



# The 2006 EU Survey on R&D Investment Business Trends

Alexander Tübke and René van Bavel



EUR 23279 EN - 2007

European Commission  
Joint Research Centre - Institute for Prospective Technological Studies  
Directorate General Research

**Contact information**

Address: Edificio Expo. c/ Inca Garcilaso, s/n. E-41092 Seville (Spain)  
E-mail: [jrc-ipts-secretariat@ec.europa.eu](mailto:jrc-ipts-secretariat@ec.europa.eu)  
Tel.: +34 954488318  
Fax: +34 954488300

Comments and inputs can be sent by email to: [JRC-IPTS-IRI@ec.europa.eu](mailto:JRC-IPTS-IRI@ec.europa.eu)

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JRC 42600

EUR 23279 EN

ISSN 1018-5593

Luxembourg: Office for Official Publications of the European Communities

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EUROPEAN  
COMMISSION

Monitoring industrial  
research:

**The 2006 EU SURVEY  
on R&D Investment  
Business Trends**

Joint Research Centre  
Directorate General Research

## Acknowledgements

This 2006 EU Survey on R&D Investment Business Trends is part of the Industrial Research Investment Monitoring activity carried out jointly by the Joint Research Centre (JRC) and the Directorate General Research (DG RTD) of the European Commission. The work has been conducted by the JRC's Institute for Prospective Technological Studies (JRC-IPTS), with overall monitoring and guidance provided by Unit C.3 (Economic analysis and monitoring of national research policies and the Lisbon strategy) of DG RTD.

Within JRC-IPTS the project was coordinated and carried out by the Knowledge for Growth Unit (KfG) under the leadership of the Acting Head of Unit Pietro Moncada Paternò Castello, who also contributed to the analysis. Alexander Tübke and René van Bavel from JRC-IPTS were the main authors of this report. Raquel Ortega Argiles, Peter Voigt, Marco Vivarelli, Lesley Potters, and Joaquín Azagra Caro from the KfG Unit, and Xabier Goenaga Beldarrain and Antonio Puente Rodero from DG RTD-C.3, contributed to it.

The project benefited from contributions from external experts, namely Andrew Dearing (European Industrial Research Management Association), Ben Dankbaar (Radboud University Nijmegen) and Parimal Patel (University of Sussex, SPRU), who were co-ordinated by Jos Leijten (TNO) through the European Techno-Economic Policy Support network (ETEPS).

JRC-IPTS and DG RTD-C.3 would like to express their thanks to everyone who has contributed to this project.

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## Key Findings

This is the second survey on R&D investment business trends. It provides new insights into company expectations about future R&D investments and their motivations to invest in research. The results are drawn from 110 responses out of the 700 of the European companies appearing in the 2005 EU Industrial R&D Investment Scoreboard. The responding companies are responsible for a total global R&D investment of almost €25 billion, constituting a considerable share (24.3%) of the total R&D investment by the European Scoreboard companies. The main results are as follows:

### **R&D investment is expected to grow at around 3.2%.**

On average, the companies surveyed expect their global R&D investment to grow by about 3.2% per year over the period 2007-09. These expectations reflect a dominance of the medium R&D intensive sectors, which constitute more than half of the total R&D investment of all companies in the sample.

### **While the surveyed companies, all from the EU, carry out the majority of their R&D in the EU...**

All the companies in the sample are headquartered within the EU. More than four fifths of their overall R&D investment spending is on work carried out in the EU. The US and Canada follow, where about 10% is performed. Despite worries about R&D offshoring, R&D investment carried out in China and India accounts for less than one percent.

### **... the highly R&D intensive sectors are the most internationalised in terms of R&D distribution.**

The medium R&D intensity sectors invest the largest proportion of their R&D inside the EU, and the high R&D intensity ones the lowest proportion. The highly R&D intensive companies, mainly those in the pharmaceuticals & biotechnology sector, are the most internationalised in terms of how their R&D investments are distributed.

### **However, there is a slight movement to invest outside the EU.**

Comparing the current distribution of R&D investment with the distribution of future expectations, there is a slight movement to invest outside the EU. The 89 companies for which data were available expect to invest an additional €60 million a year approximately (corresponding to 0.4% of their annual R&D investment) outside the EU. Almost two thirds of this is expected to go to the US and Canada and one tenth each to China and India.

### **Access to R&D knowledge and market access make R&D locations attractive...**

The most important factors when deciding where to locate R&D are access to specialised R&D knowledge and results, market access and a plentiful supply of researchers. As in past year's Survey, the labour costs of employing researchers seem to be less significant.

### **... and China and Germany are most frequently mentioned as an attractive location.**

China and Germany are the countries most frequently mentioned as being the most attractive R&D investment locations. About one third of the respondents, all from the EU, chose their home country as the most attractive R&D investment location. For Germany, this share was higher in relative terms. After China and Germany, the most attractive locations were India and the US.

### **Market demand and better company turnover or profit are incentives for increasing R&D investment.**

The two main incentives for increasing R&D investment are market demand for new products and services, and improved company turnover or profit. As in last year's Survey, changes in the availability and labour costs of researchers are the least cited incentives for increasing R&D investment.

