

Community Innovation Statistics

More than half of the innovative enterprises in the EU do in-house R&D

Statistics in focus

SCIENCE AND
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Author

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Contents

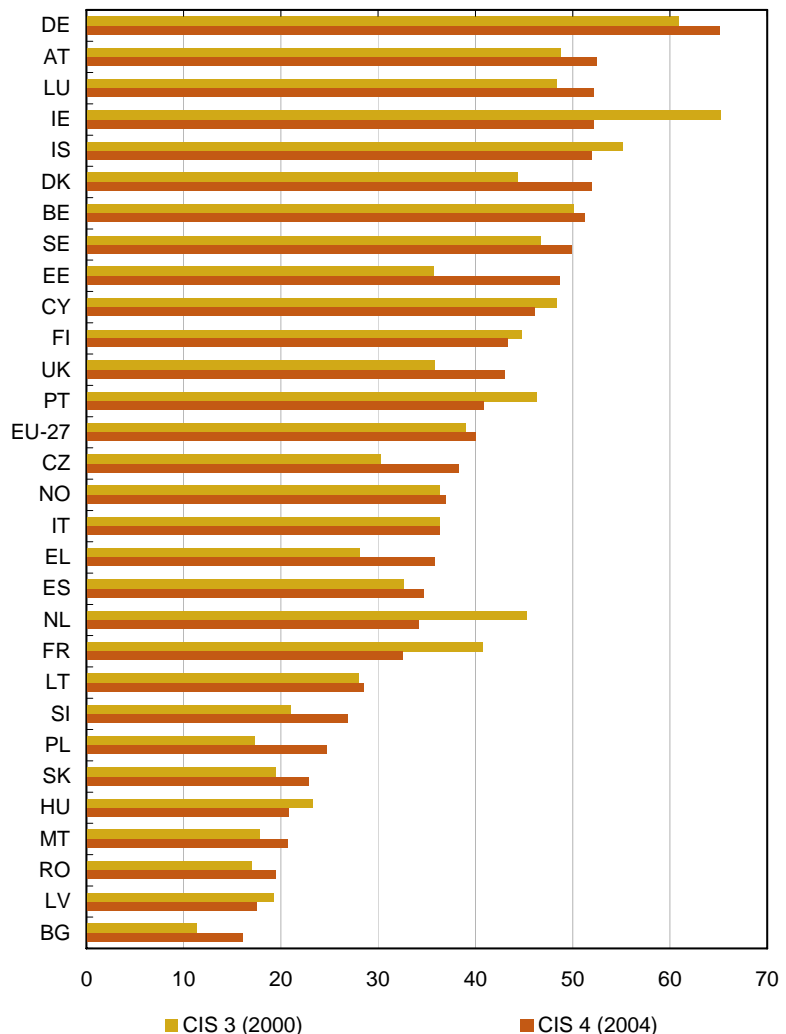
- More innovative products? 2
- Public funding of innovation often stable 3
- Often more than 40% of innovative enterprises are engaged in intramural R&D 4
- Changing role of factors hampering innovation 6



This publication compares the fourth Community Innovation Survey (CIS 4) with the third (CIS 3), taking a closer look at some of the main results of the two surveys. The overall picture for the EU-27 shows marked contrasts, and only a few common trends can be discerned, for example the high shares of innovative enterprises acquiring machinery, equipment and software and engaged in intramural R&D.

Innovation is a continuous process; measuring such a dynamic process is no straightforward operation. The Community Innovation Survey (CIS) was created to add to the traditional innovation indicators, such as R&D expenditure and patent statistics. The general aim of the CIS is to collect innovation data in order to provide a better understanding of innovation and how it relates to economic growth.

Figure 1: Share of innovative enterprises as a percentage of all enterprises, CIS 3 (2000) and CIS 4 (2004), EU-27 Member States and selected countries



The CIS data produced are based on harmonised survey questionnaires which were not fully identical between CIS 3 and CIS 4. To a certain extent this hampers the comparability of the results from CIS 3 and CIS 4.

