

FEATURE

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First findings from the UK Innovation Survey 2007

SUMMARY

This article presents the initial analysis of the 2007 UK Innovation Survey. It begins with patterns of innovation activity, looks at which markets innovative UK businesses are operating in, and then discusses collaborations and sources of information, the barriers to innovation and the methods used by firms to protect the value of innovations. A broader range of innovations in business practices and organisational structures, such as the introduction of new management techniques, is then considered. The article includes a few highlights from analysis of the panel (overlap) between the 2007 survey and its predecessor from 2005 and concludes with a comparison of the last three surveys from 2007, 2005 and 2001.

This article presents the first findings from the UK Innovation Survey 2007, covering the three-year period from 2004 to 2006. This is the UK contribution to a Europe-wide Community Innovation Survey (CIS). The 2007 survey is the first one run on a new, biennial cycle. Previously, the survey was commissioned every four years.

The 2007 survey was sent to 28,000 UK enterprises with ten or more employees across manufacturing and services sectors, and achieved a 53 per cent response rate. The latest data also provide a significant panel (respondents common to both 2007 and 2005 surveys) of over 7,000 businesses, making it an even more valuable resource for both government and academic users. The Department for Innovation, Universities and Skills (DIUS) would like to thank all those businesses that completed the survey form.

The importance of innovation in business and in national economic performance is reflected in one of the Department's strategic objectives to 'accelerate the commercial exploitation of creativity and knowledge, through innovation and research, to create wealth, grow the economy, build successful businesses and improve quality of life'. Measuring the level of, and trends in, innovation activity in the UK and thus identifying where there may be shortfalls or gaps in the functioning of the innovation system, helps to show where policy measures might be required that could have some impact, and contributes to

this mission. The UK Innovation Survey complements other indicators of innovation by providing a periodic snapshot of the spectrum of innovation inputs and outputs and the constraints faced by UK businesses in their innovation efforts, across the entire range of UK industries and business enterprises. It has the additional benefit of providing the basis for some comparisons with other countries.

The majority of the survey is concerned with innovation through new and improved products and processes and with the investments that develop and implement them. It also asks businesses about the drivers to innovate, as well as their perception of barriers to innovation. The markets businesses operate in, exports, changes in businesses structures and management practices, and the roles of knowledge are also covered.

Innovation activity

Innovation takes place through a wide variety of business practices, and a range of indicators can be used to measure its level 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 2004 to 2006¹ and makes some general comparisons with the results obtained from the previous survey in 2005.²

Table 1
Innovation-active enterprises: by type of activity, 2004 to 2006

	Percentage of all respondents		
	Size of enterprise (employees)		
	10–250	250+	All
Innovation-active	63	74	64
Product innovator	22	30	22
of which (share with new-to-market products)	34	46	34
Process innovator	11	22	12
of which (share with new-to-industry processes)	26	25	26
Abandoned activities	5	12	6
On-going activities	8	15	8
Innovation-related expenditure	54	65	55
Both product and process innovator	8	16	9
Either product and process innovator	25	36	26

Figure 1
Breakdown of activities (all enterprises)

