

Research and development in international enterprises 2005

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Summary

ITPS carries out every second year surveys of the R&D of international enterprises (Swedish and foreign) in Sweden and also of the R&D abroad of Swedish enterprises. The most recent survey concerns 2005.

In principle the Swedish groups have not increased their R&D in Sweden over the period 1995–2005, but sometimes increases amounting to several hundred per cent, have taken place abroad. This was not so evident earlier. The explanation is not only that the groups increased their R&D during an earlier period 1993–1995, but also that in recent years it has tended to stagnate. In addition, changes have been partly concealed by the fact that some groups have come under foreign control, and in the survey on R&D they have been replaced by other Swedish groups with lower R&D and a different rate of increase.

Direct investment of Swedish enterprises in research and development have increased substantially in China, India, some countries in Central and Eastern Europe, as well as South America. The expansion in these areas resembles the expansion in R&D that took place in high wage countries during the 1990s, when the globalisation of R&D accelerated and Swedish enterprises established R&D mainly in EU15 and the USA. But even though the rate of increase in R&D has been high in low wage countries, R&D in China and India, for example, only accounts for 1.4 and 1.3 per cent respectively of major Swedish groups' total R&D expenditure. This should be put into context where these two large countries have 40 per cent of the world's population and have a rapidly growing economy and demand.

The large increase in R&D expenditure of foreign enterprises in Sweden took place at the end of the 1990s, and was mainly a result of some large acquisitions. The groups acquired have increased their R&D relatively more in Sweden than the groups which remained under Swedish control. The R&D of foreign controlled enterprises has remained relatively unchanged in Sweden during the most recent survey period 2003–2005 with a share of 46 per cent for expenditure and 41 per cent for personnel in the R&D of the business sector.

The survey of Swedish groups' R&D abroad consists of a relatively small population and changes in this have an impact on reporting and volumes of R&D. Between 1995 and 2005 some groups had changes in the location of their institutional controlling unit. The most common changes in control have been that enterprises which were originally Swedish have come under foreign control. The groups also buy and sell enterprises carrying out R&D in Sweden and abroad. In order to obtain a more balanced picture of changes in R&D in Sweden in comparison with abroad where there have been changes in the enterprises surveyed, Figure 4 shows changes that are real and not just those dependent on which enterprises have been surveyed.

Three surveys of R&D in international enterprises

In this report statistics are presented on research and development in international enterprises, i.e. major Swedish groups with business operations in Sweden and abroad, and major foreign groups in Sweden. The results reported from questionnaires sent to the major groups have been supplemented by a report from Statistics Sweden's regular R&D survey concerning 7,000 enterprises in Sweden in which R&D has been disaggregated by international Swedish, foreign and domestic enterprises. The report is structured in four sections:

- I. **R&D in international enterprises:** Here an overall picture is given of the three survey results over the last decade, 1995–2005, and also the size of the changes that have taken place, reasons for these, and the measures that the groups themselves regard as most relevant for them to increase their R&D in Sweden.
- II. **R&D in major international Swedish groups 2005:** This survey is based on a questionnaire to 22 major Swedish groups, in terms of number of employees abroad, which also carry out R&D. These groups account for a major share of the business sector's total resources used for research and development. The data relates to R&D person-years and R&D expenditure in Sweden and abroad. The survey is carried out every two years.
- III. **R&D in major foreign groups in Sweden 2005 (formerly Swedish):** This survey is based on a questionnaire to 12 major foreign groups. Common to these is that earlier they were under Swedish control and included in the Survey on R&D in major international Swedish groups. The data relates to R&D personnel and R&D expenditure in Sweden.
- IV. **R&D in Swedish and foreign enterprises in Sweden 2005:** This survey is based on data from Statistics Sweden's regular R&D survey on foreign, international Swedish and domestic enterprises. The survey covers slightly more than 7,000 enterprises in Sweden with at least 10 employees.

Definitions

Foreign controlled enterprises/groups: Enterprises which are controlled by one or more foreign institutional units with more than 50 per cent of the voting rights of shares.

Swedish controlled international enterprises/groups: Swedish controlled enterprises with at least one subsidiary and employee abroad.

Domestic enterprises/groups: Swedish enterprises without subsidiaries abroad. This also includes industrial research institutes serving the enterprise sector.

R&D in international enterprises

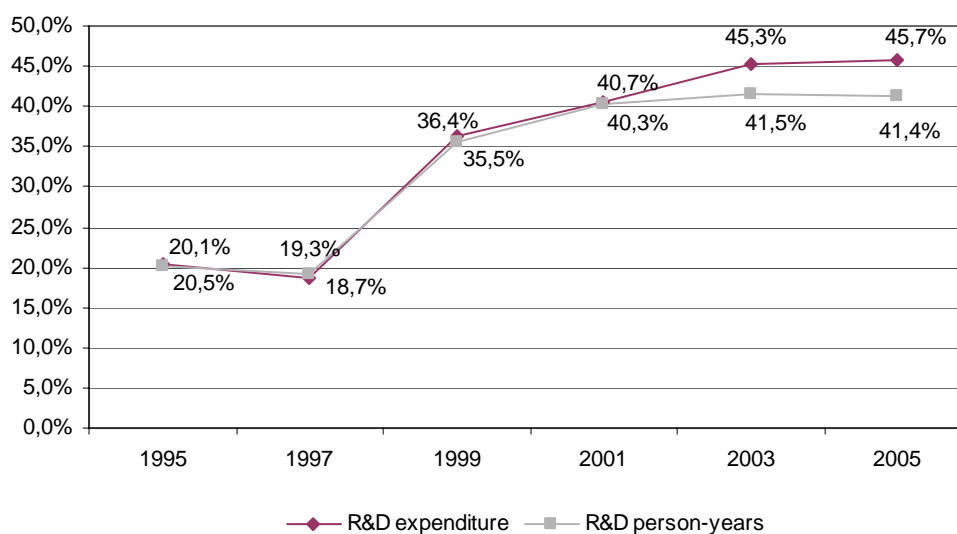
This gives an overall view of the extent to which the enterprises have internationalised their R&D in the last decade (1995–2005) by focusing on the most recent surveys for 2005.

In Sweden the business sector accounts for 74 per cent, universities and university colleges for 21 per cent, and "other public research" for 5 per cent of R&D expenditure. The R&D of the business sector amounting to SEK 77 billion in 2005 is largely concentrated in a few large international enterprises. The groups covered in the survey were 22 Swedish controlled and 12 foreign controlled, accounted for close to 70 per cent of the business sector's R&D expenditure in Sweden. The R&D expenditure of Swedish groups is somewhat larger in Sweden than abroad. The foreign groups generally have a significantly lower share of their R&D in Sweden than Swedish groups have, 17 per cent of R&D expenditure compared with 56 per cent for the Swedish groups. If a comparison is made for R&D personnel instead, the differences are approximately the same amounting to 14 and 57 per cent respectively.

Foreign controlled enterprises' share of R&D expenditure remained unchanged

Share of the business sector's R&D carried out by foreign enterprises has in principle remained unchanged over the period 2003–2005 with a share of 41 per cent for person-years and 46 per cent for expenditure. Note that the difference between R&D expenditure and person-years increased at the turn of the century. Increased foreign control in 1997–1999 is largely due to foreign acquisition of a few large Swedish enterprises.

Figure 1 Share of business sector's R&D carried out by foreign controlled enterprises, 1995–2005, per cent.



Source: *ITPS and Statistics Sweden*

Swedish enterprises are increasing in low wage countries

A new trend is the expansion by Swedish groups of their R&D in low wage countries such as China, India, some countries in Central and Eastern Europe, as well as South America. At the same time the R&D of these groups has in principle remained unchanged in Sweden, the EU15, and the USA.

Table1 Major Swedish groups' expenditure on R&D 1995–2005, SEK million.