### **Considerable shares of R&D investment are carried out via outsourcing and collaboration.**

Companies outsource an average of 15% of their R&D investment. Around two thirds of this amount goes to other companies and one third to public research organisations. The respondents use around 11% of R&D investment to fund collaborative research with other companies. Access to new knowledge and results is the most important reason for entering into these collaborations.

### **Almost four fifths of R&D corresponds to development and only one fifth to research.**

Overall, 78% of R&D corresponds to development. The share of development in R&D is around 10% higher for work done outside the EU than inside. The difference is seen most clearly in the high and medium R&D intensity sectors.

# 1 Introduction

Increasing and improving Research and Development (R&D) investment in Europe is at the heart of the EU's Lisbon Strategy<sup>1</sup>. In order to support policymakers in this field and monitor progress towards the accompanying (Barcelona) targets, the present survey gathers information, at a European level, on factors and issues which surround and influence R&D investment<sup>2</sup> by companies. It is part of the Industrial Research Investment Monitoring (IRIM) initiative<sup>3</sup> and closely related to the *EU Industrial R&D Investment Scoreboard*<sup>4</sup>.

Following the first edition<sup>5</sup> in 2005, the present document describes the results of the 2006 IRIM Survey. The questionnaire<sup>6</sup> was sent to the 700 European companies which appear in the *2005 EU Industrial R&D Investment Scoreboard*<sup>7</sup>. Responses were received from 110 of these companies, a response rate of 15.7%. Responses were sorted into groups<sup>8</sup> according to R&D intensity<sup>9</sup>. Table 1 shows the number of responses, the response rates, and the response rate weighted to reflect the respondents' share of total investment by the Scoreboard companies as a whole.

**Table 1: Number of responses and response rates compared to the Scoreboard, by sector group**

Sector group	ICB Sector	Number of responses in sample	Response rate	
			in terms of number of responses	in terms of R&D investment (share of sample in Scoreboard)
High R&D intensity	Electronics & electrical equipment, health care equipment & services, pharmaceuticals & biotechnology, software & computer services, and technology hardware & equipment	38	12.7%	17.8%
Medium R&D intensity	Aerospace & defence, automobiles & parts, chemicals, general industrials, industrial engineering, and personal and household goods	37	15.4%	27.1%
Low R&D intensity	Beverages, construction & materials, electricity, fixed line telecommunications, food producers, forestry & paper, gas, water & multiutilities, industrial metals, industrial transportation, oil & gas equipment, producers and services, and tobacco	35	21.9%	34.9%
<b>total</b>		<b>110</b>	<b>15.7%</b>	<b>24.3%</b>

Source: European Commission JRC-IPTS (2007)

Although there were slightly more responses from the highly R&D intensive sector group, the response rates for this group are the lowest, both in terms of the number of responses and of the R&D investment share they represent in the Scoreboard. In all three sector groups, the response rate in terms of R&D investment is higher than that in terms of number of responses, which is to say that compared to the Scoreboard, there is a disproportionate share of companies with higher-than-average R&D investment in the sample. The 110 respondents are responsible for a total global R&D investment of almost €25 billion, which is a sizeable share (24.3%) of the total R&D investment by the European Scoreboard companies.

<sup>1</sup> See: [http://ec.europa.eu/growthandjobs/index\\_en.htm](http://ec.europa.eu/growthandjobs/index_en.htm).

<sup>2</sup> The Survey addresses R&D investment rather than expenditure. R&D investment refers to all R&D performed and financed by the company, regardless of where or by whom that R&D is performed. By definition (see Annex A: The Methodology of the 2006 Survey), this excludes R&D financed by governments or other companies as well as the companies' share of any associated company or joint venture R&D investment. The Survey therefore takes up what each responding company indicates as its particular financial commitment to R&D. The official statistical concept, Business Expenditure on R&D (BERD), takes a geographic perspective: it refers to all R&D performed by businesses within a particular territory, regardless of the home location of the business, and regardless of the sources of finance. Thus, BERD includes R&D performed by a company but funded by government, research councils, non-profit foundations, or from overseas, as well as R&D financed by the company itself. Therefore, an official BERD figure comprises R&D performed in a given country or region and carried out by those companies or parts of companies (including foreign-owned subsidiaries) that are physically located in the country, regardless of the source of funding.

<sup>3</sup> See: <http://iri.jrc.es>. The activity is undertaken jointly by the Directorate General Research (DG RTD C, see: <http://ec.europa.eu/research>) and the Joint Research Centre, Institute of Prospective Technological Studies (JRC-IPTS, see: <http://www.jrc.es/activities/research-and-innovation/iri.cfm>).

<sup>4</sup> The Scoreboard is published annually and provides economic and financial data of companies from the EU and abroad investing the most in R&D. The Scoreboard analysis examines the overall levels of R&D, the performance of the EU companies, and the main changes that have taken place (see: <http://iri.jrc.es/research/scoreboard.htm>).

