Department
for Business
Innovation & Skills

THE UK INNOVATION SURVEY 2015
MAIN REPORT

Innovation Analysis

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Contents

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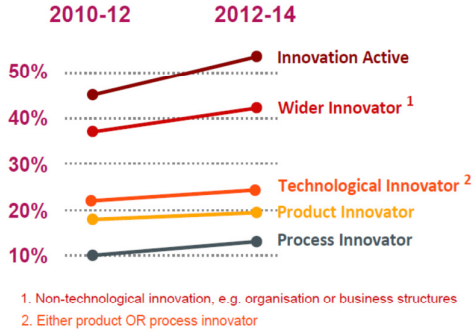
Infographics

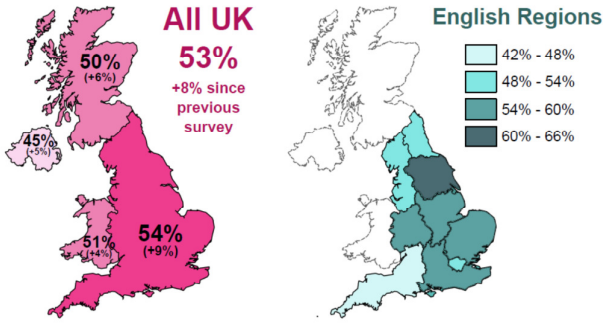
In 2012-14, more UK businesses were innovative than in 2010-12

53% of all businesses were innovative



1. Non-technological innovation, e.g. organisation or business structures
2. Either product OR process innovator

The proportion of innovators increased across the UK, and most English regions.



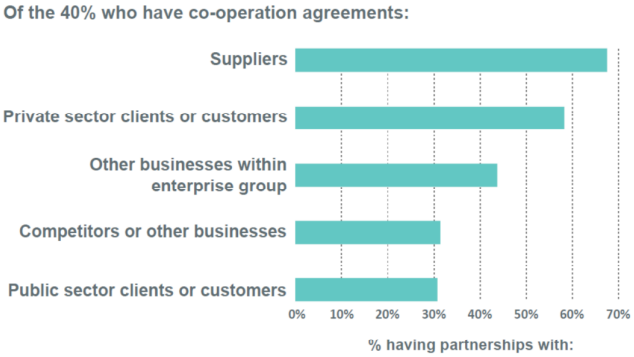
Innovative businesses are more likely to export, employ more qualified staff, and 40% collaborate to innovate, mostly with industry

Innovators are more likely to export

Innovators employ more highly qualified staff

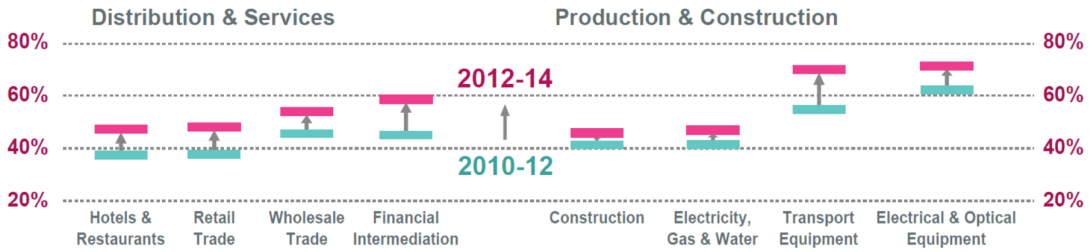
	Staff with STEM degree/postgraduate	Staff with other degree/postgraduate
Innovators:	10%	15%
Non-Innovators:	4%	9%

Innovators co-operate mostly with suppliers, clients and customers on innovation activities



The proportion of innovative businesses increased across sectors

Innovation active businesses by selected industries, over the two survey periods



Executive summary

In 2012-14, more UK businesses were innovative than in 2010-12[1].

UK innovation activity

- 53 per cent of businesses were innovative (up from 45 per cent).
- 61 per cent of large businesses (those with more than 250 employees) and 53 per cent of small and medium enterprises (those with 10 to 250 employees) were innovative.
- 42 per cent of businesses used non-technological innovation, up from 37 per cent: 27 per cent engaged in 'new business practices' (up from 21 per cent), 19 per cent in 'new method of organising work responsibilities' (up from 18 per cent) and 16 per cent in 'changes to marketing concept or strategies' (unchanged).
- 24 per cent of businesses used technological innovation, up from 22 per cent: 19 per cent used 'product innovation' (up from 18 per cent) and 13 per cent used 'process innovation' (up from 10 per cent).

Innovation activity across countries, regions and sectors

- All four countries were more innovative. While England was leading the way with 54 per cent innovative firms (up from 45 per cent), Wales had the second highest proportion of innovative firms with 51 per cent (47 per cent previously), followed by Scotland (50 per cent, from 44 per cent previously) and Northern Ireland (45 per cent, up from 40 per cent).
- Almost all regions of England showed significant increases, although large variations remained across regions (from 65 per cent in Yorkshire and The Humber,

Innovative Businesses

Businesses were considered to be innovative ('innovation active') if they:

- Introduced a new or significantly improved product (goods or service) or process;
- Engaged in innovation projects not yet complete or abandoned;
- Acquired new and significantly improved forms of organisation, business structures or practices and marketing concepts or strategies.

This excludes expenditure and activities linked to innovation.

Non-Technological Innovation

Businesses that acquired new and significantly improved forms of organisation, business structures or practices and marketing concepts or strategies.

Technological Innovation

Businesses that introduced new or significantly improved product (good or service) or process.

[1] It is important to note that previously published headline figures (see https://www.gov.uk/government/statistics/uk-innovation-survey-2015-headline-findings) were based on weights across 14 broad industrial sectors. The figures in this report are based on weights across 25 detailed sectors. These detailed weights are for the data harmonisation to enable international comparisons. As a result, the figures in this report may vary slightly from those in the earlier headline report.

and 57 per cent in the South East to 43 per cent in South West, the only region showing a decrease). The disparities were more pronounced in this survey than they were in the previous survey.

- The production sector, particularly manufacturing, was the most innovative (71 per cent of 'Manufacture of Electrical and Optical Equipment' and 70 per cent of 'Manufacture of Transport Equipment'), followed by the distribution and services sector where 59 per cent of 'Financial Intermediation', 55 per cent of 'Real Estate, Renting and Business activities' and 54 per cent of 'Wholesale Trade, including Motor Vehicles and Motorcycles' were innovative.

Broader environment and export

- 40 per cent of innovative businesses reported having co-operation arrangements with other parties, mostly with industry, on innovation-related activities (41 per cent in the previous survey). Collaboration with suppliers (67 per cent, up from 59 per cent), clients from the private sector (58 per cent) and other businesses (44 per cent) were predominant.

- 21 per cent of innovative businesses co-operated with universities or higher education institutions (down from 23 per cent in the 2013 survey) and 14 per cent co-operated with government or public research institutes (down from 16 per cent).

- Innovative businesses were more likely to export. 27 per cent of innovators reported engaging in exports, only 9 per cent of non-innovators did so.

- Few businesses reported receiving public financial support[2]. Out of those, 70 per cent said they had benefited from indirect support from 'UK Central Government', 34 per cent reported direct support and 17 per cent indicated receiving both.

Investment, skills and innovation protection

- Amongst businesses engaged in innovation related investments[3], 'acquisition of capital' i.e. advanced machinery, equipment and software (36 per cent, up from 25 per cent) and 'internal R&D' (35 per cent, down from 40 per cent) were the main investments. Investment in 'all forms of design' increased (9 per cent, up from 4 per cent) whereas 'acquisition of external R&D' decreased (4 per cent, down from 14 per cent).

- Innovative businesses were more likely to employ highly qualified staff (those with a first degree or postgraduate qualification). They employed more Science, Technology, Engineering, and Mathematics (STEM) graduate/postgraduate staff (10 per cent of

[2] The take-up of this question was low (7 per cent) but over half reported receiving funding from central government.

3 Those businesses that provided information for innovation related expenditures for the purposes of current or future innovation during 2012 to 2014.

innovators, compared to 4 per cent of non-innovators), as well as staff with degrees in 'other' subjects (15 per cent of innovators, compared to 9 per cent of non-innovators).

- Few businesses reported using formal protection methods for their innovation[4]. 'Complexity of goods or services' (15 per cent amongst large firms, 10 per cent amongst SMEs) and 'secrecy' (13 per cent amongst large firms, 7 per cent amongst SMEs) were the most frequently cited protection methods.