	1995	1997	1999	2001	2003	2005
Total	36,234	46,332	44,975	60,472	47,424	55,210
of which in Sweden	28,298	29,767	25,922	34,688	26,965	30,891
of which in other high wage countries	7,557	15,861	18,252	24,270	18,999	20,792
of which in low wage countries	379	704	801	1,514	1,460	3,527
<i>Low wage countries, per cent</i>	<i>1.0 %</i>	<i>1.5 %</i>	<i>1.8 %</i>	<i>2.5 %</i>	<i>3.1 %</i>	<i>6.4 %</i>

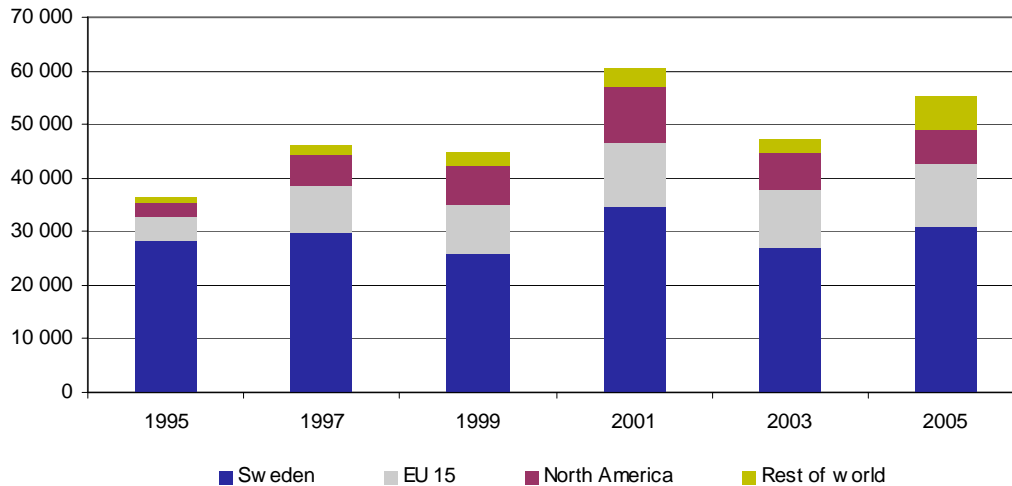
Note. Expenditures are given in current prices and without any adjustment for changes in the population.

High wage countries consists of 22 OECD countries: Australia, Belgium, Denmark, Finland, Greece, Iceland, Ireland, Italy, Japan, Canada, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Switzerland, Spain, UK, Germany, USA and Austria. The OECD has expanded over time and in 2007 consists of 30 member countries. The countries which are not part of the group of high wage countries are defined as **low wage countries**.

Source: ITPS

The increase of R&D expenditure in major Swedish groups during the period 1995–2005 has been small in Sweden and during the same period increased abroad, mainly towards the end of the 1990s. During the 2000s the increase has mainly taken place in low wage countries in South East Asia, Central and Eastern Europe, and South America. The supposedly large increase "Rest of world" in Figure 2 is partly due to a change in the population for Japan. The increase of international Swedish groups' R&D in the low wage countries, China and India, Central and Eastern Europe, and South America, has been very large over the last decade, but the increases have been from low levels. In the middle of the 1990s, these groups carried out hardly any R&D in China, India, Central and Eastern Europe and also had very low levels in South America. But even though the rate of increase in R&D has been high in low wage countries, the R&D in China and India, for example, only accounts for 1.4 per cent and 1.3 per cent of major Swedish groups' total R&D expenditure. Their share of R&D expenditure abroad became somewhat higher, about 3 per cent.

Figure 2 R&D expenditure in major Swedish multinational enterprises, SEK million (current prices).



Note. North America = USA, Canada and Mexico.

Source: ITPS

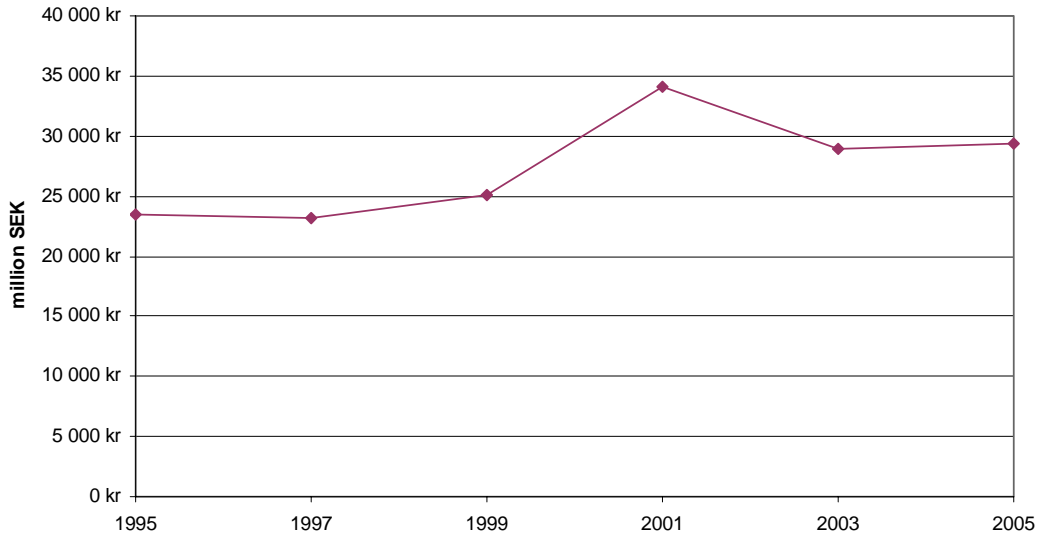
Stagnating R&D

Here the focus is on changes in the last decade (1995–2005) taking into account changes in the groups included in the survey. The questions which are taken up are how large the actual increase in R&D has been over the last 10 year period, and what developments there have been for Swedish groups compared with groups that have come under foreign control since 1995.

Of the 20 groups in the 1995 survey reported as international Swedish groups, half of them remain as Swedish groups in the 2005 survey. The remaining groups have either come under foreign control or exited the survey for other reasons. Of the 10 groups which have been Swedish during the whole of the comparison period 1995–2005, changes in Sweden have been modest with an increase of 10 per cent in fixed prices.¹ compared with an increase abroad of 260 per cent. The increase abroad took place during the period 1995–2001 and has since then declined somewhat. This has not been so evident earlier. The explanation for this is that the groups increased their R&D expenditure in Sweden in earlier years, 1993–1995, and also that it has stagnated in recent years. In addition, the changes have been partly concealed by the fact that some groups, originally Swedish and thus in the survey earlier, have come under foreign control, and mainly been replaced by other Swedish groups with lower R&D and with a different rate of increase.

¹ The figure shows R&D expenditure in current prices i.e. without any adjustment for inflation.

Figure 3 R&D expenditure in Sweden carried out by 10 major Swedish groups which were in the survey the whole period 1995-2005, SEK million (current prices).



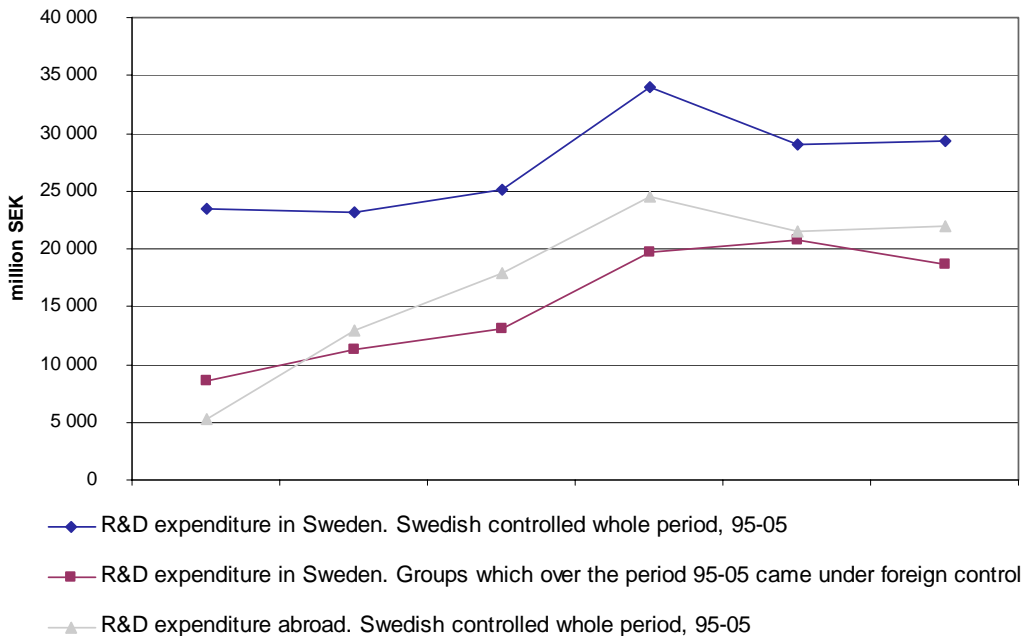
Note. This refers to the 10 groups included in the survey on international Swedish groups during the whole period 1995–2005. Some minor adjustments have been made to improve comparability over time.

Source: ITPS and Statistics Sweden

The changes were caused by the impact on the results of groups coming under foreign control in the survey of major Swedish groups' R&D. Groups exiting or entering the survey for reasons other than those concerning changes in control has not proved to be of particular importance for total R&D in Sweden during the period 1995–2005. The effects, however, are largest during the period 2003–2005 since the service industries are included in the survey and report a somewhat higher R&D in Sweden and in other high wage countries.

The changes for the ten Swedish groups in Figure 3 are compared in Figure 4 with the eight groups that have come under foreign control since 1995. A comparison is also made between the R&D of Swedish groups in Sweden with the R&D they carry out abroad. A more detailed description of these Swedish and foreign groups' R&D is provided in the appropriate sections.

Figure 4 Comparison of changes in R&D expenditure of Swedish groups with groups coming under foreign control 1995–2005, SEK million.