The European innovation landscape shows marked contrasts, as can be seen from the shares of innovative enterprises in 2004, which ranged from 16% in Bulgaria to 65% in Germany.

The share of innovative enterprises increased in the majority of the EU Member States from 2000 to 2004. By contrast, in Ireland and the Netherlands the shares of innovative enterprises fell by about 10 percentage points. In 2004 in seven EU Member States (Germany, Austria, Luxembourg, Ireland, Denmark, Belgium and Sweden) at least half of all enterprises were engaged in innovative activities.

More innovative products?

Table 2: Share of innovative enterprises which introduced new or improved products to the market by size class, CIS 3 (2000) and CIS 4 (2004), EU-27 and selected countries

	CIS 3 - 2000				CIS 4 - 2004			
	Total	10 to 49 employees	50 to 249 employees	More than 250 employees	Total	10 to 49 employees	50 to 249 employees	More than 250 employees
EU-27	38.4	36.5	39.9	49.3	35.9	33.2	39.6	49.2
BE	36.1	32.3	42.2	52.3	40.7	38.5	44.0	53.1
BG	53.6	53.3	52.5	59.5	56.4	57.6	52.9	58.6
CZ	38.2	35.2	41.2	46.3	41.5	39.0	44.4	48.3
DK	50.9	45.2	62.7	66.7	47.7	46.2	49.3	58.0
DE	30.5	26.8	33.5	45.2	26.9	22.7	31.7	42.1
EE	38.6	39.0	35.7	45.0	41.9	43.7	35.4	44.7
IE	31.7	:	:	:	44.5	38.0	57.2	62.8
EL	40.1	40.3	38.7	44.3	44.4	43.3	47.6	54.2
ES	34.0	33.1	34.8	45.2	20.9	18.0	28.2	43.2
FR	34.7	28.3	37.7	49.0	38.6	34.1	43.3	57.9
IT	54.7	53.1	60.5	64.7	31.1	28.7	37.8	52.2
CY	13.5	11.0	20.8	24.1	14.6	11.6	21.7	40.9
LV	44.8	43.8	46.5	45.6	34.5	33.8	36.4	34.1
LT	46.0	45.5	46.8	47.0	34.5	30.9	38.4	43.8
LU	39.9	:c	28.5	:c	51.6	51.4	48.8	64.2
HU	35.4	38.5	23.5	39.0	36.3	36.5	33.9	40.7
MT	53.7	56.3	56.1	35.0	25.0	25.0	25.0	25.0
NL	41.8	39.8	43.4	51.8	48.3	47.5	48.3	56.8
AT	28.3	19.8	35.4	62.5	48.4	47.3	47.1	64.7
PL	:	:	:	:	46.4	44.8	47.6	50.4
PT	43.4	39.2	48.6	70.0	30.1	27.3	35.8	44.6
RO	80.4	81.4	79.0	80.1	27.9	25.1	29.2	36.2
SI	60.7	67.4	56.4	57.1	46.6	40.8	50.1	58.1
SK	41.5	36.5	46.3	49.1	41.6	39.7	42.6	45.1
FI	62.7	62.3	62.7	64.9	49.6	47.4	52.2	58.0
SE	37.0	39.5	26.9	43.9	52.4	52.8	49.9	56.5
UK	27.5	26.7	27.8	33.3	47.8	47.3	48.2	51.9
IS	21.1	19.8	22.8	32.0	77.6	82.4	59.6	89.5
NO	38.5	39.6	33.4	41.6	36.5	37.6	32.5	38.6

