From Periphery to International Pioneers: Reimagining Innovation Practices of SMEs in Peripheral Regions

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Abstract

Purpose

Although empirical and theoretical studies have examined the innovation practices of firms for internationalisation, the ways in which small and medium-scale enterprises (SMEs) operating in peripheral regions manage and reimagine innovation practices are still underexplored and under-theorised. Hence, this study explores and maps the factors that influence the innovation practices of SMEs operating in peripheral regions. Additionally, the study explores the strategic resources SME managers utilise to manage innovation during internationalisation.

Design/methodology/approach

The study utilises a qualitative method that is theoretically grounded in deductive interviews conducted with 21 SME senior managers and 2 regional experts in the peripheral region of North East England, United Kingdom. In this area SMEs encounter several constraints related to firm-level and regional resources Data were analysed through an iterative and thematic process using the Gioia approach.

Findings

Findings reveal that the innovation activities of SMEs in peripheral regions are informal, nonlinear, and adaptive iterative processes, informed by internal and regional constraints. We also found that enhancing innovation performance for internationalisation requires the calibration and reconfiguration of internal capabilities in alignment with regional resources.

Research limitations/implications

Findings demonstrate that the innovation process of SMEs in peripheral regions is often nonlinear, iterative, experimental, and informal. It highlights how SMEs navigate complex challenges, leveraging and reconfiguring diverse capabilities and regional resources to optimise innovativeness and internationalisation.

Practical Implications

The study's findings can assist SME managers in leveraging diverse capabilities and resources for improved innovation and internationalisation performance in peripheral regions. Additionally, it informs policymakers on the need for tailored and adaptive innovation policies that reflect regional constraints and needs.

Originality/Value

This research contributes to theories and empirical studies in the fields of innovation and internationalisation. It extends the Resource-Based View and Dynamic Capability Theory by demonstrating that peripheral SMEs operating under severe constraints do not follow formal and structured processes. These SMEs recalibrate and reconfigure firm-level, regional resources to build capabilities for innovation by leveraging nonlinear, experiential, and iterative methods.

Keywords: Innovation, SMEs, internationalisation, peripheral region, dynamic capability, resource constraint, regional collaboration, regional innovation.

1. Introduction

Organisations are increasingly facing a globalised environment in which traditional business models are no longer sufficient. Firms are actively engaging in innovation activities not only to survive but to stay competitive (Crossan and Apaydin, 2010; Garrido-Moreno et al., 2024). Furthermore, innovation is perceived as an essential tool for productivity and regional growth in the United Kingdom, where Small and Medium-sized Enterprises (SMEs) account for over 99% of all private sector businesses (UK Gov, 2024). Many firms are no longer innovating solely for their local markets but are keenly looking to foreign markets to capture new opportunities, gather knowledge, and boost their global competitiveness (Love and Roper, 2015; Do et al., 2023).

Although innovation is recognised as an enabler of competitiveness (Teece et al., 2016; Eder, 2018; Costa et al., 2023), little is known about how SMEs, particularly those in peripheral regions, develop and execute innovation practices within an international context. Peripheral regions conceptualised as geographies characterised by structural detachment from national innovation and business ecosystems, less diversified economy, and limited access to skilled labour, present unique constraints for SMEs (McAdam et al., 2004; Nilsen et al., 2022). The North East of England, a peripheral region, demonstrates these characteristics with low knowledge intensity, outmigration of skilled workforces, and a weaker innovation ecosystem compared to major cities like London, the South East and other core metropolises (North East Evidence Hub, 2023; Mason and Hruskova, 2025). Consequently, SMEs in these regions, despite their innovative potentials and engagement in international markets, face the inborn resource constraints of small size alongside navigating structural deficits of their regional environment. Despite their potential in the overall economy, little is known about how these firms manage and reimagine innovation during internationalisation, with existing research in this area largely focusing on multinational organisations located in major urban areas, where businesses have greater access to knowledge, networks, skilled workforces, and institutional support (Fitjar and Rodríguez-Pose, 2011; Rajapathirana and Hui, 2018; Farzaneh et al., 2022; Garrido-Moreno et al., 2024; Bogetoft et al., 2024; Saka-Helmhout et al., 2024). SMEs operating in peripheral or less developed areas could find it difficult to fully achieve their potential (Barbero and Rodríguez-Crespo, 2022), highlighting the need to explore how SMEs operating in peripheral regions manage innovation for internationalisation. Consequently, investigating the duality of innovation management practices and potentials for

internationalisation amid peripherality provides compelling insights into how SMEs transform and reimage innovation for internationalisation within distinct regional settings.

However, while the innovation practices and internalisation processes of firms have attracted empirical attention, studies mainly focused on large firms and SMEs in core centres, where access to finance, network, infrastructure, and innovation ecosystem are comparatively strong (Farzaneh et al., 2022; Robertson et al., 2023; Garrido-Moreno et al., 2024; Bogetoft et al., 2024; Sheikh et al., 2024). There is a paucity of research focusing on the innovation and internationalisation process in peripheral regions, where SMEs often encounter resource resources and limited institutional supports. Additionally, few studies that focus on the innovation practices of firms operating in regional environments do not provide a clear picture of how peripheral SMEs in less developed innovation ecosystems manage their innovation practices during internationalisation (Tödtling and Trippl, 2005; Coad et al., 2016; Dabić et al., 2020). Mainstream research often assumed linear and formal innovation processes, while paying less attention to how innovation activities of peripheral SMEs evolve under severe resource-constraint conditions such as limited institutional supports and firm-level resources (Fitjar and Rodríguez-Pose, 2011; Rajapathirana and Hui, 2018).

Due to this apparent gap, we lack empirical evidence on how peripheral SMEs manage innovation processes despite resource limitations, while linear and formal processes identified in extant studies may not be applicable to these firms (Fitjar and Rodríguez-Pose, 2011; Rajapathirana and Hui, 2018; Qin, 2026). Thus, how peripheral SMEs mobilise firm-level, regional resources and build adaptive capabilities to foster innovation during internalisation remains an empirical and theoretical gap that requires scholarly attention (Andersen et al., 2025). Consequently, our research explores and answers the question of how SMEs in peripheral regions manage innovation during internationalisation, focusing on the North East Region of England. Therefore, this study addresses the following research questions:

1. How do internal and regional constraints influence SMEs' innovation practices and capabilities development during internationalisation?
2. How do SMEs operating in peripheral and less developed innovation ecosystems reconfigure and orchestrate internal, regional, and international resources to manage and reinforce innovation during internationalisation under condition of resource scarcity?

By addressing these questions, this study argues that peripheral SMEs manage and evolve their innovation through adaptive, iterative, and informal processes. This enables SMEs to adapt and recalibrate firm-level and regional resources to foster innovation performance during international expansion, despite resource constraints linked to the peripherality of their environment. Consequently, our study theoretically contributes to the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) by arguing that peripheral SMEs do not operate under abundant resources, and fostering innovation requires diverse and strategic iteration, experimentation, and informal processes in alignment with adaptation and recalibration of firm-level internal and regional resources. Furthermore, the study extends previous empirical studies on regional and core innovation systems (Coad et al., 2016; Dabić et al., 2020; Qin, 2026), by showing that firms' innovation during internationalisation cannot be fully understood without considering the innovation ecosystem in which they operate. By relying on qualitative data that capture the innovation practices and experiences of SMEs in the peripheral regions, empirical evidence shows that, despite facing resource limitations, small firms recalibrate resources through informal, nonlinear, and iterative adaptive processes to manage and reimagine innovation activities for internationalisation. Lastly, the study provides practical insights that can guide policymakers and SMEs on how to adopt the best management practices to advance innovation and international competitiveness of SMEs in peripheral regions and beyond.

2. Literature Review

2.1 Innovation of SMEs

Innovation, specifically the strategic implementation of new management and technology practices to achieve targeted renewal of products, services or process improvement, is acknowledged as a critical driver of firm growth and competitiveness (Rajalo and Vadi, 2021; Costa et al., 2023). Innovation has become the cornerstone for firms to create value, safeguard survival, and position themselves in the global market. It is more relevant to SMEs because of their limited resources and capabilities (Prange and Bruyaka, 2016; Kurdve et al., 2020). Classical understanding of innovation often focuses on the technological advancement or large-scale Research and Development (R&D) structures, which is not generally the case in SMEs, which create and manage the innovation process differently (Crossan and Apaydin, 2010). Innovation in SMEs is less formal in comparison to larger businesses, as these small firms do not possess enough resources for performing R&D (Love and Roper, 2015; Minami and Sato,

2024). The difference is adaptability and flexibility, as these SMEs are more adaptable, which leads these firms to react and adjust more rapidly due to changes in the market conditions (Arend, 2014).

Larger firms generally have a well-structured innovation system, dedicated R&D infrastructure and enough financial resources, permitting them to systematically manage their innovation process (Rajapathirana and Hui, 2018; Vega-Jurado et al., 2021). However, SMEs majorly depend on dynamic adaptability (Vossen, 1998; Mayanja et al., 2019), networking (Caballero-Morales, 2021), and collaboration (Padilla-Meléndez et al., 2013) to manage their innovation process. Having these capabilities, effective management practice, and the informal nature of innovation in SMEs make them more reactive in the limited resources and changing market environment. The RBV supports the view that possessing the unique, rare, and valuable organisational resources, including skilled workforces and innovation capability, plays a central role for businesses to gain a competitive advantage in global markets (Barney, 1991). However, recent work extending RBV stresses that the performance of a firm, particularly under resource constraints, does not merely depend on the resources it possesses, but on the relational resources and mobilisation of these resources to remain competitive under constrained conditions (Donaldson et al., 2025). This study extends this logic, explaining that SMEs in peripheral regions assemble their internal and regional resources to manage their innovation under constrained conditions.

