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## Quality in the focus of innovation

First results of the 2006 Community Innovation Survey

According to the 2006 Community Innovation Survey (CIS 2006), participation in innovation activity differs widely across countries and economic sectors. The main focus of the CIS is placed on product and/or process innovators.

The size of the enterprise seems to be a key factor in terms of innovation. This publication aims to shed light on why, at EU level, less than one third of small enterprises engaged in innovation activity introduced new or improved products to the market, whereas this was the case for close to half of large enterprises.

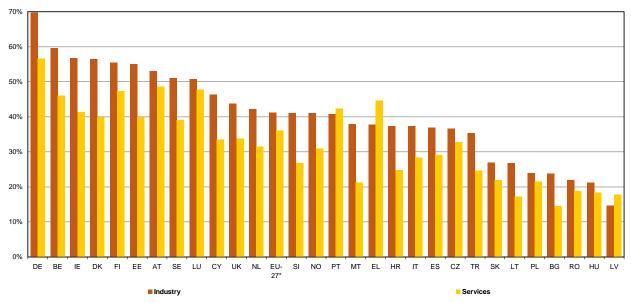
On average, turnover from new or significantly improved (new-to-market) products accounted for 10% of the total turnover of enterprises engaged in innovation activity.

Cooperation does not seem to be a necessary precondition for enterprises to innovate. However, more than half of innovative enterprises were engaged in cooperation in their innovation activities in Cyprus, Finland, Lithuania and Slovenia.

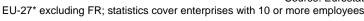
The effect most cited as being highly important for the enterprises engaged in innovation activity is to improve the quality of the services and goods they offer, whereas the 'green' side of innovation is still rather weak.

Innovation often involves more than one department of an enterprise. Alongside product and/or process innovation, a large majority of enterprises also introduced organisational and/or marketing innovations.

Figure 1: Enterprises engaged in innovation activity as a share of all enterprises, industry and services, 2006 (%)



Source: Eurostat – Community Innovation Statistics, 2006, inn\_cis5\_prod





The CIS defines enterprises with innovation activity as the sum of novel product and/or process innovators and enterprises with only ongoing and/or abandoned innovation activities. In most countries, less than 5% of enterprises have only ongoing and/or abandoned innovation activities. Novel product and/or process innovators include enterprises with product innovation, process innovation, or both. As product and process innovation often go hand-in-hand, this group accounts for the largest share in most countries. As shown in Figure 1, the industrial sector is generally more engaged in innovation activities than the services sector. At EU-27 level (excluding France), 41.2% of enterprises in industry and 36.0% of enterprises in services were active in innovation.

The "Land of ideas" nation-branding initiative can help explain why Germany is the undisputed leader in terms of industrial innovation, with almost 70.0% of industrial enterprises engaged in innovation activity. Germany was also ahead in the services sector, with 56.6% of service enterprises engaged in innovation activity. (See <a href="http://www.land-of-ideas.org/">http://www.land-of-ideas.org/</a>) In new Member States, the share of enterprises

In new Member States, the share of enterprises engaged in innovation activity was generally below the EU-27 average. However, the case of Estonia should be mentioned, as it recorded shares above the EU average in both sectors. These figures may be a sign that Estonian enterprises are embracing innovation and that the new "Knowledge-based Estonia" strategy will be bearing fruit. (See www.akadeemia.ee)

## The manufacturing and computer sectors are the most active in innovation

Table 1 takes a closer look at innovation activity by economic sector and size of enterprises. The focus is on enterprises which introduced new or improved products *new to the market*. It is important to

distinguish those from enterprises that introduced new or improved products only *new to the enterprise* but already existing on the market.

Table 1: Enterprises which introduced new or improved products to the market, as a share of

enterprises engaged in innovation activity, by sector and size-class, 2006 (%)