Note. For those groups who came under foreign control, in some cases supplementary data from Statistics Sweden has been added. In order to maintain as good comparability over time as possible, some adjustments have been made to parts of a group which has come under the control of a foreign unit.

Source: ITPS and Statistics Sweden

Changes in R&D² and the Government's role

The questionnaires to the Swedish and foreign groups contained questions on how and why major changes in R&D took place. In addition, one question was put on whether the Government can influence enterprise decisions to keep or increase their R&D in Sweden.

A number of enterprises have stated that the reasons for the changes in their R&D during the period 2003–2005 where it increased compared with 2001–2003 where the opposite occurred, had little to do with whether they were Swedish or foreign enterprises carrying out R&D in Sweden or Swedish groups carrying out R&D abroad.

The R&D expenditure of Swedish groups in Sweden has expanded mainly within existing activities. Fewer have stated that they reduced their R&D in Sweden or that no significant change in R&D took place during 2003–2005. The main explanation is that the reductions in existing R&D have instead become increases. One group relocated its R&D from Sweden and no group has relocated R&D to Sweden during the period 2003–2005.

The majority of Swedish R&D abroad takes place mainly in other high wage countries, namely the EU15 and the USA. This also means more answers to questions about how and

² The results from changes in R&D should be interpreted with caution since a few groups have chosen not to answer the question, whilst other groups have given a number of different explanations. It is also the case that the groups give general explanations for the whole or parts of the activity which makes interpreting the results more difficult.

why changes took place in high wage countries as opposed to low wage countries. The expansion of R&D in high wage countries takes place mainly through acquisition or by expanding already existing R&D activities. There has been significantly less reduction in R&D carried out in other high wage countries outside Sweden. The relocation of Swedish groups' share of R&D from other high wage countries (location unspecified) has decreased from seven to zero.

R&D expenditure of Swedish groups in low wage countries has increased in nine cases out of ten where the groups have given an explanation for the change. In the 10th case no important change has taken place. Increases take place by a variety of means, but principally through acquisitions and establishment of new R&D facilities.

Responses from the major foreign groups, formerly under Swedish control, and their R&D in Sweden does not give an equally positive picture as for the Swedish groups above. Only five out of fourteen responses confirm an increase in Sweden, three reveal a decrease and the remaining six are relatively unchanged. There are no major differences compared with 2001–2003. However, fewer groups have expanded their existing R&D in Sweden.

There are some structural differences in the group's reasons and driving forces in carrying out R&D in a specific country in preference to another. The main differences are between Sweden and abroad, but there are also differences between Swedish and foreign enterprises.

The most common reason which Swedish groups give for running R&D in other countries outside Sweden is that they need to have a presence in that specific country in order to be able to adapt their products or processes on the basis of specific customer/market requirements; or that the group's production units require an R&D capacity in this country. The most common reason given for Swedish groups' R&D in Sweden was the connection to the production unit's need for R&D. The most common reason for foreign controlled groups to carry out R&D in Sweden is access to research at universities and university colleges, as well as institutes.

Table 2 Causes of changes in R&D in Sweden and abroad between the years 2003 and 2005 (figures for 2001–2003 in brackets).

In what way has the scope of R&D changed between 2003 and 2005 (2001–2003 data in brackets)?	No. responses			
	Swedish abroad		Foreign in Sweden	Swedish in Sweden
	High wage countries ³	Low wage countries		
Increases	25 (7)	9 (4)	5 (5)	6 (5)
Acquisitions incorporating R&D activities	12 (5)	3 (1)	2 (1)	1 (3)
Group has established new R&D activities	3 (0)	3 (3)	0 (0)	0 (0)
Enterprise increased R&D activities within existing business	10 (2)	2 (0)	2 (4)	5 (1)
Enterprise relocated R&D to this country	0 (0)	1 (0)	1 (0)	0 (1)
Decreases	4 (14)	0 (1)	3 (6)	3 (5)
Sale of business with R&D	3 (3)	0 (1)	0 (2)	1 (1)
Closure of business with R&D	0 (1)	0 (0)	0 (1)	0 (1)
Enterprise has relocated R&D from this country	0 (7)	0 (0)	2 (1)	1 (0)
Enterprise decreased R&D activities in existing business	1 (3)	0 (0)	1 (2)	1 (3)
No significant change	3 (13)	1 (1)	6 (2)	2 (5)
Total responses	32 (34)	10 (6)	14 (13)	11 (15)

³ **High wage countries** consists of 22 OECD countries: Australia, Belgium, Denmark, Finland, Greece, Iceland, Ireland, Italy, Japan, Canada, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Switzerland, Spain, UK, Germany, USA and Austria. The OECD has expanded over time and in 2007 consists of 30 member countries. The countries which were not part of the group of high wage countries are defined as **low wage countries**.

Table 3 Reasons for and driving forces for R&D in Sweden and abroad.

What are the most important explanations for existing R&D and changes in R&D (2003 responses in brackets)?	No. responses			
	Swedish abroad	Foreign	Swedish	Swedish
	High wage countries	Low wage countries	in Sweden	in Sweden
Group must have a presence in this country to adapt a product or process to specific customer/market requirements	21 (13)	12 (5)	2 (0)	1 (1)
Enterprise's production unit(s) requires R&D capacity in this country.	18 (10)	5 (2)	4 (6)	5 (3)
Access to research at universities, university colleges and other institutions in this country is necessary for enterprises' development needs.	1 (3)	0 (0)	5 (5)	2 (2)
Access to skilled labour in R&D exists in this country.	7 (3)	4 (0)	2 (1)	2 (1)
Access to specialised suppliers of components and systems with their own R&D capacity (technology leaders) exist in Sweden.	8 (2)	3 (0)	3 (1)	2 (1)
Other enterprises – competitors, supplementary enterprises – which are innovative and have high quality requirements exist in Sweden.	4 (0)	3 (0)	0 (0)	2 (1)
Other reasons ⁴ , e.g. cost cuts, economies of scale, lack of skilled labour force etc.	3 (0)	4 (0)	1 (2)	0 (0)
Total responses	62 (31)	31 (7)	17 (15)	14 (9)

Table 4 Can the Swedish Government influence the scope of groups' R&D in Sweden?

Measures which major groups consider most important by no. responses	No. responses	
	Swedish groups	Foreign Groups
Research support//R&D grants	3	2
Tax burden on individuals	3	2
Tax burden on enterprises	2	2
Education investments	2	1
Joint financing by university and university college or institute	1	5
Investment in defence/defence material	1	0
No	3	2
No response available	7	2

The question "Are there any government measures that would influence your company's future R&D activities in Sweden?" gave the following responses:

⁴ The question consists of six fixed and one open alternative.

The policy measures which were considered to be most important for stimulating Swedish controlled enterprises to invest more R&D in Sweden were to reduce the costs of R&D for enterprises by providing research support/R&D grants or reduce the tax burden on enterprises by, for example, lower contributions from employers or reductions in income tax for individuals. Other measures given prominence were investments in the education system and joint financing of research by universities and university colleges or institutes. In addition, the view was put forward that large enterprises should receive just as much support and encouragement for R&D as small and medium-sized enterprises. Otherwise a number of groups responded negatively to the question stating that most of their R&D was already being carried out in Sweden. Some other groups chose not to answer the question in the survey, but referred to statements in the press.

The foreign groups received the same question as Swedish groups as to what measures they considered most important for increasing their R&D in Sweden. Half of the responses with concrete measures concerned different investments in universities and university colleges in Sweden. Everything from increased investment in basic and applied needs based research, increased grants to technological universities, improved conditions for postgraduate students, good education for graduates engineers to encouraging universities and university colleges to adapt more to the needs of industry. Also tax concessions through a reduction in corporate tax or a reduction in payroll tax, as well as reduced income taxes were considered desirable. Other measures which were pointed out were the provision of support for developing commercially usable environmental technologies and specialists in taxation.

R&D in major international Swedish groups 2005

This section is based on a survey questionnaire to 22 major Swedish groups and concerns their R&D in Sweden and abroad, reported by countries where the enterprises were carrying out R&D. The survey is carried out every two years and concerns expenditure and person-years for in-house R&D in respective countries and also the education level of R&D personnel.

The 22 groups surveyed accounted for slightly more than 40 per cent of the business sector's R&D in Sweden. In addition, these enterprises carried out almost as much R&D abroad. The fact remains that it will continue to be subsidiaries in the EU15, North America, and neighbouring Nordic countries which account for the majority of enterprises' R&D in countries other than Sweden, even though this may have decreased somewhat in recent years, particularly in North America. This is happening at the same time as low wage countries in Asia, Eastern Europe and South America account for an increasingly larger share of enterprises' R&D globally.

Table 5 Major Swedish groups' expenditure and person-years on R&D, and number of employees.

