Statistics in focus

INDUSTRY, TRADE AND SERVICES

44/2005

Author

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Contents

Manuscript completed on: 24.11.2005
Data extracted on: 01.06.2005
ISSN 1561-4840
Catalogue number: KS-NP-05-044-EN-N

The pharmaceutical industry in the European Union

More than half a million people employed

In 2002 more than half a million people were employed in the pharmaceutical industry in the EU (see box below). This corresponds, on average, to more than a quarter of the total number employed in the whole chemical industry but only to 0.5 % of the whole non-financial business economy (see Figure 1 below). Although employment is low, the equivalent share for value-added was considerably higher, suggesting a high productivity level.

At the same time, the high value-added for Ireland exemplifies the extent to which foreign ownership of enterprises, outsourcing of activities and accounting practices of multinational enterprises can affect how value-added and employment are assigned to countries.

Figure 1: Share of pharmaceutical industry (NACE DG24.4) in the non-financial business economy as a whole (NACE C-K, excl. J) for two key characteristics: value-added and number of persons employed (2002)

BE, LV, MT, UK: 2001.
Source: Eurostat (SBS).

Apart from Ireland, the pharmaceutical industry also contributed to a larger than average extent to the economies of Slovenia, Sweden, Belgium, Denmark and Hungary. Remarkably, France is the only one of the largest five European economies where the share of the pharmaceutical industry significantly exceeds the EU-25 average.

However, France, the United Kingdom and Germany were the largest contributors to EU-25 value-added in absolute terms (around EUR 10 billion each), with shares ranging between 15 % and 20 % of the EU-25 total. The high figures for France and Germany coincide with high employment (105 573 and 113 654 employees respectively — see Table 1).

France was also the largest contributor to turnover, accounting for one quarter of the entire turnover in the EU-25, with Germany having the second largest contribution of nearly 16%.

The pharmaceutical industry as examined in the present publication, corresponds to the classification NACE Rev. 1.1 Section D, sub-section DG, group 24.4 ('Manufacture of pharmaceuticals, medicinal chemicals and botanical products') which covers both the 'Manufacture of basic pharmaceutical products' (class 24.41) and the 'Manufacture of pharmaceutical preparations' (class 24.42). Hence, Biotechnology cannot be separately identified in official statistics.

Interestingly, Italy had 704 pharmaceutical enterprises, compared to 586 enterprises in France, 481 in the United Kingdom and 425 in Germany. However, there were huge differences between countries as regards the average enterprise size. Whereas in 2002, a pharmaceutical enterprise in the EU-25 employed on average 149 persons, the German enterprises were on average almost twice as large. At the other end of the scale was Malta, where on average only 23 persons were employed per enterprise. The large number of enterprises in Italy are predominantly small, which is reflected in the below average enterprise size (102 persons). One reason for this is that Italy is the only major manufacturer of 'basic pharmaceutical products' and the average enterprise in this class of the industry is smaller.

With this information at hand, it is possible to deduce apparent labour productivity (measured by value-added divided by the number of persons employed). As is evident from Figure 1, Ireland clearly had the highest rate (EUR 312 000), more than three times higher than the EU-25 average (EUR 99 000). The apparent labour productivity in Sweden, Belgium and the UK was also substantially higher than the EU-25 average. Not surprisingly perhaps, it was considerably below the EU-25 average in the new Member States, with only Slovenia above 50% of this average.

Value-added 40 % higher in the United States than in EU-25

Turnover in the EU-25 was 50 % higher than in the US: EUR 170 billion against EUR 128 billion respectively. A more detailed comparison between the EU-25, the US and Japan is shown in Table 2.

The structure and performance of the pharmaceutical industry are quite different in the EU-25, Japan and the US. Value-added at factor cost was about 40% higher in the US than in the EU-25.

At the same time, the number of persons employed was more than 50 % higher in the EU-25 than in the US and almost six times the number in Japan.

This means that – when comparing employment with value-added – apparent labour productivity was almost five times higher in Japan and more than twice as high in the US. Perhaps unsurprisingly therefore, value-added as a percentage of turnover was quite a lot lower in the EU-25 than in Japan and the US.