Source: Eurostat – Community Innovation Statistics

CIS 3: EU-27 average of available non-confidential data
c: confidential

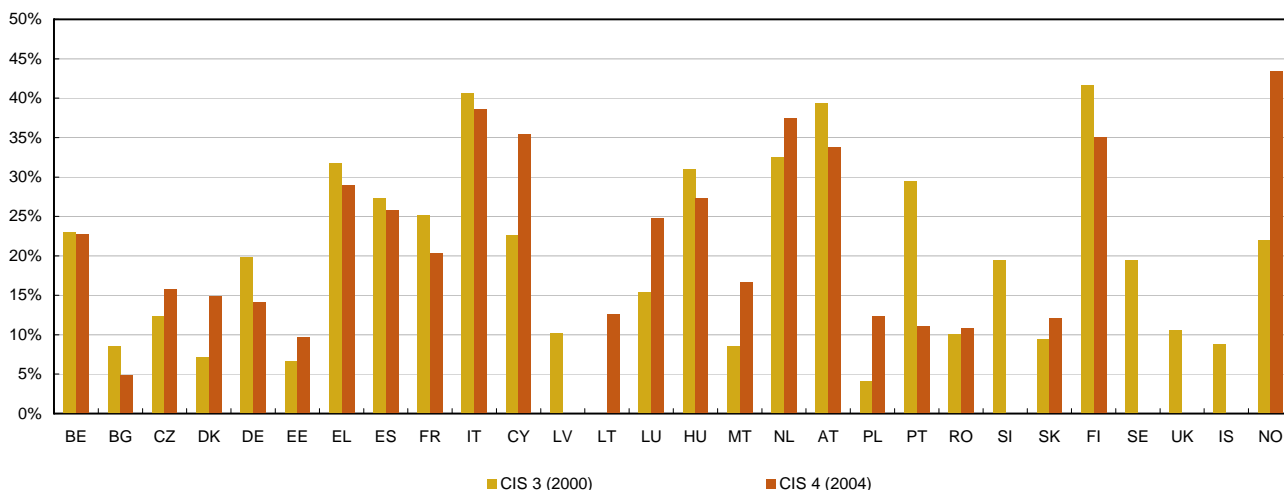
In 2004 almost 36% of the EU-27 enterprises engaged in innovation brought new or significantly improved goods or services onto the market. But the EU average hides national differences. The share varied between 15% in Cyprus and 56% in Bulgaria.

Comparing the results from CIS 3 and CIS 4 reveals that in 15 EU Member States the relative share increased. Among these, the United Kingdom, Austria and Sweden recorded the highest growth in the shares of innovative enterprises which brought new or improved products onto the market, ranging from 15 to 20 percentage points.

At EU-27 level, there is a positive correlation between the size of an enterprise and its propensity to innovate: 49% of the large enterprises with 250 or more employees and 40% of the enterprises with 50 to 249 employees had brought new or improved products onto the market, whereas for enterprises with 10 to 49 employees the share was only 33%. Small and medium-sized enterprises need to join forces with other enterprises much more. Small enterprises never show higher ratios. This correlation holds true in many Member States, but in some countries small enterprises brought more innovative products onto the market than medium-sized ones. This was the case in Bulgaria, Estonia, Luxembourg, Hungary, Austria and Sweden.

Public funding of innovation often stable

Figure 3: Share of innovative enterprises that received public funds, CIS 3 (2000) and CIS 4 (2004), EU-27 Member States and selected countries



Source: Eurostat – Community Innovation Statistics

Commission adopts new state aid Framework for Research, Development and Innovation

The European Commission has adopted a new Framework to clarify to Member States how best they can give state aid to not only research and development but also innovation projects, without infringing EC Treaty state aid rules. This new Research, Development and Innovation (R&D&I) Framework will help Member States wishing to use state aid as a complementary instrument to boost Research, Development and Innovation. The Framework sets out a series of guidelines for specific types of state aid measures – such as aid for R&D projects, aid to young innovative enterprises and aid to innovation clusters – that could encourage additional R&D&I investments by private firms, thus stimulating growth and employment and improving Europe's competitiveness.