<sup>5</sup> See: The 2005 Survey on R&D Investment Business Trends in 10 Sectors, [http://iri.jrc.es/research/survey\\_2005.htm](http://iri.jrc.es/research/survey_2005.htm)

<sup>6</sup> See: Annex B: The 2006 Questionnaire on R&D Investment

<sup>7</sup> See: [http://iri.jrc.es/research/scoreboard\\_2005.htm](http://iri.jrc.es/research/scoreboard_2005.htm)

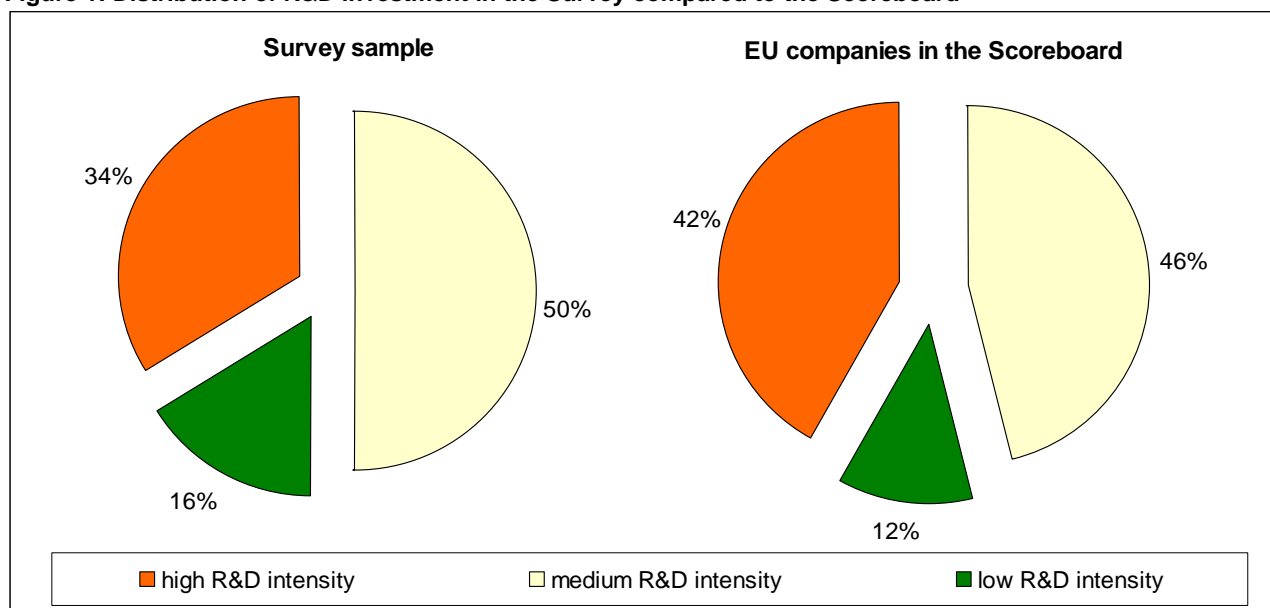
<sup>8</sup> See: Annex A: The Methodology of the 2006 Survey

<sup>9</sup> R&D intensity is the ratio between R&D investment and net sales. An individual company may invest a large overall amount in R&D but have a low R&D intensity if net sales are high (as is the case of many oil & gas producers, for example).



As shown in Figure 1, the distribution of R&D investment in the Survey is similar to that in the Scoreboard.

**Figure 1: Distribution of R&D investment in the Survey compared to the Scoreboard**



Note: The figure refers to all 110 companies in the sample.

Source: European Commission JRC-IPTS (2007)

The figure suggests that the R&D investment in the Survey, as well that of the EU companies in the Scoreboard, is concentrated in the medium R&D intensity sectors. The sectoral distribution of R&D investment in the Survey sample and the Scoreboard is different to that of the US, for example, which has a much higher share of R&D investment in the high R&D intensity sectors<sup>10</sup>.

In terms of employees and turnover, the average size of the responding companies is very large<sup>11</sup>. In this regard, the present Survey differs from other surveys in Europe such as the Community Innovation Survey (CIS), as the latter not only uses a different sampling technique but also includes Small and Medium-sized Enterprises (SMEs) with 10 employees or more<sup>12</sup>.

More information about the methodology and details of the sample composition can be found in Annex A.

<sup>10</sup> In the 2006 Scoreboard, US corporate R&D investment by companies in high R&D intensity sectors was almost twice the amount by comparable EU companies. Most of the difference in the sectorial distribution is due to the ICT sector (see: The 2006 EU R&D Investment Scoreboard, p.12).