Table 2: Comparison of the pharmaceutical industry in the EU-25, Japan and the United States for selected indicators, 2000

	EU-25	JP	US
Value-added at factor cost - in million EUR	50 579	42 133	69 426
Persons employed	542 900	94 681	302 483
Investment - in million EUR *	7 432 (1)	2 734	7 719
Value-added as % turnover	34.6%	65.2%	54.3%
Investment per value-added *	14.7%	6.5%	11.2%
Personnel cost per value-added	51.6%	:	13.3%
Apparent labour productivity (EUR)	93 165	445 000	229 523
Personnel cost per employee (EUR)	48 099	:	56 567

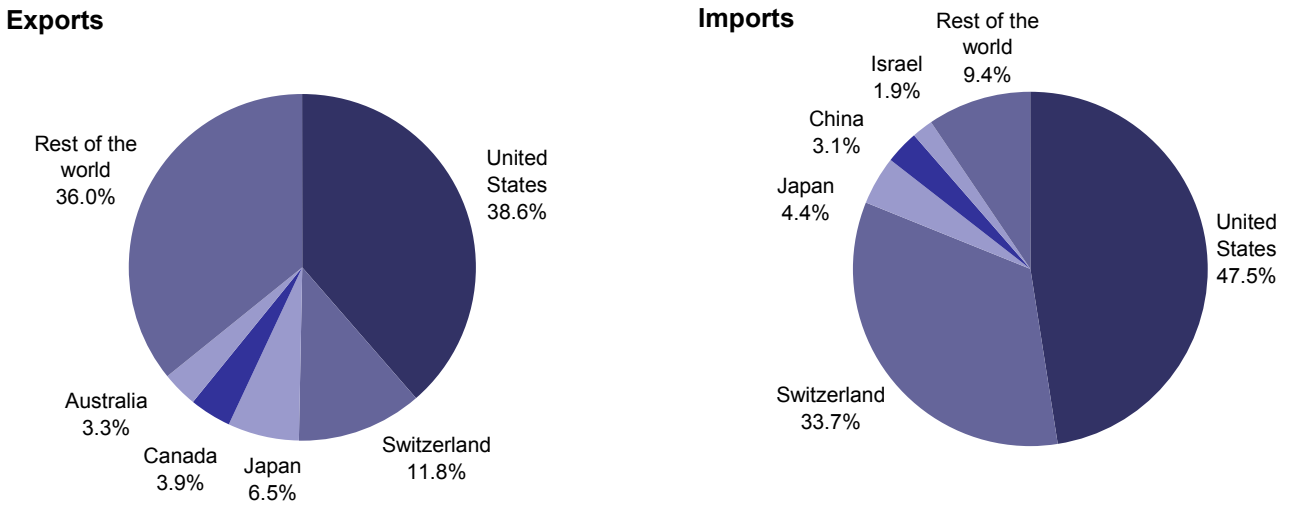
* EU25: tangible investment; JP and US: Gross fixed capital formation.
(1) on the basis of available data. EU-25 calculated aggregate with CZ: 1999 and without EE and LU.
Source: Eurostat (SBS), OECD (JP and US).

Table 1: Main indicators of the Manufacture of pharmaceutical, medicinal chemicals and botanical products (NACE DG 24.4), 2002

	EU-25	BE	CZ	DK	DE	ES	FR	IE	IT	CY	LV	LT	HU	MT
Value-added at factor cost – in million EUR	57 726	3 184	243	1 957	9 398	2 849	10 692	3 069	6 771	32	17	9	644	14
*Share in total EU-25**		*5.5%*	*0.4%*	*3.4%*	*16.3%*	*4.9%*	*18.5%*	*5.3%*	*11.7%*	*0.1%*	*0.0%*	*0.0%*	*1.1%*	*0.0%*
Persons employed	582 800	18 520	8 200	16 404	113 654	35 713	105 573	9 832	72 007	739	1 771	1 219	14 235	367
*Share in total EU-25**		*3.2%*	*1.4%*	*2.8%*	*19.5%*	*6.1%*	*18.1%*	*1.7%*	*12.4%*	*0.1%*	*0.3%*	*0.2%*	*2.4%*	*0.1%*
Number of enterprises	3 899	105	92	82	425	399	586	58	704	10	23	19	103	16
Share in total EU-25		*2.7%*	*2.4%*	*2.1%*	*10.9%*	*10.2%*	*15.0%*	*1.5%*	*18.1%*	*0.3%*	*0.6%*	*0.5%*	*2.6%*	*0.4%*
Turnover – in million EUR	170 624	7 050	663	4 464	27 392	10 215	42 598	5 880	24 396	79	44	29	1 329	39
Share in total EU-25		4.1%	0.4%	2.6%	16.1%	6.0%	25.0%	3.4%	14.3%	0.0%	0.0%	0.0%	0.8%	0.0%
Number of persons employed per enterprise	149	176	89	200	267	90	180	170	102	74	69	64	138	23
R&D spending – in million EUR	:	747	21	:	2 184	:	1 194	:	:	1	:	3	78	0
Value-added per person employed – in thousand EUR	99	172	30	119	83	80	101	312	94	43	10	7	45	39