Location	R&D expenditure, SEK million			R&D person-years			Average no. employees		
	2005	2003	2001	2005	2003	2001	2005	2003	2001
Total in world	55,210	47,423	60,472	38,204	30,803	40,037	541,775	475,629	548,683
Sweden	30,891	26,965	34,688	21,720	19,085	20,923	125,288	119,398	137,312
Abroad	24,319	20,459	25,784	16,484	11,718	19,114	416,486	356,231	411,371
EU-15	11,726	10,858	11,999	8,902	7,053	10,475	168,062	161,368	187,745
North America	6,209	6,865	10,530	4,481	2,941	5,708	97,936	93,226	103,980
Nordic area	1,958	1,630	2,847	1,317	1,103	2,304	26,450	16,718	19,281

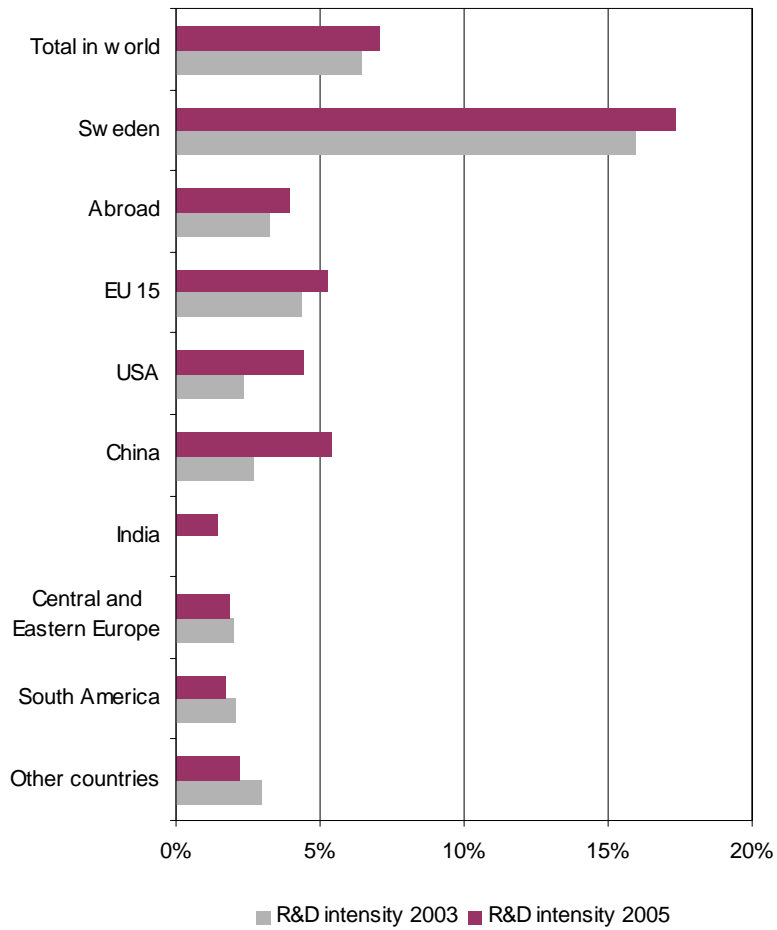
Note. North America = USA, Canada and Mexico. Denmark and Finland are both in the Nordic area and the E15.

Source: ITPS

R&D intensity in China is increasing

The Swedish groups surveyed have significantly higher R&D intensity in Sweden than they have in other countries, measured as person-years carried out in R&D in relation to total number of employees in respective countries. R&D intensity in Sweden amounts to 17 per cent compared with 4 per cent abroad. However, there are large variations between countries. Those who exceed the average are i.a. high wage countries in the EU15 and the USA, as well as the low wage country, China. Between 2003 and 2005, China's R&D increased significantly. Amongst the countries which have a lower average R&D intensity than those mentioned above, are low wage countries such as India, countries in South America and also those in Central and Eastern Europe.

Figure 5 R&D intensity (R&D person-years/number of employees) in major Swedish groups 2003–2005.



R&D in major foreign groups 2005 (formerly Swedish)

This section is based on a survey questionnaire carried out a second time on twelve major enterprises (formerly Swedish) but currently foreign controlled groups in Sweden in 2005. The first survey was in 2003 and covered eight groups. Common to these is that earlier they were under Swedish control and included in the Survey on R&D in major international Swedish groups. The data refers to person-years and expenditure on R&D conducted in Sweden.

Table 6 R&D in major foreign groups in Sweden 2003–2005.

Sweden	2005	2003
R&D expenditure, SEK million	22,507	20,007
Share of group's global R&D, %	17	12
R&D person-years	13,106	9,741
Share of group's global R&D, %	14	10

Note 1: The Swedish shares are based on 1 per cent of the groups which have stated 0-1 percent. Groups which were only able to estimate their share of R&D expenditure, have had the same share attributed to them for person-years.

Note 2: In 2005 the survey covered twelve groups, whilst in 2003 the survey covered eight groups.

The share of the foreign groups surveyed in the business sector's R&D in Sweden amounted in 2005 to 29 per cent of R&D expenditure and 23 per cent of R&D person-years. Comparisons with 2003 should be made with caution since new groups have come into the survey population, and this explains all of the increase in R&D expenditure. If the population had remained the same, there would instead have been a reduction of SEK 1.1 billion in Sweden between 2003 and 2005. Population changes also has an impact on these groups' share of R&D expenditure in Sweden (reported as an average for all groups), since the newly added groups on average have a higher share of their R&D in Sweden. Although allowance has been made for population changes, the shares are still higher than in 2003, when the figures show 15 per cent for R&D expenditure and 12 per cent for R&D person-years.

The R&D of foreign groups in Sweden amounted on average to 14–17 per cent of these groups' global R&D. Large variations, however, remain between groups. The R&D of Swedish groups in Sweden exceeds 50 per cent of their total R&D expenditure in the world.

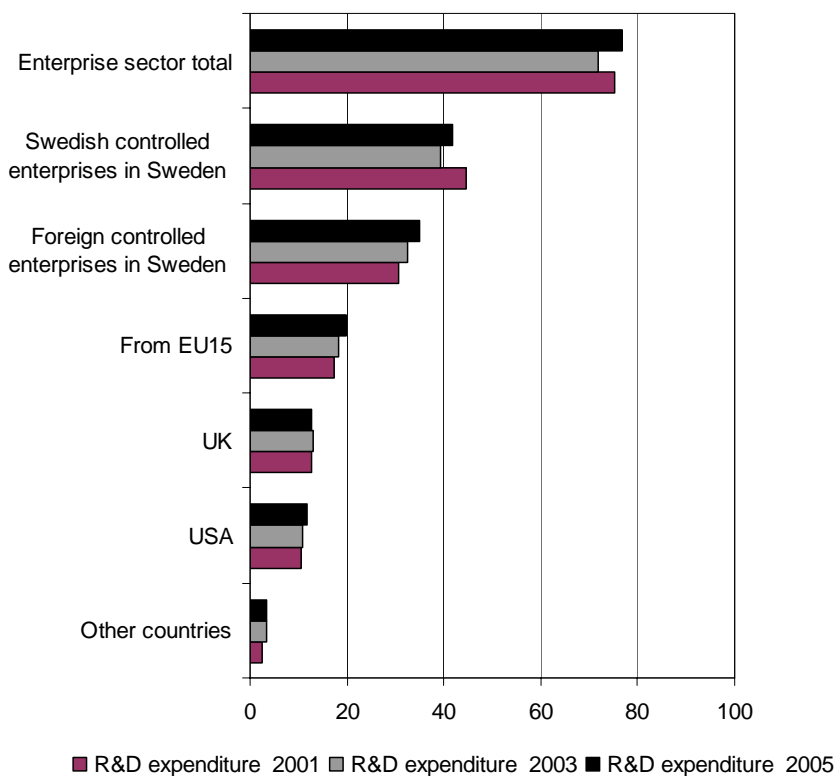
R&D in Swedish and foreign enterprises in Sweden

This section is based on results from Statistics Sweden's survey of the business sector's R&D (includes enterprises with ten or more employees) and is carried out every second year. This was done to supplement the picture from the surveys carried out by ITPS of major international groups. The R&D results from the survey on enterprises' R&D is reported here by international Swedish and foreign enterprises. The survey only deals with R&D carried out in Sweden.

Foreign controlled R&D in Sweden largely originates from the UK and USA

As mentioned earlier in the report, 46 per cent of the business sector's R&D in Sweden is controlled through foreign enterprises. These are mainly British and American enterprises. Other major countries of origin are the Netherlands, Switzerland and Finland. No major changes have taken place 2003–2005.

