



UK Innovation Survey 2019: Main Report covering the survey period 2016 - 2018

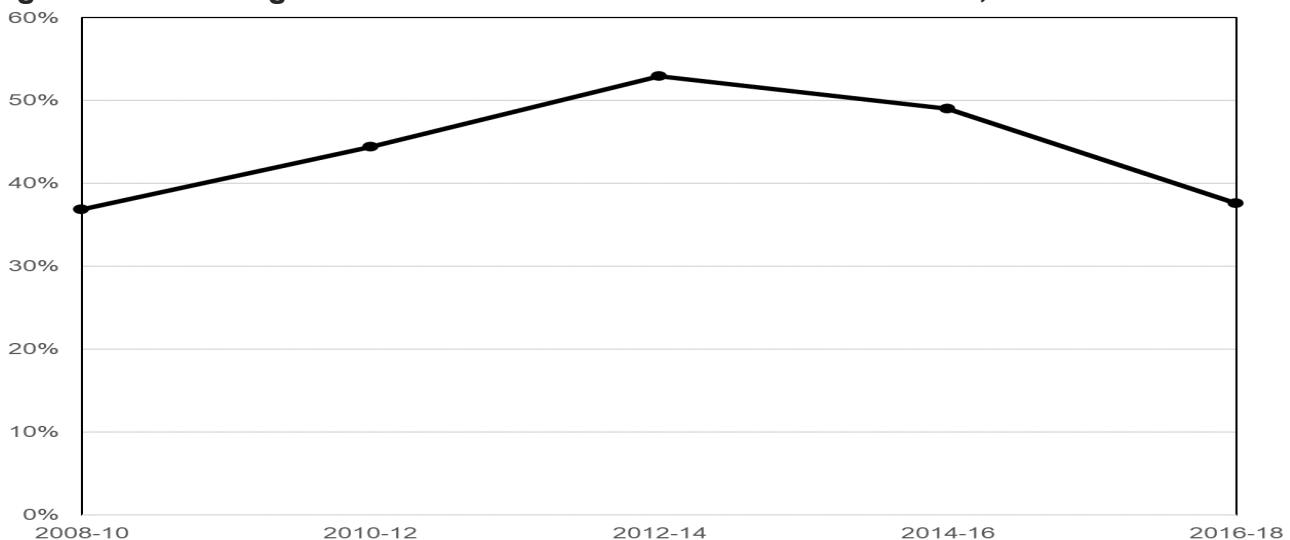
30th July 2020

Official Statistics

This release reports on innovation activity in UK businesses in 2016-18 and compares innovation activity to previous surveys.

- **In 2016-18, 38% of UK businesses were innovation active.** This is a decrease compared to 49% in 2014-16 and is the lowest level since 37% in 2008-10.
- **Large businesses were more likely to have innovated than small and medium enterprises (SMEs).** In 2016-18, 50% of large businesses were innovation active, compared to 37% of SMEs.
- **The percentage of innovation active businesses was highest in England (38%) in 2016-18.** In Wales 34% of businesses in 2016-18 were innovation active, compared to 32% in both Scotland and Northern Ireland. The South West and the South East were the English regions with the highest percentages of innovation active businesses (40%).

Figure 1: Percentage of businesses which were innovation active, 2008-10 to 2016-18



What you need to know about these statistics:

The UK Innovation Survey (UKIS) is the main data source for business innovation in the UK. It is used widely across Government to help improve policy and by the research community for understanding the innovation landscape.

UKIS 2019 sampled 30,942 UK businesses in 2016-18 with ten or more employees. It received a response from 14,040 businesses, giving a response rate of 45%.

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1. Introduction

1.1 Defining innovation

The UK definition of innovation is based on an Organisation for Economic Co-operation and Development (OECD) definition adopted by Eurostat^{1 2}. This definition includes any of the following activities, if they occurred during the survey period:

1. The introduction of a new or significantly improved product (good or service) or process;
2. Engagement in innovation projects not yet complete, scaled back, or abandoned;
3. New and significantly improved forms of organisation, business structures or practices, and marketing concepts or strategies;
4. Investment activities in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

A business that had engaged in any of the activities described in points 1 to 3 is defined as being ‘innovation active’. A business that had engaged in any of the activities described in points 1 to 4 is defined as a ‘broader innovator’. Finally, any businesses that had engaged in the activity described in point 3 were classed as a ‘wider innovator’.

1.2 About this release

The UK Innovation Survey (UKIS) is the main data source for business innovation in the UK. It is used widely across Government to help improve policy and by the research community for understanding the innovation landscape.

Now we have left the EU, it is important that our statistics continue to be of high quality and are internationally comparable. During the transition period, UK statistics that align with EU practice and rules will continue to do so in the same way as before 31 January 2020. After the transition period, we will continue to produce statistics in line with the UK Statistics Authority’s [Code of Practice for Statistics](#) and in accordance with internationally agreed statistical guidance and standards.

This publication is the main report from the UK Innovation Survey 2019 (UKIS 2019), covering the three-year period from 2016 to 2018. It provides added detail to [UKIS 2019: headline findings report](#) which was published in March 2020. Comparisons are made with previous UK innovation surveys, covering periods back to 2008-10, where appropriate. The period covering 2008-10 was the first survey data collected using a sample based on the Standard Industrial Classification 2007 (SIC 2007). This created a break in the time series, so comparisons to surveys prior to this are not included in this publication.

This report uses weighted data, in order to be representative of the business population. The responses were weighted to the total business population, using the Inter-Departmental

¹ <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-01-18-852>

² <https://www.oecd.org/science/oslo-manual-2018-9789264304604-en.htm>

Business Register (IDBR). They were not weighted by factors which would give more weight to larger businesses, such as employment or turnover. It is important to note that the previously published UKIS 2019 headline figures were based on weights using the 14 broad industrial sectors, whilst the figures in this report are based on weights using the detailed 25 sectors required by Eurostat. The figures in this report may vary slightly from those in the headline report and this is due to the application of the more detailed weights.

All percentage point changes in this report are calculated from unrounded figures.

Accompanying this report is a Statistical Annex of tables that can be viewed [here](#).

- Tables 1-13 are consistent breakdowns (for UKIS 2019 covering the period 2016-18) to previous published UKIS Statistical Annex tables.
- Table 1a has been expanded to provide further information than previously presented. It is a time series table from 2008-10 to 2016-18, with breakdowns of innovation active businesses by size of business, region, and sector.
- Table 14 is consistent with previously presented panel analysis with the addition of UKIS 2019 information covering the period 2016-2018. The UKIS 2019 Statistical Annex includes 9 sub tables to table 14 (P1 to P9) for businesses that responded to the questionnaire in each of the last three UKIS surveys (2015, 2017 and 2019).
- Regression analysis predicting the probability of higher turnover / employment growth, which was published as table 15 in the UKIS 2017 Statistical Annex, has not been repeated for UKIS 2019. Findings from the UKIS 2017 regression analysis are included, where relevant, in this release.

1.3 About this survey

The survey is the UK contribution to the eleventh Europe-wide Community Innovation Survey (CIS). Because the questions in the CIS are harmonised across Europe, UK Innovation Survey data are directly comparable with responses from other countries. This provides useful international benchmarking for UK performance³.

The survey focusses on business adoption of innovation through new and improved products and services, investments in different types of innovation, and changes in business structures, management, design, and marketing innovations. The survey also asks businesses about the drivers which motivate and barriers to innovation. Although innovation is a strong predictor of higher productivity, wider research shows that it can be difficult to measure accurately, partly due to the changing nature of economic activity. Innovation value is fluid and travels easily across organisational boundaries so may be hard to recoup at the point of origin.

The sample selection was conducted by the Office for National Statistics (ONS) and followed very similar sampling methodology to the previous surveys.

UKIS 2019 (covering the three-year period from 2016 to 2018) sampled 30,942 UK businesses with ten or more employees. The survey was voluntary and was conducted primarily through an electronic questionnaire. Businesses that did not complete an electronic response were contacted for a telephone interview. We received a response from 14,040 businesses, giving a response rate of 45%.