					Industry			Services						
	Total	Enterpri	ses with in	novation	Total	Mining	Manufac-	Electricity,	Total	Wholesale	Transport,	Financial	Computer	74 Core:
			ity by numl			and	turing	gas and		trade and	storage	interme-	and	Other
			employees			quarrying	Ü	water		commission	and	diation	related	business
								supply		trade,	commu-		activities	services
										except of	nication			(NACE
										motor				74.2, 74.3)
										vehicles and				
		10 to 49	50 to 249	above 250						motorcycles				
EU-27*	32.6	29.7	36.8	47.5	34.0	:	34.6		30.3	31.7	17.8	29.1	:	:
BE	41.3	38.6	44.0	65.3	41.6	:	41.7	:	41.0	44.0	17.4	47.3	60.6	52.5
BG	41.3	38.6	46.2	45.7	42.0	33.3	42.3	24.0	39.4	32.6	28.7	45.2	71.1	36.6
CZ	38.9	32.5	48.3	51.3	42.7	34.5	43.4	14.2	32.8	35.6	10.8	44.7	48.2	28.9
DK	33.8	30.9	37.9	50.6	36.6	:	36.2	:	30.9	29.5	13.9	23.6	53.1	31.2
DE	30.4	25.9	35.3	47.7	35.0	5.8	35.6	5.9	25.5	32.1	17.2	22.9	31.6	21.6
EE	32.8	32.9	32.1	37.0	30.4	19.0	31.3	7.9	36.9	44.3	20.4	45.7	48.4	26.9
ΙE	40.8	38.0	47.0	51.6	43.7	5.6	44.3	:	38.3	34.1	27.6	29.5	:	32.7
EL	49.5	48.1	50.2	70.7	52.2	4.5	52.9	17.6	46.8	50.9	31.3	36.9	58.3	48.7
ES	18.3	14.8	26.0	39.5	20.8	12.8	21.0	15.4	13.9	8.0	6.2	18.6	40.7	21.7
FR	:	:	:	:	:	:	51.2	:	:	:	:	:	:	:
IT	29.5	26.8	37.2	50.1	31.7	7.5	32.0	11.8	22.7	21.5	10.0	22.4	41.0	30.5
CY	34.5	30.9	42.3	52.2	36.7	10.0	37.9	25.0	31.3	24.3	31.8	36.2	68.8	33.3
LV	44.7	49.7	33.8	41.9	45.6	:	46.7	10.0	44.0	35.7	41.5	77.8	56.9	35.3
LT	36.0	36.8	32.4	38.5	32.9	:	34.2	9.3	41.2	48.7	19.8	61.3	81.5	50.0
LU	58.9	59.3	52.6	75.4	54.3	:	53.8	:	60.6	69.4	42.5	54.4	80.2	:
HU	30.9	30.1	29.5	38.2	30.7	11.1	31.7	4.4	31.4	30.2	24.7	24.5	39.5	43.6
MT	31.3	29.4	29.2	47.6	33.6	:	34.0	:	28.4	27.0	15.8	:c	45.5	:
NL	48.1	46.1	50.8	59.5	50.1	60.0	49.9	58.1	46.5	47.3	25.3	34.8	64.7	52.3
AT	45.4	42.1	48.8	65.0	47.1	64.7	47.1	37.3	43.8	48.6	24.3	30.5	60.6	60.2
PL	32.7	33.1	30.6	37.5	31.8	31.7	33.0	4.8	34.6	30.6	22.3	33.1	75.3	40.1
PT	29.8	26.5	37.1	48.4	29.5	25.2	29.7	17.2	30.3	28.7	17.5	40.4	74.0	23.6
RO	24.7	22.1	26.6	33.9	26.5	15.9	26.9	11.4	21.5	18.7	17.8	29.3	36.0	29.1
SI	51.1	52.5	44.9	59.4	50.2	:	:	:	53.2	44.7	39.4	55.8	76.8	51.3
SK	37.6	34.7	39.8	43.8	38.3	11.1	38.9	22.7	36.4	39.5	23.3	47.9	42.7	31.8
FI	44.6	44.3	40.7	58.1	44.1	15.8	46.0	11.2	45.3	51.1	29.4	48.3	:	:
SE	51.3	49.3	55.8	58.4	50.2	u	51.0	u	52.4	u	u	47.8	u	u
UK	31.6			39.8	30.6	:	30.7	:	32.6		20.3	19.4	46.8	28.1
HR	31.7			47.5		4.5	37.9	7.7	25.6		31.1	40.0	50.0	16.7
TR	59.6	62.3	50.5	52.9	61.2	50.2	61.8	25.5	55.6	57.0	42.6	39.2	69.2	77.1
NO	39.9	40.6	37.0	42.0	35.5	43.3	36.7	1.4	44.8	51.4	11.6	19.2	54.7	43.9

