

Marshall, Alison, Shaw, Gareth, Murphy, David, Sena, Vania, Rosiello, Alessandro, Carr, Catherine, Golra, Owais and Hickman, Stephen (2020) Knowledge absorption and innovation in UK SMEs: a pilot study by place and economic sector. In: International University-Industry Interaction Conference, 8th-11th June 2020, Online.

Downloaded from: <http://insight.cumbria.ac.uk/id/eprint/5570/>

*Usage of any items from the University of Cumbria's institutional repository 'Insight' must conform to the following fair usage guidelines.*

Any item and its associated metadata held in the University of Cumbria's institutional repository Insight (unless stated otherwise on the metadata record) may be copied, displayed or performed, and stored in line with the JISC fair dealing guidelines (available [here](#)) for educational and not-for-profit activities

**provided that**

- the authors, title and full bibliographic details of the item are cited clearly when any part of the work is referred to verbally or in the written form
- a hyperlink/URL to the original Insight record of that item is included in any citations of the work
- the content is not changed in any way
- all files required for usage of the item are kept together with the main item file.

**You may not**

- sell any part of an item
- refer to any part of an item without citation
- amend any item or contextualise it in a way that will impugn the creator's reputation
- remove or alter the copyright statement on an item.

The full policy can be found [here](#).

Alternatively contact the University of Cumbria Repository Editor by emailing [insight@cumbria.ac.uk](mailto:insight@cumbria.ac.uk).

# Knowledge Absorption and Innovation in UK SMEs: A Pilot Study by Place and Economic Sector

A. Marshall<sup>1</sup>, G. Shaw<sup>2</sup>, D F. Murphy<sup>1</sup>, A. Rosiello<sup>3</sup>, V. Sena<sup>4</sup>, C. Carr<sup>1</sup>, O. Golra<sup>3</sup>, S. Hickman<sup>2</sup>

<sup>1</sup> University of Cumbria, Institute of Business, Industry and Leadership

<sup>2</sup> University of Exeter, Business School

<sup>3</sup> University of Edinburgh, Business School

<sup>4</sup> University of Essex, Business School

Corresponding author: Alison Marshall [alison.marshall@cumbria.ac.uk](mailto:alison.marshall@cumbria.ac.uk)

## Abstract

**Introduction:** This study examined the role played by knowledge transfer and knowledge absorption mechanisms as processes in understanding rates of innovation activity in small and medium-sized enterprises (SMEs), by place and by economic sector, within the UK.

**Research design and methodology:** Research was undertaken on SMEs in three economic sectors (manufacturing, high tech and services) based in four locations representing different types of local economies. In order to develop a richer understanding not only of *how* SMEs innovate, but also *why*, we chose to use a framework in which the role of absorptive capacity as a process impacting on innovation could be examined at a firm level (see Zahra and George, 2002 and Schmidt, 2005). The research used two survey instruments, a questionnaire completed by participants, followed by in-depth telephone interviews.

**Results:** Results of the research covered conceptualisation of innovation, approaches to acquisition, assimilation, transformation and exploitation of knowledge. Participating companies also reflected on their perceptions of enablers of and barriers to innovation. Results were analysed by place and sector.

**Conclusion:** As expected, innovative firms in all sectors are those able to acquire, assimilate, transform and exploit the knowledge in a constructive fashion.. However, a wide range of approaches are adopted to assimilate these activities into normal business operations. This study indicates that place alone does not play a key role, compared with the SME industry sector. This study begins to understand those SMEs who are 'innovation followers' and those who have sustainability orientations. Some of the SMEs studied stated clearly that they were not motivated for a desire for growth, but recognized an innovation focus was necessary for business sustainability.