Similarly, the DCT emphasises how firms adapt, build and reconfigure their internal resources to react to uncertainty and a changing market environment, especially during innovation (Teece et al, 1997). Nevertheless, while a recent conceptualisation by Teece (2023) indicates dynamic capability as a set of interconnected processes involving sensing and seizing opportunities through strategic decisions, this innovative process operates under resource abundance conditions within core centres. Furthermore, recent studies also emphasise the importance of dynamic knowledge management in the DCT process, enabling firms to effectively absorb, recombine, and redeploy knowledge across organisational and regional boundaries (Li et al., 2025). Furthermore, recent studies also argue that RBV explains the scarcity and availability of firm resources, whereas DCT describes the calibration, recombination, and orchestration of these resources in response to changing conditions (Kero and Bogale, 2023; Sun et al., 2024). Nonetheless, the resource-based and dynamic approach to managing and adapting firms' capabilities is contingent upon having an abundance of resources and a strong innovation system (Qin et al., 2024). Additionally, sustaining competitive advantage through DCT

demands significant capital investment and ongoing financial commitment (Sun et al., 2024), which can be expensive for peripheral SMEs. It is important to clarify that the dynamic capability process may operate differently in peripheral contexts. Due to the liability of smallness and weaker regional innovation infrastructures, peripheral SME sensing capability is not conditioned on resource abundance but an outcome of deliberate network construction and boundary bridging efforts. Moreover, seizing capability rarely requires large-scale investments; it is realised through the recombination of scarce resources, cost-effective experimentation, and utilising regional assets. Reconfiguration effort occurs through iterative adaptation rather than formal restructuring processes. These mechanisms suggest that dynamic capabilities in peripheral settings are implemented through informational, nonlinear, and improvisational processes shaped by scarcity rather than abundance. Yet, the DCT failed to consider the conditions under which peripheral SMEs emerged with their dynamic capabilities and how these facilitate their competitiveness (Sergeeva and Andreeva, 2016; Tehseen et al., 2019). Thus, this study argued that peripheral SMEs operate under severe resource constraints and may perform resource calibration and adaptation differently during the innovation processes.

However, managing and effectively using these resources for innovation can be challenging for SMEs. SMEs could face resource constraints, including financial resources (Hottenrott and Peters, 2012; Love and Roper, 2015; Coad et al., 2016) and skilled workforces (Costa et al., 2023), in their innovation journey. This sometimes requires following informal approaches such as learning by doing, learning by experimenting, learning by interacting, and collaborating closely with employees and customers (Bennat, 2022; Thomä and Zimmermann, 2020). Thus, this element enables a firm's ability to quickly make decisions and adapt, which can allow SMEs to test new ideas and swiftly respond to changes in the organisational environment (Teece et al., 2016).

Nevertheless, SMEs from peripheral regions may face unique challenges, including weaker institutional support, limited knowledge access, and geographical distance from an innovation hub, hindering their innovation process (Tödtling and Trippl, 2005; Fitjar and Rodríguez-Pose, 2011). Innovation activities of these SMEs operating in peripheral regions received little empirical attention in comparison to SMEs operating in the urban and high technology regions (Zarębski et al., 2022; Wibisono, 2022). Thus, this research gap demands a closer examination of how SMEs in peripheral regions manage their resources to improve their innovation activities, particularly under several resources constraint.

2.2 Internationalisation of SMEs

Studies have shown a strong impact of internationalisation practices as a key element, enabling firms to grow and remain competitive (Knight and Cavusgil, 2004; Johanson and Vahlne, 2009). The internationalisation practice of SMEs is not limited to overseas revenue generation, but it also involves the implementation of strategic practices that assist firms to gain access to overseas markets, customers and knowledge from overseas markets (Zahra et al., 2000; Johanson and Vahlne, 2009). This cross-border involvement permits SMEs to adapt their offerings to overseas market requirements and to learn the best practices to operate in foreign markets (Yeoh, 2004). Thus, this experimental learning supports businesses to strengthen their international involvement in other foreign markets and maximise their competitive advantage (Eriksson et al., 1997).

The internationalisation of SMEs is explained by a number of theories. The Uppsala internationalisation Model suggests that the process of internationalisation is a gradual learning process through new and experimental knowledge from the international market (Johanson and Vahlne, 1997, 2009). This perception stresses that firm develops their international practices through repeated engagement in markets, which allows them to improve their international operations gradually over time. This explanation supports SME internationalisation, as entering foreign markets exposes SMEs to experimental knowledge that pushes firms to strengthen their international engagement (Oviatt and McDougall, 1994). However, the applicability of this to SMEs can be oversimplified, especially due to the liability of smallness (Aldrich and Auster, 1986) and liability of foreignness (Lu and Beamish, 2001).

Notably, liability of smallness is not solely a scale disadvantage, but a form of constant resource scarcity that limits a firm's ability to shape capabilities necessary for effective internationalisation (Morris et al., 2022). A recent study further suggests that the outcome of resource scarcity depends on a firm's approach to construct innovation ambidexterity, stating that smallness can be perceived as an asset or a liability, reliant on the balance between exploratory and exploitative innovations (Choi et al., 2022). Empirical findings also denote that firm performance is largely influenced by resource scarcity, instead of the firm's strategic flexibility or competitive positioning (Wang et al., 2023). Thus, the liability of smallness should not be perceived as a limitation, but it is viewed as a condition that alters firm capabilities for internationalisation practices under resource scarcity.

Such constraints may restrict SMEs, particularly those in less developed regions, from fully utilising their capabilities during internationalisation. Similarly, entering the overseas markets may further add risk because of the lack of international experience. However, studies have shown that a large number of these SMEs manage to limit these obstacles by utilising numerous management practices such as flexibility, adaptability and learning from experience (Knight & Cavusgil, 2004). Moreover, the size limitation enables businesses in their swift decision-making and responsiveness due to turbulences in their operating environment, which support organisations in their innovation and internationalisation activities (Karácsony et al., 2025). Nevertheless, SMEs operating in peripheral regions may face distinct challenges in their internationalisation process, and studies have largely focused on businesses operating from metropolitan or export-intensive regions (Dabić et al., 2020; Audretsch and Guenther, 2023). Thus, this gap demands empirical research focusing on SMEs from peripheral regions, on the challenges and opportunities that hinder or drive their innovation process during internationalisation activities.

2.3 The Peripheral Regional Context: Constraints and Capabilities

National innovation and industrial policies have often focused on high-tech areas and innovation hubs in major cities in the UK, while granting uneven support to peripheral regions (Fothergill et al., 2019*)*. From the perspective of the Regional Innovation System (RIS), regional resources are not merely a physical infrastructure, but include other actors, such as higher education and research centres, innovation networks, firms and place-based policies, and these actors play significant roles in determining firm innovation (Trippl and Tödtling, 2025). Though innovation may begin through informal groups and social networks in the peripheral location with weak formal institutions, these are critical for low-tech firms as they enable disruptive knowledge exchange outside of traditional R&D structures (Martinus, 2022). However, this policy imbalance has shaped inequalities in innovation capacity across regions, leaving support to various peripheral SMEs without sufficient institutional support to advance global competitiveness. This absence of support is often associated with a Regional Technician Supply (RTS), restricting skilled actors available to local firms (Tang and Beer, 2022).

SMEs that operate from the peripheral regions face challenges such as weaker institutional support and isolation from the overall business ecosystem in their innovation and internationalisation journeys (Tödtling and Trippl, 2005; McAdam et al., 2014). A relational perspective on these peripheral regions argues that place-based entrepreneurs and local support

actors are the main drivers of regional competitiveness, including small regional banks, supporting essential financial and social capital which larger institutions might overlook (Leick et al., 2024). Additionally, SMEs that operate under extreme uncertainty, such as those in peripheral regions, may make decisions using effectual logic instead of traditional planning. This action stresses reliance on available means, partnerships and affordable loss principles (Sarasvathy, 2023). Also, the soft assets of the firm in geographically distant areas become critical due to the scarcity of external resources; a proactive organisational culture and psychological variables of decision-makers shape how effectively firms mobilise effectual logic to support innovation activities (Pedraza-Rodríguez et al., 2023; Ratinho & Sarasvathy, 2024). Nevertheless, some of the main challenges for geographically distant firms are a lack of opportunities for knowledge spill-over, limited access to global networks, and expensive access to innovative services (Barboza, 2024; Leick and Gretzinger, 2020). Furthermore, businesses may lack shared practices and routines with knowledge centres (Boschma, 2005). Thus, these challenges could limit the learning process for SMEs, reducing their ability to access the formal R&D supports (Rodríguez-Pose and Crescenzi, 2008).

The innovation system in the peripheral regions is reasonably weak in comparison to the urban and high-tech hubs. The number of higher education institutions, research centres, collaboration support platforms, and business support institutions may be scarce in this region, making it harder for businesses in their capacity to improve management practice and innovate (Zarębski et al., 2022; Leick and Gretzinger, 2020). Also, even if the peripheral regional firm innovates, they often struggle with scaling up locally, indicating that these innovative firms may relocate to more central areas after reaching a certain growth phase, and this action hinders local development in the long term (Shearmur & Doloreux, 2022). Additionally, the Regional Intellectual Property Flexibility (RIPF) policy has a significant role in the region to retain its value, as this policy actor determines how local innovations are protected and captured within the regional networks (Tang & Beer, 2022). Furthermore, talent drain and migration of skilled workforces to urban or international centres could make it difficult for regional SMEs to access skilled individuals for innovation (Glückler et al., 2023).

Although SMEs operating from peripheral regions have challenges, these businesses also hold hidden strengths which may enable them to support their innovation and internationalisation activities (Lewandowska et al., 2021). These SMEs in these regions may be equipped with local knowledge, such as an understanding of niche markets and regional resources (Zarębski et al., 2022). This local orientation may manifest as social innovation, which is driven by a

blend of social enterprises, local actors and public-private partnerships which collaborate to counter regional challenges, prioritising the societal values (Micelli et al., 2023). Recent work by Trippl & Tödtling (2025) advocates for a shift toward Challenge-Oriented Regional Innovation Systems (CORIS) to leverage these assets, which apply place-based transformative innovation policies to remodel support structures explicitly for the needs of peripheral regions (Trippl & Tödtling, 2025). Hence, the context of the periphery exhibits both hurdles and unique capabilities, exploring how SMEs operating in this region manage innovation practices for internationalisation offers new insights to the field of innovation and internationalisation. Thus, the outcome of regional innovation does not merely depend on firm-level capabilities, but regional institutions and policies play a substantial part, facilitating or constraining value creation within a specific place (Tang & Beer, 2022).