Source: Eurostat - Community Innovation Statistics, 2006, inn cis5 prod

EU-27\* excluding FR, except for Manufacturing excluding SI; statistics cover enterprises with 10 or more employees; FR: Manufacturing (NACE D) includes only enterprises with > 50 employees

Larger enterprises seem to be more innovative as they often accounted for significantly higher shares than the overall proportion of enterprises engaged in innovation activity. However, it should be noted that, in the EU, large enterprises account for only 4% of enterprises engaged in innovation activity, whereas small enterprises make up 79% of all innovative enterprises. Therefore, although a lower share of small enterprises introduced new or improved products to the market, small enterprises outnumber their larger counterparts by a wide margin. The impact of small enterprises on innovation is therefore far more substantial than the table suggests.

Considering innovation by sector of activity reveals that the highest shares of enterprises which introduced new or improved products to the market were found in the manufacturing sector. At EU level, 34.6% of innovative enterprises in this sector introduced new or improved products to the market, whereas this was the case for 30.3% of innovative enterprises in the services sector.

Innovation in the services sector is dominated by enterprises engaged in computer and related activities, which can partly be explained by the fast pace of technological advances in computers and related software. This share varies from 31.6% in Germany to over 80% in Luxembourg and Lithuania. The comparison of these shares should take into account that the share of enterprises engaged in innovation activity varies considerably across countries (see Figure 1).

# New-to-market innovations accounted for 10% of turnover in innovative enterprises in the EU

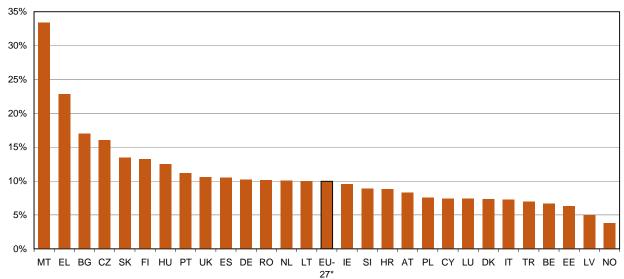
Product innovations cover goods and services with characteristics or intended uses that differ significantly from already existing products produced by the enterprise. These improvements include significant changes in technical specifications, components and materials, incorporated software, user-friendliness or other functional characteristics. Examples may include environmentally friendly plastics or breathable textiles.

The effects of innovation can also be measured in financial terms. In 2006, new or significantly improved products comprised about 10% of the total turnover of EU enterprises engaged in innovation activity. Most countries were close to the EU average.

In Malta, however, new-to-market products accounted for more than 33.4% of the total turnover of innovative enterprises. This share is quite exceptional, but can be partly explained by the size of the semiconductor industry in relation to the island's economy.

Relative figures are useful in comparing small and large countries, but absolute figures are better suited to represent the volumes involved. In Germany the turnover from new-to-market products amounted to EUR 340 billion, against EUR 6 billion in Romania.

Figure 2: Share of turnover from new or significantly improved products (new-to-market) in the total turnover of enterprises engaged in innovation activity, 2006 (%)



Source: Eurostat – Community Innovation Statistics, 2006, inn\_cis5\_prod EU-27\* excluding missing countries FR and SE; statistics cover enterprises with 10 or more employees

## In Cyprus, Finland, Lithuania and Slovenia more than half of enterprises were engaged in cooperation

Cooperation is often praised as a central source of innovation. In theory, creating knowledge collaboratively means to jointly give birth to new ideas, to further develop early concepts into market-oriented innovations and to accept that the boundaries of an organisation are no longer boundaries of value creation. However, how does theory translate into practice? Are the countries with the highest shares of enterprises engaged in cooperation for innovation also those that are the most innovative?

Table 2: Share of enterprises with innovation activity engaged in cooperation for innovation, by location, 2006 (% of innovative enterprises)