## Keywords

SMEs, knowledge absorption, knowledge management, regional development, business support

# 1 Introduction

In 2016-17, the United Kingdom (UK) Government committed to replace business and regional development support from the European Union (EU) Structural Funds with a Shared Prosperity Fund, as part of the preparations for the UK leaving the EU. These ideas were presented in the *Building Our Industrial Strategy Green Paper* (UK Government, Jan 2017), which set out ten strategic ‘pillars’. Two of these are relevant to the research presented below: Developing a More Innovative Economy and Understanding Variations by Sector and Place (p.12). As Kitson, Tyler and Martin (2004) argued, evaluating local variations in the performance of innovative activity can provide important evidence to help shape regional policy. The proposals from the *Green Paper* were further developed into the UK Government policy paper *Industrial Strategy: Building a Britain fit for the future* (UK Government, Nov. 2017). This document emphasised the need to strengthen the business environment and to improve sector productivity, with support tailored by sector and place. A new business basic support programme was proposed called ‘Be the Business’ (2020). The need to diffuse good practice in order to improve the “competitiveness of different places” and within different sectors was stressed. It is against this background that the research was developed. In April 2017, four of the authors of this papers participated in a workshop led by the Innovation Caucus (2020), InnovateUK and the UK Economic and Social Research Council – the latter two are now part of UK Research and Innovation (2020). The purpose of the workshop was to identify research areas which could provide the UK Government with evidence of business support needs under the new programme. This project was scoped as a feasibility study for further work, supported by the UK Economic and Social Research Council and Innovate UK, as part of the Innovation Caucus programme, with the intention of informing policy for business support and regional development. The project was completed during the second half of 2017 and presented as a report. This article reviews selected findings prior to a fuller publication that is in preparation.

## 2. Background

The study examined the role played by knowledge transfer and knowledge absorption mechanisms as processes in understanding rates of innovation activity in small and medium-sized enterprises (SMEs), by place and by economic sector, within the UK. Research was undertaken on SMEs in three economic sectors (manufacturing, high tech and services) based in four locations representing different types of local economies: Cornwall; Cumbria and North Lancashire; Edinburgh and Central Scotland; and Essex, Norfolk and Suffolk.

The three key research questions were:

- (1) What role does knowledge management and absorptive capacity play in innovation activity within SMEs?

- (2) To what extent does innovation activity vary across different places and economic sectors?
- (3) How does our understanding of variations in innovation activity by place and economic sector help contribute to a more targeted innovation policy for SMEs?

Our focus on SMEs is based on three key reasons: (i) they are somewhat neglected in the research on knowledge transfer and innovation (ii) they are the most numerous in all places – there has been an increase in self-employed business ownership during the last three decades. The rate of self-employment grew from under 8% in 1980 to 15% in 2015 (Henley, 2018) (iii) they have acted as a focus for various business development policies, indeed including the current Industrial Strategy More recently, Henley (2018) presented an overview of research relating to SMEs and their absorptive capacity and identified some key gaps. The three main themes identified were: small business growth, growth in productivity, and spatial influences on small business performance. The associated gaps for each theme are identified in Table 1, with some adaptation of the terms used. Those of particular relevance to our study are highlighted in bold.

<b>Themes</b>	<b>Gaps</b>
1. Absorptive Capacity	<ul style="list-style-type: none"> <li>• <b>More interdisciplinary perspective to SME performance</b></li> <li>• <b>Absorptive capacity and the ability of SMEs to translate knowledge into performance</b></li> </ul>
2. Growth in Productivity	<ul style="list-style-type: none"> <li>• Greater clarity needed in understanding, in the context of SMEs and micro businesses, the complementarity of growth, employment growth and productivity</li> <li>• Evaluation of specific interventions to improve the management of SMEs</li> </ul>
3. Spatial influences on SME Performance	<ul style="list-style-type: none"> <li>• <b>Need for more work on understanding spill-overs</b></li> <li>• <b>Scope for research to understand local norms and entrepreneurial culture</b></li> <li>• <b>A key question is people or place or some combination of the two?</b></li> </ul>

*Table .1. Key themes and gaps relating to the performance of SMEs.  
Source: modified from Henley (2018)*

As can be seen, a key gap in terms of absorptive capacity relates to the ability of SMEs to use knowledge to improve their performance. As Henley (2018:6) states: ‘It is likely that SMEs display high heterogeneity in absorptive capacity, but we need to understand more about this’. In addition, he has identified relevant gaps related to the importance of place in influencing the entrepreneurial culture of SMEs, especially linked to knowledge exchange and absorption.

