

Statistics in focus

RESEARCH AND DEVELOPMENT

THEME 9 – 2/2000

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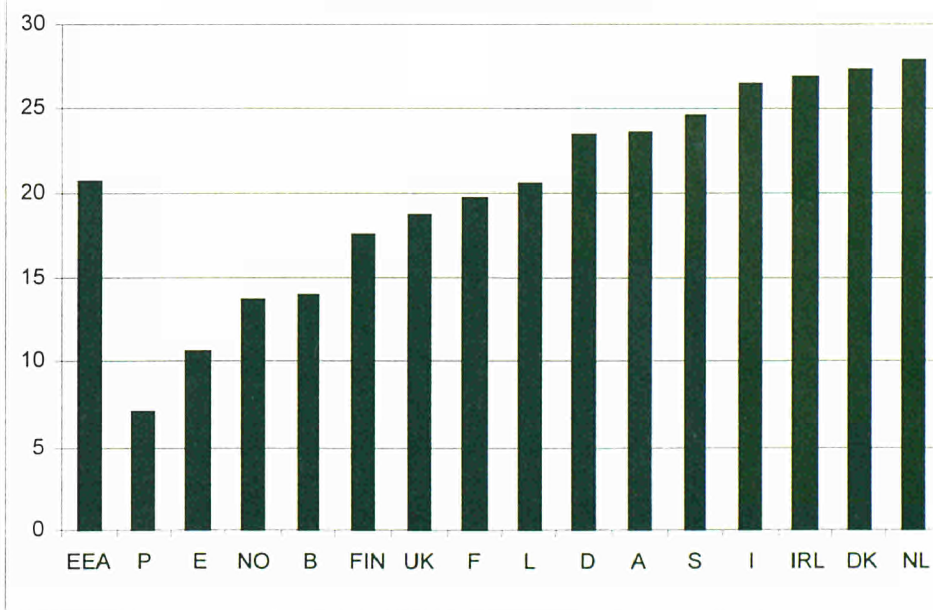
Community Innovation Survey 1997/98 - final results -

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Novel innovators

Innovation surveys in the European Economic Area have identified that 51% of manufacturing enterprises with more than 20 employees were innovative in 1996. These firms have either been commercialising a technologically new or improved product or introducing a new technological process in their production system in the period 1994-96. For the service sectors covered by the survey the corresponding figure is 40%. If we focus on innovative products that are not only new to the enterprise but also new to the market, then every fifth enterprise is a novel innovator in the manufacturing sector (service data not being available for this indicator). This average varies widely across economic sector, ranging from 36% for electrical and optical instruments to 10% in the case of wood and wood products. These figures are based on the second Community Innovation Survey (CIS2). More detailed results will be presented and commented in the forthcoming publication 'Innovation in Europe'. This joint DG Enterprise and Eurostat publication will be available during the fourth quarter this year.

Figure 1: Number of novel innovators by country (%), manufacturing sector, 1996



The share of novel innovators also varies widely at the country level. In Portugal and Spain only 7% and 11% respectively were novel innovators. However, more than a quarter of Italian, Irish, Danish and Dutch enterprises have commercialised a technologically new or improved product for their market place (see table 2).



Innovators according to export activity

There are more innovators among exporters than among non-exporters. On average, 57% of the EEA enterprises with sales in foreign markets are innovators compared to 40% for non-exporters in manufacturing. This picture holds true for all countries. We see also from table 3 that as the export intensity increases, the share of innovators raises. 61% of enterprises with more than 40% of sales due to exports is an innovator, while the percentages are 58 and 52 respectively for medium- and low-rated exporters.

In the service sector, where wholesale and financial intermediation are not included, the situation is different. There are still more innovators among exporters than non-exporters. However, on average the percentage of innovators decreases as the export intensity increases, ranging from 53% for low export intensity down to 44% for highest intensity, but there are variations between the countries.

Innovation cooperation

On average more than a quarter of innovators have established a cooperation with another partner in developing new products or processes. There are slightly more innovators with joint projects at the EEA level in the manufacturing sector than in the service sector, 27% against 24%.