The new Framework is due to apply from 1 January 2007.

Source: European Commission, IP/06/1600, 22/11/2006

In 2004 between 5% (Bulgaria) and 44% (Norway) of the enterprises engaged in innovation activities declared that they had received public funds. In the new Member States (2004 and 2007 enlargements) never more than 20% of all innovative enterprises received public funds, with the exceptions of Cyprus and Hungary which reported 36% and 27% respectively in 2004.

There seems to be some convergence towards a share of publicly funded innovative enterprises of between 15% and 20%. Countries in which 20% or more of all innovative enterprises received public funds in 2000 cut the number of enterprises benefiting. On the other side countries where 15% or less of all innovative enterprises received funds in 2000 increased the number of enterprises receiving public subsidies. Exceptions to these rules are Bulgaria, Cyprus and the Netherlands.

Table 4: Share of innovative enterprises that received public funds by source of funds, CIS 4 (2004), EU-27 Member States and Norway

	Enterprises that received funding from local or regional authorities	Enterprises that received funding from central government (including central government agencies or ministries)	Enterprises that received funding from the European Union	Of which enterprises that received funding from the 5th or 6th Framework Programme
Belgium	15.9	9.2	3.6	2.2
Bulgaria	0.5	1.4	3.9	1.2
Czech Republic	2.3	10.9	4.5	3.2
Denmark	2.1	8.7	6.5	3.4
Germany	7.7	7.6	4.0	3.2
Estonia	9.7	8.2	1.8	0.5
Greece	5.5	19.9	19.7	7.8
Spain	18.7	10.3	3.7	1.4
France	8.0	15.1	5.1	1.8
Italy	25.7	14.9	3.3	1.2
Cyprus	0.3	33.8	3.1	1.0
Lithuania	2.1	7.5	5.4	0.6
Luxembourg	3.0	22.4	1.8	1.2
Hungary	2.6	25.5	4.3	1.9
Malta	2.1	14.6	2.8	: c
Netherlands	6.6	32.5	5.6	2.2
Austria	20.6	24.7	9.3	2.6
Poland	:	:	:	:
Portugal	1.1	6.8	5.2	2.9
Romania	2.3	3.2	7.3	1.1
Slovenia	: c	: c	: c	: c
Slovakia	3.4	5.1	5.3	0.6
Finland	6.6	31.2	8.4	4.3
Norway	1.7	42.8	1.9	1.7

Source: Eurostat – Community Innovation Statistics

Enterprises have the possibility to apply for public funds from different national and European authorities. In many countries the majority of innovative enterprises received funding from the central government. However, there are exceptions. In Belgium, Estonia, Spain and Italy more innovative enterprises received funding from regional or local authorities.

In some countries the European authorities played a bigger role in public funding of innovative enterprises than the central government. This is the case in Bulgaria and in Slovakia. In many countries the share of innovative enterprises that received funding from the European Union was higher than the share turning to local or regional authorities as their source of funding.

Often more than 40% of innovative enterprises are engaged in intramural R&D

Innovation activities cover research and development (R&D), investments in a production facility and other preparations to introduce a new product. CIS 4 identified seven different activities related to innovation. The four main ones are analysed in more detail. These are intramural (in-house) R&D, extramural R&D, acquisition of machinery, equipment and software and acquisition of other external knowledge.

In most countries 40% or more of all enterprises engaged in innovation activities undertook intramural R&D during the period from 2002 to 2004. Ireland and France recorded the highest shares of innovative enterprises engaged in in-house R&D, with 86% and 70% respectively. At the other end of the scale came Bulgaria and Poland, with 9% and 14% respectively.

Innovative enterprises were generally less likely to be engaged in extramural R&D, with shares of around 20%.

On average, three out of every four enterprises engaged in innovation activities purchased machinery, equipment and software during the observation period (2002 to 2004).