Our exploratory study gives strong focus both to knowledge absorption within SMEs as well as by place and economic sector. In this context, it provides a comparison of the ability of micro business and SMEs to recognise knowledge, capture it and actually absorb it into their business model. Our specific interest in the importance of place also aligns with the spatial dimension as shown in Table 1. We also address the policy gaps as identified by Henley (2018).

In order to develop a richer understanding not only of *how* SMEs innovate, but also *why*, we chose to use framework in which the role of absorptive capacity as a process impacting on innovation could be examined at a firm level (see Zahra and George, 2002 and Schmidt, 2005). These measures are based on a range of previous studies, extending and deepening to overcome a lack of research on knowledge absorption within SMEs (Abreu et al. 2008) and especially within parts of the service sector (Thomas and Wood, 2014). These shortcomings have also been highlighted by Henley (2018) who observed that ‘Absorptive capacity may have a regional dimension illustrating the different contexts in which knowledge and information is acquired’ (Henley 2018: 14). ). Table 2 shows the key themes and our emphasis on knowledge transfer and knowledge absorption (see Zahra and George, 2002), which informed the design of our research.

<b>Dimension</b>	<b>Components discussed with SMEs</b>
<b>Acquisition</b>	<ul style="list-style-type: none"> <li>• Prior investment scope of search</li> <li>• Prior knowledge</li> <li>• Intensity/speed of search</li> </ul>
<b>Assimilation</b>	<ul style="list-style-type: none"> <li>• Understanding <ul style="list-style-type: none"> <li>○ Interpretation</li> <li>○ Comprehension</li> <li>○ Learning</li> </ul> </li> </ul>
<b>Transformation</b>	<ul style="list-style-type: none"> <li>• Internationalisation</li> <li>• Conversion</li> </ul>
<b>Exploitation</b>	<ul style="list-style-type: none"> <li>• Use <ul style="list-style-type: none"> <li>○ Core competencies</li> </ul> </li> <li>• Implementation <ul style="list-style-type: none"> <li>○ Harvesting resources</li> </ul> </li> </ul>

*Table 2. Dimensions of Absorptive Capacity used in research design. Source: Modified from Zahra & George (2002)*

## 2 Study Areas and Survey Design and Methodology

### 2.1 Regional Profiles

This report covers four locations, referred to as: (i) Cornwall; (ii) Cumbria and North Lancashire; (iii) Edinburgh with Central Scotland; and (iv) Essex, Norfolk, Suffolk. These locations were all adjacent to the home regions of the four participating universities, where access to appropriate SMEs would be facilitated via existing research activities. The selected locations also represent very different types of local economies as detailed below.

**Cornwall** is largely a service based economy with the long-term decline of primary industries such as mining and fishing. The region is characterised by a small firm economy with 90% of businesses having less than 10 employees, employing approximately 25,000 people. There is also an increasing proportion of high tech businesses relating to the digital economy and e-health. Productivity is only 74% of the average for England.

**Cumbria and North Lancashire** covers the county of Cumbria and the Lancaster-Morecambe Bay area. This encompasses diverse sectors, including the tourist-dominated Lake District, post-industrial West Cumbria (Whitehaven, Workington and surrounding areas), largely agricultural areas (Eden Valley and rural north Lancashire) and the more mixed urban economies of Carlisle, Barrow, Lancaster and Morecambe. In West Cumbria, the presence of the Sellafield nuclear processing facility means that there is a cluster of nuclear supply chain SMEs, as well as larger engineering contractors. BAE Systems, based in Barrow, also supports a local supply chain, alongside a small number of high technology SMEs. The mixed urban centres of Carlisle and Lancaster host a range of service SMEs, some with innovative business models.