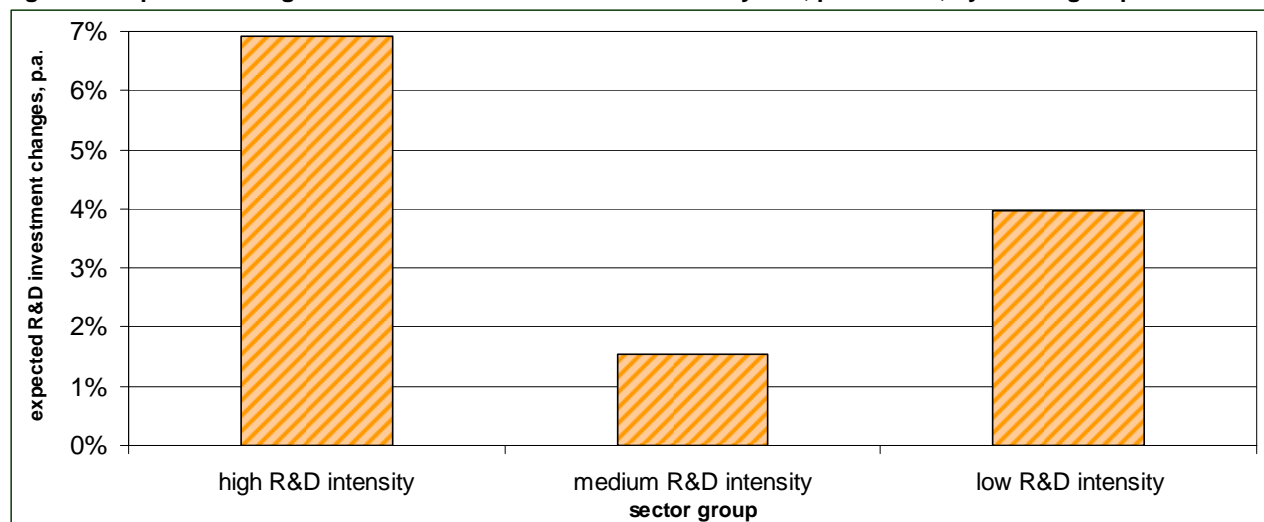
<sup>11</sup> Per company, the average turnover is €13 billion with 36 000 employees and 1 900 R&D employees. Among the 110 respondents there are only five medium-sized companies according to the European Commission's definition of a SME (see: [http://ec.europa.eu/enterprise/enterprise\\_policy/sme\\_definition/index\\_en.htm](http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm) and Annex A: The Methodology of the 2006 Survey).

<sup>12</sup> The CIS uses a stratified sampling for at least 3 size classes (small, medium and large enterprises) across all EU Member States.

## 2 Expectations Regarding R&D Investment

On average, the 89 companies which supplied data expect their global R&D investment to grow by about 3.2% a year over the period 2007-09<sup>13</sup>. This is broken down by sector group in Figure 2 below.

Figure 2: Expected changes in R&D investment in the next three years, per annum, by sector group



Note: The figure refers to 89 out of the 110 cases in the sample, weighted by R&D investment.

Source: European Commission JRC-IPTS (2007)

The biggest increases are expected in the high R&D intensity sectors, followed by the low and medium R&D intensity sectors. The highly R&D intensive sectors are dominated by the pharmaceuticals & biotechnology sector, with a share of 60%. Additionally, the low growth expectations of the medium R&D intensity sectors weigh heavily on the overall expectations as they constitute half of the R&D investment in the Survey<sup>14</sup>.

The difference in expectations between this and last year's Surveys is not statistically significant<sup>15</sup>. However, expectations reported by the 25 companies that participated in both years showed a decline. This is mostly due to a drop in expectations among the medium R&D intensity sectors since last year. These are especially relevant to the average R&D investment growth in the EU, as highly R&D intensive sectors account for a much lower share of R&D investment in the EU than in the US, for instance<sup>16</sup>.

<sup>13</sup> The expectations are per annum over the next three years, weighted by R&D investment.

<sup>14</sup> See Figure 1: Distribution of R&D investment in the Survey compared to the Scoreboard

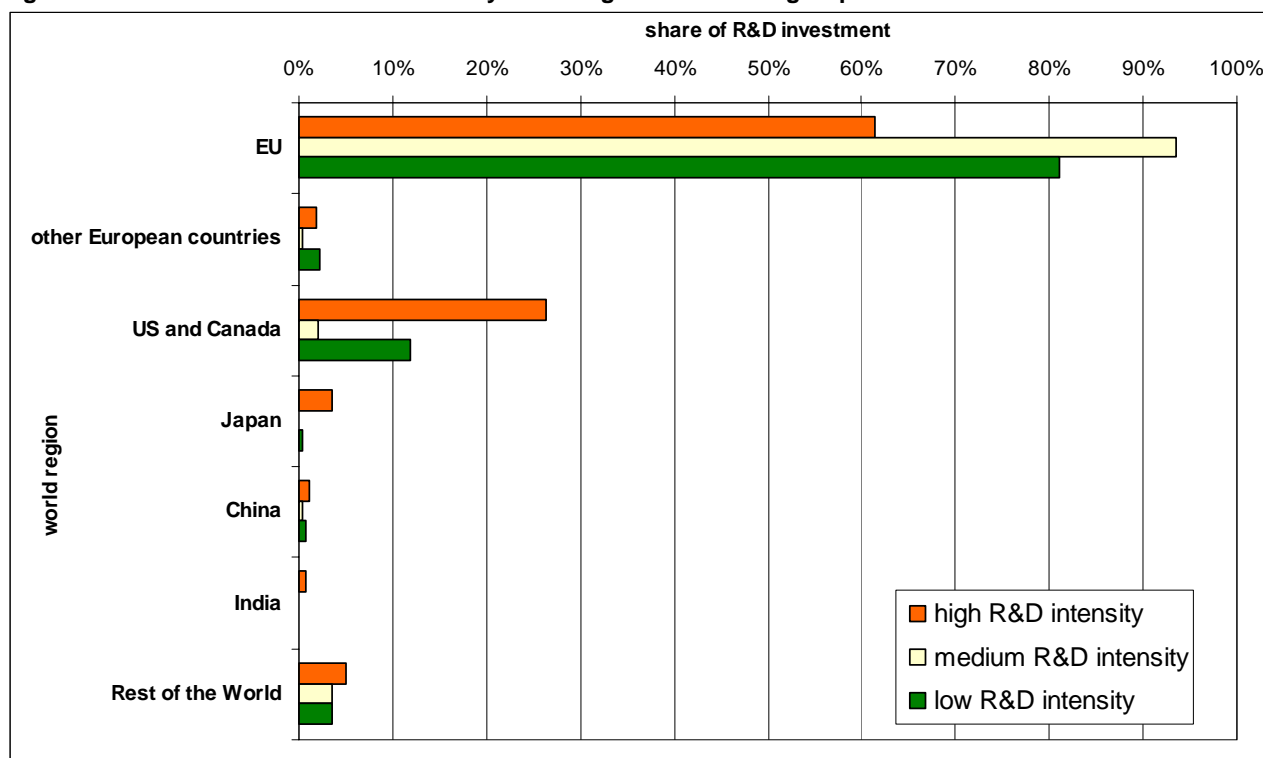
<sup>15</sup> With the European Scoreboard companies as a basic population of the Survey, a two sample t-test was performed between the expectations of the responses from the 2005 Pilot Survey and those from the present one. With  $t=-1.8$  and  $df=72.1$ , the test showed the difference of the means to be statistically insignificant ( $p=0.076$ ).