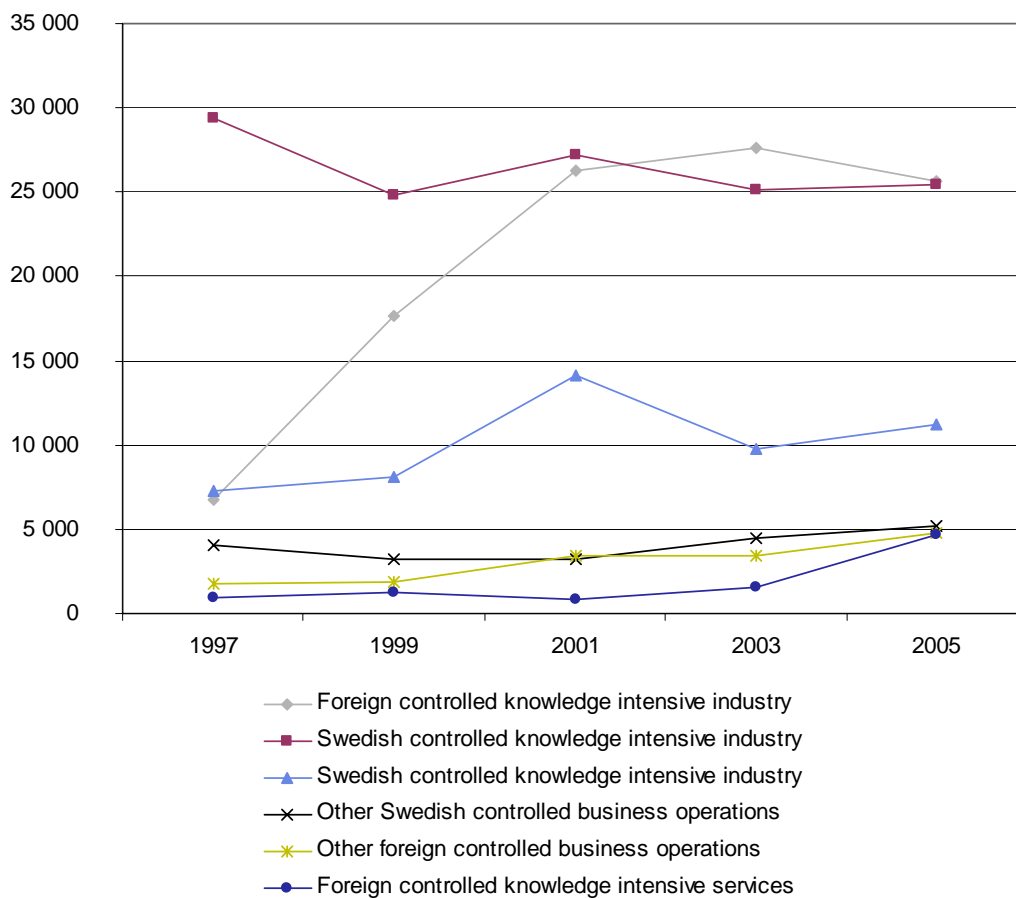
Figure 6 R&D expenditure in Sweden 2001–2005, by country of origin, SEK billion.



R&D carried out mainly in knowledge intensive manufacturing in Sweden

The R&D of the business sector in Sweden is mainly carried out by enterprises classified as knowledge intensive manufacturing enterprises⁵, but it is service enterprises⁶ which are increasing their R&D most rapidly. This applies to both foreign as well as Swedish enterprises. It is worth noting from the figure below that foreign controlled knowledge intensive manufacturing reduced its R&D somewhat during 2003–2005 measured in current prices, at the same time as foreign controlled knowledge intensive service enterprises account for the largest increase.

Figure 7 R&D expenditure by business sector, 1997-2005, SEK million.



⁵ The different sectors industries have been assigned to are described in the section "Methods and Quality Assurance".

⁶ Note, for example that a major international group can own both manufacturing and service enterprises. This does not necessarily mean that a purely service oriented enterprise has increased its R&D, it could just as easily be a manufacturing group which has increased the services related to its industrial products.

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Table 17. R&D expenditure 2005 by foreign, international Swedish and domestic enterprises, by type of cost and business sector, SEK million.

Table 18. Expenditure and person-years for R&D 2005 by county and controlling institutional unit, SEK million.

Table 19. Sources of finance for in-house R&D carried out in Sweden 2005, by controlling institutional unit, SEK million.

Table 20. Outsourced R&D 2005, by controlling institutional unit, SEK million.

Figure 8. R&D expenditure in foreign and Swedish controlled enterprises in Sweden 1995–2005, SEK billion.

Figure 9. R&D person-years in foreign and Swedish controlled enterprises in Sweden 1995–2005.

Tables

Table 7 R&D expenditure in major international Swedish groups 1995–2005.

Country/region	R&D expenditure, SEK million					
	2005	2003	2001	1999	1997	1995
Total in world	55,210	47,423	60,472	44,975	46,332	36,234
Sweden	30,891	26,965	34,688	25,922	29,767	28,298
Abroad	24,319	20,459	25,784	19,053	16,565	7,936
EU15	11,726	10,858	11,999	9,055	8,760	4,515
North America⁷	6,209	6,865	10,530	7,425	6,088	2,577
Nordic area⁸	1,988	1,630	2,847	1,732	1,481	520
China	767	560	316	111	2	-
India	710	8	221	8	30	3
Central and Eastern Europe⁹	549	259	197	174	64	22
South America¹⁰	1,161	427	332	189	332	157
Rest of world¹¹	2,887	1,179	1,098	1,273	718	373
USA	4,446	5,292	8,250	5,716	5,034	2,419
Germany	2,376	2,300	3,174	2,257	1,866	952
France	1,895	1,975	706	673	477	388
Denmark, Finland and Norway	1,988	1,630	2,847	1,732	1,481	520
Italy	1,579	1,229	1,428	1,147	993	510
UK	555	601	1,507	1,041	2,276	901
Other countries	11,512	7,462	7,872	6,487	4,438	2,246

Note. 22 groups are included in 2005, and 20 groups in 2003, of which 18 responded to the questionnaire. The groups which were surveyed in 2003 have together reduced R&D expenditure totally and in Sweden by around SEK 0.5 billion. Expenditure remained unchanged abroad.

⁷ USA, Canada and Mexico.

⁸ Denmark and Finland are included in both EU15 and the Nordic Area.

⁹ Poland, Czech Republic, Slovakia, Hungary, Russia, Rumania and Eastern Europe unspecified.

¹⁰ Argentina and Brazil.

¹¹ Rest of world: Japan, Switzerland, South Africa, Australia, New Zealand, Korea, Sri Lanka, Singapore, Thailand, Taiwan, Hong Kong, Israel, Turkey, Philippines.

Table 8 Number R&D person-years (annual full-time equivalents) in major Swedish international groups 1995–2005.

Country/region	R&D person-years					
	2005	2003	2001	1999	1997	1995
Total in world	38,204	30,803	40,037	38,846	45,135	37,623
Sweden	21,720	19,085	20,923	22,022	27,517	24,670
Abroad	16,484	11,718	19,114	16,824	17,618	12,953
EU15	8,902	7,053	10,475	8,814	10,013	7,437
North America¹²	4,481	2,941	5,708	5,660	5,170	3,712
Nordic area¹³	1,317	1,103	2,304	1,669	1,740	1,462
China	974	388	313	107	2	-
India	120	2	286	9	30	15
Central and Eastern Europe¹⁴	448	389	405	292	64	96
South America¹⁵	323	256	401	216	332	298
Rest of world¹⁶	1,090	485	873	1,077	1,340	809
USA	3,421	1,814	4,249	4,440	3,865	2,997
Germany	1,522	1,377	2,483	1,990	1,894	1,453
France	2,109	1,271	805	679	543	473
Denmark, Finland and Norway	1,317	1,103	2,304	1,669	1,740	1,462
Italy	1,703	1,368	1,760	1,246	1,166	971
UK	406	360	652	954	2,469	1,523
Other countries	6,030	4,425	6,862	5,846	5,941	4,074

Note. 22 groups were included in 2005, of which 18 responded to the question on R&D person-years. In 2003, 20 groups were included, of which 18 responded to the questionnaire and 16 to the question on R&D person-years. The figure for person-years in 2003 is consistently underestimated due to non-response in reporting.

¹² USA, Canada and Mexico

¹³ Denmark and Finland are included in both EU15 and the Nordic Area.

¹⁴ Poland, Czech Republic, Slovakia, Hungary, Russia, Rumania and Eastern Europe unspecified.

¹⁵ Argentina and Brazil

¹⁶ Rest of world: Japan, Switzerland, South Africa, Australia, New Zealand, Korea, Sri Lanka, Singapore, Thailand, Taiwan, Hong Kong, Israel, Turkey, Philippines, and unspecified parts of the world.

Table 9 Number R&D person-years (full-time annual equivalents) carried out by university graduates in major international Swedish groups 2005.

Country/region	Education level						University graduates total
	Postgraduate	Share Postgraduate (%)	Technical	Share Technical (%)	Others university graduates	Share others university graduates (%)	
Total in world	1,495	7	17,605	81	2,512	12	21,612
Sweden	800	7	10,965	90	454	4	12,219
Abroad	695	7	6,640	71	2,058	22	9,393
EU15	424	8	3,680	72	1,014	20	5,118
North America	176	7	1,396	58	818	34	2,390
Nordic area	60	7	769	88	45	5	874
USA	125	8	676	43	777	49	1,578
Germany	65	6	769	76	172	17	1,006
Italy	74	6	635	49	580	45	1,289
France	85	28	67	22	157	51	309
UK	13	6	162	74	45	20	220
Other countries	273	7	3,562	87	238	6	4,073

Table 10 Number R&D person-years (full-time annual equivalents) carried out by university graduates in major international Swedish groups 2003.