**Edinburgh and Central Scotland** region comprises mainly the central belt of Scotland, which is the area of highest population density with approximately 3.5 million inhabitants covering an area of 10,000 square kilometres. The central belt is one of the UK's highest performing economic and innovation regions, with Glasgow and Edinburgh being ranked 5<sup>th</sup> and 6<sup>th</sup> respectively when it comes to FDI (by value). As at March 2017, there were an estimated 365,600 private sector enterprises operating in Scotland. Almost all of these enterprises (98.3%) were small (0 to 49 employees); 3,855 (1.1%) were medium-sized (50 to 249 employees) and 2,365 (0.6%) were large (250 or more employees)<sup>1</sup>. The SMEs provide approximately 1.2 Million Jobs. This survey covers SMEs operating in Edinburgh, Glasgow, Livingston, Falkirk and Penicuik regions.

**Essex, Norfolk and Suffolk (EN)** – this region covers Essex, Norfolk and Suffolk. The economic structure of the area is dominated by SMEs (below 10 employees) which mostly operate within services. There is a number of large companies operating in manufacturing

(like pharmaceuticals, telecommunications and automotive) but they tend to be located along the M11 corridor and in South Essex. More recently, a number of tech businesses have located within the region thanks to the presence of large companies (such as BT) and of engineering science parks (such as Hethel Innovation).

## **2.2 Research Design and Survey Instruments**

Three main economic sectors were selected for the study, namely: manufacturing, high tech and services. These were defined using a combination of NACE data (Statistical Classification of Economic Activities in the European Community) and Eurostat definitions for high-tech businesses (Eurostat, 2017). The issues of classification are problematic in the division between manufacturing and high technology businesses. This becomes apparent in the responses to the categories used in the questionnaire survey, as we will highlight later. We also categorised SMEs according to whether they were urban or rural, using Office of National Statistics definitions - settlements (villages, hamlets or isolated dwellings) of less than 10,000 inhabitants are classified as rural and the remainder are urban (UK Government Census, 2011). Again, there are weaknesses in this classification, with its limited granularity. Other classifications propose a separate category of Market Towns, but there are discrepancies between different approaches, so it was agreed to use a simpler urban-rural categorisation. This was only used to aid analysis of the in-depth interviews.

The research used two survey instruments, a questionnaire completed by participants, followed by in-depth interviews by telephone.

Through the questionnaire (available on request from corresponding author), respondents have been asked about their key demographic variables (age, gender and qualifications) as well as about the number of years spent working in the industry and for the company, respectively. The questionnaire also asked about the company and its size (proxied by the number of employees, both full and part-time) as well as the proportion of employees that have a university level education. As for the innovation process, the questionnaire asked about the proportion of the business' earnings that are invested in R&D (innovation input) as well as the number of innovations (innovation output) produced on average over the year preceding the survey. In terms of innovation drivers, businesses were asked whether there is a dedicated team focusing on innovation development and whether innovation is started actively by management and supported by all employees within the firm. Finally, the questionnaire asked a set of detailed questions on sources of innovation which include customers, suppliers, universities, research institutes and technical standards. In this respect, the questionnaire mirrors the content of the UK Innovation Survey (Office for National Statistics, 2016). The questionnaire also had a variety of questions on whether employment participation is actively supported by the management and whether employees can put forward new ideas. Following these questions on participation, a set of questions were asked about internal knowledge sharing processes and whether it was

supported at all levels. In addition, there were questions on training and whether employees were encouraged to train both internally and externally

Following the large scale questionnaire, a smaller sample of SMEs were invited to take part in semi-structured interviews. These in-depth discussions enabled researchers to focus on the main dimensions of absorptive capacity (Table 2). The four dimensions of knowledge acquisition - Acquisition, Assimilation, Transformation and Exploitation - were used to frame the interview schedule. We also attempted to synthesize these data from all the respondents in an attempt to explore the various ways in which these dimensions were manifest in the different types of organisations. Participants were invited to reflect on key examples of innovation within their own business, having first discussed what innovation meant to them, and were then asked to describe how knowledge was acquired and used in that case.