Compared with acquisition of machinery, equipment and software, purchases of other external knowledge were less predominant.

In these cases the knowledge is often created and used in the same enterprise.

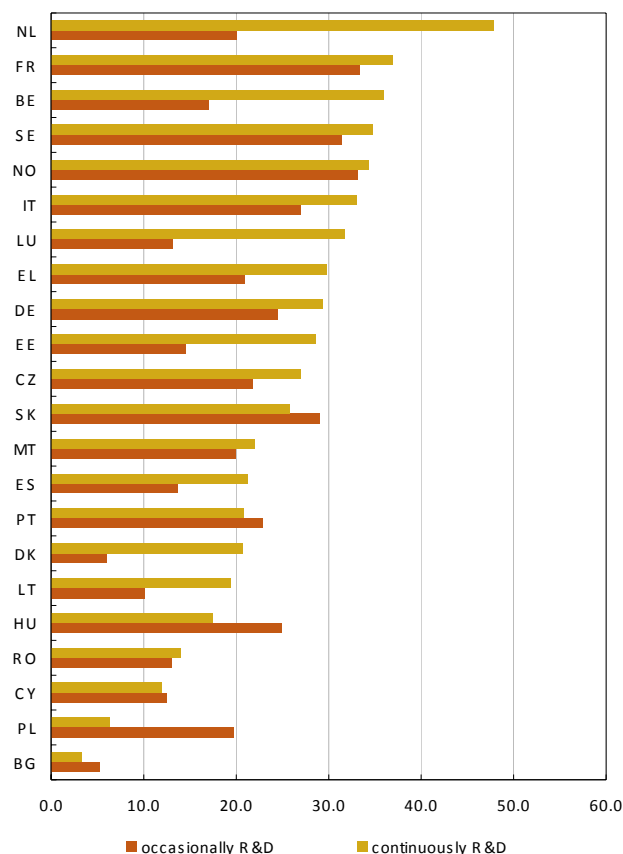
Table 5: Share of innovative enterprises by type of activity, CIS 4 (2004), EU-27 Member States and Norway

	Enterprises engaged in intramural R&D	Enterprises engaged in extramural R&D	Enterprises engaged in acquisition of machinery, equipment and software	Enterprises engaged in acquisition of other external knowledge
EU-27	52.2	22.0	75.1	21.5
Belgium	53.3	26.4	73.4	19.6
Bulgaria	8.6	12.6	65.9	24.5
Czech Republic	48.7	24.3	75.6	24.3
Denmark	40.1	23.2	63.2	35.6
Germany	53.8	20.9	72.9	23.5
Estonia	43.2	23.0	82.6	35.9
Ireland	85.5	22.2	71.4	23.7
Greece	50.6	32.0	91.6	14.7
Spain	34.9	20.3	66.6	12.6
France	70.2	24.9	60.0	23.9
Italy	59.1	21.1	90.6	20.2
Cyprus	24.5	15.5	97.7	33.4
Lithuania	29.6	16.8	86.5	27.2
Luxembourg	45.0	25.0	75.7	24.3
Hungary	42.4	16.1	75.5	17.3
Malta	42.4	9.0	49.3	13.2
Netherlands	67.4	35.0	63.8	24.8
Poland	26.2	9.2	90.7	7.8
Portugal	43.8	29.0	86.0	24.8
Romania	27.7	9.1	78.9	12.8
Slovenia	: c	: c	: c	: c
Slovakia	54.8	26.1	77.3	23.7
Sweden	66.1	28.4	65.5	41.1
Norway	65.9	40.3	30.4	21.9

Source: Eurostat – Community Innovation Statistics

C: confidential. Missing data: Latvia, Austria, Finland and the United Kingdom. EU-27 based only on available data.