<sup>16</sup> In the 2006 Scoreboard, compared to EU companies, almost twice the amount of US corporate R&D investment is from companies belonging to high R&D intensity sectors. Most of the difference in the sectorial distribution is due to the ICT sector (see The 2006 EU R&D Investment Scoreboard, p.12).

### 3 R&D Investment Location

This Survey addresses two aspects of R&D investment location: the actual distribution (stock) of R&D investment and the distribution of the expected changes in R&D investment (dynamics). In answer to the question about the current distribution, respondents stated how much of their total R&D investment was made in each of seven world regions (see Figure 3 below).

**Figure 3: Distribution of R&D investment by world region and sector group**



Note: The figure refers to 89 out of the 110 cases in the sample, weighted by R&D investment.

Source: European Commission JRC-IPTS (2007)

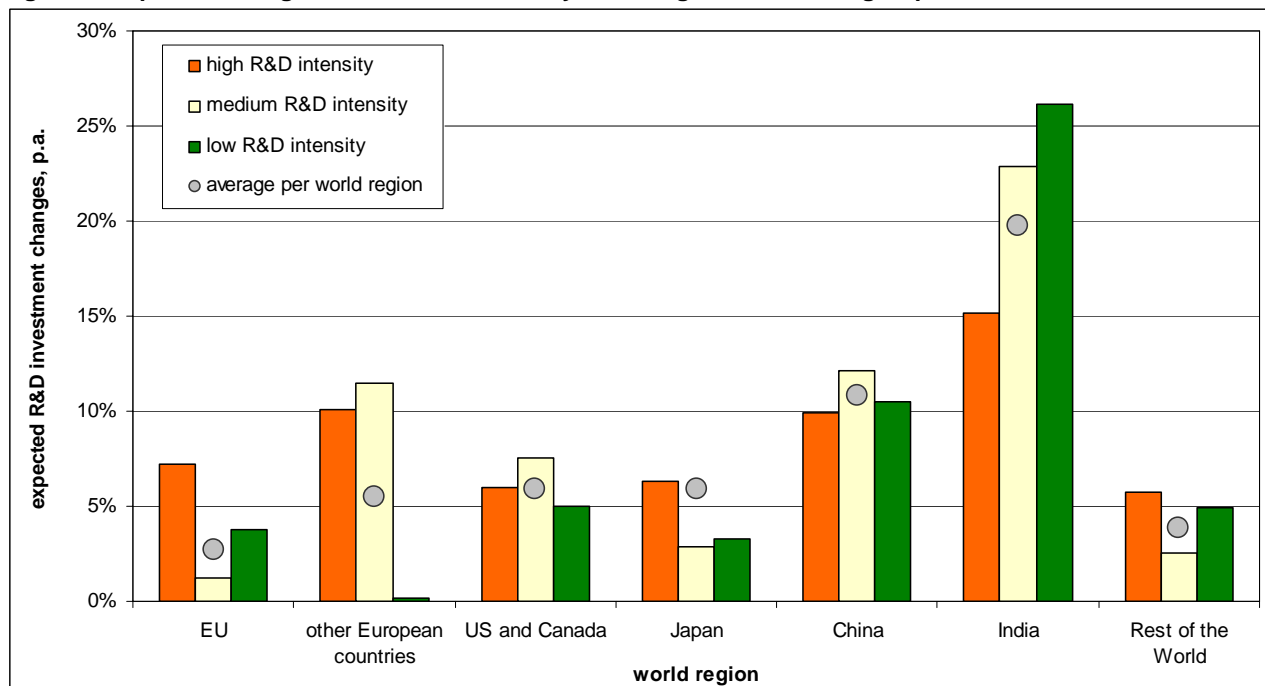
On average, the companies in the sample, all of which come from Europe, carry out more than 80% of their R&D in the EU. They are followed by the US and Canada, with about 10% of R&D investment. Despite worries about R&D offshoring to Asia, work carried out in China and India makes up less than one percent of this sample's R&D investment.