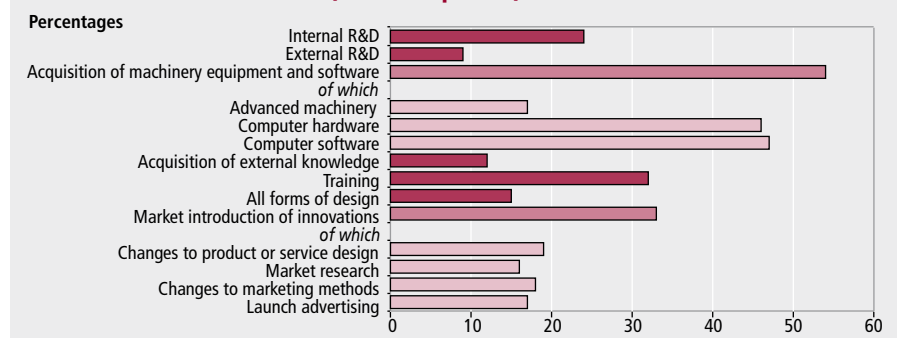
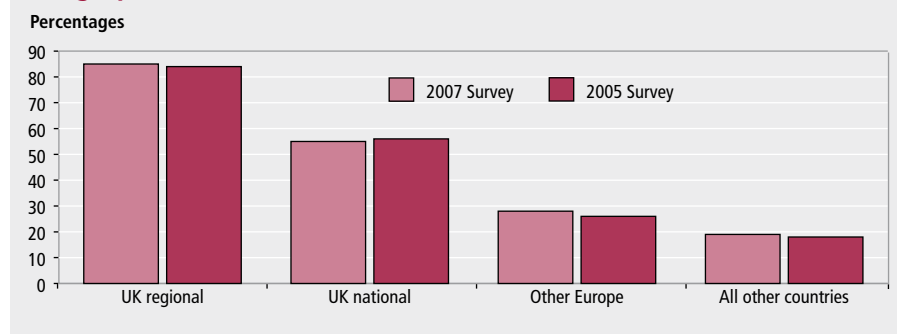


Figure 2
Geographical markets



Innovation activity³ is defined here as where enterprises were engaged in any of the following:

- introduction of a new or significantly improved product (goods or service) or process
- engagement in innovation projects not yet complete or abandoned
- expenditure in areas such as internal research and development, training, acquisition of external knowledge, or machinery and equipment linked to innovation activities

From **Table 1**, overall, 64 per cent of enterprises were classed as being innovation-active during this period. Large enterprises (with 250 or more employees)

were more likely to engage in some sort of innovation activity, with three-quarters of firms innovation-active, compared with nearly two-thirds of smaller enterprises.

In total, 22 per cent of enterprises had introduced new or significantly improved goods or services in the sample period, of which 34 per cent were new to market, and 12 per cent had introduced a new or improved process for production or delivery, with over a quarter of these processes being new to the industry in question. The share with product (goods and services) and process innovation is considerably greater in larger enterprises.

A new feature of the 2007 survey is the ability to distinguish between ongoing and abandoned innovation activities, previously combined into one question. Around a

tenth of firms have projects ongoing and 6 per cent of enterprises report abandoned projects.

The proportion of enterprises having participated in some innovation-related activity (55 per cent) shows that firms recognise the need to assign resources to innovation. The 2007 survey disaggregated the combined activities question into ‘acquisition of machinery, equipment and software’ and ‘marketing’, as shown in **Figure 1**. The most commonly reported activities were in acquisition of computer software and hardware, followed by a considerable investment in training. While the single most frequent marketing-related activity is changes to product or service design, most respondents reported more than one of these activities.

Summing up, these early results seem to suggest that a larger share of enterprises is participating in just one mode of innovation behaviour, such as expenditure in an innovation-related activity. In contrast, results from the previous survey found more businesses were participating in several modes of innovation, such as combining product innovation and expenditure.

Markets and exports

The businesses surveyed were asked which markets they operated in. **Figure 2** shows that over half of UK enterprises operate at a national level, nearly a third at European level and just under a fifth worldwide. Overall, higher proportions of businesses surveyed in 2007 operated in markets outside the UK (particularly Europe) than those surveyed in 2005.

Just under a quarter (23 per cent) of businesses reported any exports for the year 2006. The estimated average value of exports for these businesses was in excess of £7 million.

Co-operation agreements and sources of information

Ten per cent of all enterprises had co-operation arrangements on innovation activities and, of these, 70 per cent had agreements that operated at a national level. The most frequent partners for co-operation were clients or customers (68 per cent of enterprises with co-operation agreements) and suppliers (also at 68 per cent). Around 30 per cent of collaborators included universities amongst their partners. Innovation-active enterprises were more likely to collaborate (15 per cent). **Figure 3** shows the proportions collaborating.