Figure 6: Share of innovative enterprises engaged in intramural R&D continuously or occasionally, as a percentage, CIS 4 (2004), EU-27 Member States and Norway



Source: Eurostat – Community Innovation Statistics

On average 22% of all innovative enterprises acquired other external knowledge between 2002 and 2004. Sweden was an exception with a share of 41%. At the other end of the scale came Poland with 8%.

Looking in more detail at intramural R&D, it is possible to distinguish between continuous and occasional involvement in this activity.

The Netherlands led with 48% of all its innovative enterprises continuously engaged in intramural R&D. France ranked second with 37% and Belgium third with 36%.

Turning to the innovative enterprises occasionally engaged in intramural R&D, France ranked first and Norway came second, followed by Sweden.

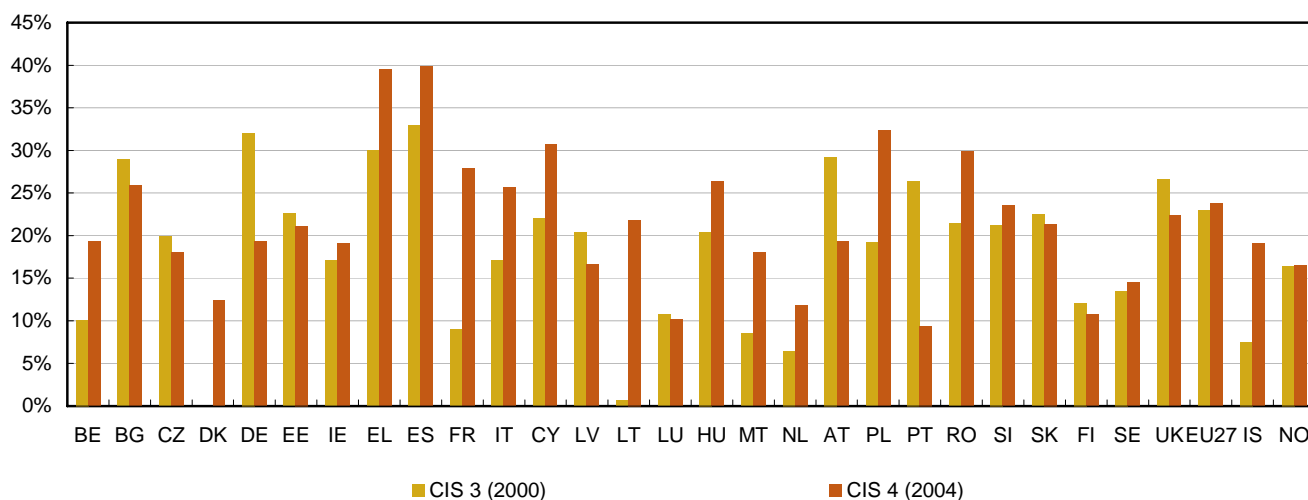
Comparing the results from CIS 4, as shown in Table 5, with those from CIS 3¹ there is one striking point. In 2000 the shares of innovative enterprises engaged in acquisition of machinery, equipment and software were, on average, about 15 percentage points lower, whereas the shares of innovative enterprises engaged in the three other innovation activities did not change significantly. This increase may be explained by the frequent acquisition of computer hardware and software which also falls into this category.