³ https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en

The UKIS 2019 questionnaire can be viewed [here](#).

Businesses are self-reporting their innovation activities when responding to this survey. Businesses that have reported certain activities, and therefore are classed as innovators by our definitions, sometimes do not think of themselves as innovators.

1.4 Policy context for innovation

The 2017 Industrial Strategy⁴ sets the target of raising public and private sector investment in Research and Development (R&D) from 1.7% to 2.4% by 2027. This is intended to support businesses to reap the benefits of commercial opportunities available, through science and technological development.

Measuring R&D takes a tightly focussed perspective on the kinds of activities that may help businesses improve their competitive performance. Innovation is a wider concept and recognises a bigger set of activities, including R&D, which contribute to improved organisational performance in businesses across the economy. Evidence shows a positive and statistically significant link between innovation and organisational growth⁵. A series of investment programmes contained within the Industrial Strategy are providing resources to help businesses, across a variety of sectors, scale up innovations in their products and services.

⁴ <https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future>

⁵ <https://www.gov.uk/government/statistics/small-business-survey-2019-panel-report>

2. Levels and types of innovation

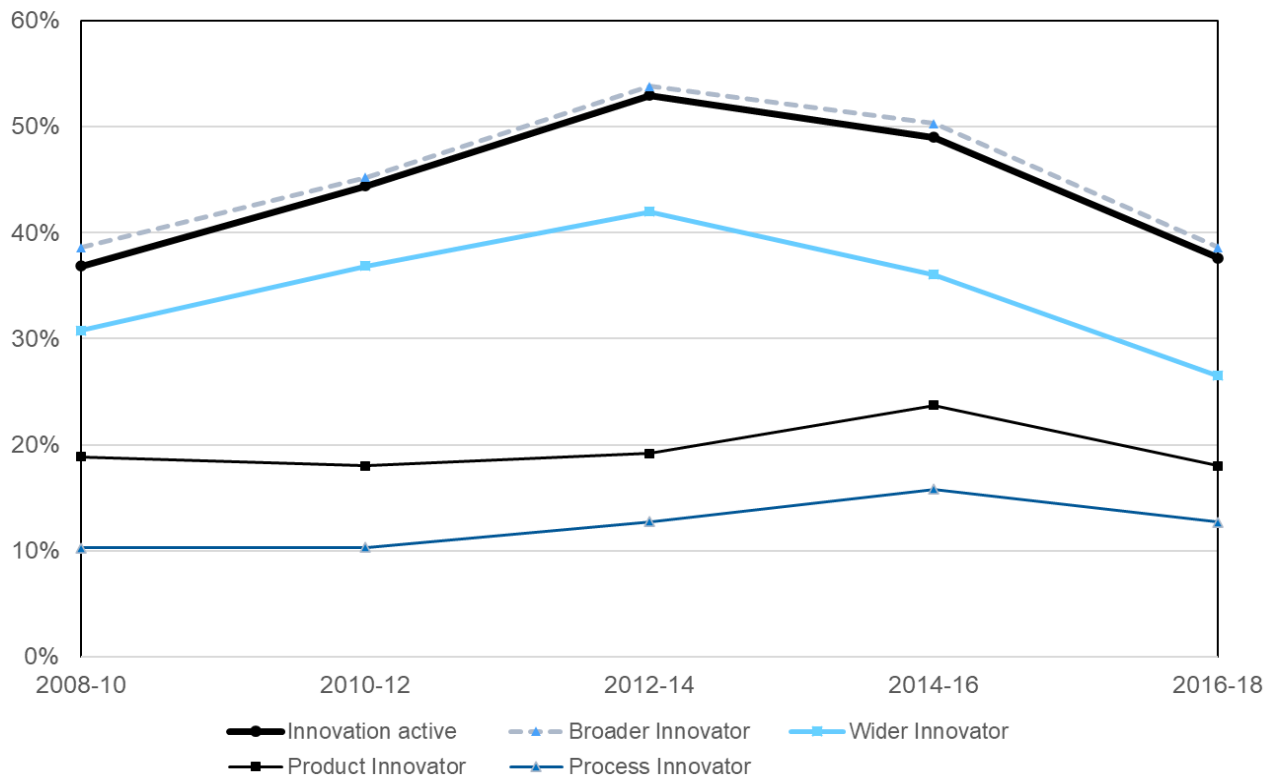
2.1 Introduction

Innovation types and levels vary widely by organisation size and location, while business investment and its purpose can vary according to individual business choices in the context of sector and type of innovation.

2.2 Changes in innovation over time

Innovation and type of activity

Figure 2.1: Percentage of businesses engaging in innovation by activity, 2008-10 to 2016-18



Unweighted base = 14,342 in 2008-10, 14,487 in 2010-12, 15,091 in 2012-14, 13,194 in 2014-16 and 14,040 in 2016-18

In 2016-18, 38% of UK businesses were innovation active. This is a decrease compared to 49% in 2014-16 and is the lowest level since 37% in 2008-10⁶.

⁶ The survey included information relating to the recession period in 2008-09.

Table 1a in the Statistical Annex of tables that accompanies this report, can be viewed [here](#). It provides a time series table from 2008-10 to 2016-18, with breakdowns of innovation active businesses by size of business, region, and sector.

In 2016-18, 39% of businesses were broader innovators and 27% were wider innovators.

Businesses were more likely to introduce new products than new processes. In 2016-18, 18% of businesses were product innovators and 13% were process innovators.

Innovation activity varies by size of business

Large businesses were more likely to have innovated than SMEs. In 2016-18, 50% of large businesses were innovation active, compared to 37% of SMEs. This trend was true for every innovation activity.

Table 2.1: Percentage of businesses engaging in innovation by activity and size, 2008-10 to 2016-18

Type of activity	2008-10	2010-12	2012-14	2014-16	2016-18
SMEs (10-249 employees)					
<i>Innovation active</i>	37	44	53	49	37
<i>Broader Innovator</i>	38	45	54	50	38
<i>Wider Innovator</i>	31	37	42	36	26
<i>Innovation investment activities</i>	33	39	43	44	33
<i>Product Innovator</i>	19	18	19	24	18
<i>Process Innovator</i>	10	10	13	16	12
<i>Abandoned</i>	4	4	4	4	2
<i>Ongoing</i>	6	14	17	16	10
<i>Scaled back</i>	*	*	*	5	2
Large businesses (250 plus employees)					
<i>Innovation active</i>	43	50	61	63	50
<i>Broader Innovator</i>	44	51	62	65	52
<i>Wider Innovator</i>	35	39	45	44	32
<i>Innovation investment activities</i>	39	43	50	58	45
<i>Product Innovator</i>	24	24	27	29	22
<i>Process Innovator</i>	18	15	20	23	18
<i>Abandoned</i>	7	5	7	7	2
<i>Ongoing</i>	9	19	24	28	19
<i>Scaled back</i>	*	*	*	7	3

Notes:

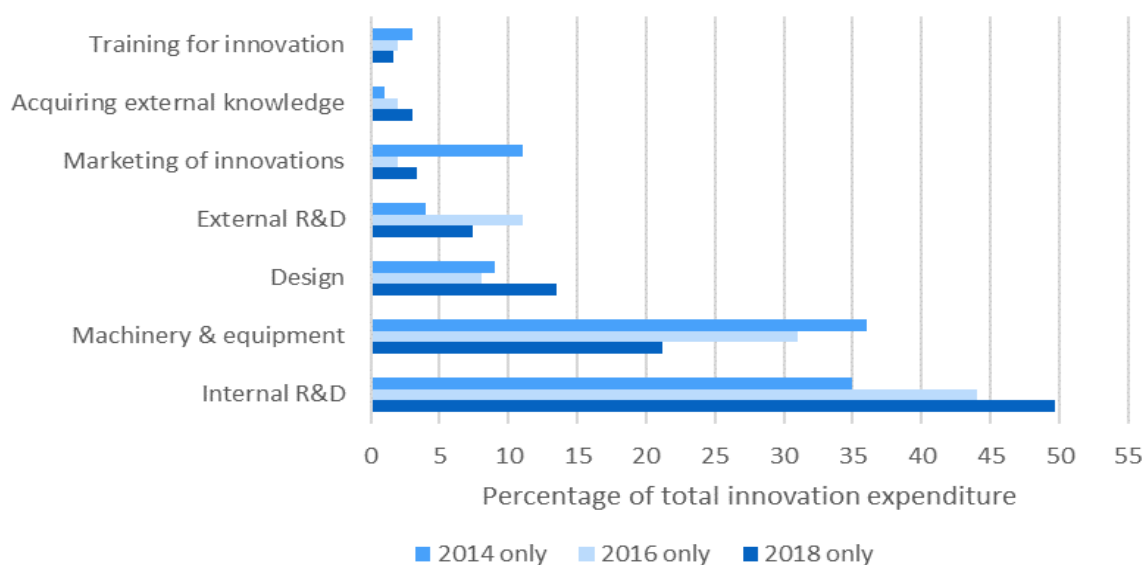
* Scaled back was a new option introduced in UKIS 2017 (2014-2016 reporting period).

Unweighted base = 14,040 in 2016-18, 13,194 in 2014-16, 15,091 in 2012-14, 14,487 in 2010-12 and 14,342 in 2008-10

This pattern of declining innovation activity in both SMEs and large businesses was replicated within the panel data, covering a longitudinal sub-sample of 2,858 businesses, that responded to the questionnaire in each of the last three UKIS surveys (2015, 2017 and 2019). See Statistical Annex – Table 14, Table P1.

2.3 Change in innovation expenditure over time

Figure 2.2: Innovation expenditure by area, as a percentage of total innovation expenditure for all businesses 2014, 2016 and 2018



Unweighted base = 15,091 for 2012-14, 13,194 for 2014-16, 14,040 for 2016-18

Expenditure information is only collected based on one year of data (for example the UKIS 2019 survey collects expenditure data for 2018).

Figure 2.2 shows changes in focus of innovation expenditure over time. In 2018, the percentage of innovation expenditure used for internal R&D was 50% and has increased by six percentage points since the previous survey. In 2018, the percentage of innovation expenditure used for external R&D was 7%, a four percentage point decrease compared to 11% in 2016. In 2018 the percentage of innovation expenditure used for acquisition of machinery and equipment was 21%, a 10 percentage point decrease compared to 31% in 2016.

The percentage of businesses investing in machinery was highest in Yorkshire and the Humber (12%) and lowest in London (4%). The relatively low percentage in London is likely to reflect the fact that a greater proportion of London businesses are in the service sector⁷. Percentage of businesses investing in computer software was highest in the South East and in training was the East Midlands. The percentage of businesses investing in both computer software and training was lowest in Scotland (see Statistical Annex – Table 2).

Within the longitudinal panel data sub-sample of 2,858 businesses, in contrast to the cross sectional survey analysis which was presented above, there was a decrease in internal R&D as a percentage of total expenditure in 2019 panel members compared to 2017 and 2015 (Statistical Annex – Table 14, Table P2).

⁷<https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/bulletins/ukbusinessactivitysizeandlocation/2019>

3. Innovation support and collaboration

3.1 Introduction

Developing innovations of any kind can be a complex process and businesses may decide to work jointly with other businesses and seek access to sources of advice and information to help the creative process. This section explores the types of collaborators that businesses work with and where they turn for support.

3.2 Trends in collaboration

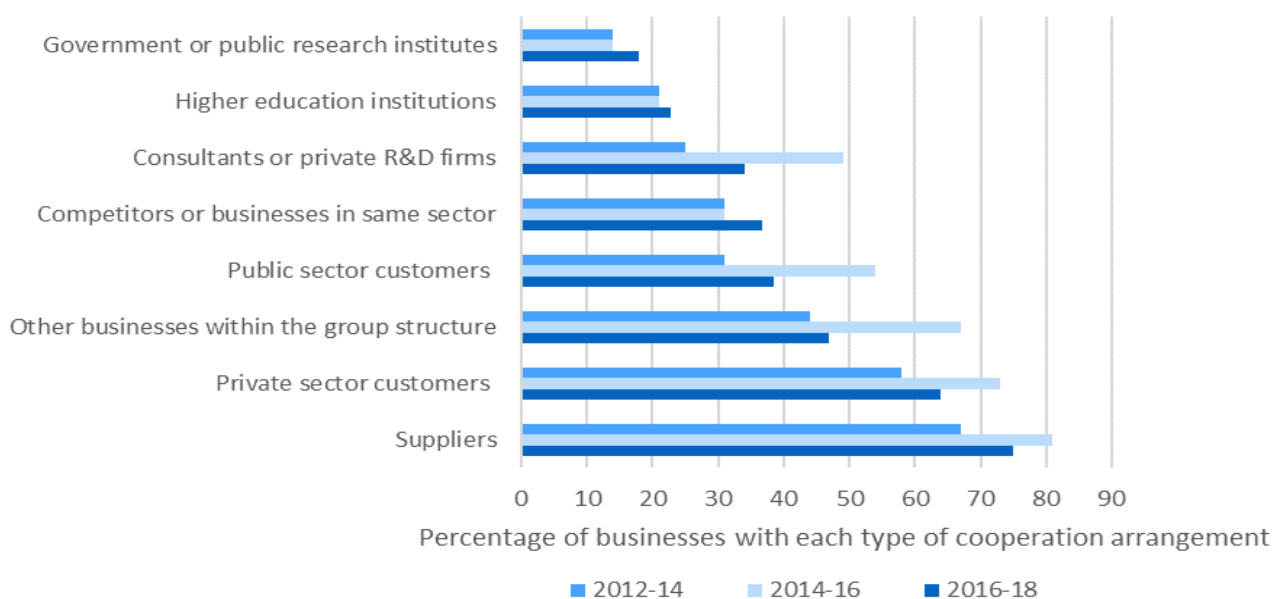
Percentage of innovation active businesses that have co-operation arrangements

In 2016-18, 49% of broader innovator businesses reported having co-operation arrangements, compared to 58% of businesses in the 2014-16. There was a lower co-operation across all partnering arrangements compared to the previous survey.

Co-operation arrangements

Co-operation occurs when two or more participants agree to take responsibility for a task or series of tasks and information is shared between the parties to facilitate the agreement. An innovation-active business co-operates with another business if it procures ideas or inputs from the other business, by providing it with a detailed specification of its needs.

Figure 3.1: Percentage of businesses with each type of cooperation arrangement (of broader innovators with any cooperation requirements only), 2012-14 to 2016-18