Figure 3
Co-operation partners (innovation-active, collaborative firms only)

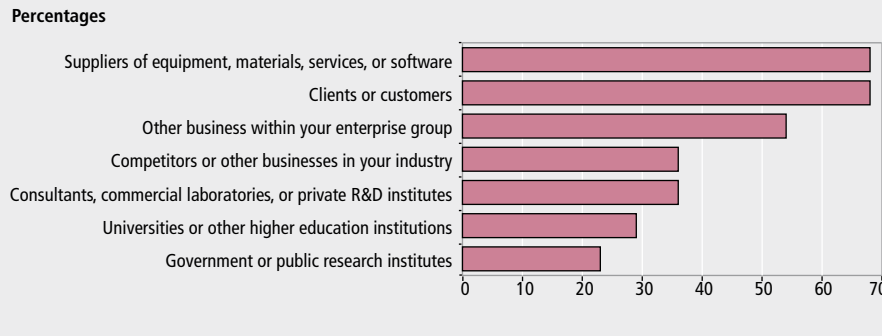


Table 2
Sources of information: firms rating 'high'

	Percentage of all respondents		
	Size of enterprise (employees)		All
	10-250	250+	
Internal			
Within your enterprise group	18	33	19
Market			
Clients or customers	27	37	27
Suppliers of equipment	14	18	14
Competitors or other enterprises within your industry	10	17	10
Consultants, commercial labs or private R&D institutes	2	4	2
Institutional			
Universities or other higher education institutes	1	3	1
Government or public research institutes	1	2	1
Other sources			
Technical, industry or service standards	6	12	6
Conferences, trade fairs, exhibitions	4	6	5
Scientific journals and trade/technical publications	3	4	3
Professional and industry associations	0	1	0

Figure 4
Innovative businesses: by industry

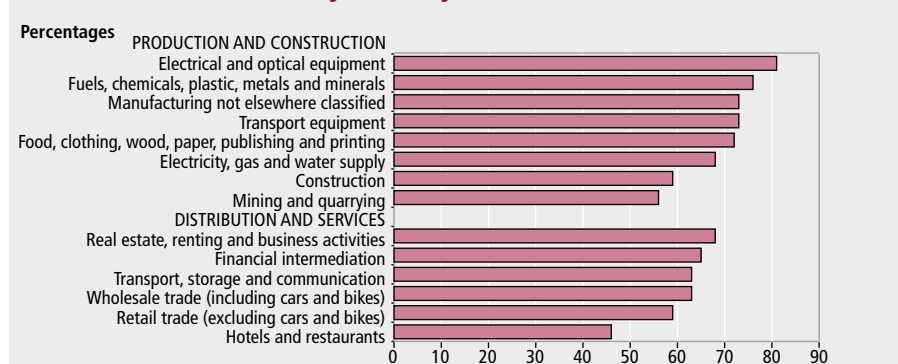
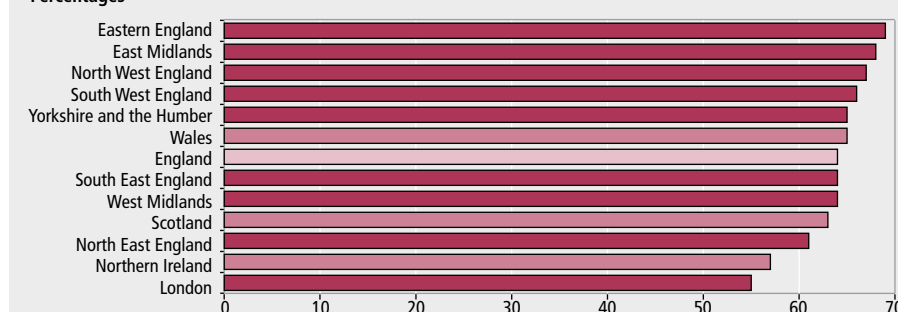


Figure 5
Shares of innovation-active businesses: by region



Sources of information

It is important to know how far enterprises engage with external sources of technology and other innovation-related knowledge and information, as innovation is increasingly complex, requiring the co-ordination of multiple inputs. Firms can gain guidance, advice or even inspiration for their prospective innovation projects from a variety of both public and private sources.