Country/region	Education level						University graduates total
	Postgraduate	Share Postgraduate (%)	Technical	Share Technical (%)	Others university graduates	Share others university graduates (%)	
Total in world	1,256	7	16,594	91	470	3	18,320
Sweden	776	7	10,108	90	338	3	11,222
Abroad	480	7	6,486	91	132	2	7,098
EU15	279	6	3,614	84	402	9	4,295
North America	117	7	1,630	93	9	1	1,756
Nordic area	53	7	674	90	22	3	749
USA	62	7	831	92	9	1	902
Germany	55	6	790	92	12	1	857
Italy	48	6	754	92	16	2	818
France	6	3	184	90	14	7	204
UK	11	6	179	93	2	1	192
Other countries	245	7	3,074	91	57	2	3,376

Table 11 R&D intensity in major international Swedish groups 2005. Distribution by country and country groups.

Country/region	R&D person-years ¹⁷	Average employees	R&D intensity (%)
Total in world	38,204	541,775	7
Sweden	21,720	125,288	17
Abroad	16,484	416,486	4
EU15	8,902	168,062	5
USA	3,421	77,126	4
China	974	17,919	5
India	120	8,296	1
South America	323	18,634	2
Central and Eastern Europe	448	24,315	2
Other countries	2,296	102,134	2

Table 12 R&D intensity in major international Swedish groups 2003. Distribution by country and country groups.

Country/region	R&D person-years ¹⁴	Average employees	R&D intensity (%)
Total in world	30,803	475,629	6
Sweden	19,085	119,398	16
Abroad	11,718	356,231	3
EU15	7,053	161,368	4
USA	1,814	77,005	2
China	388	14,459	3
India	2	10,972	-
South America	256	12,325	2
Central and Eastern Europe	389	19,526	2
Other countries	1,816	60,576	3

¹⁷ A person-year is the work performed by a full-time employee in a year.

Table 13 Number of person-years for R&D 2005. By gender, country of location and business sector.

Business sector	Men			Women		
	Foreign controlled enterprises	Swedish controlled inter-national enterprises	Domestic enterprises	Foreign controlled enterprises	Swedish controlled inter-national enterprises	Domestic enterprises
Business sector total	16,201	22,590	3,477	7,026	5,525	1,286
Manufacturing industry						
Knowledge intensive	10,597	15,879	773	4,749	3,073	100
Capital intensive	1,046	1,023	73	673	495	34
Labour intensive	287	565	170	257	153	63
Services Knowledge intensive	3,460	4,108	2,205	806	1,508	997
Capital intensive	25	119	63	15	58	15
Labour intensive	759	800	159	519	148	54
Other activities	26	97	34	8	89	23

Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with 10 or more employees. The survey has been expanded from 2005 to include enterprises with 10-49 employees, which affects comparability between the years. The industries assigned to different sectors are described in the section "Methods and Quality Assurance".

Table 14 Number of person-years for R&D 2003. By gender, country of location and business sector.

Business sector	Men			Women		
	Foreign controlled enterprises	Swedish controlled inter-national enterprises	Domestic enterprises	Foreign controlled enterprises	Swedish controlled inter-national enterprises	Domestic enterprises
Business sector total	13,862	20,227	1,957	6,128	4,660	1,278
Manufacturing industry						
Knowledge intensive	11,198	14,926	392	4,656	2,980	226
Capital intensive	1,002	1,038	33	712	420	22
Labour intensive	328	432	100	176	111	46
Services Knowledge intensive	1,171	2,990	1,360	301	811	941
Capital intensive	3	312	20	2	141	5
Labour intensive	124	438	33	274	115	21
Other activities	36	91	20	7	83	17

Table 15 R&D person-years and R&D expenditure in Sweden 2001–2005. By country of origin.

Country	R&D person-years			R&D expenditure, SEK million		
	2005	2003	2001	2005	2003	2001
Business sector total	56,106	48,113	49,433	76.9	72	75.1
Swedish enterprises in						
Sweden	32,879	28,123	29,508	41.8	39.3	44.6
Foreign enterprises abroad	23,227	19,990	19,924	35.1	32.6	30.5
From EU15	11,216	9,370	9,308	19.7	18.4	17.4
From North America	9,516	8,686	8,631	12.2	11.6	10.9
From Nordic area	2,683	1,888	1,242	2.7	1.9	1.6
of which from:						
UK	5,906	5,309	5,657	12.8	13	12.8
USA	9,279	7,986	8,185	11.9	10.9	10.5
Switzerland	1,364	1,497	1,660	2.0	2.2	1.9
Netherlands	1,254	1,741	1,336	2.2	2.8	1.7
Germany	872	246	530	1.3	0.4	0.8
Finland	1,957	1,529	891	1.8	1.5	1.3
Norway	459	212	140	0.6	0.2	0.2
France	438	152	391	0.5	0.2	0.5
Denmark	267	147	211	0.3	0.2	0.2
Canada	237	700	445	0.3	0.8	0.4
Other countries	1,194	471	477	1.4	0.4	0.4

Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with 10 or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years. The industries assigned to different sectors are described in the section "Methods and Quality Assurance".

Table 16 R&D expenditure and R&D person-years in foreign and Swedish controlled enterprises in Sweden by industry sector 2003–2005, SEK million.

Business sector	Enterprise category	R&D expenditure, SEK million		R&D person-years	
		2005	2003	2005	2003
Knowledge intensive					
<i>Manufacturing industry</i>	Foreign controlled enterprises	25,625	27,664	15,346	15,854
	Swedish controlled international enterprises	24,577	24,288	18,952	17,906
	Domestic enterprises	912	846	872	617
	Total	51,113	52,797	35,171	34,378
<i>Services</i>	Foreign controlled enterprises	4,720	1,523	4,266	1,472
	Swedish controlled international enterprises	7,668	7,044	5,616	3,801
	Domestic enterprises	3,508	2,688	3,203	2,301
	Total	15,896	11,255	13,084	7,574
Capital intensive					
<i>Manufacturing industry</i>	Foreign controlled enterprises	2,304	1,946	1,720	1,714
	Swedish controlled international enterprises	1,930	1,790	1,518	1,458
	Domestic enterprises	94	43	108	54
	Total	4,328	3,780	3,345	3,227
<i>Services</i>	Foreign controlled enterprises	161	26	40	5
	Swedish controlled international enterprises	209	656	177	453
	Domestic enterprises	103	45	78	25
	Total	473	728	295	483
Labour intensive					
<i>Manufacturing industry</i>	Foreign controlled enterprises	596	571	544	504
	Swedish controlled international enterprises	713	525	718	543
	Domestic enterprises	167	196	233	146
	Total	1,476	1,291	1,495	1,192
<i>Services</i>	Foreign controlled enterprises	1,694	726	1,277	398
	Swedish controlled international enterprises	1,392	916	948	553
	Domestic enterprises	248	48	213	55
	Total	3,334	1,689	2,438	1,006
Other activities					
	Foreign controlled enterprises	36	153	34	44
	Swedish controlled international enterprises	215	214	186	173
	Domestic enterprises	78	47	57	37
	Total	329	413	278	254
Business sector					
	Foreign controlled enterprises	35,136	32,608	23,227	19,990

Swedish controlled international enterprises	36,704	35,432	28,115	24,888
Domestic enterprises	5,109	3,913	4,763	3,235
Total	76,949	71,953	56,106	48,113

Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years. The industries assigned to different sectors are described in the section "Methods and Quality Assurance".

Table 17 R&D expenditure 2005 by foreign, international Swedish and national enterprises, by type of cost and business sector, SEK million.

Business sector	Labour costs			Other running costs and investments (for R&D)			Total R&D expenditure		
	Foreign cont- rolled enter- prises	Swedish controlled inter- national enterprise s	Dom- estic enter- prises	Foreign contr- olled enterpri- ses	Swedish controlled inter- national enterpris- es	Dom- estic enter- prises	Foreign cont- rolled enter- prises	Swedish cont- rolled internatio- -nal enterpris- es	Dom- estic enter- prises
Total	16,865	18,899	2,899	18,271	17,806	2,210	35,136	36,704	5,109
Manufacturing industry									
Knowledge intensive	11,016	13,480	502	14,609	11,096	410	25,625	24,577	912
Capital intensive	1,168	941	53	1,136	990	40	2,304	1,930	94
Labour intensive	302	445	90	294	269	78	596	713	167
Services									
Knowledge intensive	3,306	3,066	2,035	1,414	4,602	1,473	4,720	7,668	3,508
Capital intensive	11	151	62	151	59	40	161	209	103
Labour intensive:	1,038	713	127	656	679	121	1,694	1,392	248
Other activities	25	103	30	11	111	48	36	215	78

Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years. The industries assigned to different sectors are described in the section "Methods and Quality Assurance".

