should help SMEs focus on a specific niche and narrowly defined markets to dominate with regard to innovation. Collaboration with top external sector-specific consultants to help identify niche and specific markets with "growth opportunities".
- Highly focused strategy
  - Support SMEs to have a highly focused strategy and thus develop top expertise and efficiencies enabling competitive advantage concerning customised service.
- Global players
  - Work closely with SMEs to expand internationally with their niche focus and superior management of risk (i.e. avoiding external financing).

Pursue customer alignment

- Custom-designed products to individual customer's specific requests
  - Support SMEs with resources to respond to particular customer's specific needs.
- Capability building
  - Identify the capabilities that would strengthen customer relationships and help SMEs either access or develop those capabilities.
- Long-term customer relationship and partnership
  - Encourage and support SMEs to develop long-term innovation capabilities to deliver top-quality innovative products and services in respective markets

enabling them to develop long-term customer relationships and partnerships despite short-term losses.

Pursue multiple channels to market

- Alternative revenue stream
    - Create networking and showcasing events regarding 'not fully exploited markets' for SMEs to reduce single/multiple customer dependency.
- Strategical packaging design
    - Offer financial support and expertise to help SMEs with 'strategical' *packaging* (design and brand) making it suitable for entering into specific markets (e.g. gift markets) both locally and internationally.
- Expansion into international markets
    - Considering the immediate point above, create networking links with international buyers and further encourage building successful brands that thrive locally and internationally.

Implications for policy: Family business culture

Professional management orientation

- Collaboration with non-for-profit family business organisations for professional management
    - Business support organisations should increase engagement with family business associations, institutes, and educational establishments to promote, educate, and train on the importance of professional management on innovation in family businesses and provide further support with implementation.
- Refresh management
    - Focus on assisting family businesses to hire highly skillful, educated, experienced, and well-connected non-family 'director(s)' to lead the business. Management changes bring in new life and expertise enabling the SME to experience rapid growth and innovation. Combined with the above point i.e. collaborate with not-for-profit family business organisations as well as SE account managers to assist ambitious but poor-performing family businesses.

- Bring balance to the board
    - Allow senior colleagues in business support organisations and not-for-profit family business organisations to serve as non-executive directors in family business firms.

Take a long-term orientation on business

- Process innovation
    - Offer grants to buy equipment, incentives to access university/RCs equipment, and create industry peer-to-peer networking events to share best practices.
- Build brands
    - Provide resources needed to encourage SMEs to build successful brands. The support should be incorporated with other recommendations i.e. niche focus, packaging (design and branding), advertising, and networking/marketing opportunities for local and international markets, all of which encourage building brands.
- Entrepreneurial tacit-knowledge resource
    - Target retired or experienced entrepreneurs in every sector to act as mentors to entrepreneurs with less experience in the same sector. This sectoral industry peer-to-peer knowledge exchange and mentorship facilitates long-term growth and innovation strategies.

Cultivate stronger employee relations and satisfaction

- Long-term employee commitment
    - Encourage and support SMEs located in rural areas or small towns and across Scotland to build long-term relationships with staff creating stability and continuity in tough times.
- Build tacit know-how
    - Encourage and support SMEs in rural areas or small towns and across Scotland regarding training, flat culture and high employee involvement.
- Wellbeing at work
    - Encourage and support SMEs in rural areas or small towns and across Scotland regarding improving staff motivation and working conditions despite market conditions.

The framework presented in this study informs both research and industry on innovation strategies of low-tech SMEs. It can help industry and politicians on how firms with various key firm-level and sectoral constraints can still undertake innovation. It also highlights the importance of managers being able to manage between the constraining and facilitating effects of innovation to achieve more innovation in SMEs, particularly in contexts where there are dominant exchange partners, contexts with unique ownership and organisational culture, and or contexts where there is limited resources or low-innovation environments. Further, the model also highlights the importance of holistic strategies to manage the interplay of innovation constraints. Managers should be aware of and therefore execute holistic strategies to more effectively manage constraints and the interplay that exists between them.

6.4 Limitations of the Study

This thesis explored how small and medium-sized enterprises (SMEs), particularly those operating in the low-tech (e.g. food) in Scotland undertake innovation despite constraints. Thus, the findings were bound to the Scottish low-tech sector, nevertheless, the study offered themes that can inform future studies into innovation in other sectors and countries.