Prior to the main questionnaire survey, each region piloted the questionnaire with three firms, reflecting each of the three SME sectors. The pilot questionnaire was deemed to be workable, with only two questions added and one modified. The research study received ethics approval from the University of Exeter. Copies of the questionnaire and interview schedule are available on request from the corresponding author.

## **3 Profile of businesses surveyed**

### **3.3 Research sample**

The selection of participant businesses was undertaken through a variety of approaches, necessitated by the short time scale for the project. In each of the four areas, research partners used a slightly different strategy for contacting businesses. In Cornwall, there was an existing database of companies, a number of whom were known to the University of Exeter. In total, the number of firms contacted was 105. These were a mixture of SMEs across the three sectors, although inevitably there were more service based firms given the nature of the Cornish economy.

Cumbria used a range of approaches, namely a database of companies known to the University of Cumbria comprising 47 firms. They also used a number of business networks and Chambers of Commerce in Cumbria and Lancaster, accessed via an article about the research project in their weekly newsletters. Finally, they utilised local radio and social networks to publicise the project. Again, they had more service sector businesses, reflecting their dominance in large parts of Cumbria and North Lancashire.

The Edinburgh region used a larger database, FAME, and from this they sent the questionnaire to 691 companies. This was broken down into the following sectors: High-tech/ICT 97; Manufacturing 194; Services 400. The firms were contacted by email. This produced a much more even spread of responses across the 3 sectors, again partly reflecting the local economy.



All the above three regions used an email based questionnaire. In contrast, Essex utilised a hard copy version of the questionnaire contacting people by telephone after the mail out of the surveys.

The distribution of the responses across the sectors and the four places is shown in Table 3 and we had a total sample of 118 firms for the first stage of the research.

Place	Sector			Total
	Manufacturing	High- Tech	Service	
<b>Cumbria/N.Lancs</b>	7	2	16	<b>25</b>
<b>Cornwall</b>	4	7	20	<b>31</b>
<b>Edinburgh/Central Scotland</b>	12	7	13	<b>32</b>
<b>Essex, Norfolk, Suffolk</b>	10	5	15	<b>30</b>
<b>Total</b>	<b>33</b>	<b>21</b>	<b>64</b>	<b>118</b>

*Table 3. Expected Sample Framework of SMEs. Source: Authors*

For the second part of the research, 19 interviews were conducted with firms drawn from the main questionnaire survey ( Table 4). The interviews were conducted either face-to-face, by Skype or by phone and lasted on average between 30 and 50 minutes.

	<b>Code</b>	<b>Place</b>	<b>Company size (No. of employees)</b>	<b>Sector</b>
<b>Cumb1</b>	1R-HT	R	160	High-Tech
<b>Cumb2</b>	2U-S	U	1	Service
<b>Cumb3</b>	3U-S	U	2	Service
<b>Cumb4</b>	4U-M	U	1	Manufacturing
<b>Edin1</b>	5U-M	U	100-149	Manufacturing
<b>Edin2</b>	6U-HT	U	50-59	High-Tech
<b>Edin3</b>	7U-HT	U	1-9	High-Tech
<b>Edin4</b>	8U-HT	U	60-79	High-Tech
<b>Edin 5</b>	9-S	U	100-149	Service
<b>Corn.1</b>	10R-HT	R	1-9	High-Tech
<b>Corn2</b>	11-HT	R	1-9	High-Tech
<b>Corn3</b>	12-M	U/R	1-9	Manufacturing
<b>Corn4</b>	13R-S	R	10-19	Service
<b>Corn5</b>	14U-S	U	1-9	Service
<b>Ess1</b>	14R-HT	R	1-9	High-Tech
<b>Ess2</b>	15U-HT	U	1-9	High-Tech
<b>Ess3</b>	16U-S	U	1-9	Service
<b>Ess4</b>	17R-S	R	"small"	Service
<b>Ess5</b>	18R-M	R	"medium"	Manufacturing
<b>Ess6</b>	19U-HT	U	Small	High-Tech