* on the basis of available data
2001 - BE, CY, LV, MT, SK, UK; 2000 - US, JP.
Source: Eurostat (SBS), OECD (JP and US).

Figure 2: Pharmaceuticals, medicinal chemicals and botanical products (CPA Group 24.4) - Share in extra-EU trade, 2002



Source: Eurostat, Comext.

Another indicator strongly distinguishes the US from the EU-25: personnel costs as a percentage of value-added which was much lower in the US.

The investment rate (investments divided by value added) on the other hand was clearly higher in the EU than in the US and more than twice as high as in Japan.

There are at least three main factors affecting these results: the exchange rate: in 2000 the euro was close to its lowest against the dollar; secondly, the general price level of prescribed medicines; and finally, the structure of the pharmaceutical industry (the inclusion or not of certain ancillary activities).

The EU-25 exported EUR 53.5 billion worth of pharmaceutical products in 2002, which equals around 30 % of the total turnover generated by the industry. At the same time EU-25 imports amounted to EUR 30.7 billion, which means a trade surplus of nearly 23 billion EUR.

The three most important destinations (Figure 2) for EU-25 exports of pharmaceutical products were also the three most important sources of imports, namely the United States, Switzerland and Japan. Together, they accounted for 56.9% of the EU-25's exports and 85.6% of the EU-25's imports.

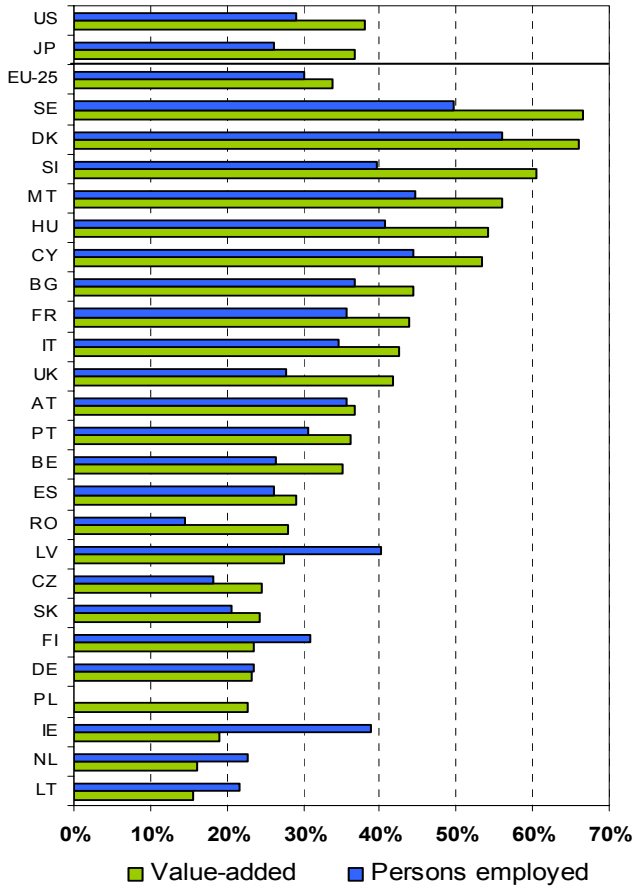
The EU-25 had a trade surplus with both the US and Japan, but a trade deficit with Switzerland.