Methodologically, despite the many positive aspects of qualitative research, a common criticism of such studies is the lack of objectivity and generalisability. The subjective view of the researcher may indicate bias. While qualitative studies are not generalisable in a traditional sense of the word, nor does the author claim to be, actions were taken to maintain the rigour in the collection of data and analysis, as discussed in the Methodology chapter as well as the opening of each Finding (RQ1-RQ3). Further, the study has a sample of different types of SMEs, encompassing family firms, privately owned, and subsidiaries, and SMEs in the sample operate in different sectors within food ranging from biscuits, chocolates, ice cream, pastries to meat, seafood, and vegetables, and varied both in terms of size and turnover, allowed for multiple views offering a more well-rounded and comprehensive understanding of innovation in SMEs in the food sector. This may in turn contribute to knowledge on SME innovation more generally.

Innovation is complex and challenging to explore as a concept and from a methodological point of view. Participant responses may include bias, in that SMEs may exaggerate their innovation activities. Such limitations are common in research studies in general, however, as stated the researcher took steps (see Methodology Chapter) to minimize respondent bias.

Furthermore, the interviewing firms were all accounts managed by Scottish Enterprise, thus the results of the interviews (emerging and final findings) were also presented and discussed together with Account Managers, and Innovation & R&D and Economic Research departments. However, it may be necessary to add that while research may fundamentally be a political activity (Easterby-Smith et al., 2003), the researcher felt it important to wisely balance the requirements of the academic thesis with Scottish Enterprise. The researcher mentioned in this section that the doctoral research was partly funded by Scottish Enterprise, with an interest in exploring the SME innovation phenomena. Fortunately, the researcher was given control over the progression of the research topic and the way to operationalise the process. Whilst suggestions were proposed and discussed with Scottish Enterprise, there was no political pressure controlling the research on any specific issue. The choices were based on the researcher's view to best suit the research project. The researcher is very grateful to the funding provided by Scottish Enterprise to support this research, as well as their enthusiasm and insights offered to the researcher. Since this project was a partnership between Strathclyde University and Scottish Enterprise (SE), the researcher identified himself as a Doctoral Researcher from Strathclyde University undertaking this research project in partnership with SE. This was to avoid any conflicts that may have come up. During the data collection process, the researcher had to make participants aware of this and that the researcher was not part of the SE funding teams, which may have affected the research. The researcher ensured all participants that all data collected was confidential (Lincoln and Guba, 1985).

6.5 Future Research

Future research may examine the themes discovered in this study in other contexts such as contexts with limited resources, contexts where there are imbalanced relationships or dominant customers, contexts where there is unique organisational culture and low innovation contexts.

Future studies may also consider other constraints such as the burden of complying with regulation and how SMEs innovate despite this. This is important, particularly for many food SMEs.

Furthermore, while this study investigated how SMEs efficiently resource orchestrated for innovation under constraints future research may show how and why SMEs don't innovate due to those constraints and explain how they are inefficient in using resource orchestration. Hence, interesting future research may examine why SMEs do not innovate due to their constraints and thereby using resource orchestration to explain how they are inefficient in using resource orchestration. This research showed efficient resource orchestration for innovation in SMEs, therefore, future research may examine the opposite and provide an explanation for why SMEs do not innovate due to their constraints and by using resource orchestration to explain how they are inefficient in using resource orchestration.

Future research may also take a more systematic approach to external resources and innovation ecosystems and demonstrate how SMEs, either low-tech or high-tech or both (comparison) effectively orchestrate external resources in the innovation ecosystem to undertake innovation. Participants may include both SMEs and external actors, to offer a deeper understanding and perspective of resource orchestration of high-tech or low-tech SMEs or both (comparison) for innovation. Since SMEs rely on external resources from the external innovation community it would be very useful to explore this topic further. Additionally, the findings offer richer insights into resource orchestration between firms rather than a single firm or single-level perspective.

Further, scholars do not have the knowledge of how resources and capabilities for innovation with constraints (e,g. resource limitation) evolve and change over time. A longitudinal approach will be useful to address this issue. While this study empirically explained resource orchestration concerning innovation, future research may study resource orchestration of firms concerning other business growth activities such as internationalisation, exporting, and sustainability. For example, entrepreneurial and innovative behaviours going beyond economic gain to include sustainable or environmentally responsible innovation behaviours in the context of resource management are also relevant to future research.

6.6 Concluding Remarks

This chapter highlighted the contribution of the study to gaps in existing knowledge concerning how low-tech SMEs innovate despite constraints. It used resource orchestration as a lens to show how low-tech SMEs undertook innovation despite resources, large dominant customers, and family business culture constraints. An in-depth qualitative methodology, encompassing the perspectives of food small and medium-sized enterprises concerning innovation was implemented to address the objectives of the research.