Methodology

3.0 Design

We are interested in exploring how international SMEs reimagine and manage innovation practices at the peripheral level. Given the theoretical grounding of this research, a qualitative research method was found suitable, enabling us to undertake a context-specific examination of how SMEs evolve and manage the innovation process for internationalisation (Tie et al., 2019; Bazen et al., 2021). Unlike the quantitative approach, qualitative method enables a thorough and in-depth exploration of the implications and experiences that underpin how international SMEs define and redefine innovation practices during the international process (Mills et al., 2006; Pilcher and Cortazzi, 2023; Lim, 2024). Additionally, the choice of qualitative design is grounded in a theoretical framework, as it enabled an in-depth investigation into how SMEs in peripheral regions navigate firm-level and regional constraints in the management of innovation, through the calibration and reconfiguration of resources, aligning closely with RBV and DCT. Additionally, it allowed us to capture the experiential and iterative processes of SMEs in managing innovation for internationalisation, which is the core of the Uppsala Model. Premised on this, semi-structured interviews were conducted among international SMEs.

3.1 Sampling Strategy and Justification

We adopted a theoretically grounded purposive sampling approach to find and select participants who would give relatable and rich insights into innovation practices of international SMEs in the peripheral region. This supports the identification of participants

with specific-context experiences and characteristics (Mills et al., 2006; Dahal et al., 2024; Bouncken et al., 2025). Hence, for this study, SMEs were selected because (i) they engage in internationalisation activities through exportation; (ii) they carry out innovation activities. These SMEs are operating in the peripheral region of the North East region of the United Kingdom, conceptualised as the region situated at the margins of national economic and innovation ecosystem, often characterised by weak institutional infrastructures, low density of knowledge activities, and limited connection to national innovation hubs (McAdam et al., 2004; Nilsen et al., 2022), compared to major cities and metropolitans such as London and South East. Moreover, while this region has emerged as a major innovation hub in the UK with a growing number of SMEs operating at an international level, it simultaneously faces unique and contextual challenges, including skills shortage, technology disparities, and isolation from the country's dominant innovating ecosystem centred in London and the South East.

The Financial Analysis Made Easy (FAME) database was employed to identify and select the SMEs for data collection, offering detailed information on the corporate structure, size, contacts, sector of operations, and subsidiaries of firms. The database enabled us to identify more than two thousand SMEs operating in three major cities, Newcastle Upon Tyne, Durham, and Sunderland, in the North East. However, SMEs operating in four high sectors were selected (Industrial, Electric & Electronic Machinery, Computer Hardware, Computer Software, Biotechnology, and Life Sciences). SMEs in these sectors were selected because of their (i) innovation intensity and (ii) export activities, aligning with the study's objectives, consequently contributing to our theoretical underpinning and findings.

Although we aimed at interviewing 50 participants, the interview was stopped after 24 participants, when saturation was achieved. We reached data saturation through iterative coding and by constantly comparing interview data with new interviews, enabling us to stop the interview process when no new themes related to the research objectives emerged (Lim et al., 2024; Bouncken et al., 2025). For instance, after the 19th interview, similar themes were discovered in new interviews, and while the 22nd and 24th participants provided some new findings, new themes and codes were not found. This process is carried out by both authors and a qualitative research expert to mitigate bias, promote transparency, and reliability of findings. This approach aligns with the renowned qualitative method, where data saturation is obtained when further data or interviews do not offer new insights and become unproductive (Saunders et al., 2017; Bazen et al., 2021; Rahimi and Khatooni, 2024). Hence, concluding the

interview at 24 allows us to focus on methodology thoroughness, impartiality, consistency, and innovative contributions, instead of targeting numerical outcomes.

We recruited participants by sending an email using the contacts obtained from FAME using purposive criteria, such as firm size, sector, international activities, and innovation process. In addition, 7 SMEs were identified through snowballing logic, while only 4 chose to participate in the study. This snowballing process was limited to two referrals per participant to minimise network bias and ensure heterogeneity, thereby facilitating access to SMEs that are difficult to reach while maintaining sampling rigour. To be interviewed, the participants must be involved in the innovation activities while also overseeing some level of international operations of selected international SMEs. To obtain an external perspective, we also interview three incubator experts providing innovation and international support to SMEs in the region. This enabled us to widen the scope of our findings by minimising the possibility of narrowness. Hence, the most senior managers and experts who engaged in innovation practices and the internationalisation process were selected for the interview (See Appendix 1). The selection of managers enabled us to obtain perspectives on the firm-level innovation process, while experts provided ecosystem-level insights and opinions based on their engagement with SMEs, aiding triangulation with managerial accounts. The combination of these perspectives offered a multi-level exploration and understanding of innovation in peripheral regions.

3.2 Data Collection

The data collection followed an established interview procedure grounded in theoretical and practical relevance. The interview questions were iteratively adapted from extant studies on SMEs innovation and internationalisation, supporting theoretical validity. In addition, two professors in the field of innovation and internationalisation reviewed and adjusted the interview guide before being pretested with selected SMEs outside this study (See Appendix 3). Their insights were integrated into the questions to ensure clarity and validity. The interview started by establishing an affinity and familiarity with participants; introducing them to the researcher, objectives, and practical outcome of the study. Ethical protocol, consent and what is required of the participants were further discussed. The interview patterns followed semi-structured open-ended questions linked to the research questions and objectives. Follow-up and probing questions were asked, enabling clarification of responses and richness of data. Although there are set of questions asked, further probing questions emerged from the discussion and responses of the participants. Since the responses are important for the

reliability and theoretical contributions of findings, participants were encouraged to express their opinions freely, linking them to experiences.

We obtained ethical approval from the Northumbria University Ethics Committee before data collection. Participants were given an information sheet stating the purpose of the study, the right of withdrawal at any point without consequences, and the voluntary nature of participating in the study. All participants gave informed consent before conducting the interviews. Confidentiality and anonymity were ensured by adopting pseudonyms, and any information identifying organisations or participants was removed. Interview data were secured and stored according to the institution's data protection guidelines.

3.3 Data Analysis Procedures

The study followed the Gioia (2020) methodological approach for the categorisation of themes and coding, given the complexity and richness of the qualitative data. We commenced the data analysis by systematically listening to the recorded interviews to familiarise ourselves with the raw information, followed by transcription. The transcribed data were sent to each participant for confirmation, supporting the validity of our findings (Lloyd et al., 2024). Following the transcription of data, the themes identification and coding approach involved the detection and analysis of 1st order and 2nd order themes, and aggregate dimensions (Gioia et al., 2012). Since we identified several themes in the first coding phase, the open coding method was employed to generate the 1st order concepts (Gioia, 2020; Rochette et al., 2023). Subsequently, the 2nd order concept enabled us to reduce the themes into a more manageable number by categorising similar constructs. To ensure that the emerging themes are aligned and relevant to theoretical framing, the themes emerging from 2nd-order categorisation were further compressed to form the "aggregated dimensions" (Shkedi, 2004). To facilitate the rigour of our methodology procedures and findings, the coding process and outcomes were subjected to research team member checking, who are the authors and some qualitative methodology experts who are research friends (Smith and McGannon, 2017). Leveraging these collaborations, we thoroughly fact-checked the coded data, providing constructive feedback at different phases of the data analysis (Busetto et al., 2020). This reinforces the reliability, transparency, and validity of data and findings (Smith and McGannon, 2017; Coulston et al., 2025).

The adoption of the Gioia approach is justified by its ability to link emerging themes from data to relevant theories. Moreover, its alignments with interpretivist and inductive theory conform

with the qualitative method employed in this study, allowing for theoretical grounding during the data coding and analysis stage (Gioia et al., 2013; 2020). The progressive procedures of moving from 1st order to 2nd order concepts, and finally to aggregate dimensions, provide a methodological rigour and transparency for theoretical advancements in research (See Appendix 2). Currently, the Gioia approach is well used and recognised in qualitative research for its theoretical novelty and relevance.

Due to the qualitative and interpretivist nature of the research, we integrate reflexivity throughout the research process. The researchers uphold a reflexive stance throughout the interviews and data analysis, critically reflecting on their positionality, principles, and their potential influence on the outcomes of the research. Given the prior academic and professional exposure of the researchers to SMEs research, efforts were made to avoid undue expectations and bias and remain open to the lived experiences of the participants. The reflexive practices employed include analytic memos during coding, iterative data engagement, and continuous discussion among the research team, challenging emerging themes and interpretations. Additionally, the researchers' prior academic background and research exposure to formal and structured innovation models influenced an expectation that SMEs in peripheral regions would demonstrate direct and linear processes in their innovation activities and management. However, during early coding, the emerging inhibitors and the predominant informal and iterative approaches to innovation management and practices impelled a conscious shift to better capture the informal and nonlinear innovation dynamics of SMEs in peripheral regions. Consequently, the researchers became open to diverse possibilities of outcome during the coding, which helped reduce bias. Overall, this process mitigates potential bias, strengthens methodological rigour and transparency, thereby reinforcing credibility and validity of the findings (Corlett and Mavin, 2018; Olmos-Vega et al., 2022).

4. Results

Figure 1 presents the structured data following the Gioia approach, allowing us to foreground the themes in theoretical discourse (See Appendix 2 for coding process). The figure also demonstrates major concepts and themes serving as the foundation for our proposed theoretical framework, showing the challenges and how SMEs exploring the international market reimagine innovation practices in the peripheral region.