Table 1: Main indicators of the Manufacture of pharmaceutical, medicinal chemicals and botanical products (NACE DG 24.4), 2002 (continued)

	NL	AT	PL	PT	SI	SK	FI	SE	UK	BG	RO	US	JP
Value-added at factor cost – in million EUR	1 308	855	841	359	308	61	375	3 802	9 789	87	116	69 426	42 133
*Share in total EU-25**	*2.3%*	*1.5%*	*1.5%*	*0.6%*	*0.5%*	*0.1%*	*0.6%*	*6.6%*	*17.0%*				
Persons employed	16 501	9 294	25 811	6 753	5 511	4 067	5 800	21 576	69 393	10 490	9 767	302 483	94 681
*Share in total EU-25**	*2.8%*	*1.6%*	*4.4%*	*1.2%*	*0.9%*	*0.7%*	*1.0%*	*3.7%*	*11.9%*				
Number of enterprises	145	83	216	104	26	20	36	118	481	71	125	:	1 009
Share in total EU-25	*3.7%*	*2.1%*	*5.5%*	*2.7%*	*0.7%*	*0.5%*	*0.9%*	*3.0%*	*12.3%*				
Turnover – in million EUR	7 476	2 407	1 890	1 172	774	238	928	5 783	22 217	229	295	127 879	64 581
Share in total EU-25	4.3%	1.4%	1.1%	0.7%	0.4%	0.1%	0.5%	3.3%	12.8%				
Number of persons employed per enterprise	114	112	119	65	212	203	161	183	144	148	78	:	94
R&D spending – in million EUR	:	185	:	1	66	6	:	1 430	2 036	6	0	:	:
Value-added per person employed – in thousand EUR	79	92	33	53	56	15	65	176	141	8	12	230	445

Chemical industry in Sweden and Denmark highly focussed on pharmaceutical production

Figure 3: Share of pharmaceutical industry (NACE DG 24.4) in the chemical industry (NACE DG 24) in terms of value-added and persons employed, 2002



EU-25, BE, CY, LV, MT, SK, UK: 2001; PL, US and JP: 2000.
Source: Eurostat (SBS), OECD (JP and US).

Figure 3 shows how much of the chemical industry is focussed on pharmaceutical production, measured by its share of total chemical industry value-added and persons employed.

Interestingly, the degree of specialisation is rather similar in the EU-25, Japan and the US.

Within the EU-25, two countries with a significant pharmaceutical industry recorded a high degree of specialisation. In Sweden and Denmark, the pharmaceutical industry accounts for over 65% of value-added in the chemical industry, and for over 50% and 55% of employment respectively.

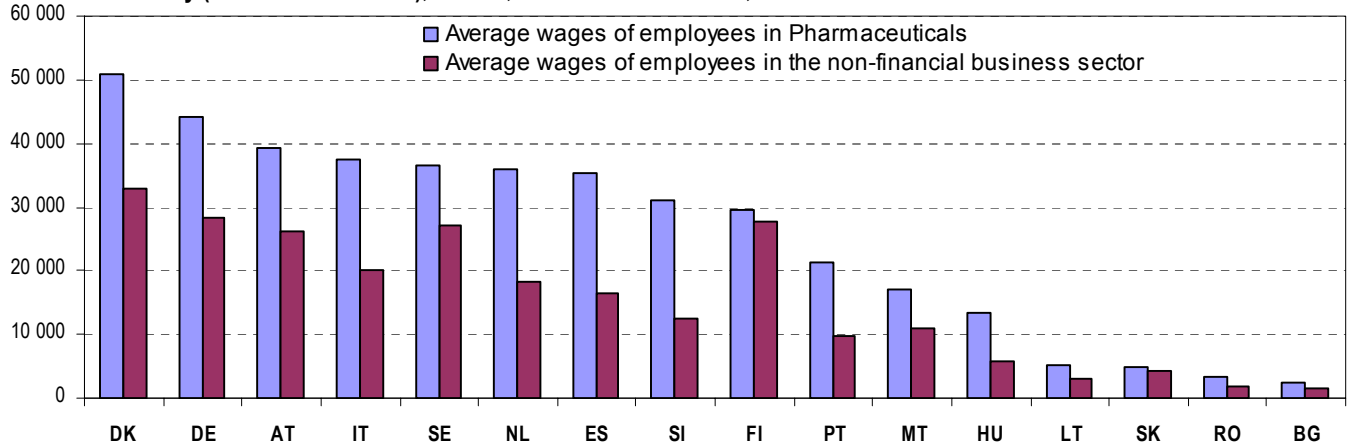
Some countries, such as Hungary and Malta, show a high degree of specialisation but have a rather small chemical industry and hence also small pharmaceutical industry.

Finally, Ireland has a low degree of specialisation but the chemical industry is quite large and therefore so is the pharmaceutical industry.