Table 18 Expenditure and person-years for R&D 2005 by county and controlling institutional unit, SEK million.

County	R&D expenditure, SEK million			R&D person-years		
	Foreign controlled enterprises	Swedish International enterprise	Domestic enterprises	Foreign controlled enterprises	Swedish controlled international enterprises	Domestic enterprises
Business sector total	35,136	36,704	5,109	23,227	28,115	4,763
Stockholm	9,089	13,872	2,177	5,913	11,067	1,779
Västra Götaland	15,220	7,484	749	7,461	5,588	864
Skåne	4,222	6,046	615	4,328	3,847	484
Östergötland	1,184	2,968	309	924	2,357	299
Uppsala	696	541	335	579	442	298
Örebro	515	882	13	389	519	13
Västmanland	1,172	170	15	871	160	16
Jönköping	487	498	99	331	563	158
Blekinge	175	767	22	118	678	24
Värmland	782	68	14	835	79	50
Södermanland	40	761	26	54	660	30
Gävleborg	32	667	52	33	561	62
Norrbottn	261	287	179	280	226	141
Dalarna	477	136	60	351	128	44
Västernorrland	218	128	149	185	130	141
Kronoberg	117	208	66	148	197	89
Other counties	448	1,221	230	428	914	271

Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years. For reasons of confidentiality, data is not reported for certain counties. "Other counties" also covers expenditure and person-years which could not be allocated regionally.

Table 19 Sources of finance for in-house R&D in Sweden 2005, by controlling institutional unit, SEK million.

Sources of finance	Foreign controlled enterprises	Swedish controlled international enterprises	Domestic enterprises	Total business sector
Business sector total	35,136	36,704	5,109	76,949
Self-financing	28,169	30,954	2,876	61,999
Public financing	230	2,416	640	3,285
Private financing sourced in Sweden	2,369	1,786	957	5,113
<i>from enterprises in Sweden</i>	2,363	1,759	882	5,005
Private financing, sourced abroad	4,165	921	435	5,521
<i>from enterprises abroad</i>	4,165	793	430	5,388
EU funding	24	162	165	351
Other financing sourced abroad	179	466	36	681

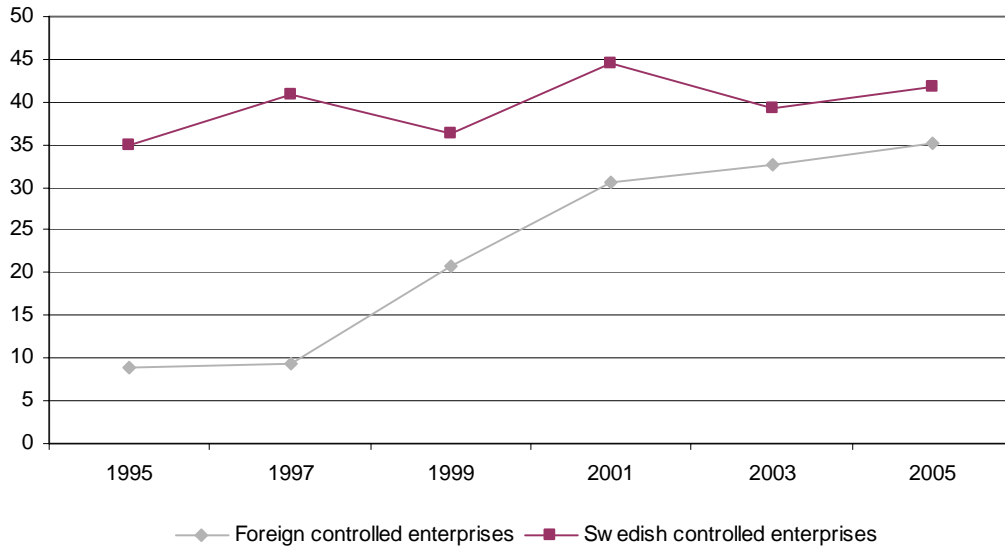
Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years.

Table 20 Outsourced R&D, by recipient and controlling institutional unit, SEK million.

Recipient	Foreign controlled enterprises	Swedish controlled international enterprises	Domestic enterprises	Total business sector
Total	3,645	15,847	941	20,433
Other enterprises in same group in Sweden	288	1,345	254	1,886
Other enterprises in Sweden	789	2,341	221	3,351
Enterprises in same group abroad	797	9,369	59	10,226
Other enterprises abroad	1,081	2,191	115	3,388
Higher education sector in Sweden	308	368	125	800
Industry organisations/ research institutes	52	151	119	322
Other units in Sweden	195	38	18	251
Other units abroad	135	44	31	209

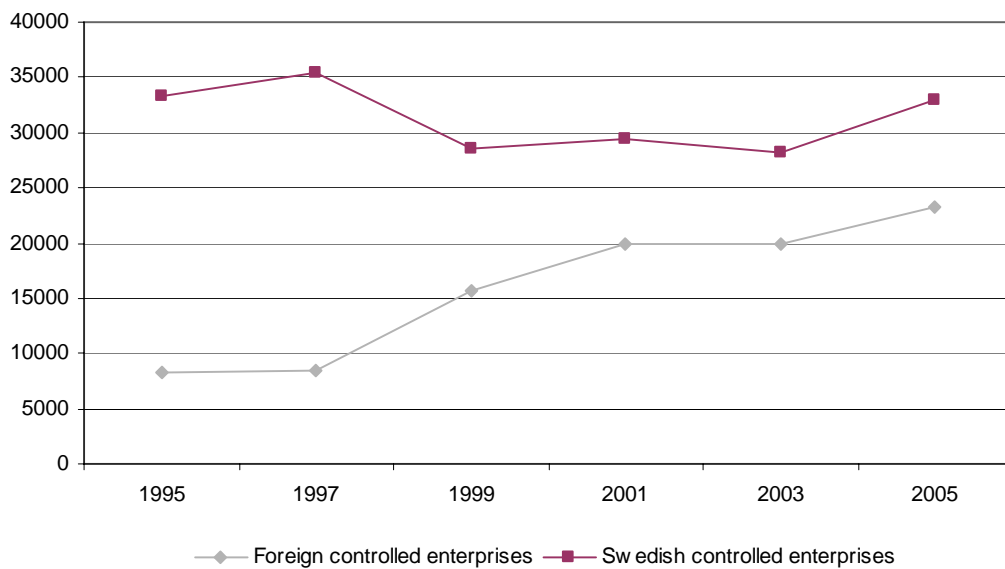
Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years. Note that in-house R&D expenditure cannot be added to outsourced expenditure, as this would lead to double-counting.

Figure 8 R&D expenditure in foreign and Swedish controlled enterprises in Sweden 1995–2005, SEK billion.



Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years.

Figure 9 R&D person-years in foreign and Swedish controlled enterprises in Sweden 1995–2005.



Note. All data are obtained from Statistics Sweden's survey of R&D in the enterprise sector in 2005 and refer to enterprises with ten or more employees. The survey has been expanded from 2005 to include enterprises with 10–49 employees, which affects comparability between the years.

Methods and Quality Assurance

This section describes how the survey was carried out, sample, definitions and quality.

Background

The Swedish Institute for Growth Policy Studies (ITPS) is a Government Agency responsible for Official Statistics on *International enterprises* as laid down in the Act on Official Statistics (2001:99) and the annex to the Ordinance (2001:100) on Official Statistics. The assignment also includes carrying out a survey of research and development in international enterprises, i.e. Swedish enterprises with business operations abroad and foreign enterprises in Sweden. This study has been carried out in collaboration with Statistics Sweden (SCB). The results from the preceding survey have been published in a number of studies including *Research and development in international enterprises 2003*. Statistical reports (including older reports) can be obtained free of charge from the ITPS web site: www.itps.se

Use of statistics

The Swedish economy and its growth are highly dependent on the activities of international enterprises. Research and development in the business sector is, for example, highly concentrated in a few major international groups.

Information on the trends and scope of R&D of these enterprises in and outside Sweden provides an important source of knowledge for industrial and trade policy.

ITPS is one of the major users of statistics and provides the Government and the Swedish Riksdag with studies to assist policy makers. Other users are researchers, journalists, trade unions and organisations representing enterprises. ITPS supplies a number of international organisations with research material on globalisation of enterprises. The EU, OECD and UNCTAD develop, for example, their own databases and issue publications.

Definitions

The definitions and classifications used to describe R&D activities are based on those agreed in the OECD and published in the Frascati Manual.

Research and Development is defined as below:

Research: work undertaken systematically in order to gain new knowledge or new ideas with or without a specific application in view.

Experimental Development: work undertaken systematically which uses research findings, scientific knowledge and new ideas to create new materials, goods, services, processes, systems, methods or significant improvements to those already existing.