	Total	National	other Europe	All other countries
EU-27*	24.9	:	:	:
BE	35.0	32.0	20.2	7.4
BG	21.2	16.9	11.6	6.1
CZ	38.3	33.3	23.7	7.4
DK	34.2	25.7	16.9	13.7
DE	16.7	:	:	:
EE	39.5	30.5	26.7	6.1
IE	27.0	:	:	:
EL	34.8	31.5	15.7	2.8
ES	17.0	15.8	3.9	1.6
IT	13.5	:	:	:
CY	68.8	66.3	37.2	15.4
LV	39.1	36.9	21.8	8.5
LT	51.2	47.3	36.2	8.5
LU	33.3	25.1	28.8	11.8
HU	39.0	36.2	16.8	3.8
MT	23.6	15.4	17.9	7.7
NL	38.3	35.0	19.3	9.0
AT	38.9	32.8	23.4	7.5
PL	48.2	43.2	21.8	6.7
PT	18.1	16.6	9.3	3.5
RO	16.5	16.4	8.1	2.5
SI	50.2	45.8	38.1	13.1
SK	35.8	29.7	30.4	8.9
FI	57.7	57.3	32.9	18.0
SE	40.0	37.0	23.6	9.4
UK	29.5	:	:	:
HR	35.6	33.3	20.7	6.6
TR	18.0	17.0	4.3	1.3
NO	29.6	23.0	11.7	8.0

Source: Eurostat – Community Innovation Statistics, 2006, inn\_cis5\_coop

EU-27\* excluding FR; statistics cover enterprises with 10 or more employees

In Cyprus, Finland, Lithuania and Slovenia more than half of innovative enterprises are engaged in cooperation for innovation, but only Finland counts among the leading countries when considering overall innovation activity.

On the other hand, countries with the highest shares of innovative enterprises, such as Germany, Belgium and Ireland, recorded comparatively low shares of innovation cooperation, with 16.7%, 35.0% and 27.0% respectively.

However, it should not be concluded from this that cooperation has a limited impact on innovation. Indeed, the share for Germany is rather low not because it has few enterprises engaged in cooperation, but because the share of innovative enterprises in the German economy is very high. In absolute terms Germany is the leader at EU level, with 11 044 enterprises engaged in cooperation for innovation.

In most countries, cooperation is strongest at national level, followed by cooperation at European level. Cooperation shares with the rest of the world were over 10% in only five countries: Finland, Cyprus, Denmark, Slovenia and Luxembourg. As enterprises included in the CIS could select several locations, the total value is lower than the sum of the locations.

A possible explanation why smaller countries tend to have a higher level of international cooperation is because the larger the country, the lower its need for cooperation. But the size of the country is only one aspect among others: in most cases, the level of cooperation for innovation can also be explained by a mixture of historic, geographic, political and economic factors.

Finally, how can there be collaboration in a context where the relationship between enterprises is defined more by competition than cooperation? Cooperation can take place between enterprises and their suppliers or clients. Joint industry-university research and development projects are the result of cooperation between business enterprises and the higher-education sector.

The statistics shown can give an indication of the degree of cooperation for innovation, but it would be hazardous to draw further conclusions on the role of cooperation in innovation.

## Innovation improves the quality and range of goods and services offered

The CIS collects information on the most important effects of innovation. The effects reported by enterprises may give an indication of corporate motivations to innovate.

Product-oriented effects were cited most frequently in a majority of countries. Priority is given to improving the quality and range of goods and services. This comes as no surprise, as these effects reflect the objective of any profit-making organisation. Improving the quality and range of products is the best way for an enterprise to remain in business.

In Luxembourg, 57.7% of innovative enterprises considered that a highly important effect of innovation was an *increased range of goods and services*, and 62.1% mentioned *increased quality of goods and services*. At the other end of the scale,

these two effects were cited by only 9.1% and 5.8% respectively of Greek enterprises.

The shares vary significantly across countries as enterprises could cite more than one important effect. Whereas in most cases only one effect was chosen in Finland, Greece and Denmark, three effects were often mentioned in Luxembourg, and four or five were frequently given in Cyprus.

At EU level the lowest shares were recorded for the two effects which hint towards 'greener' innovation: reduced materials and energy per unit output and reduced environmental impacts or improved health and safety. It seems that for a majority of innovative enterprises ecological aspects remain a by-product of innovation rather than a priority.

