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Business Activity

Statistics Bulletin

Northern Ireland Innovation Survey 2006

30 May 2007

Northern Ireland Statistics & Research agency

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NORTHERN IRELAND INNOVATION SURVEY 2006

Published 30/05/07

The NI Innovation Survey provides a wide range of information related to innovation activity among enterprises, and includes information on the extent of innovation activity, the impact of innovation on businesses and the barriers to innovation. Headline figures show that:

- In the three-year period 2003-2005, 51.8 per cent of enterprises in NI were innovation active compared to 55.9 per cent in 2002-2004.
- Hotels and restaurants, and construction sector enterprises reported the largest decreases in innovation activity over the period. However, 62.5 per cent of hotels and restaurants and 57.0 per cent of construction enterprises felt they had no need to innovate during 2003-2005 due to market conditions. If these enterprises are excluded from results, the proportion of firms innovating in 2002-2004 (60.1 per cent) and 2003-2005 (59.4 per cent) is similar.
- While product (goods and/or services) innovation levels remain unchanged among NI businesses (20.6 per cent in 2002-2004 compared to 20.5 per cent in 2003-2005), there was a slight reduction in the proportion of enterprises that were process innovators (19.4 per cent in 2002-2004 compared to 14.5 per cent in 2003-2005).
- Proportionately more businesses in 2003-2005 reported significant barriers to innovation than in the previous period. The most common barrier reported by businesses was that direct innovation costs were too high, rising from 14.2 per cent of enterprises in 2002-2004 to 22.2 per cent in 2003-2005.
- Comparisons between NI results from the 2001 Community Innovation Survey (CIS), and the 2006 NI Innovation Survey are limited by differences in methodology and the type of business sectors covered. However, when similar sectors are compared, the proportion of firms in NI engaged in innovation activity had increased from 46 per cent in 1998-2000 to 59 per cent in 2003-2005.

Northern Ireland Statistics & Research agency

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Executive Summary

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INTRODUCTION
This report presents results from the Northern Ireland Innovation Survey 2006, covering the three-year period from 2003 to 2005. The survey was conducted using the methodology employed in the fourth European Community Innovation Survey (CIS4), but was only carried out in Northern Ireland.

Business innovation is a key driver of economic growth, and it is a key objective for the Department of Enterprise, Trade and Investment (DETI) to encourage and enable NI businesses to absorb, adapt and exploit opportunities that are created and disseminated by the region's universities, public sector and leading innovative firms. This applies to both R&D and innovation activity to improve not only processes, products and near market product development but also management techniques.

The NI Innovation Survey complements other indicators of innovation by providing a regular snapshot of innovation inputs and outputs and the constraints faced by NI businesses in their innovation efforts, across the range of industries and business enterprises. By adopting CIS4 methodologies, the survey offers a time-series for 2002-2004 (from NI CIS4 results) and 2003-2005 regional innovation activity.

The 2006 survey sampled enterprises with 10 or more employees in sections C to K of the Standard Industrial Classification (SIC) 2003. In order to be representative, the responses have been weighted back to the sample population and this is reflected in the results shown throughout the publication.

INNOVATION ACTIVITY
While an innovation is a change in any of a wide variety of business activities intended to improve business performance, the majority of the NI Innovation Survey is concerned with activities leading to new and improved products and processes and with the investments that develop and implement them. Table 1 shows the proportion of enterprises that actively innovate, broken down by the components that feed into the definition of innovation activity for this publication.

In the three-year period 2003-2005, 51.8 per cent of enterprises in NI were innovation active compared to 55.9 per cent in 2002-2004.

Approximately three fifths of hotels and restaurants, and construction sector enterprises felt they had no need to innovate during 2003-2005 due to market conditions, and if these enterprises are excluded from results, the proportion of firms innovating in 2002-2004 (60.1 per cent) and 2003-2005 (59.4 per cent) is similar.

Innovation by type
During 2002-2004 and 2003-2005, the proportion of enterprises with product (goods and/or services) innovations and ongoing or abandoned innovation activities remained unchanged (21 per cent of enterprises were product innovators, and 6 per cent had ongoing or abandoned activities).

