ARTICLE

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First findings from the UK Innovation Survey 2009

SUMMARY

This article presents initial analysis from the 2009 UK Innovation Survey (UK IS 2009). Beginning with key statistics on overall innovation activity the article moves on to examine in which markets and regions innovative UK businesses are operating; discuss collaborations and sources of information, barriers to innovation and the uptake of intellectual property 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 2009 survey and its predecessors from 2007 and 2005 and concludes with a comparison of the last four surveys from 2009, 2007, 2005 and 2001.

Introduction

This article presents the first findings from the UK Innovation Survey (UK IS) 2009, covering the three-year period from 2006 to 2008. This is the UK contribution to a Europe-wide Community Innovation Survey (CIS). The 2009 survey is the second survey run on the biennial cycle. Further information on the UK IS methodology is presented in the **Annex**.

The 2009 survey followed the same sampling format as the 2007 survey. It was again sent to 28,000 UK enterprises with 10 or more employees across the manufacturing and services sectors achieving a 50 per cent response rate. The latest data also continues to provide a significant panel (respondents common to the 2009, 2007 and 2005 surveys) of over 4,000 businesses making it an even more valuable resource for both government and academic users alike. The Department for Business, Innovation, and Skills (BIS) would like to thank all those businesses that completed the survey form.

Promoting innovation, enterprise and science is a key component in achieving BIS's mission of building a dynamic and competitive UK economy. The UK IS continues to provide a means to measuring the level, types and trends in innovation activity in the UK. In doing so, it contributes to understanding of the constraining factors faced by businesses, across all sectors, to innovate, thus providing the empirical evidence to support policy measures. The UK IS is a periodic snapshot of innovation behaviour and has

the additional benefit of providing the basis for some comparisons with other countries. The large panel dataset also facilitates longitudinal studies.

The majority of the survey questions are concerned with innovation through new and improved products, along with the processes and 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, changes in businesses structures and management practices, and the roles of knowledge and intellectual property 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 2006 to 2008¹ and makes some general comparisons with the results obtained from the previous survey in 2007².

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

- introduction of a new or significantly improved product (good or service) or process

- engagement in innovation projects not yet complete or abandoned
- expenditure (activities) in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities⁴

Table 1 shows the proportions of businesses that were innovation active in the period 2006-2008, broken down by type of innovation activity and the size of enterprise (in terms of number of employees). Before looking more closely at the results from Table 1, it is worth noting that GDP started to contract in Q2 2008, so economic conditions were probably unfavourable from the start of the year. Whilst the survey refers to innovation in the period 2006-2008, this is likely to have had an impact on the number of businesses starting innovation activities in 2008 and an affect on the overall number of innovation active firms. 58 per cent of enterprises were classed as being innovation active during this period with 45 per cent reporting innovation expenditure, but both measures were down relative to the previous survey. Interestingly, the proportion of innovation active large enterprises (those with more than 250 employees) was only marginally higher (2 percentage points) than small and medium enterprises (SMEs), although large firms were more likely to engage in most forms of innovation behaviour.

Results from the previous survey showed businesses had increased investment in innovation related activities. These findings suggest that those investments have, in many cases, resulted in product and process innovations during the period 2006-2008 which saw increases of 2 and 1 percentage points respectively. Nearly half of all product innovators were market leaders while nearly a third of process innovations were new to the industry in question.

Improvements to the 2009 survey enable us to distinguish how the development of good and service innovations differs. The majority of goods and service innovations are developed within the business (70 per cent and 67 per cent respectively). However, around two-fifths of service innovations are also developed by the business with other businesses or organisations (compared with less than a third of goods innovations) and a quarter by other organisations (in contrast to 15 per cent of goods innovations.).

The proportion of ongoing and abandoned innovation activities projects

were both lower than during the last survey period. It is likely that some of those ongoing projects materialized into innovations during 2006-2008.

Innovation activities

As **Figure 1** shows, the most commonly reported innovation activities were acquisition of computer software and hardware, though these were considerably lower than during the last sample period. The share of enterprises reporting Internal R&D was slightly higher (by 1 percentage point), noting the recent Business Expenditure on R&D (BERD) release also showed increases in expenditure in R&D (2007 and 2008) and the number of personnel (BERD 2007). The share reporting design activity remained constant. But, the share of businesses

reporting innovation activity in all the other categories showed a decline. Training, in particular, was reported by a third fewer enterprises.