Table 3: Share of enterprises engaged in innovation activity that cited the following effects as being highly important, 2006 (% of innovative enterprises)

	Produ	ct-oriented e	ffects	Process-oriented effects				Other		
	Increased range of goods and services	Entered new markets or increased market share	Improved quality in goods or services	Improved flexibility of production or service provision	Increased capacity of production or service provision	Reduced labour costs per unit output	Reduced materials and energy per unit output	Reduced environmental impacts or improved health and safety	Met regulation requirements	
EU_V	31.6	24.9	35.5	23.7	26.5	15.2	10.9	14.6	18.0	
BG	38.2	30.1	38.9	21.0	21.7	15.9	13.2	20.9	25.3	
CZ	39.3	28.8	38.2	25.4	26.1	18.2	14.2	13.8	7.2	
DK	18.6	15.8	16.6	15.3	18.8	11.5	7.3	5.3	9.2	
EE	29.8	25.7	27.2	20.0	20.5	14.3	7.8	8.4	6.8	
EL	9.1	11.6	5.8	8.3	9.2	26.2	20.7	12.9	11.3	
ES	25.2	18.6	33.5	22.6	27.4	12.9	8.5	13.4	19.8	
CY	45.4	38.0	57.5	69.8	62.4	29.2	19.9	38.0	56.1	
LV	27.9	15.8	26.6	16.4	17.3	6.2	5.4	6.3	13.9	
LT	32.4	28.0	34.4	25.0	30.5	10.7	8.5	9.9	25.2	
LU	57.7	45.1	62.1	35.2	33.6	12.9	6.8	12.9	28.5	
HU	32.4	26.2	37.2	21.9	22.3	6.2	7.2	13.6	19.8	
MT	27.7	15.9	31.3	21.0	18.5	11.8	7.7	8.7	20.0	
NL	44.8	38.8	44.0	31.8	31.6	16.6	10.5	11.7	14.6	
AT	39.4	33.7	48.7	30.0	27.8	11.9	9.7	13.4	18.5	
PL	36.1	26.9	38.1	20.8	25.7	13.8	11.6	18.5	24.7	
PT	34.1	25.4	44.3	31.2	36.5	22.4	15.0	24.1	25.6	
RO	37.0	29.4	41.7	28.2	34.1	18.3	14.8	23.7	20.9	
SK	38.1	23.1	41.6	28.5	27.2	8.0	10.8	13.8	13.4	
FI	16.5	15.5	17.0	14.4	15.3	10.7	5.2	7.2	9.6	
SE	32.9	24.3	34.2	18.4	23.1	17.0	u	14.0	17.8	
HR	39.1	32.8	52.3	34.5	32.2	19.9	15.1	18.0	31.5	
TR	38.3	32.6	49.5	39.4	39.4	18.0	10.2	21.6	28.8	

Source: Eurostat - Community Innovation Statistics, 2006, inn\_cis5\_eff

Statistics cover enterprises with 10 or more employees EU\_V based on available country data

## Innovation in organisation and marketing

Enterprises engaged in innovation activity can introduce product innovation, process innovations, or both. Figure 3 presents the shares of enterprises engaged in innovation activity that introduced organisational and/or marketing innovations. These shares range from 86% in Greece to 46% in Bulgaria. The EU average of 77%, which is based on data available in 20 Member States, indicates that more than two thirds of European enterprises engaged in innovation activity were also active in organisational and/or marketing innovation.

Innovation and organisation often go hand in hand. In this context, Joseph Schumpeter's coinage of 'creative destruction' seems particularly appropriate. Schumpeter is often cited as one of the fathers of the innovation theories. For instance, the introduction of DVD technology has gradually ousted the production of video tapes and video recorders. Such innovations may lead to the opening of new markets, which may in turn require a new organisation or significant changes in the existing organisation.

A process innovation, such as the introduction of new technology in a company, may also lead to changes in the organisation of the enterprise. However, if this new technology is applied in only one unit of the enterprise, the innovation cannot be considered to be an organisational innovation. Organisational innovations include changes in knowledge management systems, improvements in work organisation or changes in external relations.

Marketing and innovation are also related. Innovation needs marketing because it is necessary to know the needs of potential clients before creating a new

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product; similarly, once the product has been developed, the clients need to be informed. The use of marketing measures is also often necessary, as potential clients are not always aware of the benefits of the new goods or services. New technologies need to be explained and understood. Failing this they may be rejected by customers.

New technologies such as the Internet have paved the way for marketing innovations. Nevertheless, as regards organisational innovation, it is also possible for non-innovative enterprises to carry out marketing innovation. This is the case when, for example, only the design or labelling of an existing product is changed or if an enterprise which advertises in the printed press opens a website and sends out promotional offers by e-mail.