There was a slight reduction in the proportions of enterprises that were process innovators (19.4 per cent in 2002-2004 compared to 14.5 per cent in 2003-2005) or had innovation-related expenditure (54.4 per cent in 2002-2004 compared to 50.6 per cent in 2003-2005).

Innovation by size of business
Similar to 2002-2004 findings, large enterprises with 250 or more employees were more likely to engage in each of the components of innovation activity during 2003-2005.

While 72.5 per cent of large enterprises engaged in at least one of these components during 2003-2005, the comparable figure for small and medium-sized enterprises (SMEs[1]) was 21 percentage points lower (51.3 per cent) over the period. The difference in innovation levels between SMEs and large enterprises is most marked when examining the proportion of firms that introduced a new or significantly improved good and/or service during 2003-2005 (product innovators). Over one third (34.7 per cent) of large enterprises were product innovators, while one fifth (20.2 per cent) of SMEs product innovated.

Innovation by industry type

The proportion of firms reported to be innovation active also varied considerably across industrial and commercial sectors, with 57.0 per cent of respondents in the production and construction sector (SIC 2003 sections C-F) being innovation active compared with 49.3 per cent of enterprises in the distribution and services sector (SIC 2003 sections G-K).

The primary, engineering-based manufacturing and retail & distribution sectors all experienced increases in innovation activity between 2002-2004 and 2003-2005. Businesses in construction, other manufacturing, knowledge-intensive services and other services all experienced a decrease during this period.

Enterprises that were innovation active, by type of activity, 2003-2005

Table 1 Percentage of all enterprises

	ZE OF ENTERPRISE		
	SMEs	Large	All
Innovation active	**51.3**	**72.5**	**51.8**
Product innovator	20.2	34.7	20.5
Process innovator	14.3	23.2	14.5
Innovation-related expenditure	50.0	72.5	50.6
Ongoing or abandoned activities	6.4	10.1	6.5

FACTORS IMPACTING ON INNOVATION

The survey asked about a range of constraints that enterprises might perceive as limiting their ability to innovate. Cost factors were most commonly regarded as significant barriers to innovation among NI enterprises, with 'direct innovation costs too high' the most cited response (rising by 8 percentage points, from 14.2 per cent in 2002-2004 to 22.2 per cent in 2003-2005).

The most recent results suggest that businesses are more sensitive to barriers to innovation than in 2002-04. In 2003-2005 almost half of businesses attached a high level of importance to one or more of the barriers to innovation compared to less than one third of businesses in 2002-2004. Of those businesses who perceived barriers to be highly important, fewer were innovation active in 2003-2005 (65.5 per cent) than in the earlier period (78.5 per cent).

CO-OPERATION ARRANGEMENTS

For the first time the Innovation Survey requested information on the extent of co-operation arrangements with organisations in the Republic of Ireland (RoI). This revealed that 28.1 per cent of NI businesses with such arrangements had partners in the RoI, compared with 48.6 per cent who had arrangements with partners in Great Britain and 72.9 per cent who had links with NI organisations.

COMPARISONS WITH THE 2001 SURVEY

Comparisons between NI results from the 2001 Community Innovation Survey (CIS3 – reference period 1998-2000), and the 2006 NI Innovation Survey are limited by differences in methodology and the type of business sectors covered. However, when similar sectors are compared, the proportion of firms in NI engaged in innovation activity had increased from 46 per cent in 1998-2000 to 59 per cent in 2003-2005.

[1] SMEs are defined here as having 10-249 employees. They may be part of an enterprise group.

Innovation activity

2

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 achievement (the introduction of new or improved products and/or processes). This section reports on the types and levels of innovation activity over the three-year period, 2003-2005[2].