Furthermore, the medium and low R&D intensity sectors have the highest shares of R&D investment in the EU. The highly R&D intensive sectors, where Europe is already under-represented relative to the US<sup>17</sup>, make a quarter of their R&D investments in the US and Canada and also have the highest shares in Japan, China, India and the rest of the world. This suggests that, with respect to the current distribution of R&D investment, the high R&D intensity sectors are the most internationalised ones. The high R&D intensity sector group is dominated by a large share of R&D investment from the pharmaceuticals & biotechnology sector.

<sup>17</sup> In the 2006 Scoreboard, compared to EU companies, almost twice the amount of US corporate R&D investment is from companies belonging to high R&D intensity sectors. Most of the difference in the sectorial distribution is due to the ICT sector (see: The 2006 EU R&D Investment Scoreboard, p.12).

The second aspect, R&D investment dynamics, are shown in Figure 4.

**Figure 4: Expected changes in R&D investment by world region and sector group**



Note: The figure refers to 89 out of the 110 cases in the sample, weighted by R&D investment.

Source: European Commission JRC-IPTS (2007)

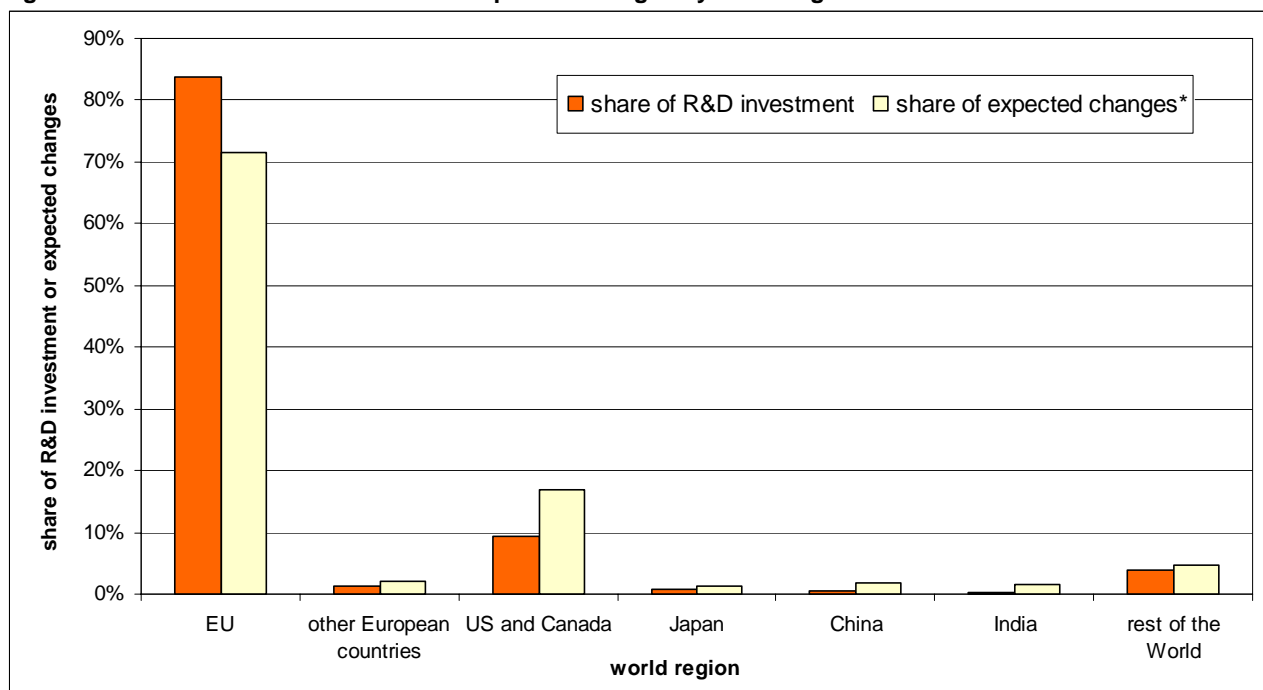
As stated in Section 2, the biggest increases are expected in the high R&D intensity sectors, followed by the low and medium R&D intensity sectors.

Growth expectations are lowest in the EU's case, mainly because of the low growth expectations of the medium R&D intensity sectors, which account for a large share of R&D investment in the sample, thus weighing heavily on overall expectations.

The expected changes in other European countries, the US and Canada and Japan are more than twice those of the EU. They are bigger still, at around 10% and 20%, in the case of China and India, respectively. For both these countries, these high growth expectations apply to a relatively small base, accounting together for less than 1% of the total R&D investment by the companies in the sample. The expectations for these countries generally rest on a broad sector base, although expectations for the low R&D intensity sectors in India are dominated by food producers.

In order to take a closer look at the R&D investment dynamics, Figure 5 compares the shares of R&D investment with the share of expected R&D investment changes in each world region.