Unweighted base = 4,065 for 2012-14, 4,367 for 2014-16, 3,436 for 2016-18

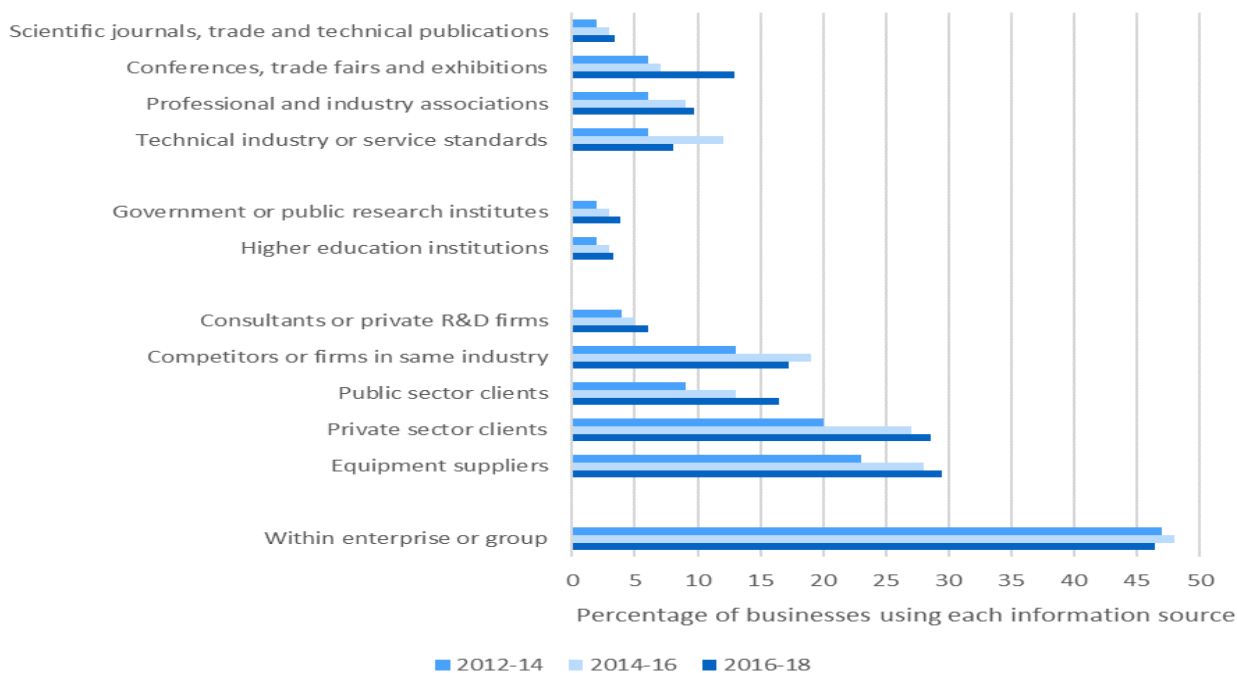
In 2016-18, 75% of broader innovators with any cooperation arrangements reported partnering with their suppliers (compared to 81% of businesses in 2014-16). In 2016-18, 64% worked with clients and customers in the private sector, and 47% worked with other businesses in their enterprise group. Overall businesses were much more likely to work with private sector organisations than they were with public sector and government organisations. 18% reported working with government or public research institutes, and 23% with universities or other higher education institutions.

Further analysis at regional level within the UK is available in the Statistical Annex -Table 8 and Table 8c. Collaboration with suppliers was less common in the North East and more common in the South West, East Midlands, and Wales. Collaboration with private sector customers was more common in Yorkshire and the Humber and Northern Ireland. Collaboration with universities or other higher education institutions was most common in Wales and collaboration with Government or public sector institutes was most common in the South West.

Collaboration arrangements were also reported in the panel survey sub-sample of 2,858 businesses from the 2015, 2017 and 2019 surveys (see Statistical Annex – Table P3 in Table 14). Within the panel, in 2019 collaboration, by broader innovators with higher education institutions and government or public research institutes, had both decreased since the 2017 survey (by 13 and 15 percentage points respectively). Collaboration with higher education institutions and government or public research institutes in 2019 were however still higher than 2015 survey levels for the panel.

3.3 Trends in information sources used

Figure 3.2: Percentage of innovation active businesses using various information sources, 2012-14 to 2016-18



Unweighted base = 8,735 for 2012-14, 7,438 for 2014-16, 6,389 for 2016-18

Figure 3.2 shows a consistent indicative trend in businesses reporting that they most commonly seek information from within their own business or group structure, which was also found in the longitudinal panel data sub-sample. In 2016-18 there were notable increases in businesses reporting seeking information from public or private sector clients or equipment suppliers.

At regional levels within the UK, businesses in Northern Ireland, Scotland and the South East were more likely to source information from within their own businesses group, than other English regions or Wales. Businesses in London and Northern Ireland sourced information from consultants, or private R&D firms more than businesses in other English regions or Scotland, Wales (see Statistical Annex – Table 9).

Further information on sources of information used by the longitudinal panel sub-sample in UKIS 2015, 2017 and 2019 surveys, is available in Statistical Annex – Table P4 in Table 14.

3.4 Links between public support and business outcomes

Around 3 per cent of businesses in the 2019 survey reported receiving financial support from central government, compared to 5 per cent receiving support in the 2017 survey.

A theme from the comments given by businesses on the UKIS 2019 survey was that government R&D tax credits and government grants were both key factors, for businesses who innovated, in their decisions to invest in innovation.

It is possible that those businesses making use of public support, in the form of financial support via tax credits or deductions, grants, subsidised loans and loan guarantees, may benefit from greater capacity to innovate. In turn this could lead to superior performance outcomes, including increased turnover and increased numbers of employees.

Regression analysis which accompanied UK innovation survey 2017 - main report (and was also presented in the 2017 Statistical Annex), showed that businesses that received financial support were more likely to experience increases in turnover and employment (see Appendix 1 in [UK innovation survey 2017 - main report](#)).

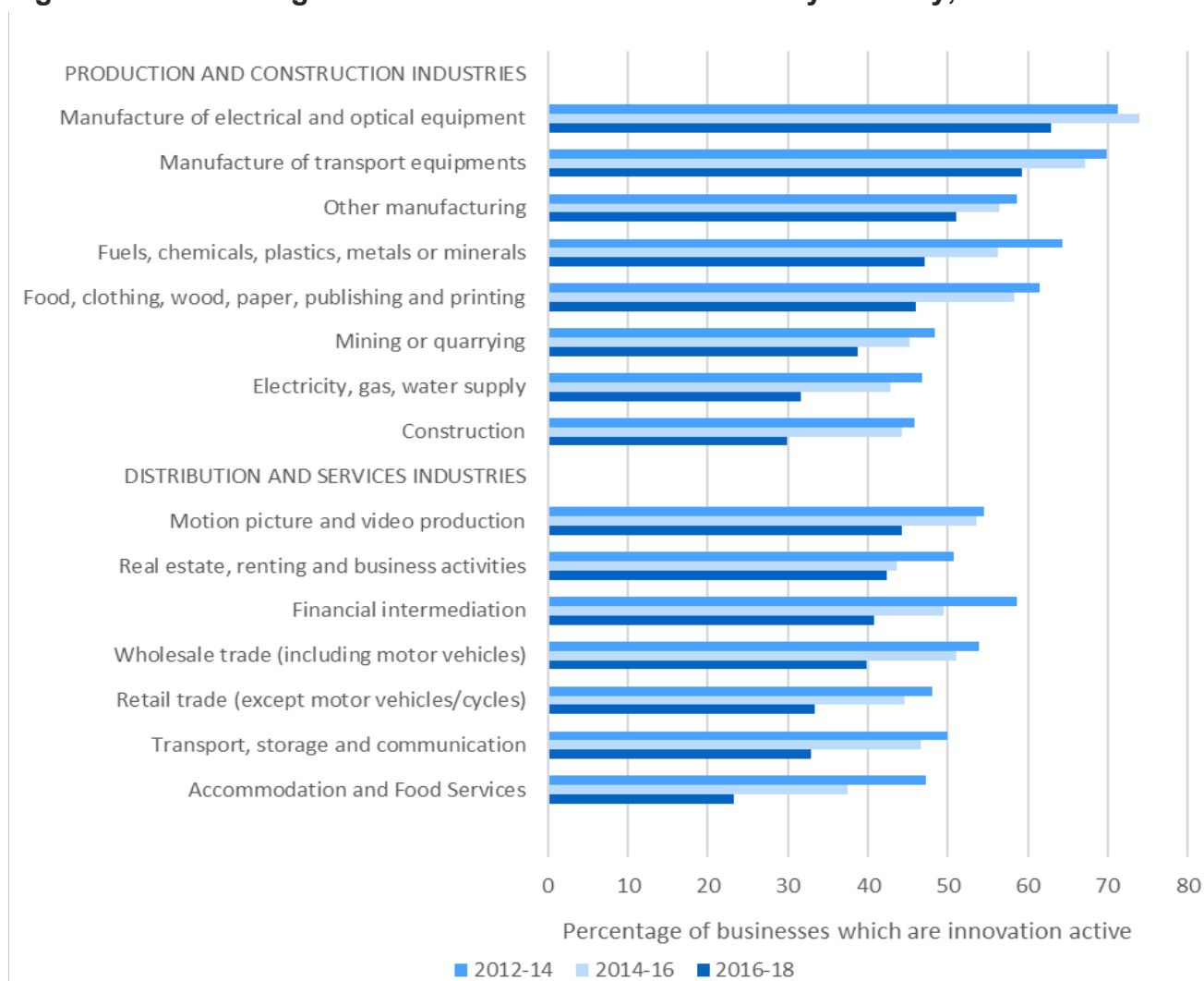
4. Innovation characteristics and outcomes

4.1 Introduction

Innovation engagement varies across different types of sectors and the type of innovation can vary according to sector, in particular whether businesses are supplying products or services⁸.