These early results seem to indicate that businesses have continued R&D projects through the financial downturn and, although there has inevitably been some retrenchment in the face of difficult economic conditions, innovative performance has remained fairly strong.

Markets and exports

The businesses surveyed were asked which markets they operated in. **Figure 2** shows that regional markets are the most dominant for UK enterprises, and just over a half (55 per cent) operate at a National level. Outside of the UK, 27 per cent operated in European markets and just

Table 1

Percentage of enterprises who were innovation active, by size and type of activity, 2006-2008

Type of activity	Size of enterprise		Per cent
	10-250 employees	250+ employees	All (10+ employees)
Innovation-active	58	60	58
Product innovator	24	30	24
of which (share with new-to-market products)	45	43	45
Process innovator	12	18	13
of which (share with new-to-industry processes)	29	30	29
Abandoned activities	4	6	4
On-going activities	6	9	6
Some innovation related expenditure (activity)	45	48	45
Both product AND process innovator	9	14	9
Either product OR process innovator	27	35	28

Source: UK Innovation Survey

Figure 1

Share of enterprises reporting types of innovation activity, 2006-2008

Source: UK Innovation Survey

Figure 2
Proportion of UK enterprises operating in different geographical markets

Source: UK Innovation Survey

Figure 3
Proportion of firms with different types of co-operation partners in innovation activities (innovation-active, collaborative firms only)

Source: UK Innovation Survey

Table 2
Sources of innovation information (percentage of all firms rating 'high')

Source of innovation information	Size of enterprise		Per cent All (10+ employees)
	10-250 employees	250+ employees	
Internal			
Within your enterprise group	26	34	26
Market			
Clients or customers	30	34	30
Suppliers of equipment	15	15	15
Competitors or other enterprises in your industry	12	14	12
Consultants, commercial labs or private R&D institutes	3	5	3
Institutional			
Universities or other higher education institutes	2	2	2
Government or public research institutes	2	3	2
Other sources			
Technical, industry or service standards	7	9	7
Conferences, trade fairs, exhibitions	5	3	5
Scientific journals and trade/technical publications	3	3	3
Professional and industry associations	6	6	6

Source: UK Innovation Survey

under a fifth world-wide. Proportions of businesses surveyed in 2009 were slightly lower in Regional and European markets, but remained consistent nationally and internationally with results from businesses surveyed in 2007.

Co-operation agreements and sources of information

There was a large increase in the proportion of firms collaborating on innovation projects during the latest survey period. Nearly a quarter (23 per cent) of all innovating enterprises had co-operation arrangements on innovation activities, compared to only a tenth in the previous survey. And, 64 per cent of these collaborations were agreements that operated at a national level. The most frequent partners for co-operation were clients or customers (76 per cent of innovation active enterprises with co-operation agreements, see **Figure 3**). Just over a quarter of collaborators included universities among their partners, a slightly lower proportion than in the 2007 survey. However, the number of cooperation partnerships were slightly up in all categories.

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 to the UK IS 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
- **other:** from conferences, trade fairs and exhibitions; scientific journals, trade/technical publications; professional

and industry associations; technical industry or service standards

Firstly, proportions of businesses using all forms of information sources were higher than recorded in UK IS 2007. It seems this is predominantly driven by the increased value SMEs are placing on all information sources. In contrast, there was a decrease in the value large firms placed on all but two of the information sources. Overall, market sources such as clients and customers and internal sources (within their enterprise group), were rated as the most important source of information for innovation. Earlier survey results are also consistent with these findings indicating businesses rely on their own experience coupled with information from suppliers, customers and clients. The least frequently cited sources were institutional sources. Technical, industry or service standards were the most highly important source from the 'other sources' category. Conferences, trade fairs and exhibitions were the only category rated as more important by SMEs than by large firms.

Innovation in sectors

As expected the percentage of firms reported to be innovation active varied considerably across industrial and commercial sectors. 77 per cent of electrical and precision engineering enterprises were innovation active, against 51 per cent of enterprises in mining and quarrying, construction and utilities (see **Figure 4**). In distribution and services, real estate, renting and business activities (which includes the R&D services sector) had the highest share of innovation active businesses (62 per cent), while hotels and restaurants (at 47 per cent, although up by 1 percentage point from UK IS 2007) had the lowest share.