#### **EUROPEAN INNOVATION SCOREBOARD 2008**

The eighth edition of the European Innovation Scoreboard (EIS) provides a comparative assessment of the innovation performance of EU Member States, under the EU Lisbon Strategy. The methodology for the 2008 EIS is revised compared to that of 2007 with a stronger focus on services, non-technological aspects, and outputs of innovation. The analysis of trends over time is now based on changes in the absolute values of the indicators over a five year period, rather than the previous approach of measuring trends relative to the EU average.

The EIS report and its Annexes, accompanying thematic papers and the indicators' database are available at http://www.proinno-europe.eu/metrics

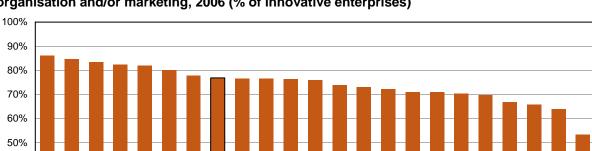


Figure 3: Share of enterprises engaged in innovation activity that introduced innovations in organisation and/or marketing, 2006 (% of innovative enterprises)



EU average based on available countries, IE and SI cover only organisational innovation; statistics cover enterprises with 10 or more employees

40% 30% 20% 10% 0%

### **METHODOLOGICAL NOTES**

## **Community Innovation Survey**

The Community Innovation Survey (CIS) is a survey of innovation activity in Europe.

The data are collected on a two-yearly basis (as from 2004). The latest survey (CIS 2006) was carried out in 27 Member States, two candidate countries (Croatia and Turkey) and Norway in 2007 based on the reference year 2006.

In order to ensure comparability across countries, Eurostat, in close cooperation with the EU Member States and other countries, developed standard core questionnaires for CIS 2006, with an accompanying set of definitions and methodological recommendations.

CIS 2006 is based on the *Oslo Manual* (2nd edition, 1997), which gives methodological guidelines and defines the concept of innovation, and on Commission Regulation (EC) No 1450/2004.

The European Commission accorded on 22 July 2005 a derogation to France concerning CIS 2006 data. Due to the derogation, CIS 2006 data for France cover only the manufacturing sector (NACE D) for enterprises with more than 50 employees.

This Statistics in Focus compares data compiled on the basis of the CIS 2006 survey.

#### STATISTICAL UNITS

The main statistical unit for CIS 2006 was the enterprise, as defined in Council Regulation (EEC) No 696/1993 on statistical units or as defined in the national statistical business register. EU Regulation (EEC) No 2186/1993 requires Member States to set up and maintain a register of enterprises as well as associated legal units and local units.

#### TARGET POPULATION

The population of CIS 2006 is determined by the size of the enterprise and its principal activity. At least all enterprises with 10 or more employees in any of the specified sectors were included in the statistical population.

The target population of CIS 2006 was the total population of enterprises with 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 2006 by means of a stratified sample survey, while a number of countries used a census or a combination of both.

The CIS 2006 data are organised in the Eurostat reference database following broadly the same structure as the harmonised survey questionnaire.

The enterprise size classes referred to in this publication are:

small: 10–49 employees

• medium-sized: 50-249 employees

• large: 250+ employees

#### REFERENCE PERIOD

For CIS 2006 the observation period covered was 2004–2006 inclusive, i.e. the three-year period from the beginning of 2004 to the end of 2006. The reference period for CIS 2006 was 2006.

#### **DEFINITIONS** (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 the 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 the 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.

An *organisational innovation* is the implementation of new or significant changes in firm structure or management methods that are intended to improve the firm's use of knowledge, the quality of its goods and services, or the efficiency of work flows.

A *marketing innovation* is the implementation of new or significantly improved designs or sales methods to increase the appeal of goods and services or to enter new markets.

## **COUNTRY CODES**

BE	Belgium	HU	Hungary
BG	Bulgaria	MT	Malta
CZ	Czech Republic	NL	Netherlands
DK	Denmark	ΑT	Austria
DE	Germany	PL	Poland
EE	Estonia	PT	Portugal
ΙE	Ireland	RO	Romania
EL	Greece	SI	Slovenia
ES	Spain	SK	Slovakia
FR	France	FI	Finland
IT	Italy	SE	Sweden
CY	Cyprus	UK	United Kingdom
LV	Latvia	HR	Croatia
LT	Lithuania	TR	Turkey
LU	Luxembourg	NO	Norway

#### STATISTICAL SYMBOLS

not available

u unreliable due to small sample size

c confidential

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