4.2 Patterns of innovation behaviour in sectors

Figure 4.1: Percentage of innovation active businesses by industry, 2012-14 to 2016-18



Unweighted base = 15,091 for 2012-14, 13,194 for 2014-16, 14,040 for 2016-18

Figure 4.1 shows how innovation activity varies across sectors. The percentage of innovation active businesses has fallen in every industry between 2014-16 to 2016-18. This mirrors the overall fall in innovation active businesses. The three industries with the largest percentage point reduction in innovation activities, of 14 percentage points each, were accommodation and food services, transport, storage and communications, and construction.

⁸ Ibidem.

Businesses in production and construction industries generally remained more innovative than businesses in distribution and service industries. In 2016-18, manufacture of electrical and optical equipment and the manufacture of transport equipment remained the most innovative industries (63% and 59% of businesses respectively). Accommodation and food services had the lowest percentage of innovation active businesses (23%). The relative order of industries in terms of their innovation activities was similar to the previous survey (see Statistical Annex – Table 1a).

This pattern of a reduction in innovation activity across all industries is repeated in the panel survey, with a drop in all sectors between panel members who responded in both 2017 and 2019, apart from a slight increase in percentage of innovation active businesses in the retail industry (see Statistical Annex - Table P5 of Table 14).

4.3 Innovation and organisational performance outcomes

Wider research has shown associations between business level innovation and benefits of superior performance outcomes, including increased turnover and increased numbers of employees^{9 10}.

Regression analysis which accompanied UK innovation survey 2017 - main report (and was also presented in the 2017 Statistical Annex), showed that businesses which were broader innovators were more likely to experience increases in turnover and employment (see Appendix 1 in [UK innovation survey 2017 - main report](#)).

⁹ Turner, Joanne, Roper, Stephen, Hewitt-Dundas, Nola. (2020) *Pathways to efficiency, pathways to growth: Evidence from the UK Innovation Survey*, Enterprise Research Centre Research Paper 83.

¹⁰ Coad, Alex., Cowling, M., Nightingale, P., Pellegrino, G., Savona, M. and Siepel, J. (2014) *Innovative Firms and Growth*. BIS Research Report, Department for Business, Innovation and Skills

5. Geography of innovation

5.1 Introduction

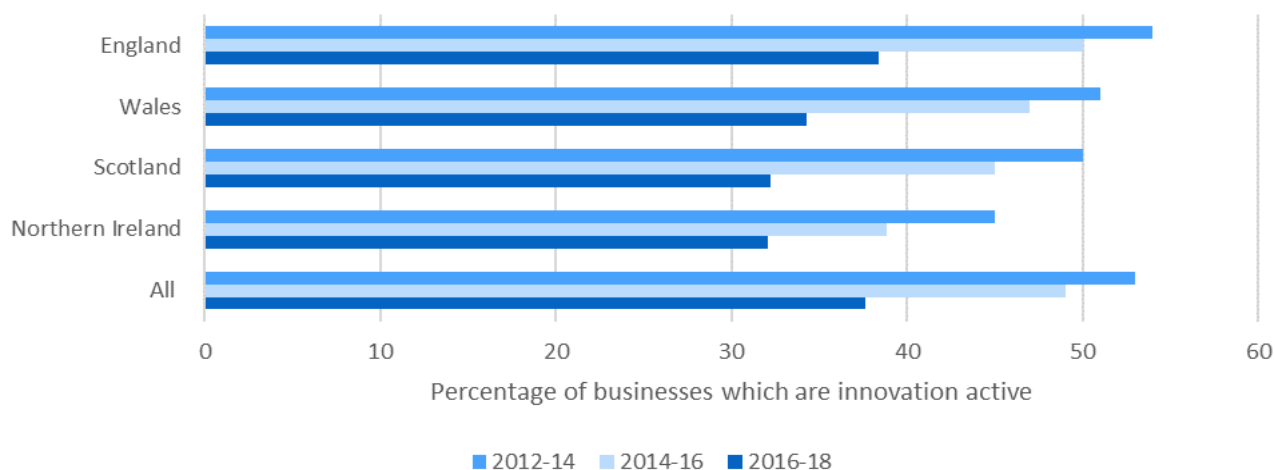
This section investigates variations in engagement in innovation at a spatial level over the past three waves of the survey.

Previous panel analysis of UKIS surveys from 2004 to 2010, showed that highly innovative businesses are distributed relatively evenly across the UK and within English regions and are not concentrated in particular locations¹¹.

5.2 Spatial distribution of innovative businesses

Country level differences

Figure 5.1: Percentage of innovation active businesses by country, 2012-14 to 2016-18



Unweighted base = 15,091 for 2012-14, 13,194 for 2014-16, 14,040 for 2016-18

The percentage of innovation active businesses was highest in England 38% in 2016-18. In Wales 34% of businesses in 2016-18 were innovation active, compared to 32% in both Scotland and Northern Ireland.

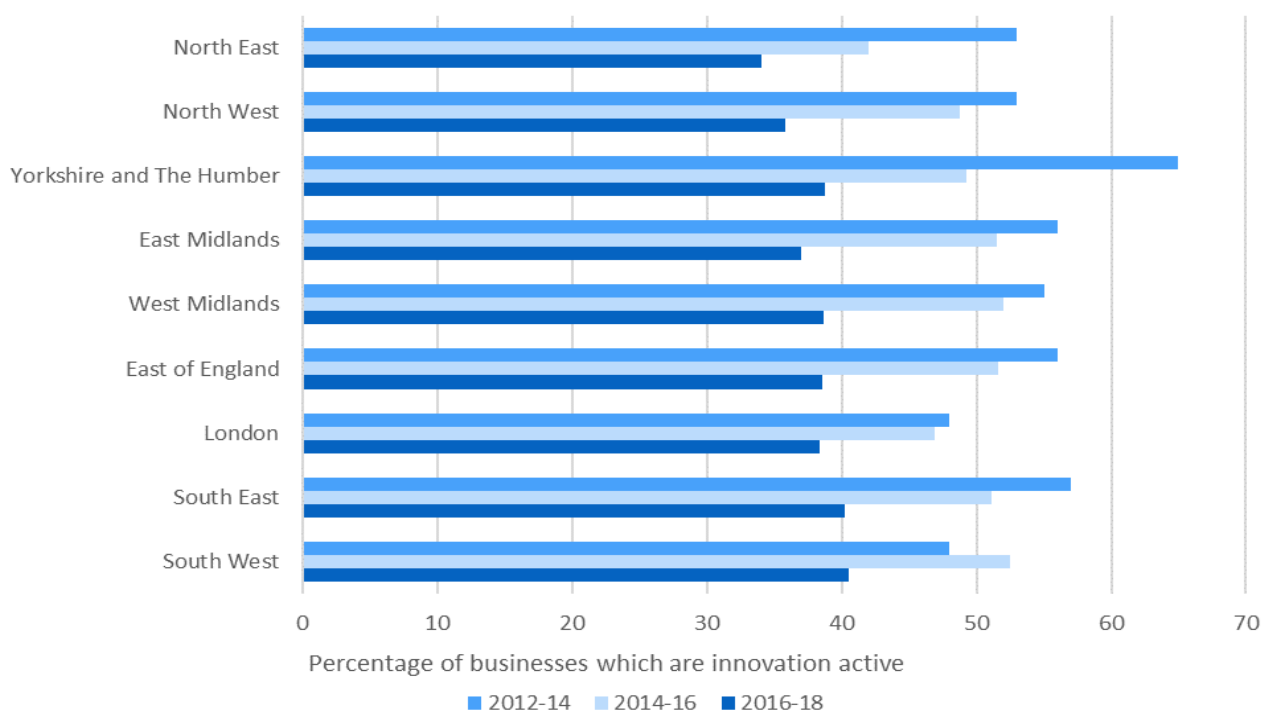
The percentages of innovation active businesses in all four countries were lower in 2016-18, than 2014-16. The largest percentage point drop was in Scotland, where the percentage of innovation active businesses decreased from 45% in 2014-16 to 32% in 2016-18.