Consistent with the definitions employed in the UK CIS survey, we define innovation activity here as whether enterprises were engaged in any of the following:

- introduction of new or significantly improved products (goods and/or services) or processes;
- innovation projects not yet complete or abandoned; or
- expenditure in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

Enterprises that were innovation active, by type of activity, 2003-2005
Table 2 Percentage of all enterprises

	ZE OF ENTERPRISE		
	SMEs	Large	All
Innovation active	**51.3**	**72.5**	**51.8**
Product innovator	20.2	34.7	20.5
Process innovator	14.3	23.2	14.5
Innovation-related expenditure	50.0	72.5	50.6
Ongoing or abandoned activities	6.4	10.1	6.5

In the three-year period 2003-2005, 51.8 per cent of enterprises in NI were innovation active compared to 55.9 per cent in 2002-2004[3]. Similar to 2002-2004 findings, large enterprises with 250 or more employees were more likely to engage in each of the components of innovation activity during 2003-2005. While 72.5 per cent of large enterprises engaged in at least one of these components during 2003-2005, the comparable figure for SMEs was 21 percentage points lower (51.3 per cent) over the period.

During 2002-2004 and 2003-2005, the proportion of enterprises with product (goods and/or services) innovations and ongoing or abandoned activities remained unchanged (21 per cent of enterprises were product innovators, and 6 per cent had ongoing or abandoned activities). However, there was a slight reduction in the proportions of enterprises that were process innovators (19.4 per cent in 2002-2004 compared to 14.5 per cent in 2003-2005) or had innovation-related expenditure (54.4 per cent in 2002-2004 compared to 50.6 per cent in 2003-2005).

[2] Throughout this report, all results are grossed up to the business population.

[3] Please note, innovation active levels among the 245 enterprises responding to both NI CIS4 and the NI Innovation survey also decreased.

The average responding business reported a 20.8 per cent increase in turnover during 2003-2005, with 83.0 per cent of turnover in 2005 generated from the NI market. Innovating businesses experienced a larger increase in turnover compared to non-innovators (25.5 per cent compared to 15.5 per cent) and generated a larger proportion of their turnover in 2005 from non-NI markets (23.7 per cent compared to 9.7 per cent).

INNOVATION BY INDUSTRY TYPE

As shown in Table 3, the percentage of firms reported to be innovation active varied considerably across industrial and commercial sectors. However, enterprises in the distribution and services sector tended to have relatively low levels of innovation (49.3 per cent) compared to the production and construction sector (57.0 per cent). As can be seen in Table 3, this trend does not hold true for all industry types within the broad groupings.

At the end of 2005, DETI Statistics Research Branch published the first set of results from the Exporting Northern Ireland Services (ENIS) study, which examined NI businesses with high export potential. The majority of these businesses fall within the knowledge-intensive services sector in distribution and services, and during 2003-2005 they had noticeably higher than average levels of innovation activity (74.3 per cent).

Innovation activity by industry
Table 3 Percentage of all enterprises

Industrial Sector[4]	YEARS	
	2002-2004	2003-2005
Production and Construction	**63.2**	**57.0**
Primary Sector	47.9	66.5
Engineering-based Manufacturing	75.5	76.9
Other Manufacturing	71.3	64.2
Construction	51.4	41.4
Distribution and Services	**52.3**	**49.3**
Retail & distribution	46.4	48.8
Knowledge-intensive services	79.8	70.9
Other services	46.2	41.3
ALL INDUSTRIES	**55.9**	**51.8**
High Export Potential Group (as defined by ENIS)[5]		74.3

The primary, engineering-based manufacturing and retail & distribution sectors all experienced increases in innovation activity between 2002-2004 and 2003-2005. Businesses in construction, other manufacturing, knowledge-intensive services and other services all experienced a decrease during this period.

Analysis of innovation levels by industrial section shows that hotels and restaurants (within other services), and construction section enterprises experienced the largest decreases in innovation activity between 2002-2004 and 2003-2005. It is interesting to note, however, that these groups were most likely to cite a reason for having no innovation activity, with 'no need to innovate due to market conditions' being the reason most frequently given (57.0 per cent of construction enterprises and 62.5 per cent of hotels and restaurants). While less frequently cited, these two industries were the most likely sections to have no innovation activity due to 'factors constraining innovation'.