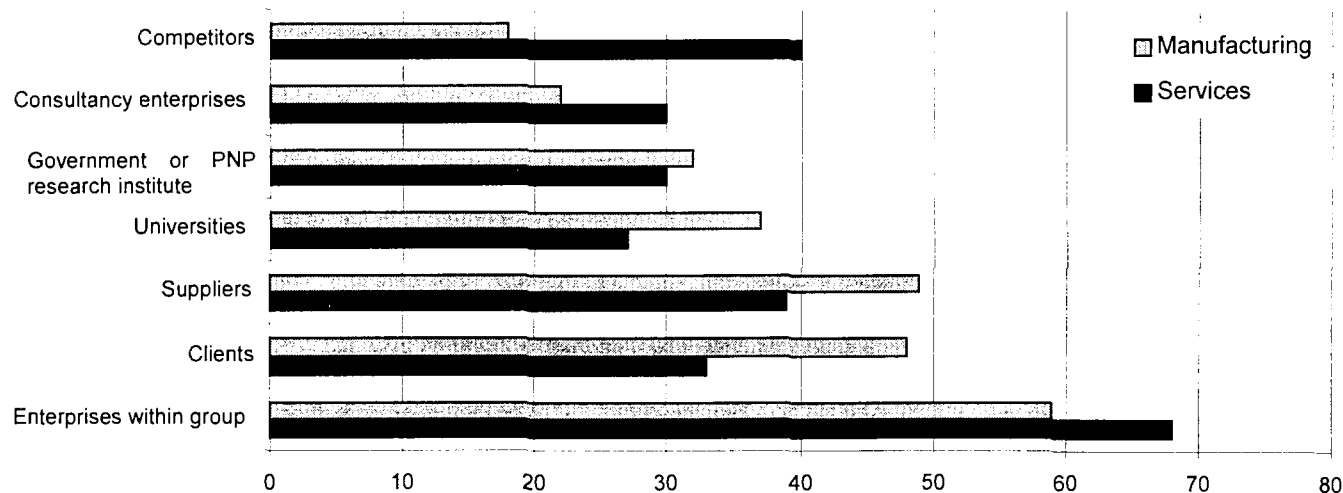
The Nordic countries, namely Finland, Sweden, Denmark and Norway, are very active in joint innovation projects. In these countries, the percentage of innovation cooperation in the manufacturing sector varies from 82% in Finland to 51% in Norway. Southern countries are less involved in innovation arrangements. Around one fifth of Spanish and Portuguese innovators in the manufacturing sector are cooperating with partners; the proportion is as low as one-tenth for Italy.

Table 1: Percentage of innovators with cooperation, 1996

	Manufacturing*	Service*
EU	26	24
B	32	45
D	24	17
DK	57	66
E	21	:
F	35	35
I	11	:
IRL	36	23
L	29	46
NL	29	28
A	23	18
P	20	23
FIN	71	60
S	59	48
UK	32	28
EEA	27	24
NO	49	61

* See methodological note for the coverage of branches

Figure 2: Number of innovators with innovation cooperation by type of partner (%), EEA, 1996



See methodological note for the coverage of branches

There is a high level of innovation cooperation between enterprises belonging to the same enterprise group; six out of ten innovators belonging to a group are involved in joint projects. Vertical cooperation with partners such as clients and customers or suppliers of equipment is also widely used; above 45% in the manufacturing sector and more than a third of innovators for the service activities.

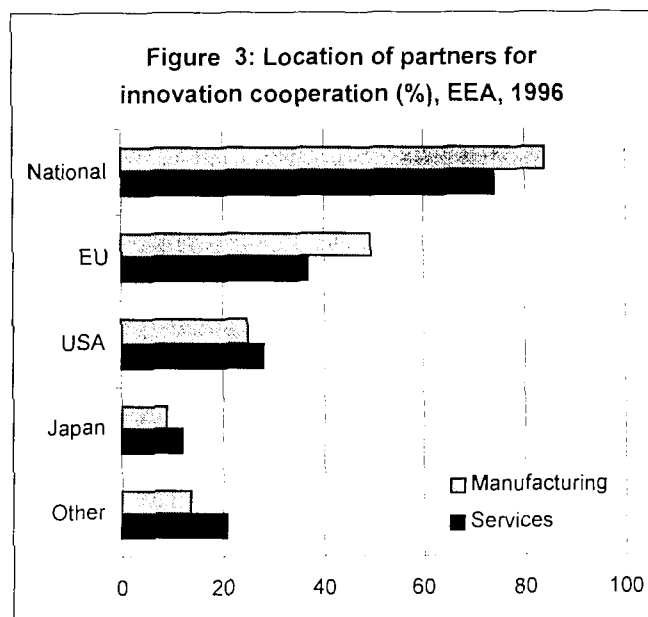
Horizontal cooperation occurs more often between the service enterprises than between the manufacturing ones. Four in ten service enterprises involved in innovation cooperation have a project with a competitor, but the figure is halved for the industrial firms: less than two out of ten.