Similar trends were found in the longitudinal panel survey, with decreases in the percentages of businesses who were innovation active in all UK countries, when comparing UKIS 2019 to 2017 for panel respondents (see Statistical Annex - Table P6 of Table 14).

¹¹ ibidem

Regional level differences (English Regions only)

Figure 5.2: Percentage of innovation active businesses by English region, 2012-14 to 2016-18



Unweighted base = 11,913 for 2012-14, 10,331 for 2014-16, 11,215 for 2016-18

The South West and the South East were the English regions with the highest percentage of innovation active businesses in 2016-18 (40%). The North East was the English region with the lowest percentage of innovation active businesses in 2016-18 (34%).

There has been a reported decrease in innovation activity in all English regions among businesses between 2014-16 and 2016-18 (see Table 1a in the Statistical Annex). The largest percentage point drop of 15 percentage points was in the East Midlands. Similar trends were found in the longitudinal panel survey, with decreases in percentages of businesses who were innovation active in all English regions, when comparing UKIS 2019 to 2017 for panel respondents (see Statistical Annex - Table P6 of Table 14).

Previous evidence on the distribution of highly innovative firms¹² showed there is limited variation in engagement in innovation between different English regions. Analysis by Local Enterprise Partnership areas in England, published by the Enterprise Research Centre, which was based on UKIS 2017¹³, shows greater variation at Local Enterprise Partnership level. The most innovative areas form an arc North of the M25 and including Oxfordshire, the South East Midlands and Greater Cambridge & Peterborough. By contrast, more rural and peripheral areas of England – Cumbria, the North East, Cornwall – tend to have lower levels of innovation.

¹² Ibidem.

¹³ <https://www.enterpriseresearch.ac.uk/innovation-and-productivity-how-strong-is-the-connection/>

6. Factors driving innovation

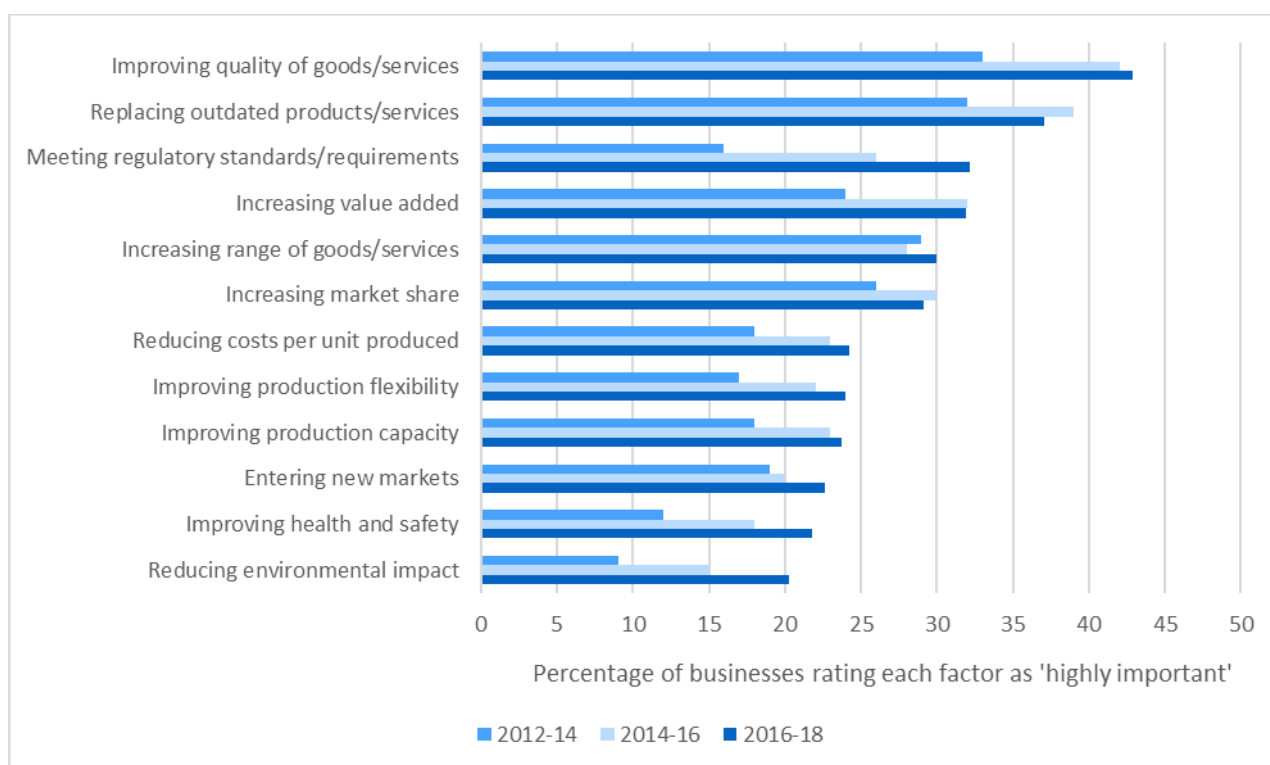
6.1 Introduction

There are varying motivations for businesses to engage in broad forms of innovation, which may relate to firms’ business strategies of improving quality, reducing costs, or diversifying their range of products and services. Changes in these motivations can vary over time, reflecting evolution in the external environment and market conditions.

6.2 Trends in factors driving innovation

Figure 6.1 shows trends in motivations for businesses to engage in broad forms of innovation

Figure 6.1 Innovation factors (percentage of all broader innovators rating factor as of “high” importance to their decision to innovate) 2012-14 to 2016-18



Unweighted base = 8,735 for 2012-14, 7,438 for 2014-16, 6,389 for 2016-18

Businesses cited a number of different reasons for innovating. Improving quality of goods or services and replacing outdated products or services remained the top-rated factors, being of ‘high’ importance to 43% and 37% of businesses respectively in 2016-18. These two reasons for innovating were also most common in the 2019 wave of the panel survey – see Statistical Annex Table P7 on Table 14.

In 2016-18, meeting regulatory requirements was of ‘high’ importance to their decision to innovate for 32% of businesses. Reducing environmental impact was of ‘high’ importance to 20% of businesses. Both factors had a six percentage point increase compared to 2014-16.

There were some regional variations among the common drivers of innovation (shown in Statistical Annex – Table 10). Expanding the range of products and services was a more frequent motivator of innovation in the West Midlands and a less common motivator in the North East. Improving quality of goods and services was more commonly reported as a motivator in the South East and Northern Ireland, but less commonly reported in the North East and North West. Replacing outdated products and processes was more commonly a motivator in Northern Ireland and a less common motivator in the North East.

Regression analysis which accompanied UK innovation survey 2017 - main report (and was also presented in the 2017 Statistical Annex), showed that businesses which rated one or more innovation motivations as 'high' or 'medium' were more likely to experience increases in turnover and employment (see Appendix 1 in [UK innovation survey 2017 - main report](#)).