**Figure 5: Shares of R&D investment and expected changes by world region**



Note: \* The share of expected R&D investment changes is the amount accounted for by the world region as a share of the total expected changes for all world regions.

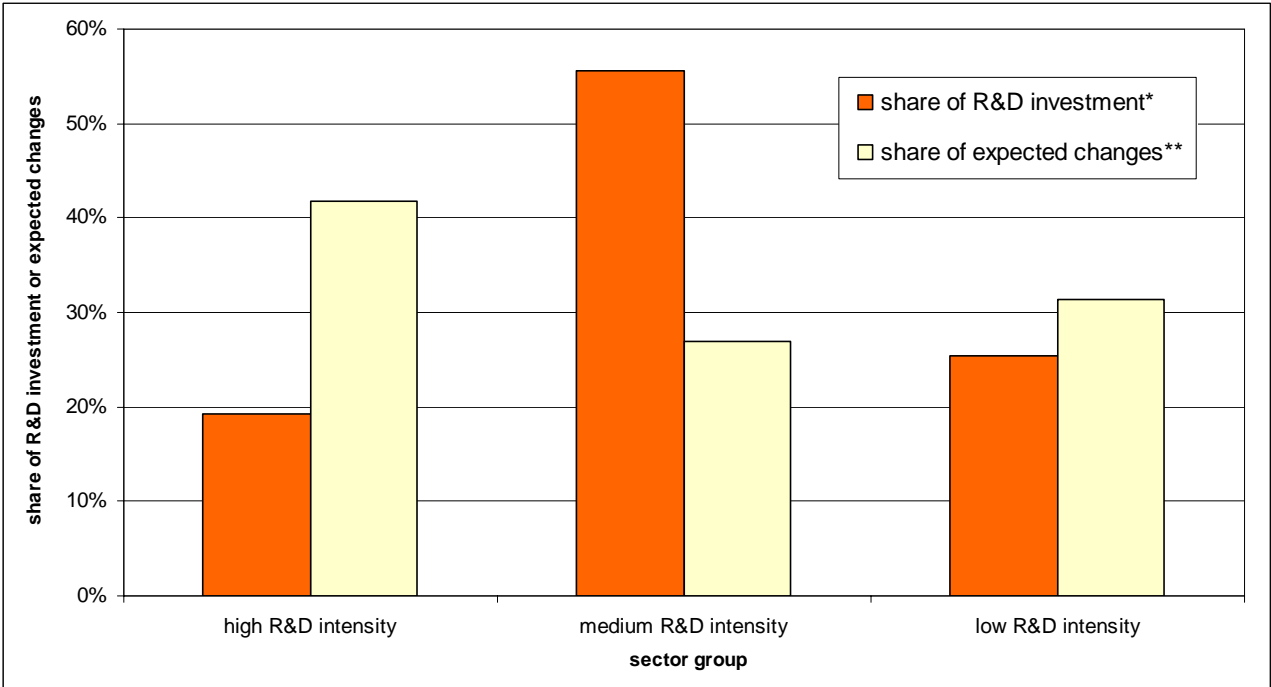
The figure refers to 89 out of the 110 cases in the sample, weighted by R&D investment.

Source: European Commission JRC-IPTS (2007)

Shares of R&D investment and expected changes are the largest in the EU. However, expected changes are larger than current shares of investment in all other world regions. Compared to a situation where R&D investment continues to develop in line with its present distribution, a growth differential is anticipated by these companies. This is leading to an outflow of R&D investment from the EU in favour of the other world regions. For the 89 companies which responded to this question, this differential equals almost €60 million, or 0.4 % of these companies' R&D investment. Almost two thirds of that amount is flowing to the US and Canada and a tenth each to China and India. This is consistent with the observation in Figure 4 that R&D investment growth is considerably higher outside the EU than inside.

Figure 6 below breaks down the information presented in Figure 5 by sector group instead of world region. Comparing the shares of R&D investment and expected changes by sector group reveals a significant expansion of R&D investment for the high R&D intensity sectors, compared to smaller growth in the low R&D intensity sectors. It seems that this difference is a result of R&D investment growth from the medium R&D intensity sectors being small relative to their share of overall investment.

**Figure 6: Shares of R&D investment and expected changes by sector group**



Note: \* The shares of R&D investment are different from those in the sample as a whole (in Figure 1) because only the shares of those companies which made a statement about the distribution of their R&D investment and its expected changes are taken into account here.

\*\* The share of expected R&D investment changes is the amount of the sector within the total amount of expected R&D investment changes for all sectors.