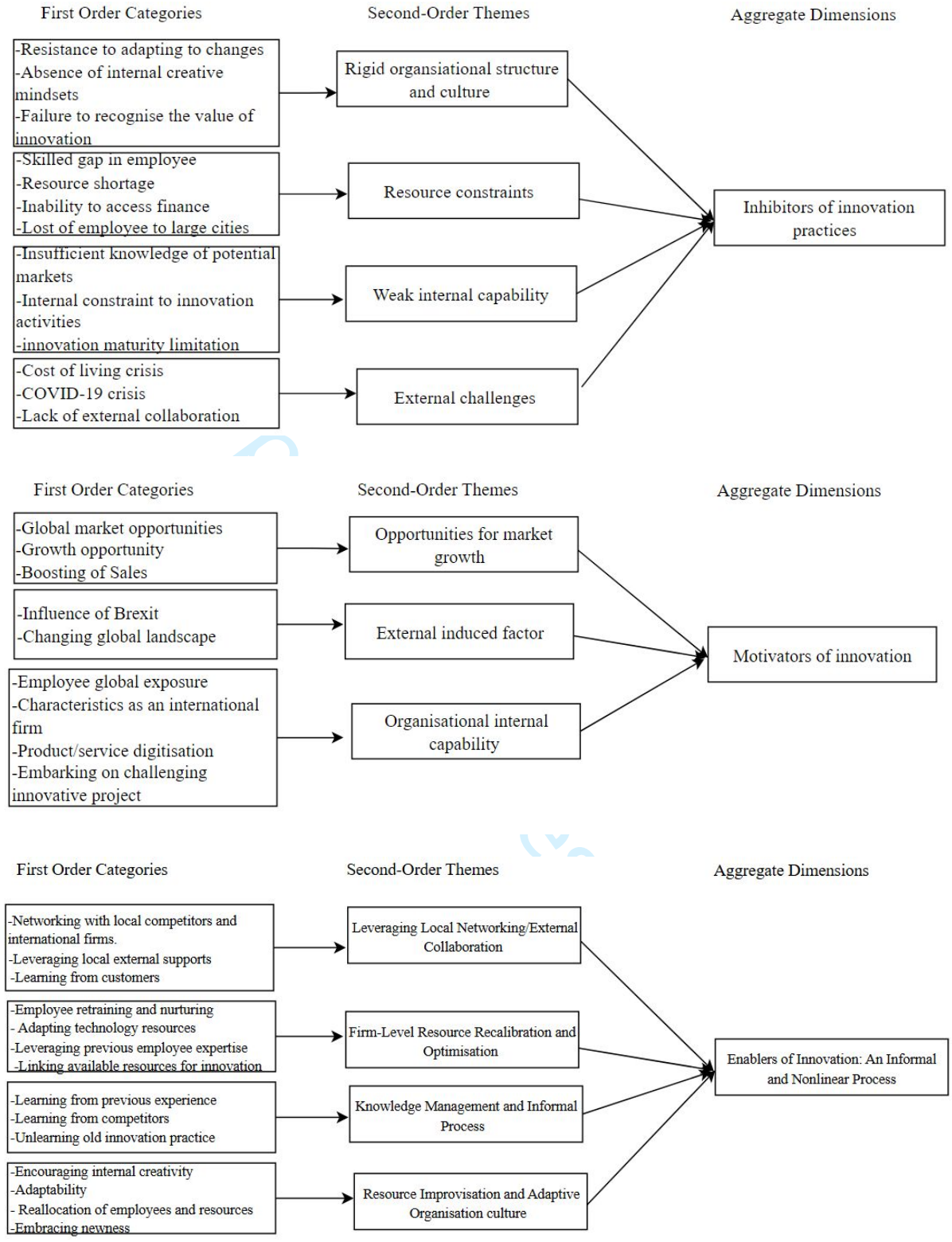

Figure 1: Coding and Dimensions

4.1 Inhibitors of Innovation Practices of SMEs in the Peripheral Region

This theme explores challenges and factors that inhibit the innovative practices of SMEs. This is considered important because (i) they do business in a peripheral region, SMEs encounter unique regional issues, and (ii) understanding these inhibitors can help enhance their innovation practices for more international presence. The quotes below demonstrate common themes, especially resource constraints:

> *'When employees leave for larger cities, they take with them their skills, capabilities, and experience, leaving a gap in their areas of responsibility. Sometimes they possess unique skills that we need to find alternatives for, either through outsourcing or finding different approaches.' (*E&M_P10*).*
>
> *"…barrier is the lack of capacity, which includes limited time, staff, and funding for executing opportunities once they have been identified. In most case funding is not enough in this region*" (Expert1)
>
> *"They [SME] need enough time, and the right skill set within their team to invest in the business and work on it. Such skills sometimes are difficult to access in our region since talented workers are moving to cities like London*" (Expert2)

From the above quote, the participants highlighted the issues of resource shortage, which is linked to the challenges faced at the regional level which highlights "liability of peripherality". The resource constraints underscore the liability of smallness faced by SMEs; upholding the RBV's standpoint on resource scarcity is an inherent characteristic of SMEs (Barney, 1991). This is pronounced among SMEs operating in peripheral regions, where small firms face the challenges of skill limitation. For instance, the loss of labour to major cities and the lack of finance appeared across responses. Most SMEs that innovate for international activities face these challenges because skilled workers are required to innovate products/services that will be accepted globally. Linked to these issues is the problem relating to rigid organisational structure and culture, as highlighted by the participants:

> *"There is always cultural resistance within the organisation. People say, 'We have always done it this way.' So, overcoming that mindset and supporting a new way of doing things can be a challenge."* (E&M_P6).
>
> *"We recently developed a second generation of our pipe-in-pipe water storage system. We believe it performs just as well, if not better, than the previous version. The technology is similar but not identical. The resistance we encounter is due to the mindset that if the old one has worked for the past 20 years, why change it now?*" (E&M_P8).

From the quote above, while participants highlighted challenges related to resistance to change, retaining employees becomes difficult due to a lack of finances, which reflect the "liability of smallness" logic. This indicates the difficulties in SMEs in developing their technical know-how. This highlights the dynamic capability perspective, that resistance to change and culture of remaining with legacy systems, combined with resource limitations, further inhibit SMEs' ability to sense, seize, and reconfigure opportunities for innovation performance (Teece et al, 1997; Teece et al., 2016). Moreover, the fear of losing trained employees adds more complexity

to this issue. These challenges are compounded by the weakness in internal capabilities, particularly with poor knowledge of potential international markets and internal restrictions to innovation activities, as elaborated by Expert 1 in the second quote:

> *"Another challenge for these firms lies in accessing both domestic and overseas markets to expand the reach of their innovations. In most cases, they lack that ability to access internal markets, especially Asian and African"* (Expert2).

> *"This includes estimating the market size, determining the level of investment or resources required, and building credibility in the solution. It becomes more difficult due to their regional orientation"* (Expert1).

> *"Another main challenge we observe is a lack of innovation maturity. This often demonstrates difficulties in clarifying the value proposition and effectively communicating it."* (Expert1).

The above quotes show the limitations of SMEs, especially at the regional level, in their innovation practices. Unlike large firms and SMEs operating in cities or urban areas, regional SMEs find it more difficult to navigate innovation activities and process results due to their weak inability. This is more noticeable due to their regional orientation and lack of innovation maturity. The participants also highlighted the influence of external factors as a major barrier to their innovation practices:

> *"We are currently in survival mode due to the pandemic, focusing on regaining the customers we lost rather than pursuing innovation and growth beyond our current state. On a day-to-day basis, the pandemic made it challenging to retain operations. It took time for our region to come to life, and not yet full, as you can see things"* (E&M_P5).

> "*We have also noticed a decline in business startups, both within the region and nationally, potentially due to the high cost of living. The inequality in starting businesses is also a concern, as it may hinder disruptive innovations made by individuals identifying better ways of doing things. In most case it looks easier to start a business in the cities compared to this region"* (Expert2).

> *"Ineffective innovative collaboration from external sources is one of the obstacles we recently faced, especially from large cities like London. We had this issue in the past where we collaborated with one of our competitors to design the battery pack, and an issue developed during the project, and we had to back off from this partnership."* (E&M_P11).

The participants highlighted several challenges linked to regional issues, especially disruptions caused by the pandemic. More so, connecting to external collaborators for innovation activities, especially from large cities, adds more nuanced complexity as well as the disparity and low start-ups in the region (Audretsch et al., 2023). Overall, this resonates with the RBV perspective, reflecting structural resource scarcity often faced by SMEs, compelling them to seek search from complementary assets outside their regional settings. Nevertheless, accessing

distant resources imposes additional costs and risks, placing additional strain on the limited internal capabilities of SMEs, which could impede their ability to reconfigure internal resources for innovation activities, according to the dynamic capability theory (Teece et al, 1997).

4.2 Motivators of Innovation among SMEs in the Peripheral Region

This section explores the factors that prompt innovative intention of SMEs operating at an international level, despite their regional operations. As highlighted in previous studies, SMEs aimed at expanding across borders to enhance growth. Emerging themes identified from the qualitative data include opportunities for market growth, external factors and organisational development capacity:

> *"The primary reason was that we realised we could not solely rely on local efforts to find customers. We believed there are opportunities at the foreign level with the type of products we offer" This pushes us do more" (E&M_P13).*
> *We had lost the contract because we relied solely on the UK market, and it emphasised the need to broaden our reach with innovative products. For instance, exploring the Middle East and searching for opportunities in the Far East as well helps us to think annotatively"* (E&M_P2).
> "*The primary driving factor behind our innovative drive for international expansion was to boost sales. So, we understand that by innovating more value-driven product we can go internal for sales and company growth*" (E&M_P4).

Other participants highlighted the growth of businesses and global opportunities as reasons for them to engage in innovation activities and operate beyond the regional and national market (IT_P20 and IT_P21). This reflects the perspective of the Uppsala internationalisation model, which demonstrates international expansion as an incremental process motivated by increasing market knowledge and opportunity identification (Johanson and Vahlne, 1997, 2009).
Furthermore, some participants emphasised the role of external factors in shaping their innovating intention:

> *"We are now actively expanding beyond the UK, and the main drivers for us expanding globally are the evolving economic situation post-COVID and the changing global landscape. Many products are emerging, and we think we can respond to this trend with an innovative offer that will meet international standards" (E&M_P1).*
> "*...due to the complications brought about by Brexit, we encounter export-related issues when selling our products in Europe. We at regionally level are hit the most. So, we believe that operating more at an international level requires more innovation due to the current competition"* (E&M_P4).