Innovation activity excluding hotels and restaurants, and construction section enterprises
Table 4 Percentage of all enterprises

	ZE OF ENTERPRISE		
	SMEs	Large	All
Innovation active 2002-2004	59.8	69.0	60.1
Innovation active 2003-2005	58.8	75.5	59.4

As shown by Table 4, if these enterprises are excluded from results, the proportion of firms innovating in 2002-2004 (60.1 per cent) and 2003-2005 (59.4 per cent) is similar.

PRODUCT AND PROCESS INNOVATION

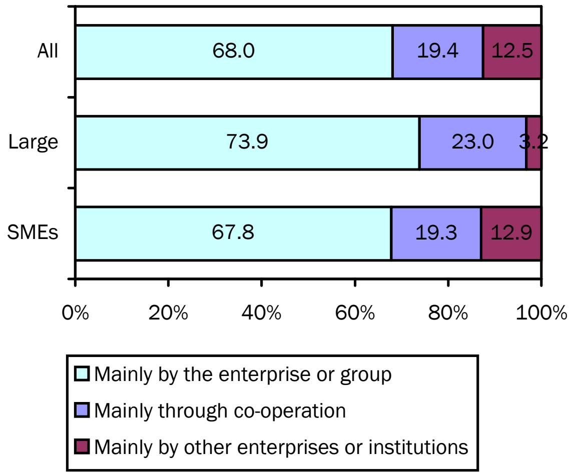
Firms stating that they had introduced new or significantly improved products or processes were asked whether these had been developed mainly by the enterprise or enterprise group, mainly through co-operation with other enterprises or institutions, or mainly by other enterprises or institutions. The majority of reported product and process innovations were developed internally, particularly among large enterprises. Results are summarised in Figures 1 and 2.

[4] Please refer to section 7 for more information on how industrial sectors were defined.

[5] Exporting Northern Ireland Services are those sectors identified to have the highest potential to trade services internationally. They include SIC 72, 73, 74.13, 74.14, 74.2, 74.3, 74.4 and 92.1-92.3).

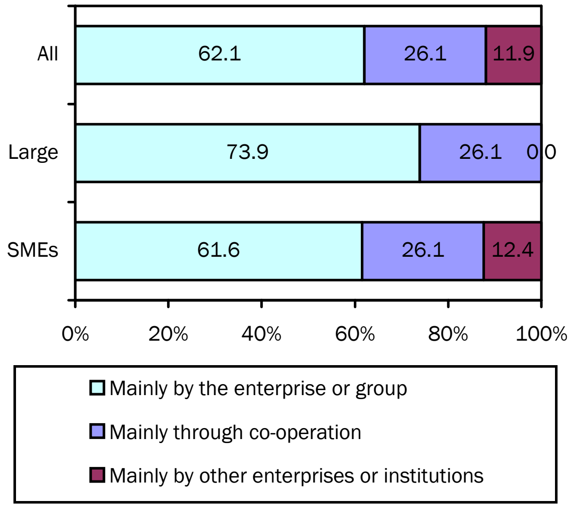
How product innovations were developed, 2003-2005

Figure 1 Percentage of product innovators



How process innovations were developed, 2003-2005

Figure 2 Percentage of process innovators



Barriers to innovation

3

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 5 shows the proportion of respondents who gave a 'high' rating to each category of constraint.

As in 2002-2004, cost factors were most commonly regarded as significant barriers to innovation among NI enterprises, with 'direct innovation costs too high' the most cited response (rising by 8 percentage points, from 14.2 per cent in 2002-2004 to 22.2 per cent in 2003-2005). Compared to 2002-2004, market factors and other regulatory factors were reported by more enterprises to be significant barriers to innovation.