Drivers of innovation and perceived constraints

- 'Improving the quality of goods and services' produced or supplied (cited by 33 per cent of innovative businesses, compared to 36 per cent in the previous survey), was the main factor driving innovation. This was followed by 'replacing outdated products or processes' (32 per cent, up from 31 per cent), 'increasing the range of goods and services' (29 per cent, up from 28 per cent), and 'increasing market share' (26 per cent).

- 'Reducing environmental impact' (9 per cent) and 'improving health and safety' (12 per cent) remain the least highly rated factors driving innovation, although large firms were more likely to report these (14 per cent) than small and medium-sized businesses (9 per cent).

- The top five self-reported constraints[5] to innovation were related to cost and market. 'Availability of finance' was the most cited constraint (17 per cent) followed by 'direct innovation cost too high' (15 per cent), 'excessive perceived economic risks (14 per cent) and 'cost of finance' (14 per cent). One in ten businesses mentioned 'market dominated by established businesses' as their important constraining factor.

[4] Around 10 per cent of all businesses provided a rating for 'what proportion of your innovations were protected during 2012 to 2014'. These low numbers are in line with findings on the protection question in the previous surveys.

5 The constraints question was not included in the 2013 survey. Therefore it is not possible to compare these figures with the previous survey's findings.

Introduction

Background

The UK Innovation Survey (UKIS) is a major data source for research into the nature and functioning of the innovation system, as well as for policy formation. It is used widely across government and by the research community for helping Government improve policy.

This report presents detailed findings from the UK Innovation Survey 2015, covering the three-year period from 2012 to 2014. The fieldwork for the survey was carried out during 2015. The survey is the UK contribution to the ninth Europe-wide Community Innovation Survey (CIS). The CIS was originally conducted every four years, but since 2005 it has been conducted every two years.

The Department for Business, Innovation, and Skills (BIS) would like to thank all the businesses that completed the survey form either over the phone or by post. The UKIS continues to provide a means to measuring the level, types and trends in innovation activity among businesses within the UK. This data source contributes to our understanding of the constraining factors faced by businesses, across various sectors and size classifications, to innovate and other limitations in the system. It provides the empirical evidence to support policy measures.

About the survey

The UK Innovation Survey 2015 sampled 29,732 UK enterprises with ten or more employees. The total sample included a boost element for Scotland which meant including around 1,000 additional firms from Scotland in the sample selected for the survey. This was funded by the Scottish Government. The survey was voluntary, and was conducted through both a postal questionnaire and telephone interview for businesses that had not yet completed a postal response. With 15,091 businesses in the achieved sample, the survey had a 51 per cent response rate. The results in this report are based on weighted data in order to be representative of firms. The responses were weighted back to the total business population of those in the Inter-Departmental Business Registration (IDBR). They were not weighted by factors which would give more weight to larger firms, such as employment or turnover.

It is important to note that the previously published 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. This second weight is the Eurostat requirement for the data harmonisation to enable international comparisons. The figures in this report may vary slightly from those in the headlines report and this is due to the application of the more detailed weights.

As in the 2011 and the 2013 surveys, the 2015 survey also used a sampling format based on SIC 2007 which is an EU legislative requirement regarding the collection of innovation statistics. The sample selection was conducted by the Office for National Statistics (ONS) and followed very similar sampling methodology to the previous surveys.

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 performance.

The majority of the survey questions are concerned with innovation through new and improved products and processes (technological innovation) and with the investments that develop and implement them along with changes in business structures, management and marketing practices (non-technological innovation). The survey also asks businesses about the drivers to innovate as well as their perception of barriers to innovation.

The questionnaire used for the survey remained mostly the same as in the 2013 survey. The composition of the 2013 achieved sample was similar to the last survey, with 20 per cent of sample consisting of large firms, 44 per cent coming from businesses with 10 to 49 employees and 36 per cent from businesses with 50 to 249 employees.

Definitions

The UK definition of innovation follows the EU-wide definition adopted by Eurostat. This definition of 'innovation active' includes any of the activities described below that enterprises were engaged in during the survey period:

1. Introduction of a new or significantly improved product (good or service) or process;

2. Engagement in innovation projects not yet complete 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[6].

The definition excludes expenditure and activities linked to innovation.

For the purpose of the UK Innovation Survey and in line with the European-wide Community Innovation Survey, a business that had engaged in any of the activities described in points 1 to 3 above is defined as being '**innovation active**'.

For the purpose of this report, a business that has engaged in any of the activities described in points 1 to 4 above is defined as a '**broader innovator'**. Also, businesses classed as a '**wider innovator'** are those that have engaged in the activity described in point 3 above.

[6] As in the 2013 UKIS, the questions in the Section C 'Context for Innovation' of the questionnaire are only asked if the respondent said yes to Q3, 4, 6, 10 or 13 (i.e. strategic innovator, innovation activities, product innovator, process innovator or abandoned/incomplete innovation) in Section B 'Innovation Activities' of the questionnaire. This differs from survey routing used in surveys conducted before the UKIS 2011.

1. Innovation activity

Innovation takes place through a wide variety of business practices. A range of indicators can be used to measure the levels of innovation within the enterprise or in the economy as a whole. These include the levels of effort employed (measured through resources allocated to innovation) and of achievement (the introduction of new or improved products and processes). This section reports on the types and levels of innovation activity over the three year period, from 2012 to 2014[7] and makes comparisons with the results obtained from the previous survey conducted in 2013.

The results given in Table 1 show notable improvements on all of the innovation activities that businesses had engaged in throughout the reference period of 2012 - 2014.

The number of 'innovation active' firms increased over the survey period; 53 per cent of enterprises were found to be 'innovation active', compared to 45 per cent of businesses in the 2013 survey. The proportion of large firms (those with more than 250 employees) classified as 'innovation active' was higher than small and medium enterprises (SMEs, those with 10 to 250 employees): 61 per cent, compared to 53 per cent of SMEs. The same difference also existed between large firms and SMEs in the 2013 survey.

[7] All results are grossed up (based on detailed sectoral groupings) to the business population, and all figures quoted relate to UK Innovation Survey 2015, unless stated otherwise.

Table 1: Enterprises engaging in innovation activity, by size and type of activity, 2012-2014*

Per cent

Type of activity	Size of enterprise		
	10-250 employees	250+ employees	All (10+ employees)
2015			
Innovation active	53	61	53
Innovation active (old definition)[8]	*49*	*58*	*50*
Broader innovator	54	62	54
Wider innovator	42	45	42
Activities	43	50	44
Product innovator	19	27	19
of which (share with new-to-market products)	*31*	*39*	*31*
Process innovator	13	20	13
of which (share with new-to-industry processes)	*26*	*24*	*26*
Abandoned activities	4	7	4
On-going activities	17	24	17
Both product AND process innovator	8	13	8
Either product OR process innovator	24	34	24
2013			
Innovation active	45	50	45
Innovation active (old definition)	*42*	*48*	*43*
Broader innovator	46	51	46
Wider innovator	37	39	37
Activities	39	43	39
Product innovator	18	23	18
of which (share with new-to-market products)	*44*	*50*	*44*
Process innovator	10	15	10
of which (share with new-to-industry processes)	*23*	*26*	*23*
Abandoned activities	4	5	4
On-going activities	15	19	15
Both product AND process innovator	7	10	7
Either product OR process innovator	21	28	22

** = Unweighted base = 15,091*

In line with the increase in the proportion of innovation active businesses, the number of firms defined as 'broader innovator' also increased to 54 per cent in this survey from 46 per cent in the 2013 survey, with the same trend existing between large firms and SMEs. There was also an increase on the wider innovator indicator from 37 per cent in the 2013 survey to 42 per cent in this survey.

Product innovation also showed a small increase of one percentage point, from 18 per cent to 19 per cent in this survey reporting engagement in product innovations. Almost a third of product innovations (31 per cent) were new to the market over this survey period, as compared to 44 per cent in the previous survey. The share of large firms having

[8] Different survey routing was applied for surveys conducted before the UKIS 2011 and the proportions reported here refer to the definition used prior to 2011, hence referred as the 'old definition'. This indicator is kept to enable comparisons with surveys conducted before the UKIS 2011 for further analyses in the full report.

products new to the market also showed a decrease from 50 per cent in the previous survey to 39 per cent.