In a few countries there was a large difference between the importance of the pharmaceutical industry measured in terms of the share of value-added or of persons employed. At the upper end, there was Slovenia (with about 40% for persons employed but 60% for value-added), at the lower end Latvia (40% for employment but only 28% for value-added) and – perhaps surprisingly – Ireland (with about 40% and 20%). This shows that in spite of the high labour productivity observed in Ireland, the rest of the chemical industry is even more productive.

Above average wage levels in the pharmaceutical industry

Figure 4: Comparison of average annual wages paid in the pharmaceutical industry (DG 24.4) and the non-financial business economy (NACE C to K excl. J), in EUR, for selected countries, 2002



MT, SK : Pharmaceutical industry: 2001

Source: Eurostat (SBS).

The pharmaceutical industry pays relatively well. Average wage levels exceeded those of the non-financial business economy as a whole in all countries with data available (see Figure 4); up to more than twice as high in Slovenia and Hungary and about twice as high in Spain and the Netherlands. At nearly EUR 51 000 a year, wages were highest in Denmark, followed by Germany where employees earned on average close to EUR 45 000.

These differences are partly an effect of differences in educational levels. For those countries with data available, 33 % of the persons employed[1] in the chemical industry had a tertiary level education, compared with only 23 % in the total EU-25 labour force[2]. Interestingly, wage disparities across education levels were on average larger in most new Member States, especially in Slovenia and Hungary.

To complete the analysis, in Table 3 wage levels in the pharmaceutical industry in the EU-25 and Japan are compared with total chemical industry and total manufacturing. Wage levels clearly depend on the sector.

Table 3: Wage levels for EU-25 and Japan, in EUR per year

	EU-25	JP
Pharmaceuticals	37 534	55 944
Chemical industry	35 295	53 647
Manufacturing sector	23 281	33 432

EU-25: 2002; JP : 2000.
Source: Eurostat (SBS), OECD (JP).

The average wage was over 50 % higher in the pharmaceutical industry than in total manufacturing in both the EU-25 and Japan. Even if reference years are different between Japan and EU-25 (2000 vs 2002), it is evident that wage levels were superior in Japan in all three industries. Available data for the US suggest that the wage level in the chemical industry in 2000 was at least 5 % higher than in Japan.

It should be borne in mind that the wage levels are affected by the application of average exchange rates as well as differences in price level.

[1] *According to the Structure of Earnings Survey of 2002*

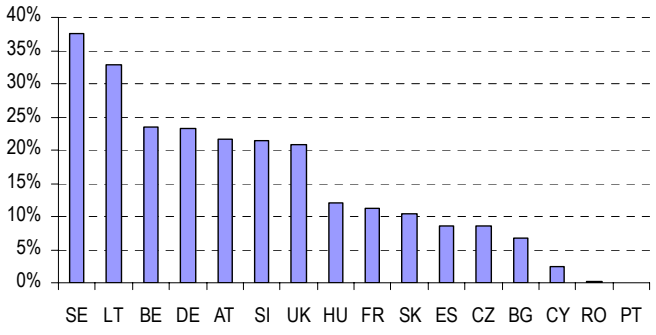
[2] *According to the Labour Force Survey of 2002*

Share of R&D in value-added high in the Swedish pharmaceutical industry

Research and Development (R&D) is particularly important in the pharmaceutical industry.

Figure 5 shows the share of R&D expenditure in value-added for those countries for which data are available. It was over 37 % in Sweden. Five other countries, including Germany and the UK, spent over 20% of value-added on R&D. At the low end came Portugal with well under 1%. The high R&D share in Lithuania is due to the low value-added in the industry.

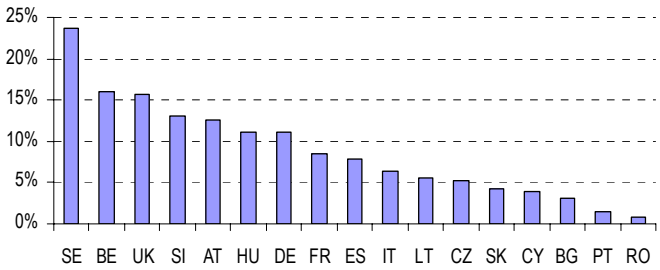
Figure 5: R&D expenditure as a share of value-added in the pharmaceutical industry, for selected countries



Data 2002, BE, SK, CY, UK: 2001; ES: 2000.
Source: Eurostat (SBS).