Variables

The variables studied mainly concern in-house R&D. Namely R&D carried out by and within the enterprise/group itself.

R&D person-years: A person-year is the work a full-time employee carries out in the course of a year. A person employed on a full-time basis, but only spending half their working hours in R&D is regarded as performing 0.5 person-years in R&D.

Education levels: Person-years in R&D carried out by employees within a group are reported in terms of education level as set out below:

- Postgraduate comprises persons with licentiate and doctoral degrees. In this survey, a Master's degree is not regarded as a postgraduate qualification.
- Post upper secondary education of at least three years for a first degree in higher education, graduate engineer - or other higher education diplomas.
- Technical/Technology education refers to all categories with engineering qualifications, including architects.

Expenditure on in-house R&D: Expenditure on in-house R&D concerns R&D which the enterprise/group itself carries out, and is distinguished from outsourced R&D. Expenditure on in-house R&D consists of labour costs (salaries and payroll overheads), other running costs (rent, telephone etc.), any investments during the year in tangible assets for R&D purposes, and also consultancy fees where a project is managed and carried out by the enterprise itself, and its personnel work together with consultants.

Major Swedish controlled international groups

The survey covers 22 major international Swedish groups, size is defined in terms of number of employees abroad. The sample is based on an annual survey of all groups in Sweden which have at least one subsidiary abroad. These groups dominate both the business sector's employees outside Sweden, and investments in R&D in Sweden. This sample should provide an accurate picture of R&D activities abroad. The statistical unit studied is the group, i.e. a group of enterprises that have been consolidated in the annual report for a group. In some cases, a sub-group has been surveyed instead of the group as a whole for technical reasons.

Groups surveyed:

Alfa Laval, Assa Abloy, Atlas Copco, Cardo, Electrolux, Gambro, Getinge Industrier, Haldex, Hexagon, LM Ericsson, Perstorp, SCA and SKF, IFS, Intentia, Saab, Sandvik, Scania, Sony Ericsson, Trelleborg, Telia Sonera and Volvo.

Changes in the population

The principle governing the selection of groups i.e. the sample for the survey is the same for each survey. On the other hand comparisons over time are made more difficult by reorganisations, acquisitions, divestments etc. At the end of the 1990s some major groups came under foreign control and have mainly been replaced by groups with lower R&D.

The change in the survey population for 2005 means that some groups have been added, particularly in the service sector. Moreover, in some cases groups have not been able to submit complete data on their R&D personnel in other countries, and as a result R&D expenditure has better coverage than R&D person-years when making comparisons over time.

The questionnaire remains largely unchanged over the period 1993–1997. The surveys for 1999 and 2001 have been supplemented by questions on how and why major changes took place in different countries. In addition, there was also a question on whether the Government had any influence over the scale of R&D in Sweden. No further changes were made in the 2005 survey.

Comparability with other statistics

When making comparisons between major international groups, and manufacturing industry and the business sector, account should be taken of the coverage of enterprises in the different surveys. As the R&D statistics in earlier years did not cover all enterprises, the total for manufacturing industry compared to the business sector is underestimated, since only enterprises with more than 50 employees were included in the total figures. Statistics Sweden's survey for 2005 also covers enterprises with 10–49 employees in the total figures, this has led to better comparability with the ITPS surveys.

Overall reliability

Earlier, some individual groups reported costs of R&D in a country other than the one in which the R&D was actually carried out. This has also this year led to some groups stating that they have employees in countries where they have either reported figures for R&D expenditure that are too low or no expenditure at all for R&D. Since the 1997 survey, this situation has improved for the better. The reason for the improvement in reporting R&D carried out abroad is due to the greater focus on R&D and more rigorous demands from different parties.

Non-response

The survey covered 22 groups. All the groups have responded to the questionnaire. On the other hand, there is some partial non-response due to the fact that four groups were not able to submit data on the number of person-years in R&D. Some respondents provided estimates of the number of person-years. The total number of R&D person-years is somewhat underestimated. No values have been imputed for non-response.

Foreign groups in Sweden (formerly Swedish)

The study is based on a questionnaire submitted to eight major foreign controlled groups concerning their R&D in Sweden. All these eight groups were earlier under Swedish control. The statistical unit studied is the group, i.e. a group of enterprises which are consolidated in an annual report for the group.

Groups surveyed:

ABB, Astra Zeneca, AGA (Linde), Autoliv, Bombardier, BT Industries (Toyota), Pharmacia (Pfizer), Volvo Personvagnar (Ford), Stora Enso, Svedala Industri (Metso) Tetra Laval and Tieto Enator.

Scope of questionnaire

The questionnaire contains questions on groups' R&D expenditure and R&D person-years in Sweden. How large a share of the groups' global R&D is carried out in Sweden. Questions concerning changes in R&D, and to what extent the Government can influence the scope of R&D in Sweden.

Comparisons

The report also compares groups' R&D in 2005 and 2003 with the R&D of the groups when they were under Swedish control in the 1993 survey. As regards those groups that were not included in the survey in 1993, data has been supplemented from Statistics Sweden's ordinary R&D survey.

Non-response

All 12 groups in the survey responded to the questionnaire. The 2003 survey was preceded by a preliminary study, the purpose of which was to examine the feasibility of collecting appropriate data. Eight out of the ten groups submitted data on their R&D in Sweden. Close contacts with respondents in conjunction with the limited amount of data requested has led to virtually no non-response.

Foreign controlled enterprises

The ITPS register of foreign controlled enterprises has been matched with Statistics Sweden's regular statistics on R&D. The survey covers all enterprises which have at least 10 employees (earlier 50 employees). The data only relates to their business operations in Sweden. The statistical unit is the enterprise. Foreign controlled enterprises are defined as enterprises in which 50 per cent or more of the voting rights are under the control of a foreign institutional controlling unit in accordance with the definition agreed on within the EU and the OECD.

Alternative classification

Ohlsson/Vinell¹⁸ have developed a classification of manufacturing industry based on relative use of production resources by different industries. The service sector is not usually classified into knowledge, capital, and labour-intensive sectors. As a result, NUTEK (Swedish Business Development Agency) drew up prior to its long-term survey (LU 99), a classification system for enterprises in all industries based on intensity of use of knowledge, capital and labour. It is this classification that has been used.

In this report enterprises are assigned to different sectors based on the industry classification on the next page due to problems with confidentiality.

¹⁸ Tillväxtens drivkrafter – En studie av industriens framtidsvillkor ("The driving forces of growth - A study of conditions for industry in the future) by Lennart Ohlsson and Lars Vinell.

Industry classification

The industry classification has been done in accordance with the Swedish Standard Classification of Economic Activities SNI 02, which is based on the statistical classification of economic activities in the European Union, NACE Rev. 1.1

22	Publishing; printing and reproduction of recorded media
29	Manufacture of machinery and equipment
30	Manufacture of office machinery and computers
33	Manufacture of medical, precision and optical instruments, watches, and clocks
24.4–5	Manufacture of pharmaceuticals, soaps and detergents
31	Manufacture of electrical machinery and apparatus
32	Manufacture of radio, television and communication equipment and apparatus
34–35	Manufacture of transport equipment
	Total, knowledge intensive industry
21	Manufacture of pulp, paper and paper products
23	Manufacture of coke, refined petroleum products and nuclear fuel
26	Manufacture of other non-metallic products
27	Manufacture of basic metals and fabricated metal products
10–14	Mining and quarrying
24	Other chemical industry
	Total, capital intensive industry
20	Wood industry; not furniture
25	Manufacture of rubber and plastics products
28	Manufacture of fabricated metal products, except machinery and equipment
15–16	Manufacture of food, beverage and tobacco
17–19	Textile, wearing apparel and leather products
36–37	Other manufacturing industry
	Total, labour intensive industry
65-67	Financial intermediation
71-74	Business services
80–85	Education, health services etc.
90–93	Other community, social and personal services
	Total, knowledge intensive services
70	Real estate activities
60–64	Transport and communication
	Total, capital intensive services
45	Construction
55	Hotels and restaurants
50–52	Wholesale and retail trade, repair of personal and household goods
	Total, labour intensive services
01-05	Agriculture, forestry and fishing
40–41	Electricity, gas, heating and water supply
	Total, other activities

The Swedish Institute for Growth Policy Studies (ITPS) is a Government Agency responsible for providing policy intelligence to strengthen growth policy in Sweden. ITPS primarily provides the Government Offices, Members of the Swedish Parliament, other state authorities and agencies with briefings based on statistical material, policy papers and key analyses. Business policy and regional development policy are areas given high priority.

Changes in policy should be based on:

- Statistic data and analyses of the structure and dynamics of industry – to obtain an up-to-date view of future challenges and opportunities.
- Evaluation of results and effects of policy measures and programmes – to provide benchmarks and learn from measures implemented earlier.
- Policy intelligence in order to look outwards and ahead – what issues are likely to come on the growth policy agenda in the future?

These represent the principal missions of ITPS.