This research has highlighted that SMEs undertake several distinctive yet interdependent strategies and structures that enable them to effectively and efficiently orchestrate resources to innovate. The study highlighted that to innovate despite limited resources SMEs here leverage external network and community support, optimise internal processes and resources, and pursue customer-centric incremental innovation. To innovate despite dealing with large dominant customers, SMEs here master niche and specific markets, pursue customer alignment, and pursue multiple channels to market. Lastly, to innovate under unique family business culture, SMEs here operationalise professional management, cultivate strong employee relations and satisfaction, and take a long-term orientation on business. Such mutually dependent and holistic strategies enable effective and efficient resource orchestration on innovation and even take stronger effect when all the strategies function in a consolidative manner. Indeed, they enable SMEs to better manage their disadvantages and turn them into strengths. By identifying holistic strategies SMEs can navigate through the constraints of innovation. They can also manage the constraining and facilitating effects of dominant customers, family business culture and limited resources for innovation. The study also identified and made aware of their interplay for innovation. These add nuance to our understanding of SME innovation not only limited to the low-tech sector. The strategies found can enrich the SME innovation research and offer a better picture of innovation in SME contexts.

The limitations of the study include the broad focus of innovation in SMEs, however, innovation in SMEs and in the low-tech sectors are complex and go beyond R&D. Moreover, the resource management perspective of low-tech food SME innovation offers a

comprehensive and useful understanding of innovation in a specific context. For example, the study offers a theory that can be widely applied to contexts where there are limited resources, contexts with dominant customers, contexts that have distinct organisational culture and ownership characteristics, and or contexts relevant to low innovation. Several valuable policy implications have emerged from this research.

To conclude, SMEs, including those operating in the low-tech sector, play a critical role in economic development. While the food sector is categorised as low-tech, there are still many innovation activities done in this sector that are less R&D focused but carry significant economic impact. The strategies found in this study are not limited to the food sector. Instead, they can apply to many sectors in Scotland and beyond. The findings and conclusions from this study apprise present studies on the resources and strategies of low-tech SMEs whilst also offering valuable perspectives and insights for firm managers, entrepreneurs, innovators, and policymakers worldwide.

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Appendix one: Research project outline and aims for participant recruitment

Project outline and aims

"Decision-making and innovation implementation within Scottish Food SMEs"

Sep Fardghassemi
Scottish Enterprise-Strathclyde
January 2019

In partnership with Scottish Enterprise we are conducting research on the decision-making of Scottish food SMEs regarding their innovation implementation i.e. *how* and *why* they make innovation implementation decisions? We are conducting this research because there is little research investigating SMEs innovation decision-making process, particularly within the context of Scottish food sector. This research will provide the benefit of providing empirical research in an under researched area, with the additional benefit of the insights contributing towards the Scottish firms, sector and the economy, and the policy the government wishes to design to increase economic development. The aims of the projects are (1) exploring and understanding the decision-making processes of innovation implementation within high growth and low growth SMEs (2) to use this information to unpack the issues surrounding this topic and design more effective policies to help firms in this sector become more innovative and generate sustainable growth.

We propose doing this through interviews to be held with relevant informants from each firm during 2019's second quarter starting from April. The participants are to be identified by individuals already working at the firm and are involved in the innovation of the firm. The semi-structured interviews will last between 60 to 90 minutes for each informant. All participants will provide informed consent including full information sheet with an appropriate 'opt out' section should they wish not to be involved with the research. Participants will be rest assured that their participation is voluntary, that they can withdraw at any time without providing reason and that their data can be destroyed if they wish. These interviews will include series of explorative questions designed to gain insights into the firm's decision-making processes concerning innovation implementation. Interviews will be audio recorded, which will be transcribed with consent.

The Food & Drink sector is among the most successful and dynamically growing sectors of the Scottish economy. It is an important contributor to the economy in terms of employment (119,100 jobs), turnover (£14.3bn) and GVA (£5.3bn). Exports totalled £4.9bn in 2015, with drink exports continuing to account for the majority (78% by value) of Scotland's total exports. While the Scottish innovation story may be well known – too few companies innovate and even fewer make significant returns from their innovation investment. The innovation story in food & drink businesses is less well articulated.

There is a consensus that innovation leads to high growth firms and industries which are key forces for fuelling economic growth. Innovation is how we come up with the new or improved products and services customers want and how we compete in the world. It is anything that adds value to products, people and process or to the workforce. The OECD has highlighted that innovation will become an ever more important driver of growth in recognition of the structural landscape of many developed Western economies. In the long-run OECD notes that innovation and employment creation go hand-in-hand contributing to a high employment economy. Equally, EU and the Scottish government have identified innovation as a source of sustainable economic growth. According to Nesta innovation may responsible for 2/3 of UK private sector productivity, and businesses that innovate grow twice as fast.