¹ Data not shown here, but available in Eurostat's NewCronos reference database

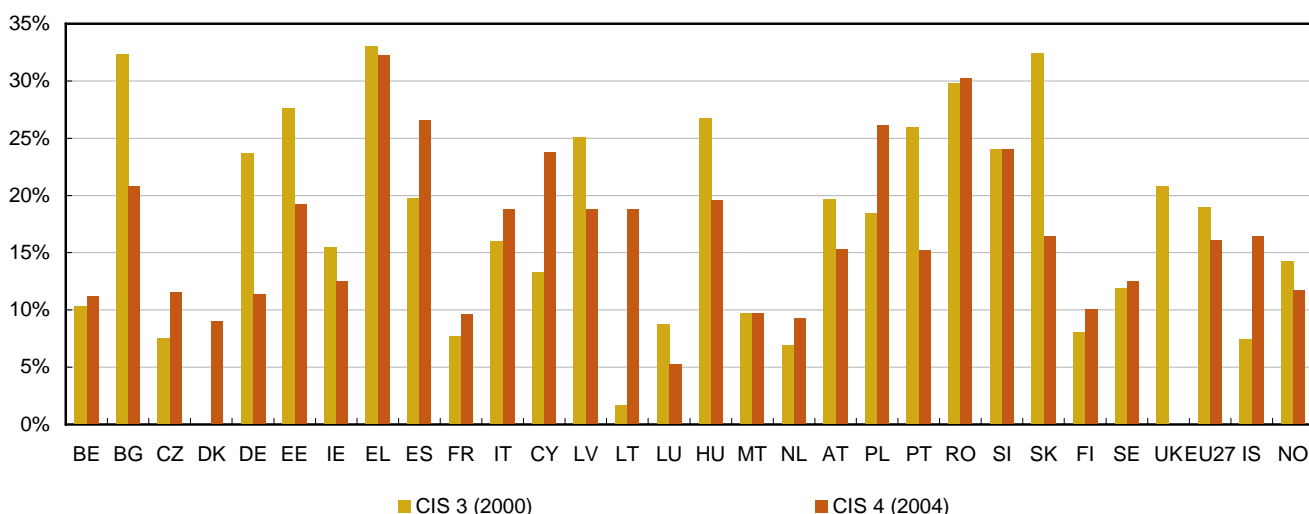
Changing role of factors hampering innovation

Figures 7a and b: Share of innovative enterprises citing two of the major factors hampering innovation, as a percentage, CIS 3 (2000) and CIS 4 (2004), EU-27 and selected countries

Innovation costs too high



Lack of finance from sources outside the enterprise



Source: Eurostat – Community Innovation Statistics

Missing data CIS 4: UK (lack of finance). EU-27 based only on available data.

CIS 4 reveals two factors that hamper innovation in the EU most. The first is that innovation costs are too high and the second lack of finance from sources outside the enterprise.

In 2000 “innovation costs too high” was perceived as the highest barrier to innovative enterprises in Spain (33%), Germany (32%) and Greece (30%). Four years later this factor had become even more important in Spain (40%) and Greece (39%), which were followed by Poland (32%). In general, comparing the results of CIS 3 and CIS 4 this factor seems to be gaining importance for innovative enterprises. Growth of 10

percentage points or more was observed in Lithuania (21%), France (19%), Poland (13%) and Denmark (12%). But in Germany (-13%) and Portugal (-17%) far fewer enterprises felt hampered by this factor.

As for the second factor, in 2000 the highest shares of enterprises engaged in innovative activities hampered by “lack of finance from sources outside the enterprise” were found in Bulgaria (32%), Greece (33%) and Slovakia (32%). Looking at the results from CIS 4, innovative enterprises in Bulgaria, Germany, Portugal and Slovakia were less concerned by lack of finance for innovation.

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

The Community Innovation Survey (CIS) is a survey on innovation activity in enterprises covering EU Member States, candidate countries, Iceland and Norway.

The data are collected on a two-yearly basis (from 2004 onwards). The third survey (CIS 3) was implemented in 2000/2001 in most countries. The latest survey (CIS 4) was carried out in 25 Member States, candidate countries, Iceland and Norway in 2005, based on the reference year 2004.

In order to ensure comparability across countries, Eurostat, in close cooperation with the EU Member States, developed standard core questionnaires for CIS 3 and CIS 4, accompanied by a set of definitions and methodological recommendations.

CIS 3 and CIS 4 are based on the *Oslo Manual* (2nd edition, 1997), which gives methodological guidelines and defines the concept of innovation, and on Commission Regulation No 1450/2004.