7. Barriers to innovation

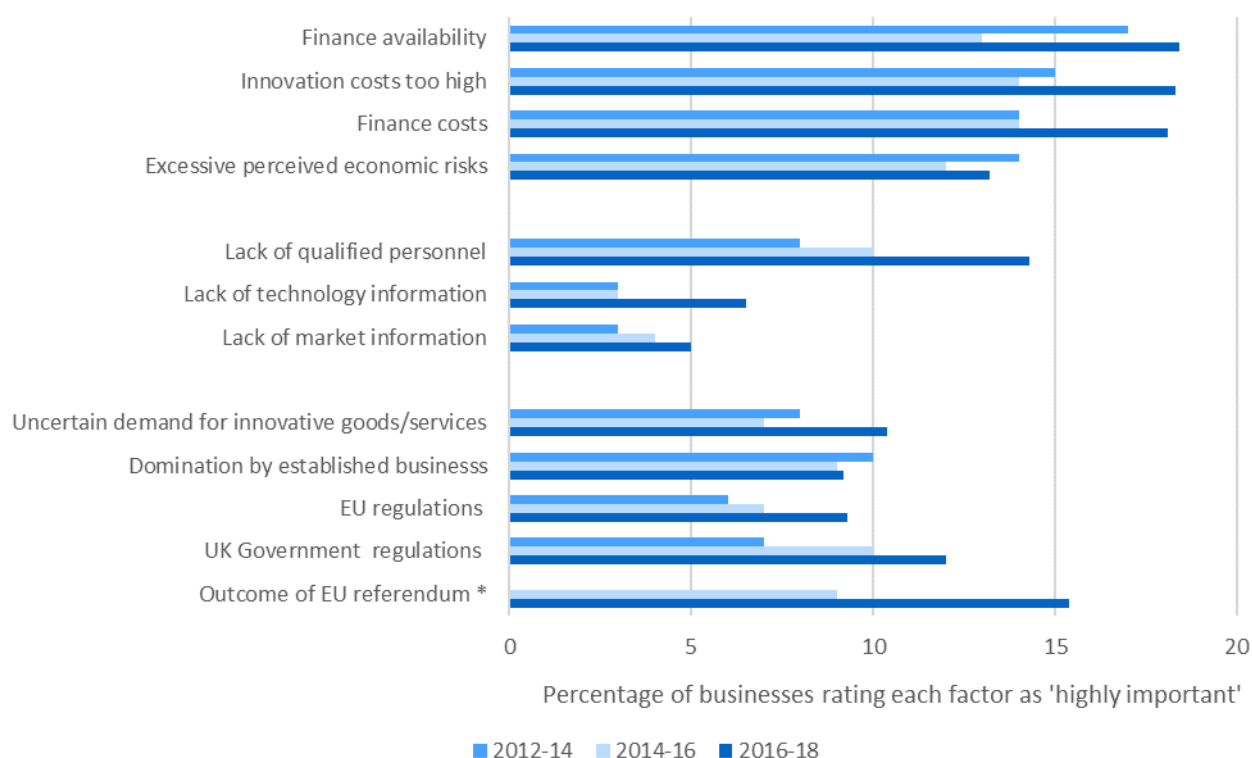
7.1 Introduction

Previous research has shown perceived barriers to innovation appear to have little relation to business performance, when focussing on highly innovative businesses¹⁴. It is important to compare and track perceptions of barriers to innovation among innovative businesses and non-innovators over time.

7.2 Trends in barriers to innovation

There are varying barriers to businesses engaging in broad forms of innovation shown in Figure 7.1.

Figure 7.1: Broader innovators' perception of potential barriers to innovation (businesses gave listed factors a rating of 'high' importance to constraining innovation activities), 2012-14 to 2016-18



Notes:

* Outcome of the EU referendum was a new option introduced in UKIS 2017 (2014-2016 reporting period)
 Unweighted base = 6,520 for 2012-14, 7,274 for 2014-16, 6,203 for 2016-18

Cost factors (including finance availability, innovation costs too high and finance costs) remained the highest rated barrier to innovation, as they had been for broader innovators in 2014-16. There was an increase in the percentage considering each of the cost factors of high importance as a barrier to innovation, compared with 2014-16. A lack of qualified personnel

¹⁴ Coad, Alex., Cowling, M., Nightingale, P., Pellegrino, G., Savona, M. and Siepel, J. (2014) *Innovative Firms and Growth*. BIS Research Report, Department for Business, Innovation and Skills

increased from a barrier to innovation for 10% of broader innovators in 2014-16, to a barrier for 14% in 2016-18.

The outcome of the EU referendum was cited as a barrier to innovation for 15% of broader innovators in 2016-18, compared to 9% in 2014-16. There were also a two percentage point increase in both the percentage of broader innovators who cited UK Government regulations and EU regulations as barriers to innovation. Businesses who gave comments on the UKIS 2019 survey responded that EU exit uncertainty, lack of government support in their area, and lack of skilled personnel were the key barriers to investing in innovation.

A higher percentage of businesses reported finance costs as a barrier to innovation in the North West and Yorkshire and the Humber. Direct innovation costs were raised as a barrier to innovation by a higher share of businesses in the North West and the East of England. A lack of qualified personnel was raised by a higher share of businesses in the North East, but this was a much lower than average issue to businesses in Scotland and Northern Ireland. Detailed information is available in the Statistical Annex – Table 10a.

Barriers to innovation do not appear to be major reasons why non-innovators do not innovate. In 2016-18, just 3% of businesses reported factors constraining innovation as a reason for not innovating. This compares to 24% of businesses responding that they did not need to due to existing market conditions and 14% responding there was no need due to previous innovations (see Statistical Annex - Table 11a). The percentage of non-innovator businesses who responded that factors constraining innovation, or that there was no need to innovate due to previous innovations, are broadly consistent with 2014-16. There was a five percentage point decrease in 2016-18 in non-innovator businesses responding that they did not need to innovate due to existing market conditions, compared with 2014-16.

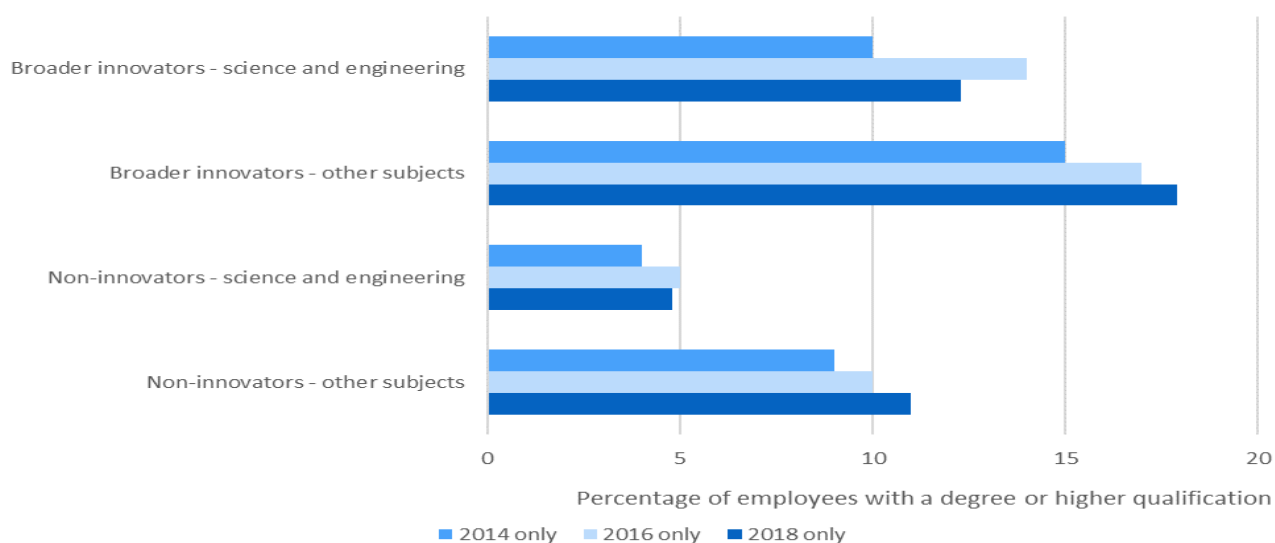
8. Skills for innovation

8.1 Introduction

Workforce skills to create and implement new products, services, practice and processes are essential components to introducing innovations. Previous research has shown that science, technology, engineering, and maths (STEM) graduates make up a greater share of the workforce in highly innovative businesses, than in less innovative organisations¹⁵. STEM graduate employment is also associated with greater use of external information, co-operation, and introduction of new products. It is argued that employing STEM graduates increases demand for innovation, through greater use of external collaboration and networking, leading in turn to further demand for these graduates.