As such, the purpose of this research is to ultimately help businesses SMEs become innovative and innovate across the full supply chain (primary producers, manufacturing business and food service and retail) with the vision of developing a successful food industry where innovation is driving growth, productivity, competitiveness and well-being in Scotland. The Scottish government recognises the importance of innovation, in terms of continued growth of the sector and also enhancing the capabilities of firms and people. So the ultimate goal is to influence

policy that will most effectively impact your business to achieve business goals through innovation.

Appendix 2: Exploratory interview guide

One-page exploratory interview guide

General information

- Please tell me a little about the origin of the company and what your company does.
    - How did you start this company?
    - What is your main line of work/what industry do you work in?
    - How many employees do you have?
    - How many of these employees work with innovation (e.g. directly)?
    - Do you have single or multiple product?

- Where does development of new products lie within your company's strategy?
    - Is innovation a priority?
    - What is the process of innovation?
    - Are you actively seeking innovation (growth through innovation)?
    - Based on your recent innovation, did your company gain any benefit/growth? What was the impact? Is the development of new product driver of economic growth?
    - Can other companies learn from your company's innovation?

Culture

- How are decisions made in your company?
- How are ideas generated in your company? How does your company decide to develop new products?
- What motivates you to develop new ideas?
- What is the process of NPD?
- Do you internationalise / export?

Resources

- **Human capital**
    - How do you form your development team?
    - Do you have leader who pushes for innovation?
    - Do you have a board?
    - Do your human capital's background, personality, characteristics, experiences and skills matter?
- **Technology capital**
    - Do you have a technology strategy?
    - Do you have resources available for developing new products?
    - How do you develop new products?
    - Does location for developing new products matter?
    - What are the most important thing for you in new product?

External factors

- **Competition**
    - How does competition impact your innovation/R&D activity?
- **Public intervention**
    - Do you get public support?
- **Collaboration**
    - Do you collaborate with local institutions (research institutions, partners, customers)

Appendix 3: Food sector's business support organisations

Scotland Food & Drink

SFD is the industry leadership organisation supported by the government to bring together all key sectors of the Scotland's food and drink industry, plus trade organisations and public sector agencies including Scottish Enterprise and Highland and Islands Enterprise, with the aim of collaboratively increasing the value of the industry to £30 billion by 2030 and to reinforce Scotland's status as a Land of Food & Drink. SFD has now over 460 member companies who pay membership fees to use SFD's services. As such, SFD is part funded by the government and runs on membership fees. To help members grow their markets and businesses SFD regularly organises commercial opportunities for Scottish food & drink businesses to pitch to buyers from across the UK, as well as organising international food & drink events including tradeshows and exhibitions for Scottish food & drink businesses to showcase products. SFD helps develop skills by organising webinars & skills workshops and Supplier Development Programmes with UK Trade Partners to achieve sustainable success for key customers. In addition, SFD provides market intelligence services to members to better navigate the ever-changing food & drink landscape.

Scottish Enterprise

Scottish Enterprise (SE) is Scotland's main economic development agency, funded largely by the Scottish Government. Their activities aim to help businesses grow, improve efficiencies, access new sources of funding and enter new markets.

SE provides business development support which includes improving business processes related to improving productivity and employee engagement a service offered by SE known as workplace innovation i.e. workforce planning, organisational design, and alternative business models. Within these, SE offers support to optimise team performance and create efficient ways for the workforce. Second, SE offers help with finding new customers and suppliers which includes domestic market research, supply chain mapping, and international market research. Thirdly, SE provides e-commerce guidance on how to sell online effectively where they arrange events, workshops and training. They also provide collaboration support whereby advising to help companies set up a consortium co-operative, particularly through Co-operative Development Scotland to support business growth through employee ownership and co-operative business models. In addition, succession planning support and scale business are also part of the business development support. Within scale business, SE has a high-growth spin-out programme funding to help food businesses scale up. SE also offers food producers support to develop new products and services, this includes connecting them to experts and project partners within industry and academia, advice on intellectual property (IP) and how to secure investment. SE's accessing other finance can support food producers through SE's investment arm, the Scottish Investment Bank which can help firms access a variety of sources of funding including their SE's co-investment funds.