Respondents were asked to rank a number of potential information sources on a scale from 'no relationship' to 'high importance'. The proportion who answered 'high' in each category is shown in Table 2. These sources are:

- 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 – from conferences, trade fairs and exhibitions; scientific journals, trade/technical publications; professional and industry associations; technical industry or service standards

Both larger and smaller enterprises reported market and internal sources as most important for information on innovation. This suggests that enterprises tend to rely on their own experience and knowledge coupled with information from suppliers, customers and clients. The least frequently cited sources were institutional sources. Technical, industry or service standards were also a highly important source for 12 per cent of large firms.

Industrial and regional variation

The percentage of firms reported to be innovation-active varied considerably across industrial and commercial sectors (Figure 4). In the production and construction sector, 81 per cent of electrical and precision engineering enterprises were innovation-active, against 56 per cent of enterprises in mining and quarrying. In distribution and services, real estate, renting and business activities (which include the R&D services sector) had the highest share of innovation-active businesses (68 per cent), against only 46 per cent for hotels and restaurants.

Figure 5 shows the shares of innovation-active businesses across the countries and regions of the UK. The 2007 data exhibit greater regional variation in the proportions than did the 2005 survey, ranging from almost 70 per cent in Eastern England, the region in 2005 that recorded the lowest levels of innovation activity, to 55 per cent in London. Regional data reflect greater industrial variation and industries follow their own business cycles which could explain these differences. At country level, England, Wales and Scotland all performed similarly, with Northern Ireland slightly lower (around 6 percentage points less).

Factors driving innovation

On this occasion, the survey sought information about motivation factors for innovation (whereas previous surveys have asked about the effects of innovation). Respondents were asked to rank a number of drivers for innovating on a scale from no impact, through low, medium or high. Looking at the proportion of innovation-

active respondents who answered high in each category points towards product-related factors over process (cost) factors, with quality enhancements most commonly reported, mirroring the results found from UK IS 2005 and verifying a strong customer-focused approach to innovation. Again, the objectives of increasing value-added in the business and meeting regulatory requirements were also widely reported.

Barriers to innovation

Successful and evidence-based policy interventions require an understanding of the barriers to business innovation. These barriers can be internal obstacles that the enterprise encounters while carrying out innovation activities as well as external factors preventing innovation.

The survey asked about a range of constraining factors and their effect on the ability to innovate. Table 3 shows the proportions of respondents who gave a high rating to each category of constraint.

The 2007 data show an overall fall in the perception of barriers to innovate. However, relative to the other barriers, and as noted in the previous survey, cost factors were most commonly regarded as the most significant barriers to innovation, including the direct resource costs of innovation activities, their perceived economic risk and the costs of acquiring finance. The impact of UK and EU regulations was also identified as a barrier to innovation, independent of enterprise size. Again, relatively few enterprises felt constrained by a lack of knowledge, while a lack of qualified personnel was viewed as one of the more important constraining factors. Larger enterprises also expressed some concerns regarding market factors.

It is striking that, across most categories, those enterprises engaged in innovation activity were, on average, more than twice as likely to perceive barriers as businesses who did not attempt to innovate (Figure 6). Exceptions are knowledge factors. Neither technology nor market knowledge are widely cited as constraints on effective innovation. These results suggest that businesses learn about barriers to innovation as a result of their attempts to innovate.