The participants further highlight the motivating influence of some internal capacity factors as a source of innovation for internationalisation:

> *"One of our key goals is to provide our employees with a diverse range of work experiences. This wide range of experience and global exposure motivates us to engage in innovation practices for internationalisation. We just have the belief that our employees are exposed to innovative"* (IT_P21).
> *"The main reason is that it is where the market exists. We cannot sell subsea oil and gas pipeline repair systems solely within the UK. We must look elsewhere and go international to find customers and opportunities for our products. This international orientation* motivates us to innovate even when we operate regionally" (E&M_P8).
> *"Exposure to new experiences advances resourcefulness motivate and improves our innovation on a global scale. We believe that highly profitable and innovative businesses are more productive and have a strong international presence because of their involvement in challenging projects. Due to this, we challenge ourselves more by undertaking an innovative project"* (SME16).

The participants emphasised their internationally oriented approach and exposure to new experiences as driving forces (E&M_P7; Expert3). Moreover, some highlighted the digitisation of their internal process and innovation, motivating their innovation activities and internationalisation (E&M_P4). This highlights the sensing and seizing capabilities of SMEs in leveraging exposures and opportunities for innovation and expansion (Teece, 2007; Teece et al., 2016). Accordingly, the RBV emphasises the distinct role of valuable intangible resources, such as new knowledge and experiences through operations, as important for building robust innovation practices and competitive advantage (Barney 1991).

4.3 Facilitators of Innovation Practices: An Informal and Nonlinear Process

Despite the challenges experienced by SMEs in the peripheral region, they are continually exploring different strategies to reimagine their innovativeness through an informal and nonlinear process. For instance, some participants highlighted enablers such as attending local networking events and following a customer-centric approach (E&M_P13; IT_P14; IT_P16; IT_P19):

> "*International networks have a significant impact on our company innovation performance. It opens opportunities for incorporating a wide range of ideas and different approaches into our products*" (E&M_P3).

> *"Local networking is extremely important for the company engaging in innovation activities in this region. The type of networks SMEs are exposed to holds significant value. Because of their constraints, they often rely more on local networks to innovate."* (Expert_P23).

> *"Collaboration with universities is important to our success. We actively engage in partnerships with academic institutions, particularly the gaming courses at Teesside University. We recruit two or three students annually through their graduate programs, helping us to get fresh ideas and knowledge locally."* (IT_P17).
>
> *"We have established partnerships with several universities, including the University of York, the University of Salford, the University of Sunderland, and the University of Durham. Furthermore, we have plans to visit Newcastle University next week. These collaborations allow us to tap into major resources and expertise from the academic world and bring new ideas."* (IT_P18).
>
> *"Our primary source of ideas and information stems from customer feedback. We closely listen to what our customers express as their needs and requirements. We also conduct customer research to gain deeper knowledge*" (E&M_P11)

Tapping into local networks, such as collaboration with universities, becomes a major strategy to navigate innovation challenges by SMEs operating in peripheral regions (Kurdve et al., 2020). From the perspective of RBV, unique intangible resources, such as networks and collaboration, offer rare and non-substitutable knowledge to achieve high innovation and competitive performance (Barney, 1991). Moreover, SMEs, especially those in peripheral regions, are better positioned to overcome innovation challenges through access to critical knowledge and resources provided by networks. Moreover, the participants highlighted the reliance on optimising their internal resources (IT_P21):

> *"We have a team of individuals whose responsibility is to actively engage in the world. These individuals, known as solutions architects, attend conferences, read papers, and explore various applications and opportunities to apply established technologies from one sector to another. We often make efforts to train and use them effectively since we often lack access to external talents"* (E&M_P9).
>
> "*The key differentiator for us is our twin AI software capability. We employ artificial intelligence to control the cameras and identify and track drones. While the underlying AI algorithm may not be unique, our implementation and performance based on specific camera specifications are unparalleled in our experience. It is more about how well we execute, adapt our resources, and the speed at which it runs on embedded hardware"* (E&M_P13).
>
> *...[we] are utilising the expertise of our design engineers, analysis tools, and other design resources available to us. Through detailed work, we successfully completed the project, meeting all the specifications, and delivered it on time and within budget* (E&M_P7)."

The quotes above underscore how SMEs in the peripheral region optimise resources to enhance their innovation performance. More importantly, the participants emphasised the role of internal knowledge management in their innovation activities:

> "*We take the time to reflect on successful projects and draw lessons from them. This gives us some leverage to do things better, especially when we are constrained by resources such as finance and resources which are scarce in the region"* (IT_P21).

> *"Unlearning means moving away from old technologies, and we have done that. Everything we currently develop and host is based on an API service, which was not the case 10 years' age through this, we are able to innovate effectively even without relying on external resources"* (IT_P16).

> "*It is also important to observe competitors to stay updated on industry-specific innovation. I have seen some of these SMEs doing it when they are faced with resource constraints"* (Expert3).

> *"We keep eyes on the competitors' practices closely. We assess if there are any benefits to their methods that we can learn from or if we can combine our own approaches with theirs to further enhance our offerings. Ultimately, our goal is to stay one step ahead and continuously innovate. This works for us despite facing a shortage of skills and even resources from the region"* (E&M_P7).

The quotes above emphasise how SMEs managed and achieved high innovation performance through knowledge management and capability, unique technologies (i.e. AI), learning from experiences, and skilled experts. From the RBV standpoint, these constitute valuable and unique resources that facilitate firms' knowledge capability, providing a foundation for optimum innovation performance and competitive advantage (Barney, 1991). Reinforcing this, the dynamic capability theory argues that these resources enable SMEs, especially those in peripheral regions, to sense, seize, and reconfigure resources and internal processes in response to market demand and innovation performance (Teece et al, 1997; Teece, 22007). Leveraging these resources enables SMEs to compensate for resource limitations imposed by small size, a shortage of capital, and isolation from major cities. Participants also attributed the performance of innovation to their ability to adapt organisational culture, despite the level of internal resistance to change in some instances:

> "*We provide our staff with the 'headroom,' or space, to explore and expand their understanding of the industry, its business aspects, and the technical landscape. This is one of the keys to our innovation performance as it allows our team members to think in a creative manner and develop new ideas. We have used it in most cases when we lack access to a pool of resources, or we lose some talents"* (IT_P17).

> *"We are particularly interested in engaging with projects that involve creating or developing products that are new to us. We flourish on doing things differently, and that is where our corporate contribution comes into play; we assist in accelerating innovation. We embrace new knowledge and even challenges like COVID-19"* (E&M_P10).

> *"In here, we quickly adapt to change, even if it comes hard. The case of Brexit and COVID-19 has taught this lesson. Even in many cases, we lost our best talents to large cities, but we adapt to ensure we are not left behind. We also ensure that our innovation is tailored to the demands of clients, even when faced with complex technical requirements"* (IT_P17).

This section aligns with the dynamic capability theory that emphasises the role of integration, building, and reconfiguring resources to adapt to a rapidly changing and challenging

environment, facilitating the achievement of high innovative performance and competitive advantage (Teece and Pisano, 1994; Teece, 2012). By adapting their resources to explore opportunities and respond to threats, SMEs operating in the peripheral region are able to promote innovation activities and performance (Osiyevskyy et al., 2025).

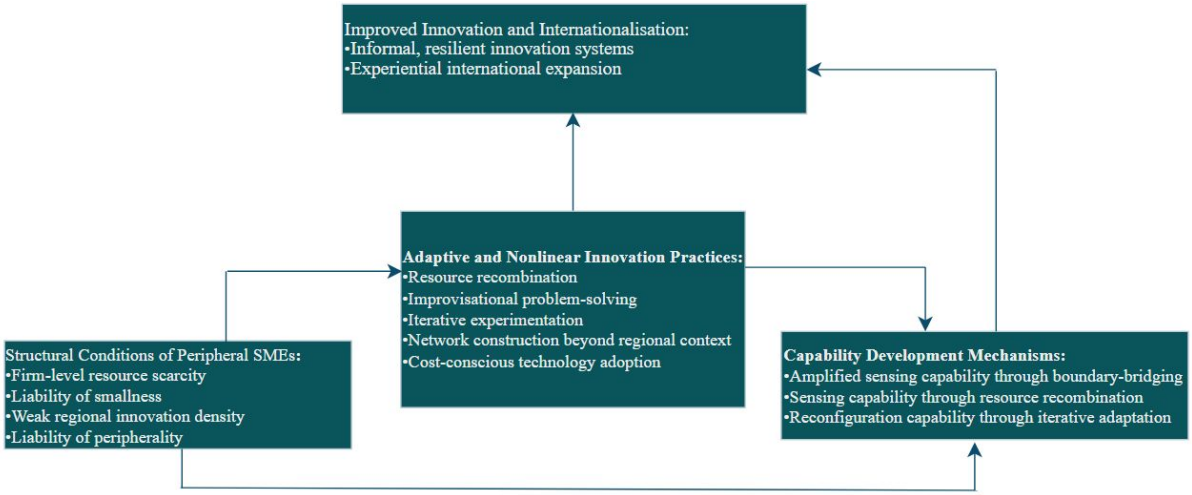

Figure 2: Framework

The framework that emerges from the study (Figure 2) shows that persistent and intensified firm-level and regional resource constraints, such as talent scarcity, limited finances, institutional thinness, and internal resistance, create conditions and tensions that increase uncertainty and constrain strategic choice. In these situations, SMEs cannot rely on formal and direct innovative approach dominant in core regions. Consequently, these constraints trigger adaptive and nonlinear innovation processes, where peripheral SMEs adopt iterative experimentation, improvisational recombination of scarce resources, and network building. Through continuous improvisational and iterative practices, firms gradually build capability led by sensing capabilities (active network formation), seizing capabilities (scarce resource recombination), and reconfiguration abilities (iterative adaptation). Over time, these repeated adaptive responses become embedded as firm-level competencies contextually shaped dynamic capabilities. Hence, regional constraints do not mainly hinder innovation; they functionally and proactively enable firms to emerge and reshape capabilities.