A third of the enterprises having innovation cooperation have a government or private non-profit research institute as partner. The same proportion applies to universities or other higher education institutes for the manufacturing sector; in the service sector they are partners for a quarter of the enterprises that have established a joint R&D and other innovation projects.

National partners are the dominating innovation collaborators. Three out of four enterprises with innovation cooperation has a national partner; the percentage is higher in the manufacturing sector than in the services. But European innovators do not privilege only joint projects with collaborators from the same country. Half of the manufacturing innovators that have established a partnership for

cooperation have chosen an enterprise belonging to another EU Member State. In the service sector it is overall 4 enterprises in 10.

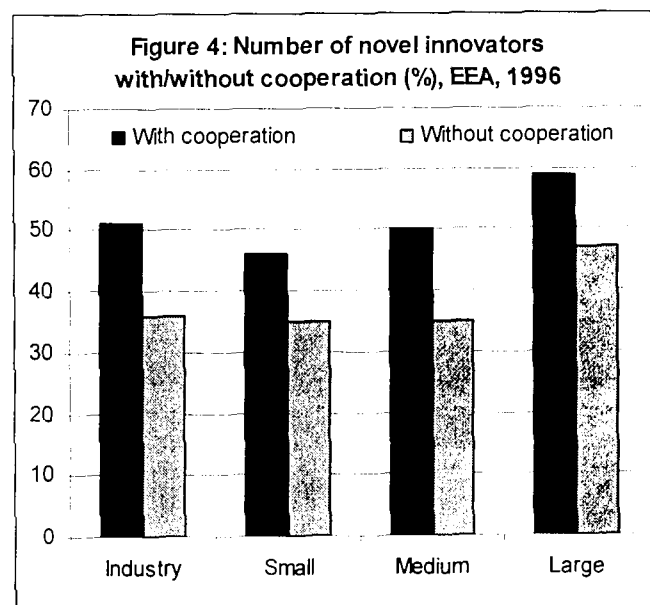
Cooperation with US partners is also common. Depending upon the main economic sector, a quarter or more of the innovation cooperation has been set between EU and the US enterprises. The percentage for Japan is lower, but not negligible: 9% for manufacturing enterprises against 12% for service enterprises.



See methodological note for the coverage of branches

Innovation cooperation and novel innovators

On average, there are more novel innovators among enterprises with innovation cooperation than without. More than half of the firms with a cooperation agreement have been implementing an innovation which was new to their market. In contrast, only one third of innovators without joint projects is a novel innovator. The larger the enterprises, the higher the percentage of novel innovators and the higher was the probability of an enterprise to be involved in the cooperation agreement. As shown in figure 4, for all size bands the average trend is maintained: there are more enterprises commercialising novel products among firms with cooperation agreement than firms without joint innovation project.



See methodological note for the coverage of branches

Structure of innovation expenditures

Manufacturing enterprises have been investing 3.7% of their turnover on innovation expenditures. The corresponding figure for the service sector (excluding wholesale and financial intermediation) is 2.8%.

On average, in-house R&D is the main component of resources devoted to innovation activities. Roughly half of the innovation expenditures is used on internal research and experimental development, but with a higher share for the manufacturing than for the service sector.