*Table 4. The characteristics of the firms interviewed. Source: Authors Interviews.*

*Code U=Urban, R=Rural, HT =High Technology, M=Manufacturing, S=Service*

### 3.4 Characteristics of SMEs

In this section, we provide some basic statistics on the characteristics of the firms that participated in our survey. Around 40% of the respondents were directors or managers of the company while 36% were owners. Our statistics show that 70% of our respondents were male and their age ranged between 35 and 50 years old. In terms of geographical dispersion, the largest proportion of male respondents were recorded in Central Scotland (90%), followed by the Essex, Norfolk, Suffolk region (80%) and Cumbria/N.Lancs (68%). Only in Cornwall was the split between male and female respondents equal (i.e. 50%).

As for the highest qualifications, almost 38% of respondents had a university degree followed by a Master's degree (around 26%). The split between male and female respondents suggests that a first degree was the highest qualification for male respondents while a master's degree was the most common highest qualification for female respondents. There were also geographical differences. 40% of the Essex, Norfolk, Suffolk respondents highest qualification was the GSCE or O-level (UK high school qualifications obtained normally at age 16) while in Cornwall, 37% of the respondents had a first degree. In Central Scotland, the respondents split themselves equally between either a first degree or a doctorate (around 27% of the respondents had either qualification) while in Cumbria/N.Lancs, 56% of the respondents had a first degree.

In terms of experience working in the industry or for the company, 34% of the respondents had worked in the industry for longer than 25 years. At regional level we find similar proportions: in Cornwall, 22% of the respondents had worked in the same industry for longer than 25 years while the proportion goes up to 50% in Central Scotland. In the Essex, Norfolk, Suffolk 40% of the respondents had worked in the same industry for around 21 years while in Cumbria/N.Lancs, the proportion is around 36%. Whilst respondents may have spent a substantial number of years working in the industry, tenures in the focal firms tended to be short. Indeed, around 22% of all respondents had been working in the company for less than three years. At regional level, we found similar figures with Cumbria/N.Lancs being the only remarkable exception (around 24% of the respondents had worked in the same company for more than seven years).

Just over half (51%) of the firms in our sample had between one and nine full time employees and only 13% of the respondents had between 10-19 full time employees. As for the number of part-time employees, most respondents (83%) had between one and nine part-time employees and this pattern was also reflected at regional level with 90% of the Cumbria respondents having hired a similar proportion of part-time employees followed by Essex, Norfolk, Suffolk (89%), Cornwall (87%) and Central Scotland (71%).

The descriptive analysis of the data collected with the questionnaire indicated that across the four regions, the largest proportion (90%) of product innovators was in Central Scotland region followed by Cornwall (around 82%), Cumbria/N.Lancs (76%) and finally Essex, Norfolk, Suffolk region (60%). As for the number of innovations, most firms

report they have produced between three and five product innovations and there was no difference among the four regions.

## **4 Summary of results**

In this section, we present key results, focusing on findings that address more directly the stated research questions. A fuller paper is in preparation, which will give greater contextual data and further analysis.