Process innovation showed an increase from 10 per cent to 13 per cent in this survey, with 20 per cent of large firms reporting engagement in process innovations, as compared to 15 per cent in the 2013 survey. Over a quarter (26 per cent) of process innovations were new to the industry processes, showing an increase from 23 per cent in the previous survey. Whilst there was a decline for large firms having process innovations new to the industry, from 26 per cent in the previous survey to 24 per cent in this survey, the share of SMEs having process innovations new to the industry showed an increase from 23 per cent to 26 per cent.

In most businesses[9], both goods and services were mainly developed within the business. 42 per cent of respondents said their 'goods' were developed mainly by their own business and 48 per cent said their 'services' were developed mainly within the business. These figures were broadly in line with the previous survey's findings in which 41 per cent said 'goods' and 50 per cent said 'service innovations' were developed within their business.

13 per cent of businesses said their goods were developed mainly in partnership with other businesses or organisations (17 per cent in the 2013 survey). The corresponding figure for services was 19 per cent (14 per cent in the previous survey). 7 per cent said their goods were developed mainly by other businesses or organisations (10 per cent in the previous survey). The corresponding figure for services was around one in ten.

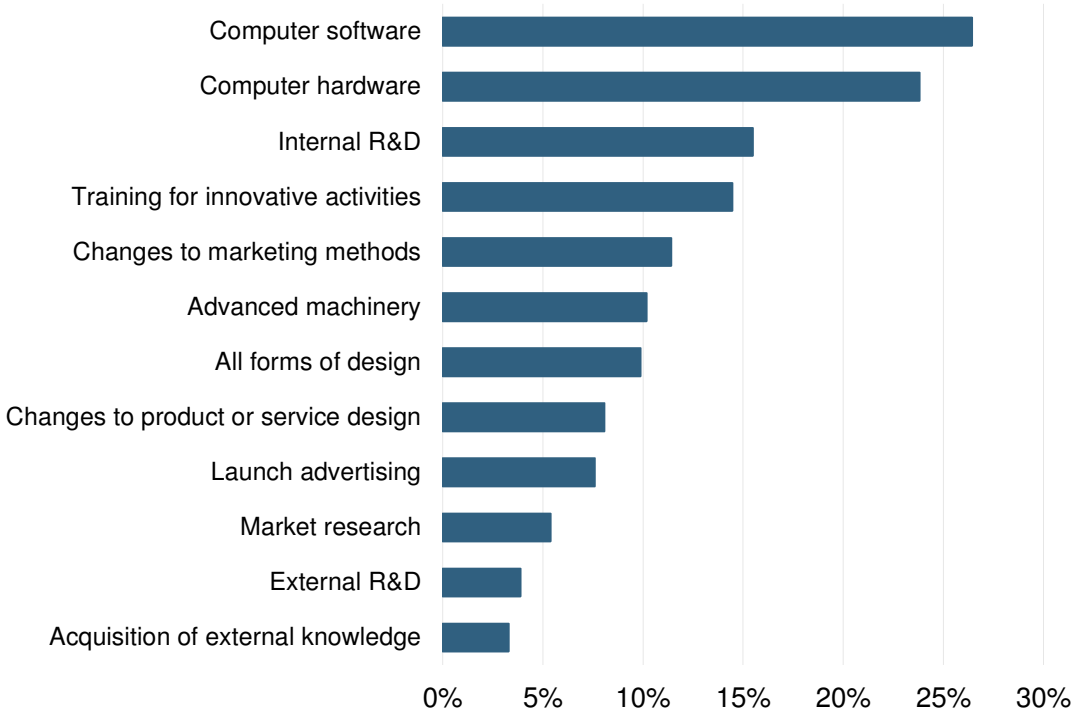
The findings showed that the proportion of businesses engaged in on-going innovation activities went up from 15 per cent to 17 per cent, with the share of large firms reporting higher proportions of on-going activities (24 per cent). This is an increase from 19 per cent of large firms in the 2013 survey. A discussion of the details of the innovation activities follows in the next section.

[9] The proportions reported in this paragraph are based on valid responses only. There were high numbers of 'not applicable/not known' responses which were kept in the base. As a result, 42 per cent and 48 per cent represent 'most' responses.

1.1 Breakdown of innovation activities

Figure 1 shows that the most commonly reported innovation activities were acquisition of computer software and computer hardware (26 per cent and 24 per cent, respectively). These proportions went up from 23 per cent of computer software and 20 per cent of hardware in the previous survey. The proportions in other categories remained broadly unchanged.

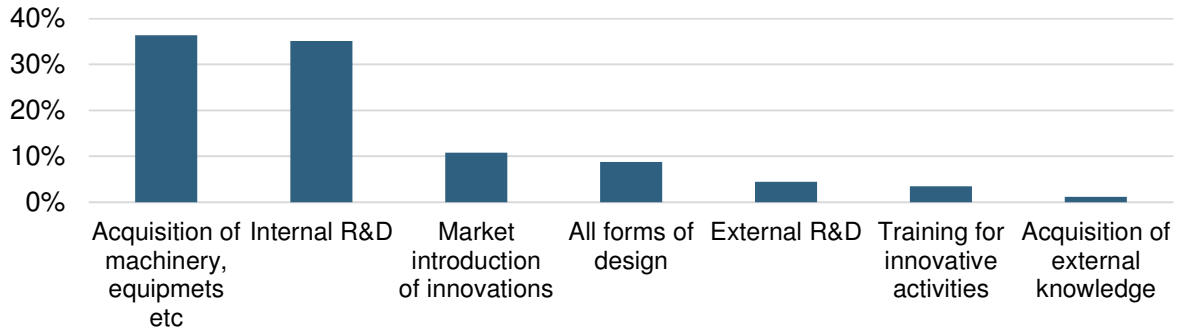
Figure 1: Innovation related activities businesses invested in (all enterprises)



Unweighted base = 15,091

Figure 2 shows the ranking of expenditure categories. The top two expenditure categories cited were the 'acquisition of capital' i.e., advanced machinery, equipment and software (36 per cent, compared to 25 per cent in the previous survey) and the 'internal R&D' (35 per cent, compared to 40 per cent in the 2013 survey). The category for 'market introduction of innovations' remained broadly the same with 11 per cent (ten per cent previously). There was an increase in spending for 'all forms of design' as this went up from four per cent in the 2013 survey to nine per cent. There was, however, a decrease in spending for 'acquisition of external R&D' as it went down from 14 per cent in the 2013 survey to four per cent.

Figure 2: Innovation expenditure in 2014 (proportion of total expenditure)



Unweighted base = 15,091

1.2 Non-technological or wider forms of innovation

Innovation is not just about the development or use of technology or other forms of product (goods and services) and process change. There are also non-technological forms of innovation, such as new business practices for organising procedures or changes to marketing concepts and strategies.

An 'organisational innovation' is a new organisational method within an enterprise's business practices (including knowledge management), workplace organisation or external relations which have not been previously used.

Enterprises were asked whether they had made any major changes to their business structure and practices in the three-year period from 2012 to 2014. The organisational innovation questions were revised to match the version found in the CIS harmonised questionnaire.

Table 2 shows that 42 per cent of businesses engaged in one or more types of non-technological innovation over the latest survey period. Over a quarter (27 per cent) mentioned the implementation of 'new business practices' for organising procedures, compared to 21 per cent of businesses in the 2013 survey. As in the 2013 survey, a higher share of large firms (30 per cent) reported this, compared to SMEs (27 per cent). The least frequently reported wider innovation was 'implementation of new methods of organising external relationships'. This was mentioned by only 7 per cent of businesses (8 per cent in the previous survey), with SMEs less likely to report this activity than large firms (7 per cent, compared to 11 per cent of large firms).