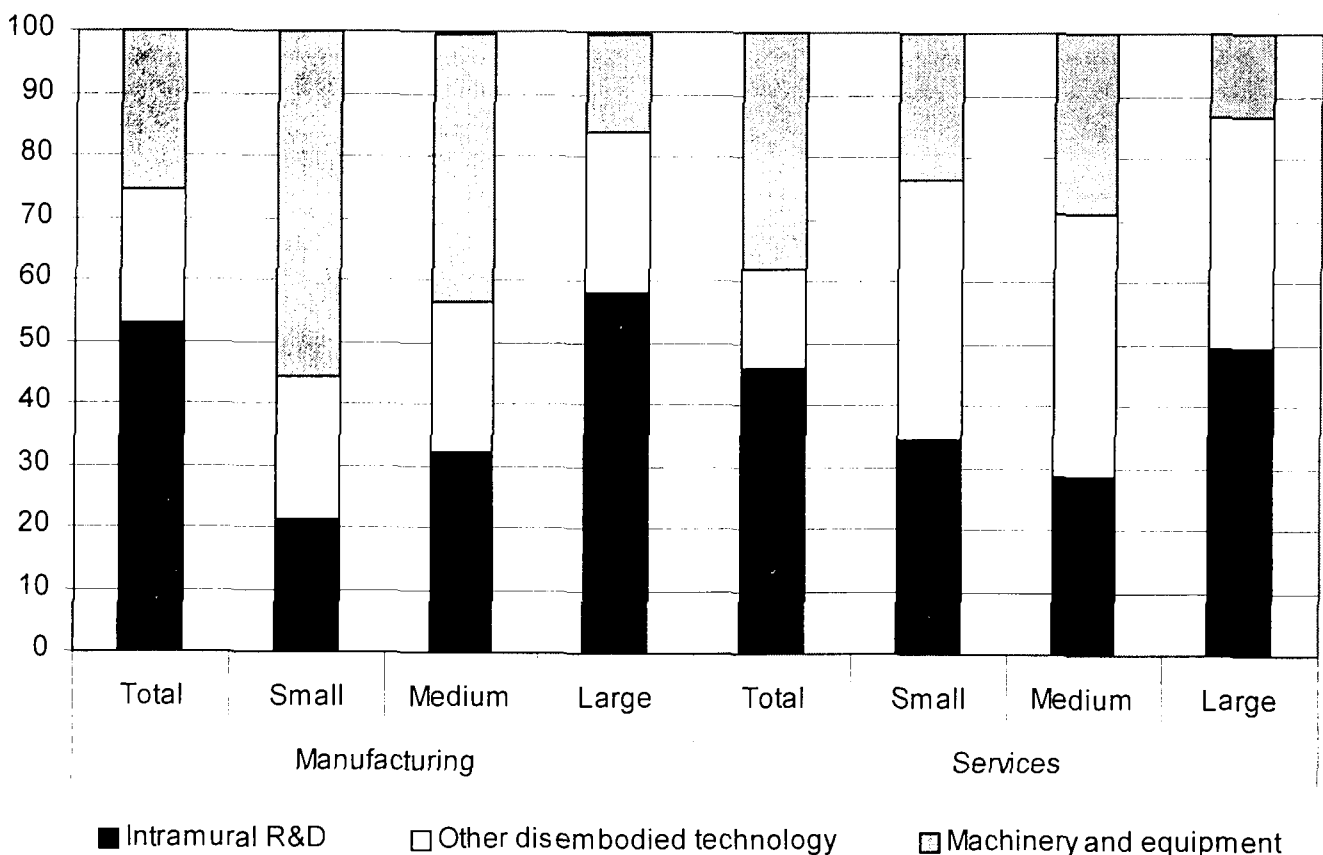
Embodied technology represents the second most important item: 22% of expenditures are spent in the acquisition of machinery and equipment in the manufacturing sector and 16% in the service sector. Outlays on disembodied technology such as patents, non-patented inventions, licenses, know-how, trademarks, are higher for service firms than for industrial enterprises, 15% for the former compared to 4% for the latter. The other activities included in

innovation expenditure each accounts for less than 10% of the total spending

When focussing on size, large enterprises in the manufacturing sector spend more than 50% of their innovation budget on intra-mural R&D to develop their innovations. Small enterprises rely more on the acquisition of machinery and equipment. It is quite clear from figure 5 that the larger the enterprise the higher is the share of intra-mural R&D expenditure in the total expenditure on innovation. For the acquisition of machinery and equipment the trend is the opposite: the smaller the enterprise the higher is the share in the total spending.

In the service sector the different sources of innovation are less strongly influenced by firm size. The prevailing tendency for small firms to innovate by acquiring machinery and equipment, against the greater propensity of larger firms to generate internally new technologies is much less marked.