This issue of Statistics in Focus compares data compiled from CIS 3 and CIS 4. As the questionnaires for the two surveys are not fully identical, the results are sometimes not fully comparable.

STATISTICAL UNITS

The main statistical unit for both CIS 3 and CIS 4 was the enterprise.

The target population for CIS 3 and CIS 4 was the total population of enterprises (with 10 or more employees) engaged primarily in the following market activities: mining and quarrying (NACE 10-14), manufacturing (NACE 15-37), electricity, gas and water supply (NACE 40-41), wholesale trade (NACE 51), transport, storage and communication (NACE 60-64), financial intermediation (NACE 65-67), computer and related activities (NACE 72), architectural and engineering activities (NACE 74.2) and technical testing and analysis (NACE 74.3).

TYPE OF SURVEY

Most Member States and other countries carried out CIS 3 and CIS 4 by means of a stratified sample survey, while a number used a census or a combination of the two.

The enterprise size classes referred to in this publication are:

- small: 10-49 employees;
- medium-sized: 50-249 employees;
- large: 250+ employees.

The economic activities covered by this publication are based on the NACE Rev. 1.1 classification. The two sectors used are:

- **industry**, which includes mining and quarrying (NACE C), manufacturing (NACE D) and electricity, gas and water supply (NACE E); and
- **services**, which includes NACE I and J plus NACE divisions 51, 72, 74.2 and 74.3.

The CIS 3 and CIS 4 data are organised in the Eurostat reference database following broadly the same structure as the questionnaire.

REFERENCE PERIOD

CIS 3 covered the observation period 1998-2000 inclusive, i.e. the three-year period from the beginning of 1998 to the end of 2000. The reference period for CIS 3 was the year 2000.

Norway used the period 1999 to 2001 instead of 1998 to 2000. Spain used an earlier version of the CIS 3 core questionnaire than the other countries. The Czech Republic, Hungary, Latvia, Lithuania and Slovakia chose 1999-2001 as the observation period, while Romania opted for 2000-2002. Slovenia used a two-year observation period (2001-2002) and Bulgaria 2001-2003.

The data for Poland are generally based on the observation periods 1998-2000 for industry and 1997-1999 for services.

CIS 4 covered the observation period 2002-2004 inclusive, i.e. the three-year period from the beginning of 2002 to the end of 2004. The reference period for CIS 4 was the year 2004.

All the countries covered collected data for this observation period; only the Czech Republic took 2003-2005 as the observation period.

DEFINITION

[OSLO MANUAL 1997](#)

Innovation: a new or significantly improved product (good or service) introduced to the market or a new or significantly improved process introduced within an enterprise. Innovations are based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by the enterprise.

Enterprises engaged in innovation activity (propensity to innovate): enterprises that introduce new or significantly improved products (goods or services) to the market or enterprises that implement new or significantly improved processes. Innovations are based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by the enterprise. The term covers all types of innovator, i.e. product innovators, process innovators and enterprises with only ongoing and/or abandoned innovation activities.

Intramural (in-house) R&D: Creative work undertaken within the enterprise to increase the stock of knowledge and use it to devise new and improved products and processes (including software development).

Extramural R&D: Same activities as above, but performed by other companies (including other enterprises within the same group) or by public or private research organisations and purchased by the enterprise.

Acquisition of machinery, equipment and software: Acquisition of advanced machinery, equipment and computer hardware or software to produce new or significantly improved products and processes.

Acquisition of other external knowledge: Purchase or licensing of patents and non-patented inventions, know-how and other types of knowledge from other enterprises or organisations.

SYMBOLS AND ABBREVIATIONS

c Confidential data

: Not available

Data presented in this publication reflect the data available in Eurostat's reference database on 16 March 2007.

Further information:

Data: [EUROSTAT Website/Home page/Science and technology/Data](#)

Science and technology

 [Community innovation survey](#)

 [Results of the fourth community innovation survey \(CIS4\)](#)

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