Geography of innovation

Figure 5 shows the shares of innovation active businesses across the countries and regions of the UK. The 2009 data exhibits less regional variation in these proportions than the 2007 survey, ranging from 62 per cent in the South East region down to 55 per cent in London and Northern Ireland. Regional innovation rankings vary considerably from survey to survey and are generally a reflection of industrial location and variations in sectoral business cycles and product life cycles.

Factors driving 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 respondents⁵ who answered 'high' in each category indicates 'product-related' factors were the most frequent drivers, with 'quality enhancements' by far the most motivating factor (for over half of innovators). This was followed by

'increased range of goods and services' and 'value added' (both 36 per cent), highlighting the strong customer-focused approach to innovation. Reducing environment impacts was the least highly rated factor with only 18 per cent of respondents reporting this to be a 'high' driver of innovation activity.

Figure 4

Proportion of innovative businesses in each industry

Source: UK Innovation Survey

Figure 5

Shares of innovation-active businesses by region

Source: UK Innovation Survey

Table 3
Percentage of enterprises regarding potential barriers to innovation as 'high'

Barrier to entry	Size of enterprise		Per cent
	10-250 employees	250+ employees (10+ employees)	All
Costs factors			
Direct innovation cost too high	17	13	17
Excessive perceived economic risks	15	12	15
Cost of finance	17	10	17
Availability of finance	16	8	16
Knowledge factors			
Lack of qualified personnel	7	4	7
Lack of information on markets	3	2	3
Lack of information on technology	3	2	3
Market factors			
Market dominated by established businesses	9	6	9
Uncertain demand for innovative goods or services	8	7	8
Other factors			
UK Gov regulations	8	5	8
EU regulations	7	4	7

Source: UK Innovation Survey

Figure 6
Perception of barriers to innovate: percentage of innovators and non-innovators rating each factor as 'high'

Source: UK Innovation Survey

Figure 7
Percentage of enterprises giving each reason for why they didn't innovate in 2006-2008 (non-innovative enterprises only)

Source: UK Innovation Survey

Barriers to innovation

An understanding of the barriers to business innovation is considered key in forming the evidence base for and the successful implementation of policy interventions. 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.

Not surprisingly, the 2009 UK IS data shows an increase in the perception of cost barriers to innovate with the availability of finance showing the greatest rise (up 9 percentage points) on the 2007 results. SMEs perceive all barriers to be greater than large firms. 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. Market factors were also identified by more firms as barriers than in the 2007 survey. Again, relatively few enterprises felt constrained by a lack of knowledge, although a lack of qualified personnel was viewed as one of the more important of these constraining factors.

Enterprises engaged in innovation activity were, on average, more than twice as likely to perceive cost and regulatory factors as barriers than businesses who did not attempt to innovate (see **Figure 6**). Market factors (and knowledge factors to a lesser extent) were closer matched though neither technology nor market knowledge is widely cited as a constraint on effective innovation. These results suggest that businesses 'learn' about barriers to innovation as a result of their attempts to innovate.

Non-innovators

The UK IS 2009 also attempts to gain an appreciation of the possible reasons why businesses were not involved in innovation activity during the period 2006–2008. The pattern of response has remained relatively stable through the iterations of the survey, with the majority of non-innovators reporting there was not a 'market need' (see **Figure 7**). Just under 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 contexts. This may involve attempts to exercise formal intellectual property (IP) rights, but 'strategic' ways of preventing emulation are important for many firms.

Previous surveys have asked about the perceived levels of importance associated with intellectual property, both formal and strategic. The UK IS 2009 asked about the use of formal protection methods. All levels of take-up were low; with registering a trademark the most frequently used method amongst large firms at 10 per cent (see Table 4). SMEs are generally only half as likely to take out formal IP protection. These results seem to suggest that, although firms have reported in previous surveys, they see IP as an important tool in protecting their innovations, formal methods have been little used in practice over the most recent survey period.

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 have made major changes to their business structure and practices in the three-year period 2006–2008. Some of the findings are summarised in Table 5. Businesses engaged slightly less in all forms of non-technological innovation over the latest survey period compared with the levels seen in the last two surveys with some form of activity in 27 per cent of firms. In particular, large firms significantly reduced their levels of 'managerial and organisational change'. The implementation of a 'new organisational structure' was (marginally) the most commonly reported with the introduction of 'advanced management techniques' being least frequent. Smaller enterprises were less likely to have introduced a major organisational change than were large enterprises.