Figure 5: Structure of innovation expenditures, by size band, EEA, 1996



See methodological note for the coverage of branches

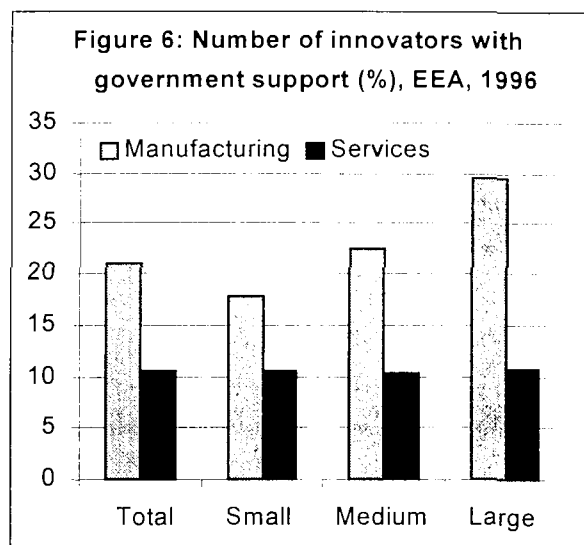
Government assistance

On average, a fifth of the manufacturing innovators have been involved in government programmes to encourage innovation activities, compared to a tenth in the service sector.

When considering firm size, there is a clear pattern which emerges for the manufacturing enterprises; the larger are the firms the higher is the percentage of innovators receiving government support. This picture is not maintained for service firms.

Within the European Economic Area, the United-Kingdom has the lowest share of innovators receiving financial allocation or loans including subsidy element or grants.

At the other extreme is the Netherlands in the manufacturing sector, and Finland for the service sector.



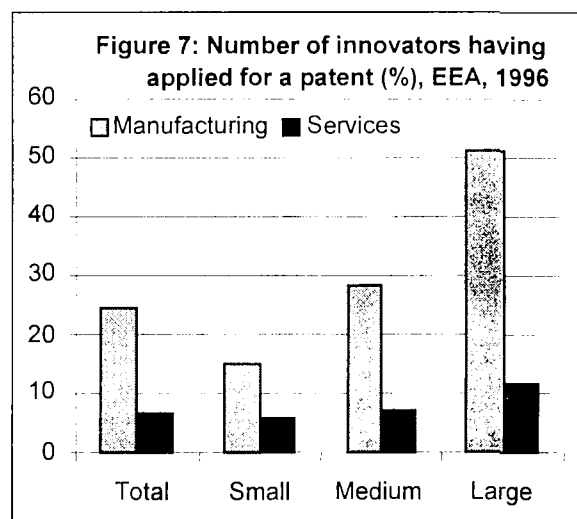
See methodological note for the coverage of branches

Patenting activity

One innovator out of four enterprises with manufacturing activities within EEA applied for at least one patent between 1994 and 1996. The proportion is much smaller in the service sector, 7%. This is consistent with the fact that manufacturing firms are more involved in in-house R&D than service innovators.

The breakdown by size shows that large enterprises have a higher propensity to make patent applications than SMEs.

The share of manufacturing innovators applying for patents varies from 11% in Portugal to 41% in Sweden. Regarding the service innovators, the figures are much lower: ranging from under 2% for Luxembourg and the UK up to 13% in Denmark.



See methodological note for the coverage of branches

Table 2: Share of novel innovators, by size and NACE, 1996

	B	D	DK	E	F	I	IRL	L	NL	A	P	FIN	S	UK	EU	NO	EEA
Total	14	24	27	11	20	26	27	21	28	24	7	18	25	19	21	14	21
By size																	
Small	12	19	22	7	14	23	23	9	21	14	4	12	21	15	16	8	16
Medium	13	22	32	17	22	32	28	28	33	31	11	17	24	19	23	17	23
Large	29	46	42	38	42	50	50	41	53	42	17	45	43	37	42	36	42
By NACE																	
Food, beverages & tobacco	15	17	15	8	13	28	29	15	24	24	6	15	13	21	17	11	17
Textile and leather	10	33	34	5	14	14	11	:	26	17	3	20	18	15	13	18	13
Wood, pulp and printing	6	8	21	6	10	17	18	15	14	12	8	9	12	6	10	5	10
Coke and chemicals	22	28	45	29	33	40	23	42	43	32	5	43	34	48	35	25	35
Rubber & other non-metallic	19	23	22	9	26	27	25	30	31	22	12	23	36	18	22	16	22
Basic and fabricated metals	12	15	26	8	14	26	28	8	21	19	8	11	22	15	17	10	17
Machinery and equipment	21	39	16	20	36	42	34	39	47	33	20	23	37	17	33	24	33
Electrical & optical equipment	27	37	53	27	33	37	48	41	35	42	26	23	39	37	36	32	36
Transport equipment	12	30	18	20	28	29	21	-	36	37	3	21	19	19	24	15	24
NEC & recycling	7	18	43	9	18	32	14	:	24	32	4	5	25	13	20	15	19