Table 3
Enterprises regarding potential barriers to innovation as 'high'

	Percentage of all respondents		
	Size of enterprise (employees)		
	10-250	250+	All
Costs factors			
Direct innovation costs too high	10	12	10
Excessive perceived economic risk	8	10	8
Cost of finance	9	7	9
Availability of finance	7	6	7
Knowledge factors			
Lack of qualified personnel	6	4	6
Lack of information on markets	2	3	2
Lack of information on technology	2	2	2
Market factors			
Dominated by established enterprises	6	7	6
Uncertain demand	5	6	5
Other factors			
UK regulations	7	7	7
EU regulations	6	5	6

Non-innovators

The survey also attempts to gain an appreciation of the possible reasons why businesses were not involved in innovation activity during the period 2004 to 2006. The majority of non-innovators reported it was not necessary due to market-related conditions (Figure 7), although a quarter of non-innovators reported that particular constraints were sufficiently binding to prevent innovation.

Methods to protect the value 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. This may involve attempts to exercise formal intellectual property rights, but 'strategic' ways of preventing emulation are important for many firms.

The survey collected data on business perceptions of the relative importance of different means of protecting intellectual property, reported in Table 4. These included formal intellectual property rights as well as strategic mechanisms such as being first to market. The data show that similar proportions of enterprises rated

Figure 6
Perception of barriers – comparison of innovators and non-innovators rating 'high'

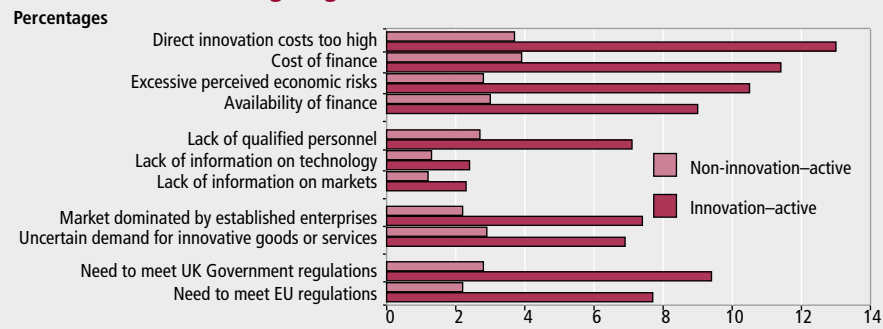


Figure 7
Reasons why enterprises did not innovate (non-innovative enterprises only), 2004 to 2006