Comparisons with the 2007 and 2005 UK Innovation Survey panel

The number of businesses responding to both the 2009, 2007 and 2005 surveys enables some direct comparison of their innovation activities and outturns. Of the

4,000 businesses in the three survey panel, nearly 40 per cent are small enterprises, a third are medium-sized, and just over a quarter are large firms. Figure 8 shows the innovation characteristics of the panel. A comparison with Table 1 shows the 2009 panel results are broadly similar, indicating

Table 4
Percentages of firms reporting protection of innovation

Method for protecting innovation	Size of enterprise			Per cent
	10-250 employees	250+ employees	All (10+ employees)	
Register an industrial design	1	3	1	
Register a trademark	5	10	5	
Apply for a patent	3	7	3	
Produce materials eligible for copyright	6	7	6	

Source: UK Innovation Survey

Table 5
Percentages of enterprises that introduced wider forms of innovation

Form of innovation	Size of enterprise			Per cent
	10-250 employees	250+ employees	All (10+ employees)	
Wider Innovator	26	38	27	
Major changes to organisation structure	16	27	16	
Changes to marketing concepts or strategies	15	18	15	
New or significantly changed corporate strategy	12	19	13	
New management techniques	10	19	10	

Source: UK Innovation Survey

Figure 8
UK Innovation Survey panel data, 2009, 2007 and 2005

Source: UK Innovation Surveys, 2009, 2007 and 2005

Figure 9
UK IS 2001, 2005, 2007 and 2009 surveys (restricted to 2001 sectoral coverage)

Source: UK Innovation Surveys, 2009, 2007, 2005 and 2001

the panel is representative of the survey as a whole.

Comparisons with the 2001, 2005 and 2007 UK Innovation Surveys

There are now four broadly similar surveys enabling some time series analysis. **Figure 9** compares the main results for the four surveys based on the common sectoral coverage⁶. Wider innovation activities were widely reported in 2001, with higher levels of product and process innovation reported in 2005. The 2007 survey found a higher share of firms with innovation activity. The outcome of this investment appears in increased levels of product and process innovation in the 2009 survey.

It's striking that the shares of firms with each type of innovation fluctuate between surveys, often in opposite directions. For example as the reported level of product innovation is higher, the level of undertaking some form of wider innovation is rather lower. Results may also be affected by effects such as improved understanding by respondents of the survey and perhaps by changes in the layout of the questionnaire⁷.

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 2007, together with some comparisons with earlier surveys.

BIS 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 survey represents a major source of data for the research community. As with previous surveys, we expect a substantial body of further research using the survey results to be undertaken and published in various forms over the next few years. Data will be available for researchers in the ONS's Virtual Micro Data Laboratory⁸.

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 variations between the questionnaires including wording, filtering and layout or the overlap of the reference period (2008 for the 2009/2007 survey period, 2008 and 2006 for the 2009/2007/2005 survey time series comparison) 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. Expenditure in innovation activities over the three year period relates to responses from engagement in innovation activities (UK IS 2009, question 4).
5. The factors question is only asked if the respondent said 'yes' to Q6,7,11 or 14 (that is strategic innovator, product innovator, process innovator, abandoned/incomplete innovation).
6. 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, 74.3.
7. The survey layout was changed considerably for UK IS 2009. In particular, improvements to question routing have improved data quality.
8. Details on how to access the VML can be found here:
www.ons.gov.uk/about/who-we-are/our-services/vml/index.html

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ANNEX**UK Innovation 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), 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 sixth iteration of the survey (CIS 6) – CIS 5, covering the period 2004 to 2006, was carried out in 2007 and the results form part of various EU benchmarking exercises (see www.cordis.lu/innovation-smes/scoreboard/home.htm).

The UK Innovation Survey 2009 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 on

Coverage and Sampling

The survey covered enterprises with 10 or more employees in sections C-K of the Standard Industrial Classification (SIC) 2003. The 2007 and 2009 surveys included additional sectors (SIC 92.1/2).

The sample was drawn from the ONS Inter-Departmental Business Register (IDBR) in January 2009.

Response and weighting

The questionnaires for the survey were distributed on March 31 2009.

Valid responses were received from 14, 218 enterprises to give a response rate of 50 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 total business population of those in the IDBR. On average each respondent represents 13 enterprises in the population.