5.0 Discussion

While innovation practices for internationalisation have been increasingly investigated, mainstream studies have largely focused on large firms and SMEs in urban cities with a robust business ecosystem (Rajapathirana and Hui, 2018; Garrido-Moreno et al., 2024; Bogetoft et al., 2024; Saka-Helmhout et al., 2024). Earlier research states that firms leveraged their

resources and capabilities to enhance innovation performance (Farzaneh et al., 2022; Robertson et al., 2023), but studies focusing on how SMEs operating in peripheral regions reimagine innovation practices for internationalisation are scarce; hence, the focus of this research.

5.1 Challenges of Innovation Practices

It was discovered based on findings that SMEs in peripheral and resource-constrained regions faced nuanced and complex challenges hindering their innovation practices and performance for internationalisation, aligning with the findings of Zarębski et al. (2022); Leick and Gretzinger (2020). Specifically, the innovation trajectories of SMEs that engage in internationalisation are often shaped by a group of interrelated constraints linked bot to firm-level and peripherality of regional factors. This highlights that SMEs innovate under both "liability of smallness" and "liability of peripherality". Evidence from the study reveals that SMEs experienced a shortage of skilled workers and continuous migration of talent to urban centres, leading to diminished human capital and innovation continuity. This is due to their small nature and lack of financial capability associated with "liability of smallness", which constrains peripheral SMEs from attracting, retaining, and investing in skilled talent. Moreover, due to the abundance of opportunities, core regions can attract highly skilled labour who migrate to these centres in search of a better living standard. This aligns with mainstream findings that reveal a widening skills gap, particularly as large firms and SMEs in major cities significantly attract talent and investment in human capital, leaving small firms in peripheral regions to compete for scarce available expertise, with a negative effect on innovation (Chen et al., 2019; Mason and Hruskova, 2025). In a regional study conducted by Glückler et al. (2023), it was consistently argued that brain drain and outmigration of skilled workforce remained a major barrier to the innovation performances of SMEs in peripheral regions. According to theorists, while large urban firms through investment in skilled human capital and attraction of skilled workers leveraged these assets to innovate, SMEs operating in peripheral regions faced the problem of "double blind", where they find it difficult to attract skilled talent, constraining their potential for both novel and cultured innovation (Lee and Rodríguez-Pose, 2013; Horbach and Rammer, 2021).

It was also found that peripheral SMEs encountered limited financial resources and the weakness of the peripheral business ecosystem, which also highlights the "liability of smallness" and "liability of peripherality". This constrains the capacity to experiment, scale, and sustain the innovation process, corroborating the findings of Costa et al. (2023) that

financial constraints hamper the innovation capability of small firms. This result indicates the inability of peripheral SMEs to attract and deploy finance for R&D activities. Practically, with the financial system largely concentrated in London and some other cities, SMEs in peripheral areas are challenged by this development as they are geographically distant from accessing these strategic institutions. According to the RBV, firms need financial assets to achieve a high level of innovation performance and competitive advantage (Barney, 1991), yet SMEs operating in peripheral regions are constrained by not only a lack of internal financial capacity but also the inability to access external finance, making it difficult for them to develop a rare and valuable resource base crucial for innovation. Supporting this finding, studies argued that while geographical gaps in access to finance are minimal in some contexts, SMEs operating in peripheral regions are largely constrained by finance compared to those in core regions, especially during economic downturns (Lee and Drever, 2014; Lee and Brown, 2017). Accordingly, this financial constraint and inaccessibility to finance limit the ability of peripheral SMEs to invest in R&D and new technologies, which restricts innovation performance during internationalisation (Harris et al., 2013; Madrid-Guijarro et al., 2016).

Furthermore, it was discovered that due to their small nature and often rigid internal systems, peripheral SMEs faced challenges such as cultural resistance to change, compounded by weak internal capabilities, which hinder innovation performance for internationalisation. This result reflects the unique nature of SMEs, particularly their liability of smallness and resource constraint, making them susceptible to internal rigidities. This corroborates previous studies that, unlike larger firms with robust internal capabilities, SMEs' innovation processes are weakened by internal structures and unreceptive to change (Vega-Jurado et al., 2021; Minami and Sato, 2024). Corroborating this, studies argued that reliance on legacy equipment and the poor attitude of employees to new technologies deteriorates the internal capabilities of peripheral SMEs, which may negatively influence their ability to innovate (Wojtaszek et al., 2025). This result is reinforced by the technostress theorists, emphasising that the severe psychological feelings of uncertainty and loss of control associated with novel technologies generate internal resistance and weak innovation propensity (Pardo del Val and Martínez Fuentes; Bausch et al., 2024).

Based on findings, several participants in this research emphasised the lack of adequate understanding of both domestic and overseas markets triggered by a lack of digital maturity and resource gap, which hinders innovation practices of SMEs in peripheral regions. Based on the DCT, for firms to build innovative and competitive capability, they must be able to sense

and seize opportunities from the external environment, leveraging their internal resources. However, it was found that the weak internal capabilities and resource constraints restrict the ability of peripheral SMEs to understand their market and capitalise on external opportunities for innovation. Extant studies have consistently linked weak internal capabilities, limited capital, and a lack of digital maturity to constraining the ability to understand and seize opportunities (McAdam et al., 2004; Harris et al., 2013). This is reinforced by extant studies suggesting that peripheral SMEs are disadvantaged by geographical distance, limiting opportunities for knowledge spill-over, constraining global network, and resource gap, which consistently limit their innovation capability to innovate effectively (Boschma, 2005; Barboza, 2024).

Beyond firm-level limitations, challenges such as slow recovery from COVID-19, high failure/falling start-up rates, and insufficient external support, particularly from the national business ecosystem, further stifled the innovation of peripheral SMEs. This result emphasises the vulnerable nature of SMEs to external shocks, which can be challenging to navigate without necessary support. Supporting this, studies argued that while many SMEs adapted during the pandemic, peripheral SMEs are challenged by a prolonged recovery, caused by supply chain disruptions, liquidity problems, and rising costs, which hinder their R&D practices (Erdiaw-Kwasie et al., 2023). Additionally, prior studies revealed that peripheral SMEs suffer from limited support from the wider innovation ecosystem and government, which constrains their innovation (Galbraith et al., 2017; Bittar and Di Serio, 2023; Costa et al., 2023). Consequently, centralising hubs in core centres constrains peripheral SMEs from accessing supports and collaborating with experts, large firms, and major recent centres (Bertello et al., 2021; Qin, 2026).

5.2 Motivators and Enablers of Innovation

We found that despite firm-level, peripheral constraints, SMEs driven by the need for sales growth expand across borders, competitive advantage, global opportunities, and resilience, enhancing innovation performance for internationalisation by strategically calibrating their internal abilities and external networks. A robust and critical empirical result emerging from this study is the management of innovation practices through an informal and nonlinear process, which is achieved by recalibrating internal resources in alignment with regional resources. This implies that, due to resource constraints, peripheral SMEs move away from formal innovation to informal and iterative innovation, where innovative ideas emerge from

day-to-day activities, interactions with customers, and experiential learning. This result underscores the effectual logic, where peripheral SMEs moved from formal approaches to leveraging available resources to manage and achieve innovation performance (Sarasvathy, 2023). This is consistently supported by academic literature that SMEs, particularly those in peripheral regions, often rely on informal and incremental innovation to achieve high innovation performance over formal R&D methods (Jeong et al., 2018; Thomä and Zimmermann, 2020). These findings highlight the unique nature of SMEs operating in peripheral regions, where firm-level and regional constraints are navigated through the combination of informal, iterative, and experiential-driven approaches that emerge as a strategic tool for managing their innovation. This reflects the theoretical logic of frugal innovation, where resource-constrained firms approach innovation through creativity, resource recombination, and iterative experimentation, rather than formal innovation structures followed by large firms with formal innovation processes (Cai et al., 2019; McCausland, 2022; Escudero-Cipriani et al., 2024).

By relying on the calibration of internal resources, we found that peripheral SMEs leveraged human capital and expertise through training, employee reallocation, and internal creativity to acquire new skills and adapt to different internal environments, which is critical for innovation performance and successful internationalisation. This result demonstrates the ability of peripheral SMEs to improvise and reallocate their assets (e.g., human capital) in adapting to resource constraints and a shortage of skilled talent. Hence, for peripheral SMEs, it is demonstrated that "liability of smallness" is not entirely a liability but an asset that enables them to evolve strategically and creatively, aligning with the findings of Cho et al. (2022). This further aligns with the DCT, which argued that achieving innovation and internationalisation requires the calibration and reconfiguration of internal resources (Teece, 2007; Teece et al., 2016; Teece, 20023). Moreover, studies emphasised the role of internal creativity, human capital development, and talent management as critical strategic tools used by resource-constrained SMEs to foster innovation (Mayanja et al., 2019; Rubio-Andrés et al., 2026).

More importantly, we found that peripheral SMEs optimise internal resources by relying on digital technologies like AI and data analytics to support data-driven decisions and foster innovation performance. This aligns with the DCT, confirming the importance of reconfiguring and adapting internal resources in collaboration with digital technologies to enhance innovation competitiveness (Teece et al., 1997; Teece, 2023). This is supported by previous studies, which

show that embracing digital technologies augments internal operations and fosters better use of resources, thereby enhancing innovation (Troise et al., 2022; Martínez-Peláez et al., 2024). Recent research indicates that disruptive technologies, particularly AI, have become strategic tools for SMEs to streamline decision-making processes, promote creativity, and strategically adapt to changing markets, thereby driving innovation (Ho et al., 2025; Alwakid and Dahri, 2025; Cooper, 2025).