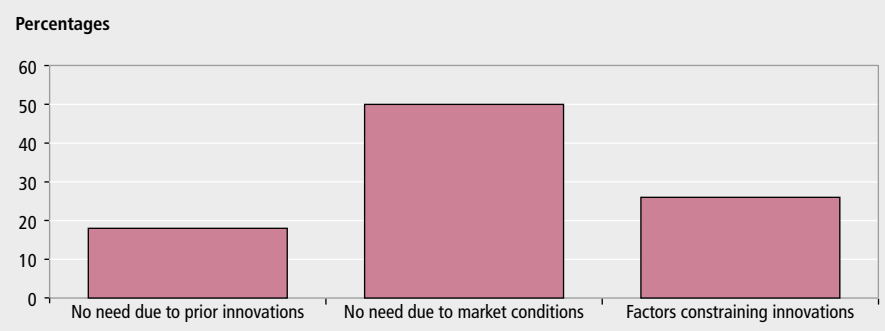


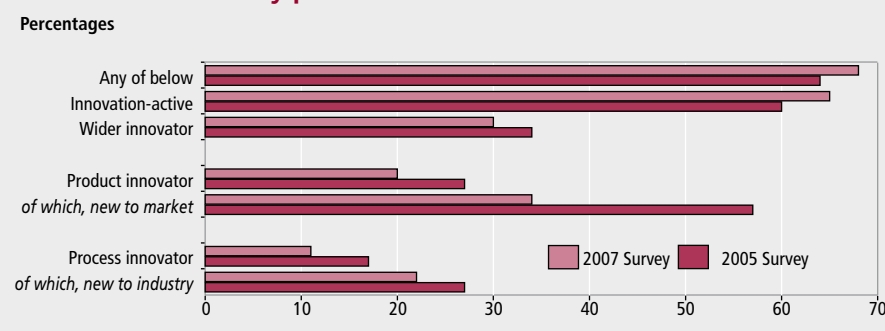
Table 4
Enterprises rating different methods for protecting innovation as of 'high' importance

	Percentage of all respondents		
	Size of enterprise (employees)		All
	10-250	250+	
Formal			
Confidentiality agreements	12	26	13
Trademarks	8	19	8
Copyright	8	14	8
Patents	6	15	6
Registration of design	5	14	6
Strategic			
Lead-time advantage on competitors	10	17	10
Secrecy	8	17	9
Complexity of design	4	9	5

Table 5
Enterprises that introduced wider forms of innovation

	Percentage of all respondents		
	Size of enterprise (employees)		All
	10-250	250+	
Wider innovator	30	50	31
New organisational structures	19	37	20
Change in marketing strategy	18	26	18
Change in corporate strategy	15	26	15
Advanced management techniques	11	25	12

Figure 8
UK Innovation Survey panel



strategic and formal methods as being of high importance, with the exception of confidentiality agreements, which were rated highly important by over a quarter of large firms. In fact, larger enterprises attached greater importance than smaller enterprises to all methods for protecting intellectual property, in the ratio of 2:1. It is not possible to determine from this survey if this is because large businesses have more intellectual property to protect or whether it is because large businesses have a greater awareness of intellectual property issues.

The Intellectual Property Office, along with the Gowers Review of Intellectual Property,⁴ have raised awareness of protection methods and, in general, the proportion of enterprises marking all methods as of 'high' importance, especially those classed as 'formal' protection methods, has increased on that recorded in the 2005 survey.

Wider forms of innovation

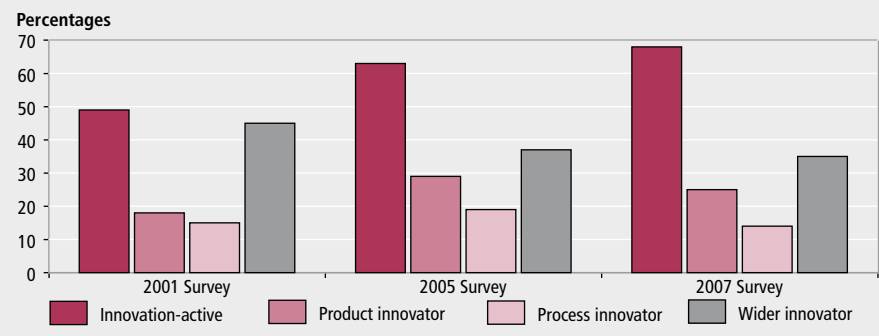
Innovation is not wholly about the development or use of technology or other forms of product (goods and services) and process change. Enterprises can also change their behaviour or business strategies to make themselves more competitive, often in conjunction with product or process innovation, but also as independent means of improving competitiveness.

Enterprises were asked whether they had made major changes to their business structure and practices in the three-year period 2004 to 2006. Some of the findings are summarised in **Table 5**. As would be expected, and as reported in 2005, a far greater proportion of large firms engaged in one or more of these changes. Implementing new organisational structures was most commonly reported, with the introduction of advanced management techniques being least frequent. Small enterprises were half as likely to have introduced a major organisational change as large enterprises.