### **4.5 Conceptualising innovation**

Many study participants, particularly those in the ‘high tech’ sector, chose to focus the discussion on product development and new technology. Some also interpreted innovation to be about service innovation. A small number of respondents, particularly micro-businesses, saw innovation very broadly, related to their business model to ‘do things better’ and as essential for business sustainability. The interviews did not focus specifically on the innovation environment, but several companies volunteered thoughts on barriers and enablers to innovation. These are reported for completeness, but further work is needed here.

### **4.6 Acquisition**

Firms acquire knowledge mainly through collaboration and communication with external partners and some via internal creative capacity development. Study participants identified a wide range of sources of knowledge including: customers, suppliers, internal team members and industry networks. The use of more formal networks and groups was mentioned by several participants, including those requiring a membership fee. A few companies in the sample had acquired knowledge from universities.

### **4.7 Assimilation**

Knowledge assimilation appears to be an inclusive process, which means evaluation and decision making about new knowledge is carried out by the internal employees. Medium sized firms adopt more formal procedures describing a formal ‘stage and gate’ process, looking at the fit with company product portfolio. Micro and smaller sized firms preferred informal processes to assimilate new knowledge. Many described a need to be inclusive in this process, involving a range of stakeholders and mentioned customer consultations, to get feedback on early ideas.

### **4.8 Transformation**

Knowledge is transformed in some companies through experimentation (trial and error) and others adopt a systematic approach. Product development in high tech companies was often based on a structured process of prototyping, testing and iterative development. Two businesses noted help from universities at this stage as either a follow-up to knowledge

acquisition or to access different, specialist resources. In a small number of cases, participants indicated that the knowledge transformation process was not needed – the knowledge was already in a form they could use. As there were many diverse responses, the transformation dimension requires further examination.

## **4.9 Exploitation**

Success in going through the other three stages of absorptive capacity leads to effective exploitation. Participants in all the SMEs reported largely positive outcomes, namely: (i) objectives were achieved (e.g., new product or service launched and profitable), (ii) outcomes not yet achieved, had been modified or the project had changed direction, and (iii) successful with further unintended benefits.

## **4.10 Perceived enablers of innovation**

A number of success factors were identified that enabled innovation. The most important one was the capacity to combine informal stakeholder relationships with formal development processes. Specific innovation enablers included: good engagement with customers and knowledge of the market; an innovation culture that accepts failure and risk-taking; and clear decision-making and accountability structures.

## **4.11 Perceived barriers to innovation**

Examples of innovation obstacles noted by participants included: time constraints, competing priorities, and being distracted by customer suggestions that do not ‘fit their roadmap’. Many companies reported that application processes for grant programmes were perceived to be difficult and bureaucratic. This was noted as a key barrier in accessing funding for innovation.

## **4.12 Place-based innovation**

Unique resources linked to specific geographical locations can be beneficial for innovation. In this study, the location of the business was of less importance to high tech and manufacturing businesses. These companies tended to be collaborating internationally more than locally. In rural areas, access to skills was cited as an important issue. Many companies in rural areas, equally, had chosen their location for social reasons (such as quality of life, closeness to family). Some of these companies deliberately constructed their business around available rural assets.

## **4.13 Sector and place in the Industrial Strategy**

The study found that sector plays a more important role than place in explaining the innovation output of the firms in our sample set. Service sector firms are relatively less innovative than those in the manufacturing and high-tech sectors. Some of the highly innovative companies observed that the regional environment constrained growth, with some unable to access resources, skills and knowledge within their locality.

#### **4.14 Factors explaining innovation capacity**

Workplace training has no statistically significant impact on the number of innovations. Instead, mechanisms that encourage employee participation in knowledge creation and sharing activities make a substantial contribution to the innovation output of the same firms. These mechanisms differ significantly among the four regions. Implementation of policies and procedures (to codify, absorb and redeploy the external knowledge) notably contribute to the innovation output.