Furthermore, we found that peripheral SMEs, by fostering an internal experimentation culture and supporting creativity, develop innovative products, services, and processes for internationalisation, aligning with the studies of Bennat (2022) and Thomä and Zimmermann (2020), which confirms that SMEs, through creativity, experimentation, and knowledge management culture, foster innovation during internationalisation. This result underscores the creativity and experimentation of SMEs, especially when operating under severe resource constraints. This experiential and creative approach is not simply a procedural choice, but a strategic necessity that converts their flexible and unique processes into innovation practices which strengthen effectuation logic, especially under environmental uncertainty (Sarasvathy, 2023). Supporting this result, empirical studies argue that resource-constrained SMEs leveraged experimentation, creativity culture, and flexibility compared to larger corporations, allowing them to adapt to changing marketing and reconfigure internal processes to fit new demands and challenges during innovation (Teece and Peteraf, 2016; Karácsony et al., 2025). The calibration of internal resources is enhanced by external regional support through collaboration with local institutions, competitors, experts, networking, and open innovation, which corroborate with the findings of Hervás-Oliver et al. (2021); Martinus (2022); Audretsch et al. (2023); Trippl and Tödtling (2025), by confirming that regional networks, local institutions, and openness to collaboration are critical for internal resource calibration. As argued by Audretsch et al. (2023), collaboration enables resource-constrained SMEs to access external resources and supports, such as technical expertise, infrastructure, and networking opportunities, which minimise innovation barriers. Literature also revealed that in a resource-constrained situation, SMEs approach innovation differently from large firms, by relying on inter-collaboration to overcome resource scarcity and foster innovation (Agostini and Nosella, 2019; Zahoor and Al-Tabbaa, 2020; Audretsch and Guenther, 2023).

6.0 Theoretical Contributions and Managerial Implications

6.1 Theoretical Contributions

Our study contributes significantly to theory, making it relevant to the field of innovation management and internationalisation of firms, specifically SMEs:

6.1.1 Extending RBV and Dynamic Capability Theory in Peripheral Context

To demonstrate how peripheral SMEs, manage innovation under severe constraints, this study adopts an integrated theoretical framework. Consequently, this research contributes to and extends the RBV and DCT by explaining how SMEs in peripheral regions managed and achieved innovation performance.

First, we argued that peripheral SMEs do not operate under resource abundance and accumulation as claimed by the RBV (Barney et al., 1991). Rather, these firms faced severe resource limitations at both the firm and regional level, which shape their innovation and how scarce resources are used. Moreover, the assumption that firms only need internal resources to achieve innovation performance as theorised by the RBV does not hold for peripheral SMEs who are constrained by both "liability of smallness" and "liability of peripherality". We argued that for peripheral SMEs, firm-level resources alongside regional and international resources are critical for achieving innovation performance. Consequently, we argued that scarce firm-level and regional resources constrain innovation performance, which are overcome through strategic iteration and adaptation of firm-level resources in combination with international (e.g., international collaborations) and regional resources (engagement with regional higher education, regional expert supports, and local networking). This represents a major theoretical contribution, indicating that resource scarcity thus becomes a structural condition that shapes unique innovation logics through the combination of firm-level and external resources.

Second, we extend the DCT by demonstrating that SMEs do not follow a formal configuration process to adapt their resources as assumed by dynamic capability theorists (Teece and Pisano, 1994; Teece, 2012; Teece, 2007; Teece et al., 2016; Teece, 2023). Due to firm-level and regional constraints rather than relying on formal sensing, seizing and configuration approaches, peripheral SMEs re-combine and dynamically reconfigure both internal dynamic capabilities alongside external regional resources by following a nonlinear, strategic improvisation, iterative experimentation, and adaptation approaches to foster innovation. This

represents a major theoretical extension to the DCT by demonstrating that for peripheral SMEs operating under severe resource constraints linked to "liability of smallness" and "liability of peripherality", building dynamic capabilities for innovation practise does not occur through formalised and structured processes, but they evolve through flexible and practice-based approaches informed by resource scarcity and regional limitations. Although recent scholarships offer extension to the DCT through the integration of dynamic knowledge management with dynamic resource configuration to achieve competitive advantage, they mainly operate under adequate resources to accumulate required knowledge over time (Li et al., 2025). To peripheral SMEs operating under severe firm-level and resource constraints, acquiring new knowledge is costly, hence they rely on unlearning and relearning processes. Moreover, theoretical extension considers the integration of RBV with DCT for sustaining competitive advantage in dynamic markets (Kero et al., 2023; Sun et al., 2024). It is assumed that firms operate within relatively supportive institutional environments, where resource endowment, network access, and organisational slack enable strategic configuration of resources. Nevertheless, the situation of peripheral SMEs fundamentally differs, because these firms simultaneously face severe firm-level and regional-level constraints. Under these conditions, achieving innovation performance is not mainly a function of resource accumulation or formulating a reconfiguration process; it depends on continuous resource recalibration, improvisational recombination, and adaptive deployment of both firm-level and fragmented regional resources. These processes reflect the effectuation logic, highlighting firms' reliance on available means, iterative commitment, collaborations, and contingencies in ongoing processes and as opportunities unfold (Sarasvathy, 2023). The informal experimentation, iteration, and creative resource recalibration emerging from this study represent a major extension to DCT beyond its traditional approach, which mainly focuses on formal processes and robust business environments.

Within the lens of the RIS perspective, this study explains that organisational resources and capabilities are directly linked with the regional environment in which SMEs operate. Thus, we contribute to the RIS scholarships (McAdam et al., 2004; Fothergill et al., 2019; Heidenreich and Mattes, 2025; Trippl and Tödtling, 2025; Qin, 2026) by showing that SMEs in peripheral regions do not generally follow a structured innovation process but strategically evolve based on regional conditions, permitting them to explore opportunities, gather market knowledge and reconfigure resources. Consequently, we argued that peripheral SMEs cannot solely rely on a dense innovation ecosystem; they must continue to take a proactive approach

to construct and negotiate external connections with universities, incubators, experts, and distant collaborators in their innovation journey.

Therefore, this study offers integrative theoretical contributions to RBV, DCT, and RIS by providing the holistic views that SMEs can achieve high innovation performance during internationalization despite operating in weaker innovation ecosystems through a proactive response to gaps and reconfiguration of resources and capabilities accordingly. Thus, this research contributes to theories by identifying boundary conditions to traditional capability development and by illustrating how innovation practices and performance can be reinforced from constraint-driven adaptability rather than resource abundance and formal processes. The study thus offers a theoretical contribution through a contextualization and extension of theories and reframes peripheral SMEs not as structurally disadvantaged followers, but as pioneers in their innovation journey.

6.1.2 Informal and Nonlinear Process

This study further contributes to empirical studies by showing that the innovation processes of SMEs are often informal, nonlinear, and adaptive. We demonstrate that innovation activities of SMEs evolve from the combination of problem-solving opportunities, experiential learning, and iterative adaptive processes in response to their "liability of smallness" and "liability of peripherality". This transcends findings of prior empirical studies that SMEs possess capabilities to achieve innovation and competitive performance, under unlimited resources (Love and Roper, 2015; Teece et al., 2016; Minami and Sato, 2024; Li et al., 2025). However, SMEs operating in peripheral regions, nonlinear, informal, and adaptive innovation practices emerge as the mechanism for experiential idea generation, improvisation, minimising uncertainty, and gradual entering of international markets, through innovation and creativity.

6.1.3 Role of Regional Resource Calibration

This research contributes to empirical studies by diverging and exploring the innovation practices of SMEs operating in a peripheral region. Our study answers the question of how innovation practices of SMEs within the peripheral region can be managed and supported by calibrating regional resources. While studies looked at SMEs within a robust business ecosystem (Lu and Beamish, 2001; Pierre and Fernandez, 2018; Caballero-Morales, 2021), the case of SMEs operating in a peripheral region with a disconnection from the national business ecosystem has not yet been investigated. We argued that for SMEs operating in peripheral regions, their innovation process is complex, influenced by nuanced firm-level and regional

inhibiting factors. Because they are mostly disconnected from the national and sometimes global business ecosystem, these SMEs encounter unique constraints linked to the peripherality of the geographical environment. Consequently, we demonstrate the unique role of regional resources, such as local networks, institutional assets, local higher education, and knowledge infrastructures in the innovation practices of SMEs. Findings indicate that navigating internal and regional resource constraints requires a collaborative and interconnected approach to negotiating, which is essential for accessing the necessary knowledge, learning, and processes to support and drive innovation.

6.2 Managerial Implications

The study offers relevant implications for SME, policymakers, and regional innovation actors. Empirical evidence demonstrates that the innovation practices of peripheral SMEs are predominantly informal, iterative, and resource-sensitive. SME managers should move beyond traditional linear innovation practices. Innovative practises should be built on adaptive, resource recombination, and iterative strategies, including experimentation, co-creation, and a network-based approach, which can help compensate for both firm-level and regional resource constraints. Transforming regional constraints to innovative opportunities requires the cultivation of adaptive learning and an open culture by actively connecting with regional actors, such as universities, incubators, and regional experts. Additionally, findings highlight the importance employee skill development and cost-effective technologies to compensate for limited human resources. Thus, SMEs should focus on building internal capability through cross-functional and digital upskilling by investing in people rather than relying solely on external hiring (Pierre and Fernandez, 2018). This can help reinforce absorptive capacity and innovation to mature over time. Due to the significance of networking formation on innovation-internationalisation linkage, leveraging international networks should be a strategic focus for SMEs that are disconnected from core innovation centres. Hence, a proactive cross-border collaboration with key international experts and institutions is essential to access a broad range of knowledge to enhance innovation performance. This requires developing trust-based and mutually beneficial partnerships that support both international growth and the enhancement of innovation performance. Overall, SME managers should prioritise networking building, resource recombination, cost-effective digitalisation, experiential learning routines, and adaptive experimentation as core strategic mechanisms rather than treating them as structural responses to constraint.