Table 3: Share of innovators, by export intensity, 1996

		B	D	DK	E	F	I	IRL	L	NL	A	P	FIN	S	UK	EU	NO	EEA
Manufacturing	Total	34	69	71	29	43	48	74	:	62	67	26	36	54	59	51	48	51
	No exports	18	61	61	18	26	36	46	:	45	49	16	15	34	53	40	37	40
	Low	31	67	50	35	42	52	70	:	55	67	26	35	51	60	52	49	52
	Medium	27	73	63	44	53	53	73	:	70	64	32	40	56	64	58	60	58
	High	45	79	89	44	62	57	83	:	79	76	26	59	68	72	61	65	61
Service*	EEA	13	46	30	:	31	:	58	:	36	55	28	24	32	40	40	22	40
	No exports	17	42	27	:	31	:	71	:	38	24	16	26	32	40	40	17	39
	Low	30	69	30	:	24	:	47	:	25	100	34	42	39	68	53	66	53
	Medium	14	54	73	:	24	:	45	:	31	56	45	53	42	63	46	46	46
	High	19	53	14	:	36	:	54	:	27	28	36	36	22	72	44	54	44

* Wholesale and financial intermediation are not included

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

The Second Community Innovation Survey (CIS2) was launched in the EEA Member States in 1997/1998. The first Community Innovation Survey was done for 1992. In general, the results from the two surveys are not directly comparable. All the participating countries have agreed on a common set of methodology and a core questionnaire aimed at providing comparable, harmonised and representative data on a pan-European scale. The survey is based on the Oslo-Manual. In general, it is either the National Statistical Institute or a Ministry that is directly responsible for the survey at the national level.

This Statistics in Focus presents results for 14 EU countries and Norway. The data for Norway and Portugal refers to 1997, for the other countries the reference year is 1996. The results presented here can deviate from national published results, mainly due to different target population.

THE TARGET POPULATION

The statistical unit is the enterprise.

The following economic activities have been included in the target population: all manufacturing industries, electricity, gas and water supply, wholesale trade, transport, telecommunications, financial intermediation, computer and related activities and engineering services. In Spain the survey was done only for the manufacturing sector; the wholesale sector has not been surveyed in France and Italian data in the service sector is not available.

The cut-off point for inclusion in the target population is 20 employees in the manufacturing sector and 10 employees in the service sector. The sampling frames are business registers with as good quality as possible. Official Statistical business register have been used whenever available.

THE SURVEY METHOD

A combination of sampling and census has been used; census down to a certain threshold of employees depending upon the country's enterprise population, and sampling for the rest. The samples have been selected by using a simple random selection in each stratum (defined by size class according to number of employees and economic activity based on Nace Revision 1 at 2 digits level). A full census is applied if the total number of enterprises in the frame population in a particular stratum is less than 5.

The results are based on answers from 39 500 enterprises, thus yielding a response rate of 57%. Nationally the response rate varies from 24% to over 90%.

The results presented are grossed-up figures for the whole population. The weighting factors are based on shares between the numbers of enterprises in the realised sample and total number of enterprises in the population for each stratum of the frame population (combined non-response correction and weighting).

A non-response analysis has been carried out whenever the national response rate is below 70%. In these cases the results of non-response analysis is used in the calculation of weighting factors.

DEFINITIONS

Innovating enterprise

is an enterprise that has introduced new or improved products on the market or implemented new or improved processes in its production system. New and improved relate to the enterprise. In contrast, a novel innovator is an enterprise that has been commercialising a product that is new or improved not only to the enterprise but also to its market.

The following **size bands**, based on number of employees, have been used to characterise enterprises.

	Manufacturing	Service
Small	20 to 49	10 to 49
Medium	50 to 249	50 to 249
Large	250 +	250 +

Export intensity

has been measured as the ratio of export sales over turnover for 1996. The levels of intensities are:

Low less than 10%

Medium between 10% and 40%

High Above 40%

Innovation cooperation

means active participation in joint R&D and other innovation projects with other organisations. It does not necessarily imply that both partners derive immediate commercial benefit from the venture. Pure contracting out work, where there is no active participation, is not regarded as cooperation.

Patents

are legal documents issued by national or supranational body (e.g. the European Patent Office). It confers on its holder (the licensor) a monopoly on the invention, on its industrial and commercial use for a limited period (usually ranging from 15 to 20 years) and on a geographical area in which the patent has been requested.

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