Comparisons with the 2005 UK Innovation Survey panel

The number of businesses responding to both the 2007 and 2005 surveys enables some direct comparison of their innovation activities and outturns. Of the 7,000 businesses in the 2007 survey panel, around half are small enterprises, with medium and large enterprises accounting for the other half in equal proportions. **Figure 8** shows the innovation characteristics of the panel. A comparison with **Table 1** shows that the 2007 panel results are broadly similar,

Figure 9
Main results of UK Innovation Survey (restricted to 2001 sectoral coverage)



indicating that the panel is representative of the survey as a whole.

Comparisons with the 2001 and 2005 UK Innovation Surveys

There are now three broadly similar surveys enabling some time series analysis.

Figure 9 compares the main results for the three surveys based on the common sectoral coverage.⁵ Wider innovation activities were extensively reported in 2001, with increased product and process innovation being reported in 2005. The 2007 survey reports higher shares of enterprises with preparatory expenditure on innovation. Results may also be affected by increased understanding by respondents of the survey. Respondents indicate that market conditions dominate their propensity to innovate. Increased investment reported in this survey may point to an upward trend in future levels of product and process innovations, to be captured in the next full survey to be conducted in 2009.

Conclusions and next steps

This short article has reported just a few of the results of the latest UK Innovation Survey and on some dimensions of the changes in innovation behaviour in the UK relative to the previous survey in 2005.

DIUS will publish more extensive detailed survey results over the next few months, as well as applying the innovation indicators to policy analysis and monitoring purposes.

The reports will include industrial and regional analyses that will enable the business community to benchmark their own innovation performance.

The survey represents a major source of data for the research community. As with previous surveys, a substantial body of further research is expected, using the survey results to be undertaken and published in various forms over the next

few years.

Notes

- 1 All results are grossed up to the business population.
- 2 General comparisons refer to overall survey results. Other differences between the survey, such as the inclusion of SIC (2003) 92.1/2, variations in question wording and the overlap of the reference period (2006) in question, are not accounted for.
- 3 The UK definition used differs from that adopted by Eurostat. The EU-wide definition of innovation-active is as follows: introduction of a new or significantly improved product (goods or service) or process; engagement in innovation projects not yet complete or abandoned. It excludes expenditure in areas linked to innovation activities.
- 4 The Gowers Review can be found at www.hm-treasury.gov.uk./media/6/E/pbr06_gowers_report_755.pdf
- 5 Sectors covered in CIS3 were SIC (92) 10–14, 15–37, 40–41, 45, 50–51, 60–64, 65–67, 70, 71, 72, 73, 74.2 and 74.3.

CONTACT

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APPENDIX**Methodology**

The UK Innovation Survey is funded by the Department for Innovation, Universities and Skills (DIUS). The survey was conducted on behalf of DIUS by the Office for National Statistics (ONS), with assistance from the Northern Ireland Department of Enterprise, Trade and Investment (DETI).

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 fifth iteration of the survey (CIS 5) – CIS 4, covering the period 2002 to 2004, was carried out in 2005 and the results form part of various EU benchmarking exercises (see www.cordis.lu/innovation-smes/scoreboard/home.htm).

The UK Innovation Survey 2007 sampled over 28,000 UK enterprises. The survey was voluntary and conducted by means of a postal questionnaire. A copy of the questionnaire used can be found at www.berr.gov.uk/files/file44938.pdf

Coverage and sampling

The survey covered enterprises with ten or more employees in sections C to K of the Standard Industrial Classification (SIC) 2003. The 2007 survey included additional sectors (SIC 92.1/2).

The sample was drawn from the ONS Inter-Departmental Business Register in January 2007.

Response and weighting

The questionnaires from the initial survey were distributed on 31 March 2007.

Valid responses were received from 14,872 enterprises, to give a response rate of 53 per cent.

The results in this article are based on weighted data in order to be representative of the population of firms. The responses were weighted back to the population using the inverse sampling proportion in each stratum, that is, the weight attributed to each enterprise was the number of enterprises in the population divided by the number of responses in that stratum. On average, each respondent represents 12 enterprises in the population.