Another indicator of the importance of R&D is the share of R&D personnel in total persons employed. (see Figure 6). The three countries with the highest shares are Sweden (23 %), Belgium and the UK (both 16 %). They were also among the countries with highest R&D expenditure per value added.

Figure 6: R&D personnel in the total number of persons employed in pharmaceutical industry, for selected countries.



Data 2002, BE: 2001; ES: 2000.
Source: Eurostat (SBS).

It should be noted that Structural Business Statistics cover R&D carried out by enterprises with pharmaceutical production as their main activity, not all R&D in the pharmaceutical research field. Some research is funded by pharmaceutical enterprises but carried out by independent research institutes, often spin-off development laboratories of universities. In addition, enterprise groups may decide to organize R&D activities in a separate specialized enterprise, which would then be classified as a research institute (NACE 73.10).

The number of patents granted is an indication of the results of R&D efforts and therefore of the developments in the industry, although no quality distinctions are made. In 2002, a total of 5 434 patents were granted by the European Patent Office (see Table 4). With 1 979 patents, Germany accounted for nearly 40 %. Together with the United Kingdom and France, they accounted for about 70 % of all patents granted in the EU-25. No patents were granted to Greece and five other smaller Member States (Cyprus, Estonia, Lithuania, Luxembourg and Malta).
In order to adjust for the country size, the ratio between the number of patents and the number of persons employed has been calculated, as shown in Fig. 7. In Germany and the Netherlands the share was almost twice the average EU-25 ratio. In the new EU Member States, but also in Italy, Spain and Ireland the ratio was less than half this average.

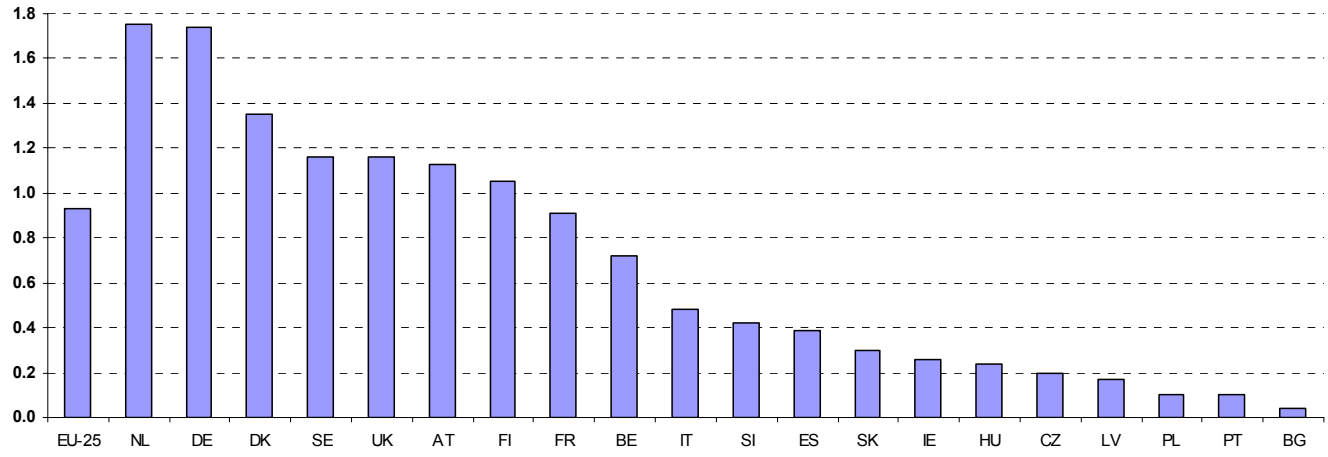
Despite increasing R&D spending, the number of patents granted and new drugs approved is actually diminishing. As development cycles are lengthening, corresponding costs are steadily increasing[1]. Expectations that genetic engineering may reverse this tendency inspired some pharmaceutical enterprises to take over Biotech companies, both as a means of financially fuelling R&D in biotechnology and to replenish their own product pipelines.
In a recent study on "Innovation in the pharmaceutical sector", it was pointed out that there was no indication that Biotechnology could yet compensate for the decrease in new medicines approved [1].