Table 2: Enterprises that introduced wider forms of innovation*

Per cent

Forms of innovation	Size of enterprise		
	10-250 employees	250+ employees	All (10+ employees)
Wider Innovator	42	45	42
New business practices	27	30	27
New method of organising work responsibilities	19	25	19
New method of organising external relationships	7	11	7
Changes to marketing concepts or strategies	16	16	16

** = Unweighted base = 15,091*

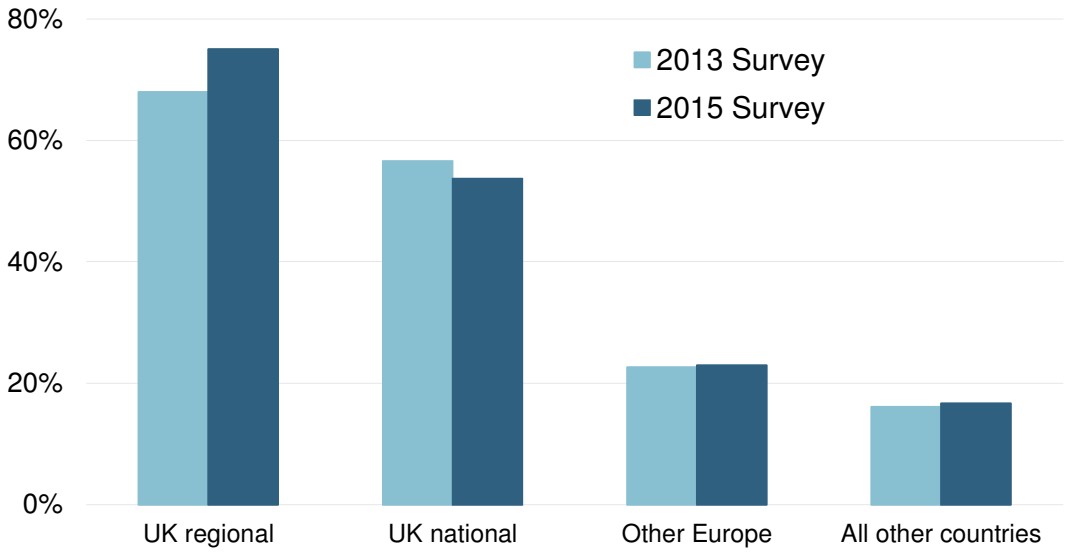
The proportions of businesses that reported the implementation of 'new methods of organising work responsibilities' showed a slight increase from 18 per cent to 19 per cent since the 2013 survey. The proportions reporting 'changes to marketing concepts or strategies*'* remained the same at 16 per cent over both survey periods. Furthermore, there was no difference in the take up of changes to marketing concepts or strategies between SMEs and large firms.

2. Markets and exports

2.1 Geographical markets

The businesses surveyed were asked to which geographical markets they had sold goods and/or services. As Figure 3 shows, the UK regional markets were still the most dominant market for UK enterprises; 75 per cent of firms reported selling goods and/or services in regional markets, compared to 68 per cent in the 2013 survey. Over half (54 per cent) reported operating at national level, showing a decrease from 57 per cent in the previous survey. The proportions of businesses operating in European countries and all other countries remained the same, with 23 per cent reporting to operate in European markets in both this survey and in the 2013 survey, whilst 17 per cent were operating in world-wide markets (compared to 16 per cent in the previous survey).

Figure 3: Geographical markets (valid responses only)



Unweighted base = 14,639

2.2 Exports

19 per cent of businesses provided an estimate of exports for the year 2014. This compares to 16 per cent in the 2013 survey providing estimates for the year 2012. The findings indicated that as compared to non-innovators, innovators are more likely to export. While 27 per cent of broader innovators reported engaging in exports, only 9 per cent of non-innovators did so.

3. Context for innovation

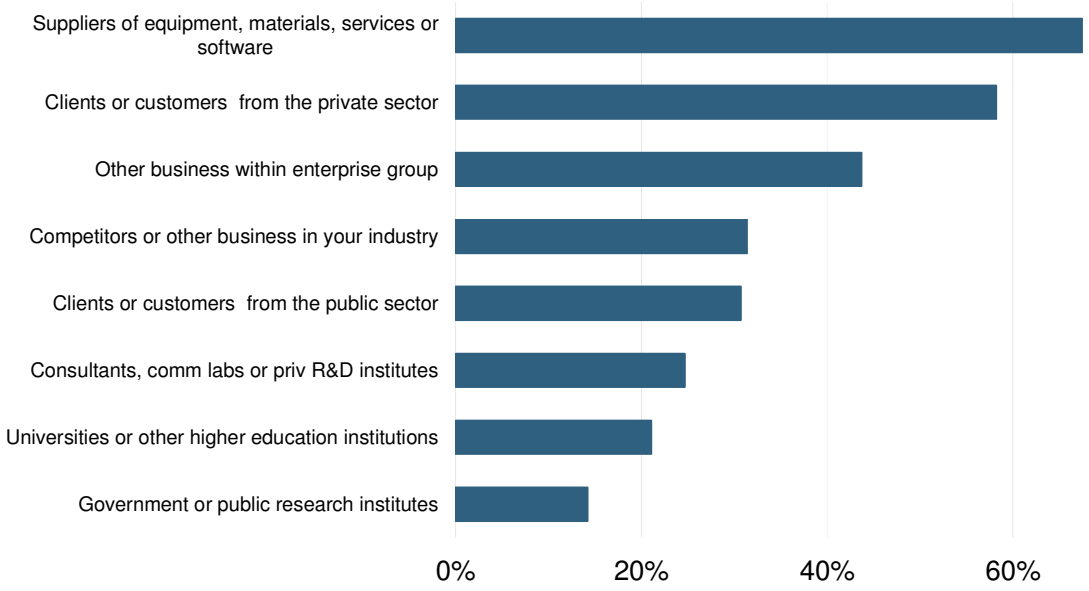
The survey asked about the context relevant to business innovation behaviour. The following sections include statistics which refer to the 'broader innovators' - businesses that had engaged in any of the four types of innovation behaviour[10].

3.1 Co-operation arrangements

The proportion of broader innovators who reported having co-operation arrangements on some innovation activities remained similar to the previous survey (40 per cent, compared to 41 per cent in the 2013 survey).

Figure 4 shows that the most frequently mentioned partners of businesses with co-operation agreements were 'suppliers of equipment, materials, services or software' (67 per cent, compared to 59 per cent in the 2013 survey). This was followed by 'clients' or 'customers from the private sector' (58 per cent, compared to 61 per cent previously).

Figure 4: Co-operation partners (broader innovators, collaborative firms only)



Unweighted base = 4,065

Over four in ten (44 per cent) cited other businesses within enterprise group as their partners of businesses with co-operation agreements. This was 46 per cent in the previous survey. There was also a sizable proportion (31 per cent) of businesses that cited clients or customers from the public sector (also 31 per cent in the 2013 survey). Just over three

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

in ten (31 per cent) said competitors or other business in their industry, an increase from 29 per cent in the previous survey. The proportions citing 'consultants, commercial labs or private R&D institutes' showed a decrease from 29 per cent in the 2013 survey to 25 per cent in this survey. Similarly, the proportions citing the 'universities or other higher education institutions' (21 per cent) and 'government or public research institutes' (14 per cent) were down from 23 per cent and 16 per cent, respectively in the previous survey.

3.2 Sources of information

Table 3 provides the details of the extent to which businesses use external resources in their innovation activities. Businesses were asked to rank information sources on a scale from "no relationship" to "high importance". The sources presented were:

- **internal**: from within the enterprise itself or other enterprises within the enterprise group;
- **market**: from suppliers, customers, clients, consultants, competitors, commercial laboratories or research and development enterprises;
- **institutional**: from the public sector such as government research organisations and universities or private research institutes; and
- **other sources**: from conferences, trade fairs and exhibitions; scientific journals, trade/technical publications; professional and industry associations; technical industry or service standards

Table 3: Sources of information (% of all firms with some innovation activity rating "high")*

Per cent

	Size of enterprise		
Information sources	10-250 employees	250+ employees	All (10+ employees)
Internal			
Within the enterprise itself or within the enterprise group	46	60	47
Market			
Suppliers of equipment	23	25	23
Clients or customers from private sector	20	26	20
Clients or customers from public sector	9	12	9
Competitors or other enterprises in your industry	13	16	13
Consultants, commercial labs or private R&D institutes	4	7	4
Institutional			
Universities or other higher education institutes	2	3	2
Government or public research institutes	2	3	2
Other sources			
Technical, industry or service standards	6	10	6
Conferences, trade fairs, exhibitions	6	5	6
Scientific journals and trade/technical publications	1	2	1
Professional and industry associations	6	7	6

** = Unweighted base = 8,735*

The ranking of information sources has been fairly consistent throughout the history of the survey. Overall, internal sources (within the enterprise itself or within their enterprise group) were rated as the most important source of information for innovation. Almost half (47 per cent) cited this, which was a decrease from 51 per cent from the previous survey.