#### **4.15 Knowledge absorption across regions**

There were no major knowledge absorption differences across regions, except for the participatory mechanisms of employees. This was due to firms with higher knowledge management and absorption capabilities being able to understand, assimilate and utilise knowledge – regardless of their location. Absorption from sources outside the regional boundaries (including global market influences) compensated for the regional disparity, triggering higher innovative performance in some firms. Further research should be undertaken to investigate why participatory mechanisms differ across regions.

### **5 Conclusions**

As expected, innovative firms in all sectors are those which are able to acquire, assimilate, transform and exploit the knowledge in a constructive fashion. However, a wide range of approaches are adopted to assimilate these activities into normal business operations. This study indicates that place alone does not play a key role, compared with industry sector. Companies that commented on this aspect usually focused on constraints of a rural locality and had developed strategies for overcoming this issue. Therefore, focusing only on place in the industrial policy may neglect the role of industry structure, which consequently affects the growth of local economies.

This study begins to understand those SMEs that are ‘innovation followers’ and those that have sustainability orientations. Some of the SMEs studied stated clearly that they were not motivated for a desire for growth, but recognized an innovation focus was necessary for business sustainability.

Although the sampling and recruiting of companies meant that there was a majority of respondents with some connection to the university conducting the interviews, many respondents had not sourced knowledge in a conventional or linear ‘technology transfer’ manner. The evidence suggests that there is a broader range of relationships, including the university as anchor institution, specialist equipment provider and knowledge broker.

Attitudes to policy and funding were variable. Many respondents had been successful recipients of government intervention, whereas others were discouraged by perceived bureaucratic hurdles.

The study was conceived as a pilot, to elucidate questions that needed to be explored in more depth. The initial findings will be used as the basis for a more detailed terms of reference, leading to a more comprehensive large-scale study.

## 6 References

- Abreu, M., Grinevich, V., Kitson, M. and Savona, M. (2008), Centre for Business Research (CBR) University of Cambridge, Absorptive capacity and regional patterns of innovation DIUS Research Report 08 11.
- Be the Business Government Website online at <https://www.bethebusiness.com> [4th May 2020].
- Eurostat definitions for high-tech businesses. Online at <https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:High-tech>
- Henley, A. (2018) 'Small Business Growth and productivity' Evidence Review, Productivity Insights Network PIN01 ESRC [www.productivityinsightsnetwork.co.uk](http://www.productivityinsightsnetwork.co.uk)
- Innovation Caucus: supporting innovation through social science input. Online at <https://innovationcaucus.co.uk/> [4th May 2020]
- Kitson, M., Martin, R. and Tyler, P. (2004), 'Regional Competitiveness: An Elusive yet key concept?', *Regional Studies* 38 (9): 991-999.
- Office for National Statistics. UK Innovation Survey (2016). Online at <https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/ukinnovationsurvey> [4th May 2020]
- Schmidt, T. (2005) 'What determines Absorptive Capacity' paper presented at the 10<sup>th</sup> DRUID Conference Denmark, June 2005
- Thomas, R. and Wood, E. (2014) 'Innovation in Tourism: re-conceptualising and measuring the absorptive capacity of the hotel sector', *Tourism Management* 45: 39-48
- UK Government (2017) Building Our Industrial Strategy, Green Paper. Online at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/611705/building-our-industrial-strategy-green-paper.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611705/building-our-industrial-strategy-green-paper.pdf) [4th May 2020]
- UK Government (2017) Industrial Strategy: Building a Britain Fit for the Future, White Paper. Online at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/730043/industrial-strategy-white-paper-print-ready-a4-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730043/industrial-strategy-white-paper-print-ready-a4-version.pdf) [4th May 2020]
- UK Government Census 2011. Rural Urban Classification. Online at <https://www.gov.uk/government/collections/rural-urban-classification>. [4th May 2020]

UK Research and Innovation. Online at <https://www.ukri.org/> [4th May 2020]

Zahra, S.A. and George, G. (2002) Absorptive Capacity: 'A Review, Re- Conceptualization, and Extension', *Academy of Management Review* 27 (2): 185- 203