Enterprises regarding potential barriers to innovation as 'high'
Table 5

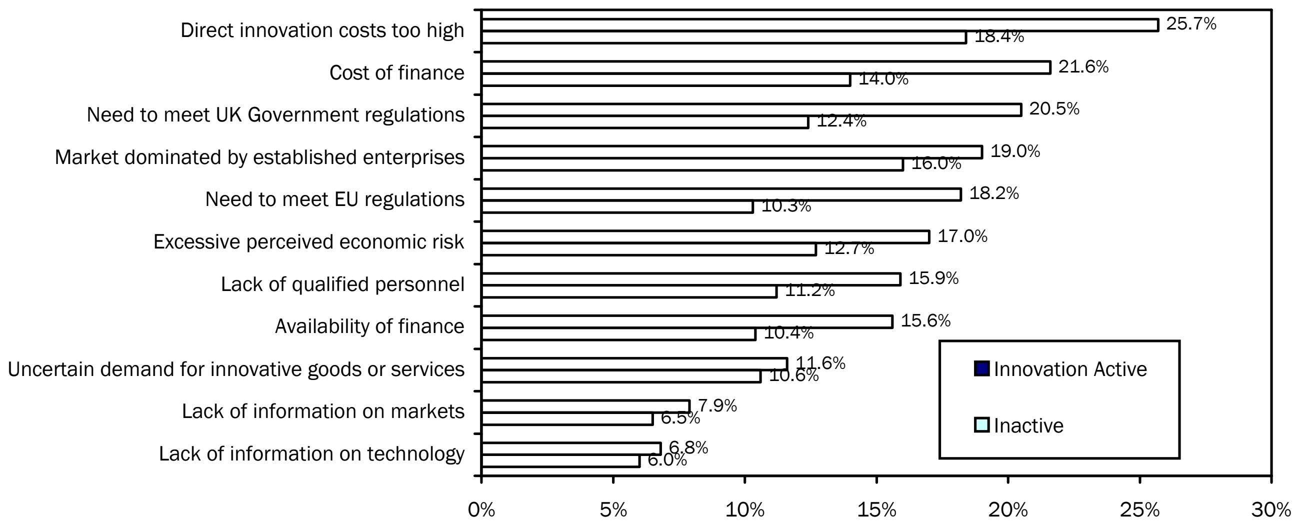
Percentage of respondents

BARRIER		YEARS	
		2002-2004	2003-2005
Cost Factors	Excessive perceived economic risk	13.0	14.9
	Direct innovation costs too high	14.2	22.2
	Cost of finance	12.1	17.9
	Availability of finance	9.7	13.1
Knowledge Factors	Lack of qualified personnel	5.6	13.6
	Lack of information on technology	2.4	6.4
	Lack of information on markets	3.3	7.2
Market Factors	Market dominated by established enterprises	6.4	17.6
	Uncertain demand for innovative goods or services	5.9	11.1
Other Factors	Need to meet UK Government regulations	8.7	16.6
	Need to meet EU regulations	7.7	14.4

As shown in Figure 3, though not as marked as in 2002-2004, those enterprises engaged in innovation activity were still more likely to perceive barriers as being highly important compared to those who did not attempt to innovate.

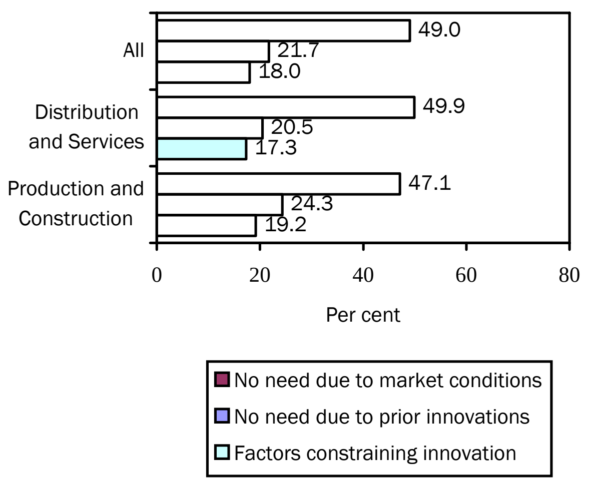
The most recent results suggest that businesses are more sensitive to barriers to innovation than in 2002-04. In 2003-2005 almost half of businesses attached a high level of importance to one or more of the barriers to innovation compared to less than one third of businesses in 2002-2004. Of those businesses who perceived barriers to be highly important, fewer were innovation active in 2003-2005 (65.5 per cent) than in the earlier period (78.5 per cent).