Historically, market sources, such as suppliers, customers, clients, consultants, competitors, commercial laboratories or research and development institutes, are also given as important information sources and that was still the case in this survey. Almost a quarter of businesses (23 per cent) cited 'suppliers' in this survey, an increase from 20 per cent in the 2013 survey, whilst 20 per cent mentioned 'clients or customers from private sector' (a decrease from 24 per cent in the previous survey). There was also an increase in the proportions citing the category of 'competitors' from 11 per cent previously to 13 per cent. However, the proportions citing 'consultants, commercial labs or private R&D institutes' were down from 8 per cent in the 2013 survey to only 4 per cent in this survey

The least frequently cited sources were 'institutional' sources. 2 per cent mentioned 'universities or other higher education institutes' (this was also 2 per cent in the previous survey). 'Government or public research institutes' was cited by 2 per cent (also 2 per cent in the previous survey). In terms of 'other' sources cited, the category of 'technical, industry or service standards' was mentioned by only 6 per cent, a decline from 9 per cent in the 2013 survey. Whilst the proportions citing and 'conferences, trade fairs, exhibitions' and 'professional and industry associations' remained the same with 6 per cent, the proportions citing the 'scientific journals and trade/technical publications' were down from 3 per cent in the 2013 survey to 1 per cent only.

3.3 Public financial support for innovation activities

A new question was added to ask all enterprises about the sources of public financial support (if any) for their innovation activities during the three years from 2012 to 2014. They were advised to include financial support via tax credits or deductions, grants, subsidised loans and loan guarantees.

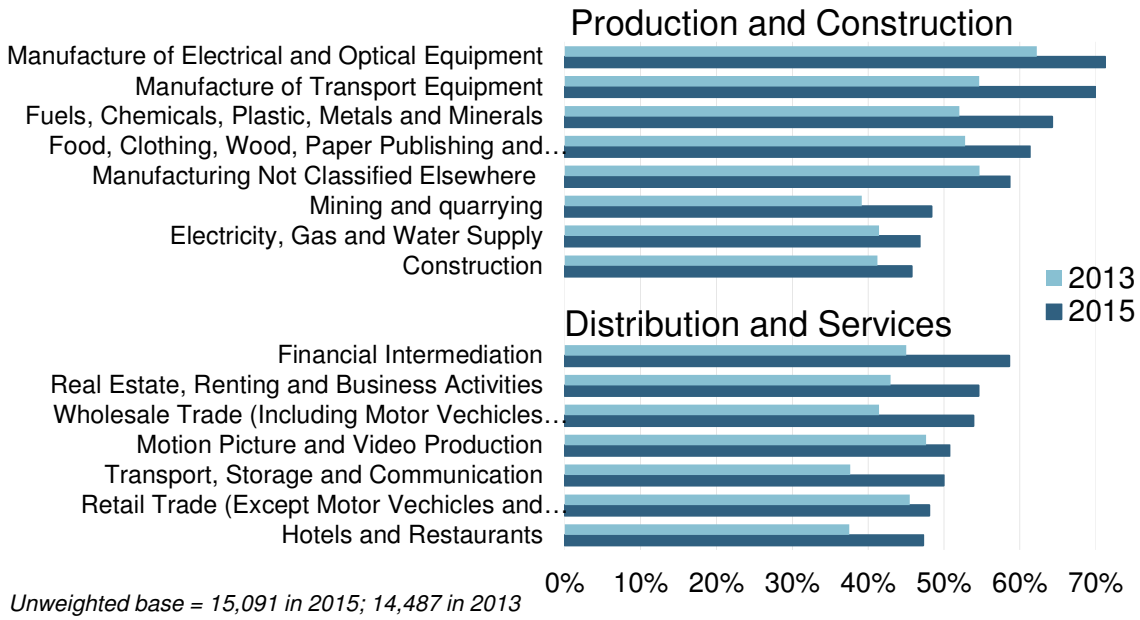
Not many UK enterprises claimed receiving any public financial support during the survey period. Only 7 per cent of businesses answered this question. 4 per cent said they had received 'UK central government' funding while 3 per cent reported receiving funding from 'UK local or regional authorities'. Only 1 per cent claimed receiving funding from 'European Union (EU) institutions or programmes'. These categories were not mutually exclusive, in that businesses could report to receive more than one of these categories.

Those who reported receiving 'UK central government' funding were then asked what kind of financial support their business had received, whether it was direct (e.g., Smart or Collaborative R&D grants, work with Catapult centres, Innovation vouchers) or indirect financial support (R&D tax credits or Patent Box). For the firms which reported receiving 'UK central government' funding, 70 per cent said they had benefited from indirect support whilst 34 per cent reported receiving direct support. As this was a "tick all that apply" question, 17 per cent of those receiving central government funding went on to say they had received *both* direct and indirect support.

4. Innovation in sectors

The proportions of businesses that are 'innovation active' across all the surveyed industrial and commercial sectors are presented in Figure 5.

Figure 5: Innovation active businesses by industry over two survey periods (% of all enterprises)



Unweighted base = 15,091 in 2015; 14,487 in 2013

The production sector, particularly manufacturing industry was the most innovation active: 71 per cent of businesses in the 'manufacture of electrical and optical equipment' group were innovation active (an increase from 62 per cent in the 2013 survey). This was followed by 'manufacture of transport equipment' (70 per cent, an increase from 55 per cent). All industries in the Production and Construction industry showed significant increases since the previous survey.

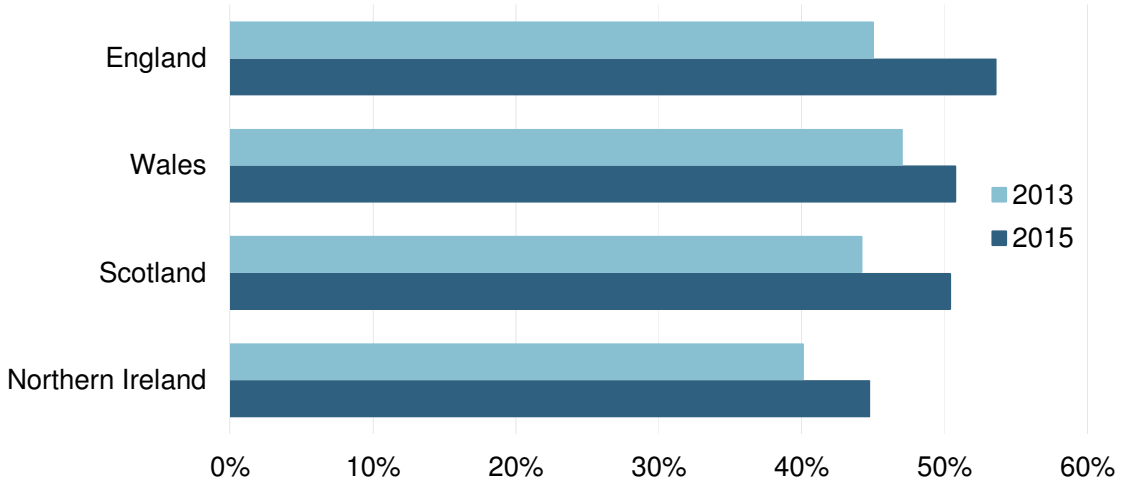
The groups within the Distribution and Services sectors also showed significant increases. The top three groups with the highest proportions of businesses who were innovation active were: financial intermediation (59 per cent, an increase from 45 per cent), real estate, renting and business activities (55 per cent, an increase from 48 per cent), and wholesale trade (54 per cent, an increase from 46 per cent). Other significant increases were in the motion picture and video production (from 43 per cent in the 2013 survey to 51 per cent in this survey) and the transport, storage and communication groups (from 41 per cent in the previous survey to 50 per cent in this survey).

5. Geography of innovation

5.1 Country level differences

Figure 6 presents the proportions of innovation active businesses across the countries of the United Kingdom and shows a comparison with the 2013 data based on the innovation active definition. There were nine percentage points between the least and most 'innovation active' country (seven percentage point in the previous survey), with England having the highest proportion (54 per cent) and Northern Ireland lowest (45 per cent). The previous survey showed Wales having the highest proportion of innovation active businesses with 47 per cent (51 per cent in this survey). Scotland showed the second highest increase from 44 per cent in the previous survey to 50 per cent in this survey). However, it is worth nothing that the proportions for all four countries were notably higher in this survey.