Specifically, for food firms, SE work together with Scotland Food & drink to help firms keep at the forefront of consumer trends by offering the latest reports, articles, insights and case studies on food & drink innovation. SE also offers support for Scottish food & drink producers to prepare for Brexit with getting to know the risks, rewards, challenges and opportunities, as such, they provide resources, advice, events and funding to help companies prepare Brexit plans. Some of these include securing the supply chain and help find alternative suppliers to replace European suppliers. Lastly, SE offers a range of exporting guides, international market research and advisory services. More specifically, giving guidance on how to start exporting

and the benefits it brings and helps create an export plan. Besides offering tips and providing expert advice SE also provides export vouchers to get food & drink firms started on exporting.

In addition to helping food manufacturers, SE runs the Scottish Manufacturing Advisory Service (SMAS) across the whole manufacturing supply chain in Scotland. They work intensively with businesses across all sectors and of all sizes in Scotland, from Shetland to the Borders. Technology, automation and global supply chain opportunities mean the business world is changing fast and so to maintain future competitiveness, food & drink producers are encouraged to increasingly engage their entire workforce in supporting innovation and the adoption of new processes and technology. Supporting manufacturing businesses plot a course to take advantage of new opportunities to increase productivity and boost competitiveness. A team of 22 practitioners, who are according to SE industrial leaders, can guide businesses through immediate tactical challenges as well as longer-term strategic change. The idea is to support improvements in productivity, culture and behaviours in Scottish businesses including those in food & drink. In addition, improvement projects can be tailored to solve an immediate business issue or focused on a more significant change programme. There are already a number of food & drink producers/manufacturers who have massively benefited from working with SMAS.

Agriculture and Horticulture Development Board (AHDB)
The Agriculture and Horticulture Development Board (AHDB) is an evidence-based levy board with a pivotal role to make the industry sectors they support more competitive and sustainable.

Dairy UK
Dairy UK represents the interests of dairy farmers, producer co-operatives, manufacturers of dairy products and processors and distributors of liquid milk throughout the UK. This supply chain approach is unique within the global dairy industry.

Food and Drink Federation Scotland
The Food and Drink Federation Scotland (FDF Scotland) is an independent, industry-funded trade association, representing food and drink manufacturers from major global brands through to small and medium-sized enterprises in Scotland.

Highlands & Islands Enterprise (HIE)
HIE is the Scottish Government’s economic and community development agency for the highlands & islands. HIE's role and responsibilities are sharply focused on helping high-growth businesses and improving regional competitiveness.

NFU Scotland
The purpose of NFU Scotland is to promote and protect the interests of the Scottish farming industry, influence the government, the public and consumers to that end, and assist its members to meet the needs of customers.

Quality Meat Scotland (QMS)
Quality Meat Scotland's core function is to work with the Scottish red meat industry to improve its efficiency and profitability and to maximise its contribution to Scotland's economy.
Seafood Scotland

Seafood Scotland is a trade organisation set up in 1999 by the main representatives of the Scottish seafood industry, to market, promote and develop responsibly caught Scottish seafood in order to maximise the value return to the industry.

SEFARI
SEFARI aims to deliver 'Leading Ideas for Better Lives', reflecting that publicly funded research in Scotland is delivering a positive impact for policy, business and public users, whether in Scotland or elsewhere. The portfolio delivers both longer-term, strategic research and shorter, more policy-responsive work. It also invests in the next generation of scientists, supports Scotland's research infrastructure and helps generate new partnerships with others.

Scottish Agricultural Organisation Society (SAOS)
SAOS are Scotland's experts on co-operative and collaborative strategies, structures and management. They provide a comprehensive range of development and consultancy services, supported by The Scottish Government.

Scottish Bakers
Scottish Bakers has represented and promoted the interests of the bakery trade in Scotland since 1891. The Association believes that it is an integral part of each member's business operation. As such it can be called upon to provide a valuable source of advice. They are focused on apprenticeship.

Scottish Development International (SDI)
Our aim is to encourage the growth of the Scottish economy by encouraging inward investment and helping Scottish companies to compete in overseas markets. We provide a wide range of international business services.

Skills Development Scotland (SDS)
Skills Development Scotland (SDS) is the national skills body supporting the people and businesses of Scotland to develop and apply their skills. SDS was formed in 2008 as a non-departmental public body, bringing together careers, skills, training and funding services.

Scottish Government
The Scottish Government is the devolved government for Scotland and has a range of responsibilities that include: the economy, education, health, justice, rural affairs, housing, environment, equal opportunities, consumer advocacy and advice, transport and taxation.

Scottish Salmon Producers' Association (SSPO)
SSPO is the trade association for the salmon farming industry. With 95% of the tonnage of Scottish salmon production in its membership, SSPO represents the industry in political, regulatory and technical issues.