Table 4: Granted patents related to pharmaceuticals, 2002

Country	Patents	Number of patents per 100 persons employed in Pharmaceuticals
EU-25	**5434**	**0.93**
DE	1979	1.74
FR	962	0.91
UK	802	1.16
IT	343	0.48
NL	289	1.75
SE	250	1.16
DK	221	1.35
BE	133	0.72
ES	141	0.39
AT	105	1.13
FI	61	1.05
HU	34	0.24
PL	27	0.10
IE	26	0.26
SI	23	0.42
CZ	16	0.20
SK	12	0.30
PT	7	0.10
BG	4	0.04
LV	3	0.17

BE and UK: 2001.
Sources : European Patent Office (EPO) and Eurostat (SBS).

Figure 7: Number of granted patents per 100 persons employed in the pharmaceutical industry, 2002



Note: on the basis of available data.
Source: European Patent Office (EPO).

[1] "Innovation in the pharmaceutical sector", a study undertaken for the European Commission by Charles River Associates (published 8-11-2004), Introduction, page 1.
http://pharmacos.eudra.org/F2/pharmacos/docs/Doc2004/nov/EU%20Pharma%20Innovation_25-11-04.pdf

➢ *ESSENTIAL INFORMATION – METHODOLOGICAL NOTES*

EU: European Union, including the 25 Member States (EU-25): Belgium (BE), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Greece (EL), Spain (ES), France (FR), Ireland (IE), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK).

SYMBOLS

":" non available or confidential.

DEFINITIONS

Division by sector of activity

Employment and other indicators in the Structural Business Statistics (SBS) are divided into sectors of activity according to the NACE Rev. 1 system of classification. This classifies activity by section (1-letter codes), sub-section (2-letter codes), division (2-digit codes), groups (3-digit codes) and classes (4-digit codes). All activities of the pharmaceutical industry are included in section D. The pharmaceutical industry, as examined in the present publication, correspond to the classification NACE Rev. 1.1 Section D (Manufacturing), subsection DG (Manufacture of chemicals, chemical products and man-made fibres), division 24 (Manufacture of chemicals and chemical products), group 24.4 ('Manufacture of pharmaceuticals, medicinal chemicals and botanical products'). Group 24.4 analyzed in this publication includes the following classes:

24.41 'Manufacture of basic pharmaceutical products'
24.42 'Manufacture of pharmaceutical preparations'

The non-financial business economy also mentioned includes the sectors C (Mining and quarrying), D (Manufacturing), E (Electricity, gas and water supply), F (Construction), G (Wholesale and retail trade), H (Hotels and restaurants), I (Transport, storage and communication) and K (Real estate, renting and business activities).

Number of persons employed: defined as the total number of persons who work in the observation unit (inclusive of working proprietors and partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it (e.g. sales representatives, delivery personnel, repair and maintenance teams). It includes part-time workers, seasonal workers, apprentices and home workers who are on the pay roll. The observation unit for aggregating data is the enterprise.

Enterprise: the enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit. Enterprises in this article are classified by their main activity.

The enterprise should not be confused with the local unit, which is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place.

Although the population of active enterprises is mainly affected by real enterprise births and deaths, other events account for the change of the population as well, such as split-offs, break-ups, mergers and take-overs.

Value-added: Value-added measured at factor cost, which is the gross income from operating activities after adjusting for operating subsidies and indirect taxes (including value-added tax).

R&D expenditure: Total intra-mural R&D expenditure performed within the enterprise, regardless of its source of funds. This excludes any amount paid to some contractor, external to the enterprise, providing R&D research facilities.

Wage levels (Figure 4 and Table 3 in this publication) refer to gross remunerations and include earnings in cash provided directly and regularly by the employer at the time of each wage payment, including fines, taxes and social security contributions payable by wage-earners and retained by employers. Payments for leave, public holidays and other individual absences are included if the corresponding time is also taken into account in the calculation of monthly or hourly earnings.

DATA SOURCES

Structural Business Statistics (SBS): collected within the framework of Council regulation on structural business statistics (EC, EURATOM) No. 58/97 of December 1996. The SBS Regulation governs the transmission of data to Eurostat from the reference year 1995 onwards and covers all market activities in sections C to K of NACE Rev. 1. For further information, visit:
http://forum.europa.eu.int/Public/irc/dsis/bmethods/info/data/new/main_en.html

The source of all figures presented in this publication is Eurostat and reflects the **state of data availability** in Eurostat's reference database NewCronos as of June 2005.

Further information:

Databases

EUROSTAT Website/Industry, trade and services/Industry and construction/Annual detailed enterprise statistics on industry and construction/Annual detailed enterprise statistics on manufacturing subsections DF-DN and total manufacturing (NACE D)

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