Figure 6: Shares of innovation active businesses by country (all enterprises)



Unweighted base = 15,091 in 2015 and 14,487 in 2013

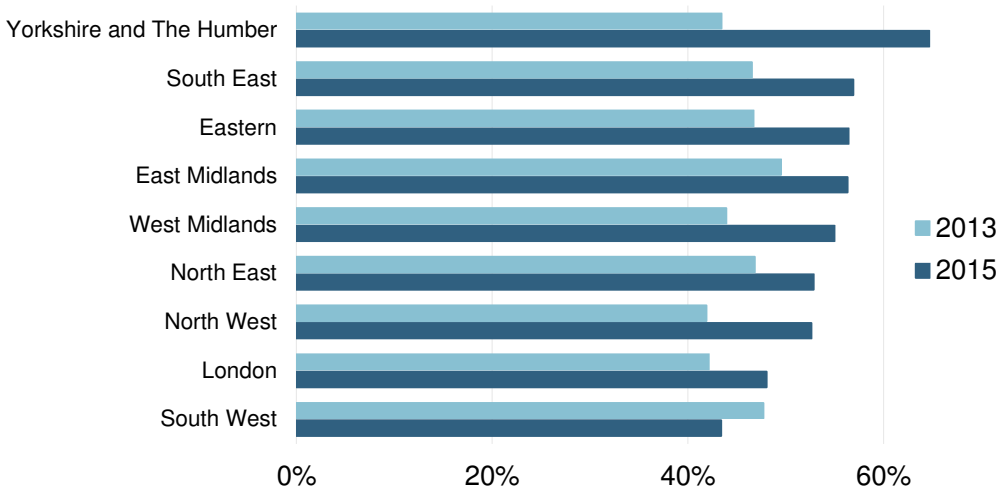
5.2 Regional level differences

Figure 7 shows the proportions of innovation active businesses across the regions of the UK, again compared with the 2013 data.

There were twenty-two percentage points between the least and most 'innovation active' regions (eight percentage point in the previous survey). The Yorkshire and The Humber region was leading the way with 65 per cent, an increase from 43 per cent in the 2013 survey. This was followed by South East with 57 per cent (an increase from 47 per cent). Eastern (56 per cent, from 47 per cent), East Midlands (56 per cent, from 50 per cent), West Midlands (55 per cent, from 44 per cent), and London (48 per cent, from 42 per cent) all showed significant increases since the previous survey. The increase over the two

survey periods was more notable for the North West region (from 42 per cent to 53 per cent) than it was for the North East region (from 47 per cent to 53 per cent). The only region which showed a decline was South West, from 48 per cent to 43 per cent in this survey.

Figure 7: Shares of innovation active businesses by region (all enterprises)



Unweighted base = 11,913 in 2015 and 12,104 in 2013

6. Factors driving innovation

Businesses defined as 'broader innovators[11]' were asked to rank a variety of drivers for innovating on a scale from no impact to low, medium or high impact. Table 4 shows the proportion of businesses that had rated 'high' in each of the innovation factors presented to them. Quality enhancement was again the most motivating factor, rated high by a third (33 per cent, compared to 36 per cent in the 2013 survey) of broader innovators. This was followed by the response of 'replacing outdated products or processes' which was cited by 32 per cent of broader innovators (31 per cent in the previous survey).

Table 4: Innovation factors (% of all broader innovators rating "high")*

Per cent

	Size of enterprise		
Innovation factors	10-250 employees	250+ employees	All (10+ employees)
Improving quality of goods or services	33	44	33
Replacing outdated products or processes	31	34	32
Increase range of goods or services	29	35	29
Increasing market share	25	37	26
Increasing value added	24	32	24
Entering new markets	19	22	19
Improving capacity for producing goods or services	18	23	18
Reducing costs per unit produced or provided	18	26	18
Improving flexibility for producing goods or services	17	22	17
Meeting regulatory requirements (including standards)	16	22	16
Improving health and safety	12	17	12
Reducing environmental impact	9	14	9

** = Unweighted base = 8,735*

While nearly a third (29 per cent) mentioned 'increasing range of good or services' (which was 28 per cent previously), just over a quarter (26 per cent) cited 'increasing market share' as their highly rated factor for innovating. This was 29 per cent in the previous survey. Almost a quarter (24 per cent) said 'increasing value added' which showed an increase from 21 per cent in the 2013 survey.

As in the previous survey, there was a notable difference between the factors motivating large firms and SMEs. For example, 'reducing costs per unit produced or provided' was higher in the agenda for large enterprises (26 per cent of large firms cited this, as compared to 18 per cent of SMEs). Similarly, responses such as 'entering new markets', 'improving capacity', 'improving flexibility' and 'meeting regulatory requirements' were mentioned more frequently by large enterprises. In both 2013 and 2015, 'reducing environmental impact' (cited by 9 per cent) and 'improving health and safety' (given by 12 per cent) were the least highly rated innovation factor overall, although the health and safety aspect was cited by 17 per cent of large enterprises as compared to 12 per cent of SMEs.

[11] The difference between businesses defined as 'Broader Innovators' and 'Innovation Active' businesses is the inclusion of the responses provided for the expenditure and activities linked to innovation. In other words, 'Broader Innovators' are the innovation active businesses that also provide information regarding their R&D related investments.

7. Factors constraining innovation

Businesses were asked to rank constraining factors on a scale from having no importance to low, medium or high importance on their innovation activities (given in Table 5).

Table 5: Broader innovators' perception of potential barriers to innovation

Per cent

	Size of enterprise		
Self-reported potential barriers	10-250 employees	250+ employees	All (10+ employees)
Cost factors			
Availability of finance	17	8	17
Direct innovation cost too high	15	11	15
Excessive perceived economic risks	14	9	14
Cost of finance	15	8	14
Knowledge factors			
Lack of qualified personnel	8	6	8
Lack of information on markets	3	2	3
Lack of information on technology	3	3	3
Market factors			
Market dominated by established businesses	10	6	10
Uncertain demand for innovative goods or services	8	7	8
Other factors			
UK Government regulations	7	6	7
EU regulations	6	6	6

** = Unweighted base = 8,735*

Table 5 presents the proportion of businesses that had provided a 'high' rating to each of the constraint categories. These are self-reported responses. The cost factors category was the most highly rated, with 17 per cent of businesses indicated 'availability of finance'. A further 15 per cent cited 'direct innovation cost too high', followed by 'excessive perceived economic risks (14 per cent) and 'cost of finance' (14 per cent). One in ten businesses mentioned 'market dominated by established businesses' as their important constraining factor.

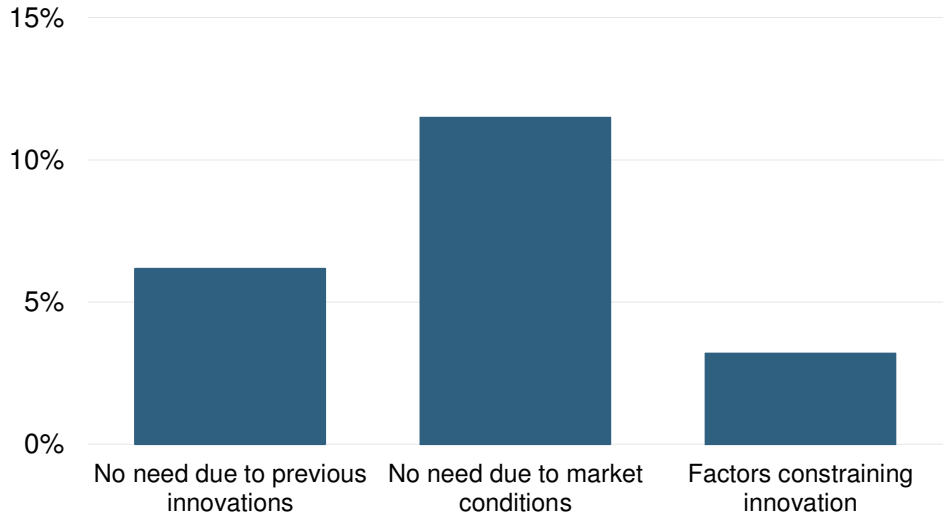
The constraints question was not included in the 2013 survey and therefore, it is not possible to compare these figures with the previous survey's findings. However, this question was included in the 2011 survey. The top five self-reported constraining factors were still the same factors provided from the cost factors category and the market factor. The proportions of businesses were also much higher in the 2011 survey: 25 per cent of businesses indicated 'availability of finance', 21 per cent cited 'direct innovation cost too high', followed by 'excessive perceived economic risks (21 per cent) and 'cost of finance' (24 per cent). One in ten businesses in the 2011 survey also mentioned 'market dominated by established businesses' as their important constraining factor.