8.2 Trends in skills and innovation over time

Table 8.1: Average percentage of employees who held a degree or higher qualification, in 2014 to 2018



Unweighted base = 15,091 for 2012-14, 13,194 for 2014-16, 14,040 for 2016-18

Figure 8.1 compares the average proportion of the workforce holding at least a degree level qualification in non-innovators and broader innovator businesses. The average percentage of employees with a degree or higher qualification was higher for broader innovators than for non-innovators

Amongst broader innovator businesses in 2018, 12% of employees had a science or engineering qualification, and 18% had a qualification in a non-science subject. In 2018, 5% of staff employed by non-innovators had a science or engineering qualification, and 11% had a qualification in a non-science subject. The increases since 2014 in both broader innovators

¹⁵ Ibidem.

and non-innovators with a degree, reflects a rising share of the working population holding graduate qualifications.

Overall, in 2018, 8% of employees held a degree in a science or engineering subject, and 14% in all other subjects (see Statistical Annex - Table 12).

The panel data shows an increase in the percentage of employees in broader innovators with a degree (in both employees with a degree in a science and engineering subject, and employees with a degree in other subjects) since 2014. The associated percentages in non-innovators were relatively stable (see Statistical Annex – Table P9 on Table 14).

Proportions of science or engineering graduates in the workforce of broader innovators were higher in London, the South East and Scotland and lower in the North East (see Statistical Annex – Table 12). Shares of non-science or engineering graduates in the workforce of broader innovators were substantially higher in London and lower in the North East and Yorkshire and the Humber.

8.3 Skill levels and organisational performance outcomes

Educational skill level of the workforce is known to be associated with innovation activity and performance¹⁶. Regression analysis which accompanied UK innovation survey 2017 - main report (and was also presented in the 2017 Statistical Annex), showed that businesses which employed an increasing share of either STEM or non-STEM graduates, were more likely to experience improvements in turnover and employment (see Appendix 1 in [UK innovation survey 2017 - main report](#)).

¹⁶ Coad, Alex., Cowling, M., Nightingale, P., Pellegrino, G., Savona, M. and Siepel, J. (2014) *Innovative Firms and Growth*. BIS Research Report, Department for Business, Innovation and Skills, London.

Accompanying tables

Accompanying this report is a Statistical Annex of tables that can be viewed [here](#).

- Tables 1-13 are consistent breakdowns (for UKIS 2019 covering the period 2016-18) to previous published UKIS Statistical Annex tables.
- Table 1a has been expanded to provide further information than previously presented. It is a time series table from 2008-10 to 2016-18 with breakdowns of innovation active businesses by size of business, region and sector.
- Table 14 is consistent with previously presented panel analysis, with the addition of UKIS 2019 information covering the period 2016-2018. The UKIS 2019 Statistical Annex includes 9 sub tables to table 14 (P1 to P9), for businesses that responded to the questionnaire in each of the last three UKIS surveys (2015, 2017 and 2019).
- Regression analysis predicting the probability of higher turnover / employment growth, which was published as table 15 in the UKIS 2017 Statistical Annex has not been repeated for UKIS 2019. Findings from the UKIS 2017 regression analysis are included, where relevant, in this release.

Technical information

This report presents the headline findings from the UK Innovation Survey 2019 (UKIS 2019), covering the three-year period from 2016 to 2018. The survey is the UK contribution to the eleventh Europe-wide Community Innovation Survey (CIS). Comparisons are made with the previous surveys.

UKIS 2019 sampled 30,942 UK businesses with ten or more employees. The survey was voluntary and was conducted primarily through an electronic questionnaire. Businesses that did not complete an electronic response were contacted for a telephone interview. We received a response from 14,040 businesses, giving a response rate of 45%.

Further details on UKIS methodology are published in the Statistical Annex to the main report for UKIS 2019 - <https://www.gov.uk/government/statistics/uk-innovation-survey-2019-main-report>.

A copy of the UKIS 2019 questionnaire can be viewed [here](#).

Definitions

Defining Innovation

The UK definition of innovation is based on an Organisation for Economic Co-operation and Development (OECD) definition adopted by Eurostat. This definition includes any of the following activities, if they occurred during the survey period:

1. The introduction of a new or significantly improved product (good or service) or process;
2. Engagement in innovation projects not yet complete, scaled back, or abandoned;
3. New and significantly improved forms of organisation, business structures or practices, and marketing concepts or strategies;
4. Investment activities in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

A business that had engaged in any of the activities described in points 1 to 3 is defined as being ‘innovation active’. A business that had engaged in any of the activities described in points 1 to 4 is defined as a ‘broader innovator’. Finally, any businesses that had engaged in the activity described in point 3 were classed as a ‘wider innovator’.

Further Definitions and Terminology

Co-operation Arrangements	<i>Co-operation occurs when two or more participants agree to take responsibility for a task or series of tasks and information is shared between the parties to facilitate the agreement. An innovation-active business co-operates with another business if it procures ideas or inputs from the other business by providing it with a detailed specification of its needs.</i>
Innovation Investment activities	<i>Business that reported spending in each of the specified main innovation related investments (as described in point 4 above)</i>
EU	<i>European Union.</i>
Large business	<i>A business with 250 or more employees.</i>
OECD	<i>Organisation for Economic Co-operation and Development.</i>
R&D	<i>Research and Development.</i>
Small and medium-sized enterprises (SMEs)	<i>Businesses with 0-249 employees. This survey does not include any businesses with less than 10 employees.</i>

Further information

Future updates to these statistics

Detailed microdata will be made available to accredited researchers through the ONS [Secure Research Service](#) and the [UK Data Service](#).

A UKIS 2021 report covering the survey period 2018-2020 will be published in summer 2022. A Statistical Annex with further data will accompany this publication.

Related statistics

International comparisons

The UKIS data is used for international statistics on innovation:

- EU-wide statistics are published by Eurostat in the [Community Innovation Survey](#) and in the [European innovation scoreboard](#)
- Further international comparisons are published by the OECD in their [Innovation Indicators](#)

Research and development

The Office for National Statistics (ONS) publishes detailed statistics on research and development:

- [Business enterprise research and development \(2018\)](#)
- [Gross domestic expenditure on research and development \(2018\)](#)
- [Research and development expenditure by the UK government \(2018\)](#)

Business statistics

For more general business statistics, please see:

- [Business population estimates](#) for an estimate of the total number of registered and unregistered businesses in the UK
- [UK business; activity, size and location](#) for UK registered businesses by legal status, industry, region, employment and turnover size bands
- [Longitudinal Small Business Survey](#) for information on survey responses for businesses with employees and businesses with no employees on topics including innovation.

Revisions policy

The [BEIS statistical revisions policy](#) sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority [Code of Practice for Statistics](#).

Uses of these statistics

The UK Innovation Survey (UKIS) is the main data source for business innovation in the UK. It is used widely across government and by the research community (including the [Enterprise Research Centre](#)) for understanding the innovation landscape, drivers of business growth and productivity and to help the Government develop, improve, and evaluate policy.

Internationally, it is used by Eurostat and OECD for international comparison (see Related statistics section).

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to: business.statistics@beis.gov.uk

The BEIS statement on [statistical public engagement and data standards](#) sets out the department's commitments on public engagement and data standards as outlined by the [Code of Practice for Statistics](#).

Pre-release access to statistics

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the [BEIS statement of compliance](#) with the Pre-Release Access to Official Statistics Order 2008.

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