Enterprises regarding potential barriers to innovation as 'high', 2003-2005
Figure 3 Percentage of all enterprises



REASONS FOR NO INNOVATION
Enterprises were asked if they had no innovation activity during 2003-2005, to indicate why it had not been necessary or possible to innovate. Results for the production and construction, and distribution and services sectors are shown in Figure 4.

Reason for no innovation activity, 2003-2005
Figure 4 Percentage of all enterprises



Co-operation

4

Due to the increasingly complex nature of innovation, it is important to know how enterprises relate to external sources of innovation-related knowledge and information. Firms can gain guidance, advice or even inspiration for their prospective innovation projects from a variety of both public and private sources.

During 2003-2005, 10 per cent of enterprises had co-operation arrangements on innovation activities. The most frequent partners for co-operation, as shown in Table 6, were suppliers, customers, competitors or other private companies (71.0 per cent of NI enterprises with co-operation agreements).

Though not as marked as in 2002-2004, the most frequent partners for co-operation continued to be based in NI (72.9 per cent of NI enterprises with co-operation agreements). Just under half (48.6 per cent) of all those with co-operation arrangements collaborated with partners from Great Britain, while 28.1 per cent collaborated with partners from the Republic of Ireland.

Partners for innovation co-operation, 2003-2005
Table 6

Percentage of those enterprises with co-operation arrangements

TYPE OF PARTNER	GEOGRAPHY OF CO-OPERATION					
	Northern Ireland	Great Britain	Republic of Ireland	Rest of the European Union[6]	Rest of the World	Any
Other enterprises within your enterprise group	26.0	17.8	11.9	6.5	5.7	44.3
Suppliers, customers, competitors or other private companies	41.1	38.1	16.7	11.3	12.2	71.0
Universities, higher education or Government institutions	42.0	11.6	7.1	2.2	0.0	46.1
Any	72.9	48.6	28.1	14.2	13.6	100.0

[6] The Rest of the European Union includes Germany, France, Belgium, Luxembourg, Netherlands, Italy, Denmark, Portugal, Spain, Greece, Austria, Sweden, Finland, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia only.

Wider forms and strategies of innovation

5

Innovation is not wholly about the development or use of technology or other forms of product or 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 an 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 2003 to 2005. Headline results are summarised in Table 7.

A change in marketing strategy was the most commonly reported wider innovation among NI enterprises, with the implementation of advanced management techniques least often reported.

Wider innovation has increased since 2002-2004 (from 26.2 per cent to 29.9 per cent overall). This increase can particularly be seen in enterprises noting a change in marketing strategy.

Enterprises that introduced wider forms of innovation
Table 7 Percentage of respondents

	YEARS	
	2002-2004	2003-2005
Wider innovator (any of changes below)	**26.2**	**29.9**
Change in marketing strategy	16.7	18.7
New organisational structures	13.6	12.7
Advanced management techniques	13.5	12.4
Change in corporate strategy	13.1	13.4

Enterprises were asked to what extent they felt their business had innovation strategies in place, with Table 8 reflecting the proportions who strongly agreed they had each of the strategies in place. Enterprises that innovated during 2003-2005 were more likely to agree, and this was most marked in strategies that related to how management motivated and led staff.

Enterprises that strongly agree innovation strategies are in place
Table 8 Percentage of all enterprises

Strategy	Innovation Active 2003-2005		
	Non-Innovators	Innovators	All
Your company provides vision, leadership and support to develop new opportunities for value-added activity	1.8	12.0	7.1
The company identifies and reviews areas of opportunity in a systematic way	1.9	8.4	5.3
Plans are in place to exploit any new areas of value added activity identified	2.2	11.0	6.8
The company engages and motivates its people, committing resources to deliver new value creation and improvements	1.9	12.3	7.3
The company has a process in place to manage the creation, assessment and initial application of new ideas	2.0	9.1	5.7
The company has a process in place to monitor the ongoing application of new ideas to create new value added	2.6	6.3	4.5