8. Non-innovators

Businesses that reported having no innovation activity during the survey period were asked to indicate why it had not been necessary or possible to innovate. They were offered the response categories presented in Figure 8, alongside a response category saying 'none of those apply'.

The majority of businesses said 'none applied' in their case. Over a tenth (11 per cent) said 'no need due to market conditions' which was the most frequently cited reason. Six per cent mentioned 'no need due to previous innovations' and a few (three per cent) cited 'factors constraining innovation'. The proportions provided in Figure 8 were more or less the same as those given in the 2013 survey.

Figure 8: Reasons why enterprises did not innovate during 2012 – 2014 (non-innovative firms only)



Unweighted base = 6,356

Non-innovators were included to answer the constraining factors question in the questionnaire. The nature of the constraining factors cited by this group was similar to those given by broader innovators but with much lower numbers citing these factors. While cost-related factors were among the top of the list of the self-reported constraining factors, the market factor was also mentioned by non-innovators (around 3 per cent and 2 per cent, respectively).

9. Protection of innovations

Successful innovations often generate intellectual property that businesses will try to protect. This can be done in numerous ways depending upon the knowledge generated and the business and market context.

In the 2013 survey, businesses were asked how effective they had found a variety of methods varying from patents to secrecy (including non-disclosure agreements) for maintaining or increasing the competitiveness of product or process innovations introduced during the survey period. However, the proportions reported were low, in line with the finding in earlier surveys that these methods had been made little use of in practice. This would indicate that these low proportions were to be expected.

In the 2015 survey, this question was replaced with another question asking businesses to rate what proportions of their innovation were protected during the survey period by a variety of protection methods given in Table 6. Businesses were asked to choose ratings which started from 'less than 10% of innovations protected' and went up incrementally to '10 to 40%', '41 to 60%', '61 to 90%' and 'over 90% of innovations protected'. The responses were far too low to analyse in their incremental forms. They were therefore collapsed into the category of 'all protection rating' which provided data for any selected protection rating. The second category of 'over 90% rating' provided data on businesses which claimed over 90% protection rating.

As can be seen in Table 6, the numbers of businesses providing data on protection of businesses were rather low. 10 per cent of all businesses rated complexity as a form of protection for some proportion of their innovation This was followed by 'secrecy (including non-disclosure agreements)', given by 7 per cent. Copyright' and 'patents' were mentioned by 4 per cent while 'design registration' was cited by 3 per cent only. At least twice as many large firms cited all the methods as protection for some proportion of their innovation. However, even with the large firms, the numbers citing over 90% protection for their innovations were very small, at around 2 per cent for the methods of 'complexity of goods and services', 'secrecy agreement', 'copyrights' and 'trademarks'.

Table 6: Enterprises rating for innovation protection*

Per cent

	Over 90% rating			All protection rating		
Methods for competitiveness	10-250 employees	250+ employees	All	10-250 employees	250+ employees	All
Patents	1	2	1	3	10	4
Design registration	1	1	1	3	7	3
Copyright	2	2	2	4	8	4
Trademarks	2	3	2	6	11	6
Lead time advantages	1	1	1	7	10	7
Complexity of goods or services	2	2	2	10	15	10
Secrecy (including non-disclosure agreements)	2	3	2	7	13	7

**= Unweighted base = 15,091*

Although question wording was changed, the findings reported in this survey were broadly in line with the previous survey's results which reported that the two most effective methods to maintain competitiveness were keeping goods or services as complex as possible (6 per cent) and having a lead time advantage (5 per cent). The previous survey also reported a size effect of businesses as higher proportions of large firms reported giving more weights to the cited protection methods.

10. Skills for innovation

Businesses were asked to provide the proportion of their employees for the year 2014 who hold a first degree or postgraduate degree in Science or Engineering or 'Other' subjects. Table 6 presents the results from this question and gives the average proportion of employees who hold a first degree or a higher degree.

Table 6: Average proportion (%) of 2014 employees who hold a degree or higher*

Per cent

	Size of enterprise		
	10-250 employees	250+ employees	All (10+ employees)
All			
Science or engineering subjects	8	10	8
Other subjects	13	14	13
Broader innovators			
Science or engineering subjects	10	11	10
Other subjects	15	14	15
Non- innovators			
Science or engineering subjects	4	5	4
Other subjects	9	12	9

** = Unweighted base = 15,091*

Comparisons with the 2013 results showed that the average proportions showed a slight decrease for 'science or engineering' subjects (8 per cent, compared to 10 per cent in the previous survey) while the average proportions for 'other' subjects remained the same (13 per cent in both surveys). The findings indicated that as compared to non-innovators, broader innovators were more likely to employ highly qualified staff (those with a first degree or postgraduate). This was the case with employing staff with STEM degrees (10 per cent of innovators employing STEM graduates/postgraduates, compared to 4 per cent of non-innovators doing so), as well as employing staff with degrees in 'other' subjects (15 per cent of innovators employing graduates or postgraduates, compared to 9 per cent of non-innovators).

Table 7 presents the proportion of individuals with listed skills used in employment. These skills can relate either to employees or skills brought in from external sources. As can be seen, large firms were more likely to use each of the listed skills than SMEs. As in the 2013 survey, 'multimedia/web design' (cited by 19 per cent), 'graphic artists/ layout/ advertising' (18 per cent) and 'software development/database management' (15 per cent) were in the top three listed skills reported by businesses. However, the proportions were significantly lower in this survey than they were in the 2013 survey which reported 28 per cent, 27 per cent and 24 per cent, respectively for these three categories. This question was first introduced to the survey series in 2011. Although these proportions show significant decreases from those reported in the 2013 survey, they were still slightly higher than the proportions provided in the 2011 survey.

Table 7: Proportion of individuals employed in-house or bought in from external sources with listed skills by firm size*

Per cent

	Size of enterprise		
Listed skills for employees in-house or brought in	10-250	250+ employees	All (10+ employees)
Graphic artists/ layout/ advertising	18	29	18
Design of objects or services	11	20	11
Multimedia/ web design	19	30	19
Software development/ database management	15	35	15
Engineering/ applied sciences	9	22	10
Mathematics/ statistics	7	18	7

** = Unweighted base = 15,091*

There were significant differences between the proportions given by broader innovators as compared to non-innovators in the survey for employing the same listed skills. Broader innovators cited the top three listed skills at least four times more than the non-innovators in the survey. While 14 per cent of broader innovators mentioned 'engineering/applied sciences', only 4 per cent of non-innovators did so. Similarly, one in ten broader innovators cited 'mathematics/statistics' while this was just 4 per cent for non-innovators.

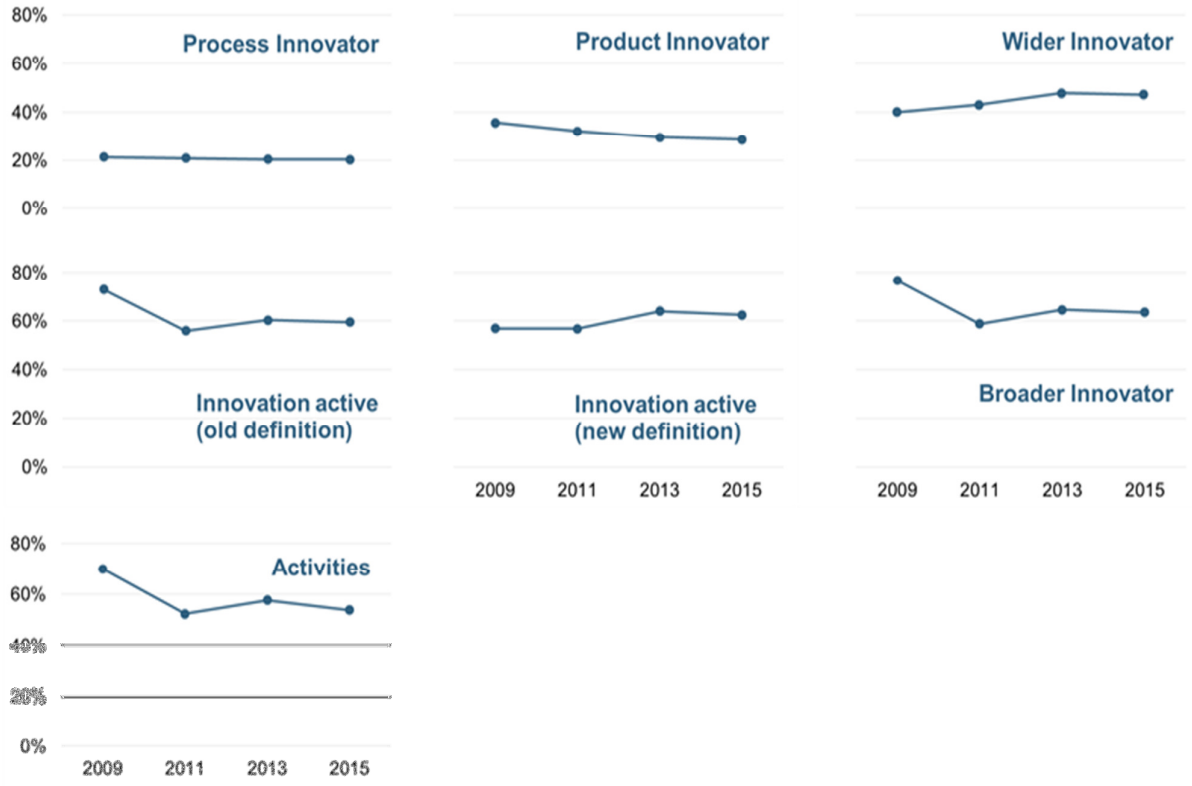
11. Comparisons with the 2013, 2011 and 2009 UKIS Panel data