Empirical evidence reveals that peripheral SMEs' innovative processes emerge differently from those of firms in core centres. Hence, the government should adopt customised innovation and entrepreneurship policies that mirror the conditions of peripheral regions. The current traditional top-down approaches within the North East of England and most peripheral regions require adaptive innovation policies through the prioritisation of networking, strategic ecosystem harmonisation, and long-term capacity development. This also requires regionally targeted training initiatives to strengthen the current education and learning scheme, aimed at bridging skills and technology gaps in these regions. Findings also reveal the role of regional actors in the innovation processes of SMEs. Hence, regional intermediary actors, such as universities, innovation incubators, business associations, and regional policymakers, can act as a link connecting SMEs at the regional level with national and international firms, supporting knowledge exchange, and providing the environment for the experimental activities of SMEs. Additionally, they can become advocates for SMEs operational in peripheral regions, by emphasising the need to focus on the innovation practises of these firms through the design of adaptive programmes that reflect their unique nature. This highlights the need to recognise the distinct innovation logic evolving from the peripheral regions, characterised by frugality, adaptiveness, and collaborative trust (Morris et al., 2022; Sheikh et al., 2023).

6.3 Conclusion

In conclusion, this study contributes to theory, practice, and policy by demonstrating that SMEs in peripheral regions reimagine innovation practices through informal, nonlinear, and iterative processes, shaped by experiential learning, strategic knowledge management, and collaboration during internationalisation. The findings presented are applicable beyond the region of investigation, transcending developed and emerging economies, where regional SMEs can be constrained by resource limitations and disconnection from the national business ecosystem. This study highlights that rather than viewing peripheral SMEs as lagging behind firms in core centres, they have developed innovative methods for managing innovation through resource recalibration, strategic improvisation, and nonlinear informal approaches. Consequently, we theorised that the nonlinear and adaptive methods discovered in this study are not just workarounds for peripheral and resource-constrained regions but are actually pioneering strategic approaches that SMEs in core regions might ultimately adopt in the current volatile markets, marked by rapid technological changes and institutional uncertainty. The study aligns and reinforces comparative studies on the innovation management processes of

SMEs (Love and Roper, 2015; Coad et al., 2016; Garrido-Moreno et al., 2024; Andersen et al., 2025).

6.4 Limitations and Future Studies

Despite the novel contributions of this research, we acknowledged some limitations. While our focus on SMEs in North East England offers valuable insights into how these firms manage innovation under severe resource constraints, factors such as cultural, institutional, and economic conditions may differ from those regions outside the UK. Hence, the findings, although they may not be generalizable, provide analytical generalisation to similar regions in developed countries. Hence, to generalise findings beyond the current context, future scholars could extend and replicate this study to other countries and regions, particularly in developed and core centres in the UK. More so, a cross-context comparison between peripheral regions and core centres as well as developed economies and emerging countries can yield more nuanced insights into how innovation evolves under different conditions. Additionally, reliance on a qualitative, cross-sectional approach may not capture the time dimension in the innovation practices of SMEs. Because innovation practises can be dynamic in nature, future research should adopt a longitudinal approach to provide deeper insights into how these practices emerge over time and under what conditions or resources.

Nevertheless, this research offered hypothetically generalisable findings to other peripheral regions in developed countries that shared a similar context with North East England, United Kingdom. The emergent framework could provide a foundation for exploring the innovative practices and performance of international SMEs. Consequently, this study raises a question for future scholarship: how do strategy choices of international SMEs influence innovation activities for internationalisation? Further study could explore the combination of strategic resources that generate optimum innovation performance for SMEs operating in peripheral regions and beyond. Furthermore, the potential moderators, such as gender, digital resources, or entrepreneurial experience, can also be examined. It would also be interesting to see a comparative study on SMEs operating in peripheral regions and large firms, and those in a robust business ecosystem. The study illustrates how SMEs reconfigure and recalibrate internal and regional resources to enhance innovation performance during internationalisation under severe resource constraints.

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Appendix 1: Participant Information

S/N	Code	Position	Tenure	Employee
1.	E&M_P1	Commercial & Operations Manager	4	68
2.	E&M_P2	Head of Defence Operations	2	
3.	E&M_P3	Group Financial Controller	1	
4.	E&M_P4	Director	10	80
5.	E&M_P5	Financial Director	23	90
6.	E&M_P6	Financial Director	3	65
7.	E&M_P7	Head of Engineering	7.5	40
8.	E&M_P8	Commercial Manager	4	
9.	E&M_P9	Chief Commercial Officer	5.5	181
10.	E&M_P10	Chief Technology Officer	15	181
11.	E&M_P11	Sales Manager	1	31
12.	E&M_P12	Manufacturing Manager	17	
13.	E&M_P13	Founder	8	16
14.	IT_P14	Director	13	8
15.	IT_P15	Technical Lead Manager	2.5	
16.	IT_P16	Chief Executive Officer	12	27
17.	IT_P17	Business Development Director	11	45
18.	IT_P18	Director of Innovation and Leadership	10	220
19.	IT_P19	Chief Executive Officer	17	
20.	IT_P20	Founder	11	238
21.	IT_P21	Chief Executive Officer	2.5	
22.	Expert1	Innovation Programme Director	3	50
23.	Expert2	Business Growth Director	8	40
24.	Expert3	Managing Director	11	150

Appendix 2: Data Structure Linking Codes, Themes, and Illustrative Quotes

First Order Codes	Second-Order Themes	Aggregate Dimensions	Illustrative Quotes
Barrier is the lack of capacity, which includes limited time, staff, and funding	Resource Constraints	Inhibitors of Innovation	Barrier is the lack of capacity, which includes limited time, staff, and funding for executing opportunities once they have been identified. In most case funding is not enough in this region (Expert1).
There is always cultural resistance	Rigid Organization Structure	Inhibitors of Innovation	There is always cultural resistance within the organisation. People say, 'We have always done it this way.' So, overcoming that mindset and supporting a new way of doing things can be a challenge (E&M_P8).
Skills sometimes are difficult to access in our region	Regional Constraints	Inhibitors of Innovation	They [SME] need enough time, and the right skill set within their team to invest in the business and work on it. Such skills sometimes are difficult to access in our region since talented workers are moving to cities like London (Expert2)
This includes estimating the market size	Weak Internal Capability	Inhibitors of Innovation	Another challenge for these firms lies in accessing both domestic and overseas markets to expand the reach of their innovations. In most cases, they lack that ability to access internal markets, especially Asian and African (Expert2)
The primary reason was that we realised we could not solely rely on local efforts to find customers	Opportunities for Growth	Motivators of Innovation	The primary reason was that we realised we could not solely rely on local efforts to find customers. We believed there are opportunities at the foreign level with the type of products we offer" This pushes us do more (E&M_P13)
We are now actively expanding beyond the UK	External Induced Factors	Motivators of Innovation	We are now actively expanding beyond the UK, and the main drivers for us expanding globally are the evolving economic situation post-COVID and the changing global landscape. Many products are emerging, and we think we can respond to this trend with an innovative offer that will meet international standards (E&M_P1)
Local networking is extremely important for the company engaging in innovation	Local Network	Enablers of Innovation: Regional Collaboration	Local networking is extremely important for the company engaging in innovation activities in this region. The type of networks SMEs are exposed to holds significant value. Because of their constraints, they often rely more on local networks to innovate (Expert_P23)

activities in this region			
International networks have a significant impact on our company innovation performance	International Collaborations	Enablers of Innovation: External Collaboration	International networks have a significant impact on our company innovation performance. It opens opportunities for incorporating a wide range of ideas and different approaches into our products" (E&M_P3)
We often make efforts to train and use them effectively since we often lack access to external talents	Firm-level Resource Calibration	Enablers of Innovation: Calibration and Orchestration of Resources	We have a team of individuals whose responsibility is to actively engage in the world. These individuals, known as solutions architects, attend conferences, read papers, and explore various applications and opportunities to apply established technologies from one sector to another. We often make efforts to train and use them effectively since we often lack access to external talents (E&M_P9
Unlearning means moving away from old technologies, and we have done that	Iteration and Knowledge Management	Enablers of Innovation: Non-Linear and Interactive Processes	Unlearning means moving away from old technologies, and we have done that. Everything we currently develop and host is based on an API service, which was not the case 10 years age through this, we are able to innovate effectively even without relying on external resources (IT_P16)
We provide our staff with the 'headroom,' or space, to explore and expand their understanding of the industry	Informal and Internal Adaptation	Enablers of Innovation: Strategies Improvision and Adaptive Processes	We provide our staff with the 'headroom,' or space, to explore and expand their understanding of the industry, its business aspects, and the technical landscape. This is one of the keys to our innovation performance as it allows our team members to think in a creative manner and develop new ideas. We have used it in most cases when we lack access to a pool of resources, or we lose some talent.

Appendix 3

Interview Protocol

SMEs Senior Managers

Can you describe the nature of your business, industry type, and products/services?

Could you please share your role within this organisation? How many years have you been in this role? How many employees do you have?

What do you understand by internationalisation, and what kind of international activities is your company involved in?

Is your company engaged in innovation activities, and what type of innovation does your company do?

Can you share an example of a product/service in which your company has developed or innovated?

What factors can you share that encourage your company to engage in innovation?

Where does your company obtain ideas and information for developing new products/services, or improving existing ones or processes?

Can you have a specific research and development department? What does this department do?

What are the most important resources your company used during the innovation process or to develop new products/services or existing products/methods?

Can you share the challenges that your company experiences during innovation processes?

What internal constraints can you share that impact your company's innovation process?

Can you share detailed external challenges and constraints that impact your company's innovation process?

Do you think that this region has the resources required for your innovation process?

What obstacles can you share that your company faces during innovation? Can you share how to overcome them with some examples?

Does your company usually engage in learning and unlearning of knowledge during the invitation?

How can you say this has helped you during innovation for internationalisation?

What supports can you say you received during the innovation process? How do you find these supports, and how useful are they to your company?

Experts

Can you share your experience with me?

Can you please tell me the types of support you give SMEs in this region?

Can you share your experience supporting SMEs?

What are the most important challenges you think SMEs face during innovation and internationalisation?

Do you think that this region has the resources to support SMEs' innovation activities?

From your experience, how do you think SMEs overcome challenges during the innovation process?

From your experience, what do you think encourages SMEs towards innovation?

How difficult do you think SMEs find support during innovation and internationalisation?

How supportive is this region to SMEs? Can you share whether these supports are adequate?