Historical changes

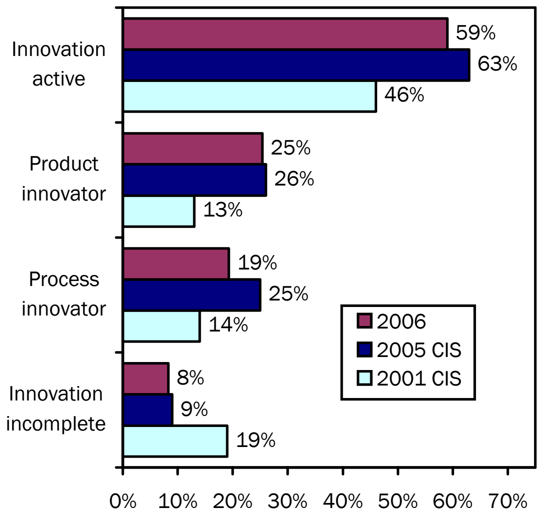
6

COMPARISONS WITH THE 2001 AND 2005 COMMUNITY INNOVATION SURVEYS
Comparisons can be made with the 2001 CIS, which measured innovation over the period 1998-2000, and the 2005 survey (2002-2004). The sectoral coverage from 2005 was widened considerably to include a larger portion of the service sector. The estimates presented below adjust for this by excluding data from the additional sectors introduced from 2005[7].

Using this more restricted but comparable sector coverage, the proportion of innovation active enterprises in the 2006 survey is around 59 per cent, an increase of 13 percentage points on the NI results reported in 2001. The proportion of enterprises reporting product innovation increased by 12 percentage points and the proportion reporting process innovation increased by 5 percentage points. It should be noted, however, that there were changes in the definition of innovation activity between the surveys.

Figure 5 compares results for the two surveys.

Comparisons of the 2001 CIS, 2005 CIS and the NI Innovation Surveys: proportions of innovating NI enterprises
Figure 5 Percentages



[7] These are: sale, maintenance and repair of motor vehicles, retail trade, hotels and restaurants. Other differences between the surveys, such as in the sample design and weighting methodology, are not accounted for.

Background Notes for NI Innovation Survey 2006

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METHODOLOGY
The NI Innovation Survey 2006 was conducted under the framework provided to countries participating in the fourth Community Innovation Survey, and results are consistent with that methodology. Just under 2,100 enterprises were surveyed by means of a postal questionnaire, with responses made on a voluntary basis.

COVERAGE AND SAMPLING
The 2006 survey covered enterprises with 10 or more employees in sections C to K of the Standard Industrial Classification (SIC) 2003, and (though not used in the core analyses) was topped up with a census of high export potential enterprises with 10 or more employees from SIC 92.1-92.3. The sample was drawn from the Inter-Departmental Business Register (IDBR) in November 2005.

RESPONSE AND WEIGHTING
The questionnaires from the initial survey were distributed on 25 August 2006. Enterprises not responding received written reminders in October and November, and additional copies of the questionnaire where necessary. Finally, non-responding enterprises were contacted by telephone in an effort to further boost response rates and to gauge differences between innovation characteristics of responding and non-responding businesses. This information will be used to inform future surveys of innovation activity.

Of the 2,021 enterprises selected from sections C to K, 899 valid responses were received, to give a response rate of 44.5 per cent. The population and achieved sample are summarised in Table 9.

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.

Please note that as with all sample surveys, the estimates provided in this publication are subject to an associated degree of sampling error.

Summary of sample frame
Table 9 Number of enterprises

ENTIRE NI POPULATION			ACHIEVED SAMPLE		
SMEs	Large	All	SMEs	Large	All
6,742	184	6,926	864	35	899

SECTORS OF INDUSTRY
Enterprises were clustered into seven sectors of industry. Those sectors were defined as followed by the SIC codes:

Primary Sector (SIC 10-14, 40-41);
Engineering-based Manufacturing (SIC 28-35);
Other Manufacturing (SIC 15-27 and 36-37);
Construction (SIC 45);
Retail & distribution (SIC 50-52);
Knowledge-intensive services (SIC 64.2, 65-67, 72-73, 74.1-74.4);
Other services (SIC 55, 60-64.1, 70-71, 74.5-74.8).

FURTHER INFORMATION
Further information is available on request from:

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