The availability of panel data (businesses responding to the 2015, 2013, 2011 and 2009 surveys) enables some comparisons of businesses' innovation activities over time. Of the 929 businesses in the four survey panel, over two-thirds (69 per cent) were large enterprises. Of the remaining 31 per cent, most of them were businesses with 50 to 249 employees (26 per cent), with only 5 per cent coming from firms with 10 to 49 employees.

It is well known that businesses that lasted at least four waves are most likely to be larger firms. Also, the size of the panel sample is significantly lower than the sample in the general survey. Bearing these in mind, the panel data results tend to differ from the general survey results.

Figure 9 presents the fluctuations in the proportions of each of the key innovation indicators of the UKIS Panel data with 929 businesses which took part in the survey over the 2009, 2011, 2013 and 2015 survey periods. The reason for the two sets figures for the 'innovation active' indicator is that the figure with the 'new definition' (from the 2011 UKIS onwards) excludes expenditure and activities linked to innovation, whilst the 'old definition' included these relevant activities.

Figure 9: Key innovation indicators of the UKIS Panel data 2009, 2011, 2013 and 2015



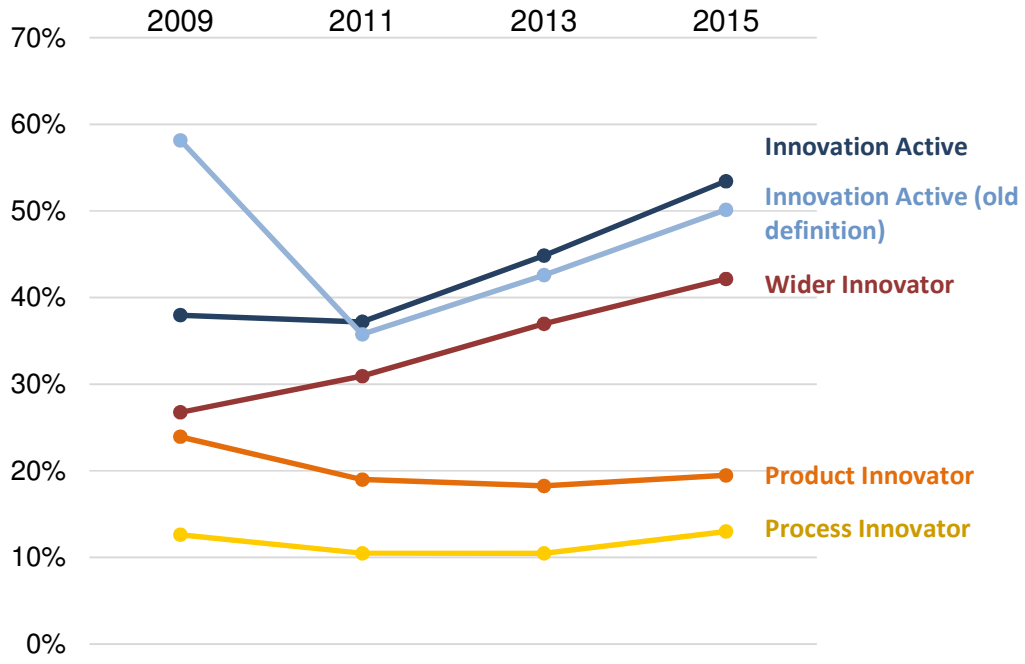
The firms in the panel data tend to show notably higher levels of innovation than the businesses in the general survey. The panel data businesses tend to be more innovative across all innovation indicators because they are often ‘committed innovators’ and tend to be more established firms. This does not necessarily mean that the trends in the proportions reporting innovation will be in the same direction as the cross-section survey data.

12. Comparisons with the 2013, 2011 and 2009 UKIS Cross-section data

As in the 2013 survey, the 2015 survey used a sampling format based on SIC 2007, which is an EU legislative requirement regarding the collection of innovation statistics. Similarly, the sample selection was conducted by ONS and it followed the same sampling methodology as the 2013 survey. Furthermore, the definition used for 'innovation active' was the same across the last three surveys. As a result, one would expect to see that the data in this survey are much more comparable to the data in the 2013 and 2011 surveys.

Figure 10 presents a general comparison of the results for some of the innovation indicators for the four surveys, this time using the cross-section data. The chart shows upward trends for the last three waves of the cross-section data, with significant increases on the proportions of innovation active and wider innovators and rather slight increases on the proportions of product and process innovators.

Figure 10: UKIS – innovation indicators from the cross section data 2009, 2011, 2013 and 2015



Unweighted base = 14,281, 14,342 , 14,487 and 15091 respectively

13. Conclusions and next steps

This report presents the results of the latest Innovation Survey (UKIS 2015). It provides information on various dimensions of the changes in business innovation behaviour in the UK relative to the 2013 survey. The report also provides comparisons with earlier surveys making use of both panel and cross-section data.

The UK Innovation Survey represents a major source of data for the research community. The data feeds into the economic analyses and other policy related work. It provides both a periodic snapshot of innovation behaviour and has the additional benefit of the panel dataset alongside, which facilitates longitudinal studies and evaluations of innovation policy. The data is also comparable with other countries, which provides useful international benchmarking for the UK performance in this area.

The Department for Business, Innovation and Skills will publish additional data tables in the Statistical Annex output alongside a further set of interactive data from the 2015 UK Innovation survey in early autumn.

As with previous surveys, it is expected that there would be a substantial body of further research using the survey results and publications in various forms over the next few years. Data will be available shortly for researchers in the Virtual Micro-Data Laboratory (VML) and from the Secure Data Service (SDS)[12] .

[12] Details on how to access the VML and SDS can be found here: www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/virtual-microdata-laboratory--vml-/index.html and www.data-archive.ac.uk/home.

Annex: Methodology

The UK Innovation Survey is funded by the Department of Business, Innovation and Skills (BIS). The survey was conducted on behalf of the BIS by the Office for National Statistics (ONS).

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The UK Innovation Survey is part of a wider Community Innovation Survey (CIS) covering EU countries. The survey is based on a core questionnaire developed by the European Commission (Eurostat) and Member States. This is the ninth iteration of the survey (CIS9). CIS8, covering the period 2010 to 2012, was carried out in 2013 and the results form part of various EU benchmarking exercises for international comparisons.

The UK Innovation Survey 2015 sampled almost 30 thousand UK enterprises. The survey was voluntary and conducted by means of both a postal questionnaire and telephone interview for businesses that had not yet completed a postal response.

Coverage and sampling

The survey covered enterprises with 10 or more employees in sections C-K of the Standard Industrial Classification (SIC) 2007. This was the third time survey data was collected using a sample based on the Standard Industrial Classification 2007 (SIC 2007).

The sample was drawn from the ONS Inter-Departmental Business Register (IDBR) in January 2015.

Response and weighting

The questionnaires for the survey were dispatched between 23 and 25 February 2015 and the survey was in the field until November 2015.

Valid responses were received from 15,091 enterprises which gives a response rate of 51 per cent.

The results in this report are based on weighted data in order to be representative of the population of firms. The responses were weighted back to the total business population of those in the IDBR. On average each respondent represents 12 enterprises in the population.

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