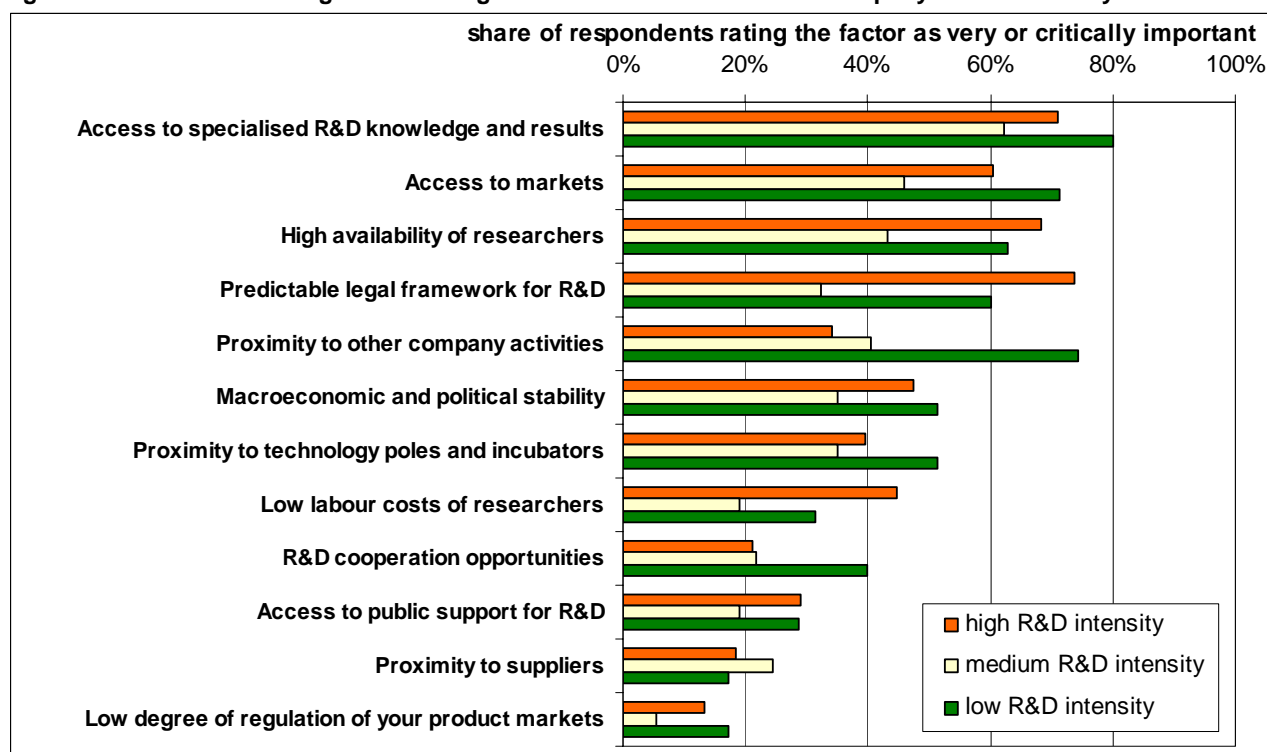
The figure refers to 89 out of the 110 cases in the sample.

Source: European Commission JRC-IPTS (2007)

Looking at these data by world region (not shown in the above figure), the proportionally lower R&D investment growth in the medium R&D intensity sectors is a result of a lack of growth in these sectors generally in the EU. This contrasts with proportionally higher shares of R&D investment growth in the medium R&D intensity sectors outside the EU, especially the US and Canada, China, and India. In the other sector groups, there are few changes in the distribution of R&D investment across world regions.

In the Survey respondents rated the factors affecting their decisions to locate or increase R&D investment in a country other than the company's home country. As shown in Figure 7, the three most important location factors are the same as in last year's Survey<sup>18</sup>, although the order within the group has changed<sup>19</sup>. More than 60% of respondents considered access to specialised R&D knowledge and results, market access and ready availability of researchers to be very or crucially important for locating R&D investment.

**Figure 7: Factors for locating or increasing R&D investment outside the company's home country**



Note: The factors are sorted by average importance. The figure refers to 105 out of the 110 cases in the sample.

Source: European Commission JRC-IPTS (2007)

Factors considered to be of some importance<sup>20</sup> for the choice of R&D investment location were a predictable legal framework for R&D, proximity to other company activities, macroeconomic and political stability and proximity to technology poles and incubators.

The factors which were of less importance<sup>21</sup> include low labour costs of researchers, R&D cooperation opportunities, access to public R&D support, proximity to suppliers and a low degree of regulation of the company's product markets. Just as in last year's Survey<sup>22</sup>, the cost of employing researchers is ranked among the least important location factors, and light regulation of the company's product markets is the least important factor. The only one that moved from one relative importance group to another was R&D cooperation opportunities, which fell from 'some importance' last year to 'less importance' this year because of the difference in the composition of the sample<sup>23</sup>.

There are a few factors have more relative importance for some sectors than for others:

- ♦ A predictable legal framework for R&D and low costs of employing researchers are more important for the highly R&D intensive sectors.
- ♦ Access to specialised R&D knowledge and results, market access, proximity to other company activities, proximity to technology poles and incubators, and R&D cooperation opportunities for the low R&D intensity sectors.

<sup>18</sup> See: "The 2005 EU Survey on R&D Investment Business Trends in 10 Sectors", European Commission, JRC-IPTS, Technical Report EUR 22303 EN, <http://www.jrc.es/publications/pub.cfm?id=1454>, pp.5

<sup>19</sup> In last year's Survey, market access ranked above high availability of researchers and access to specialised R&D knowledge and results.

<sup>20</sup> "Some importance" means that the factor is very or crucially important for more than one third but less than two thirds of the respondents.

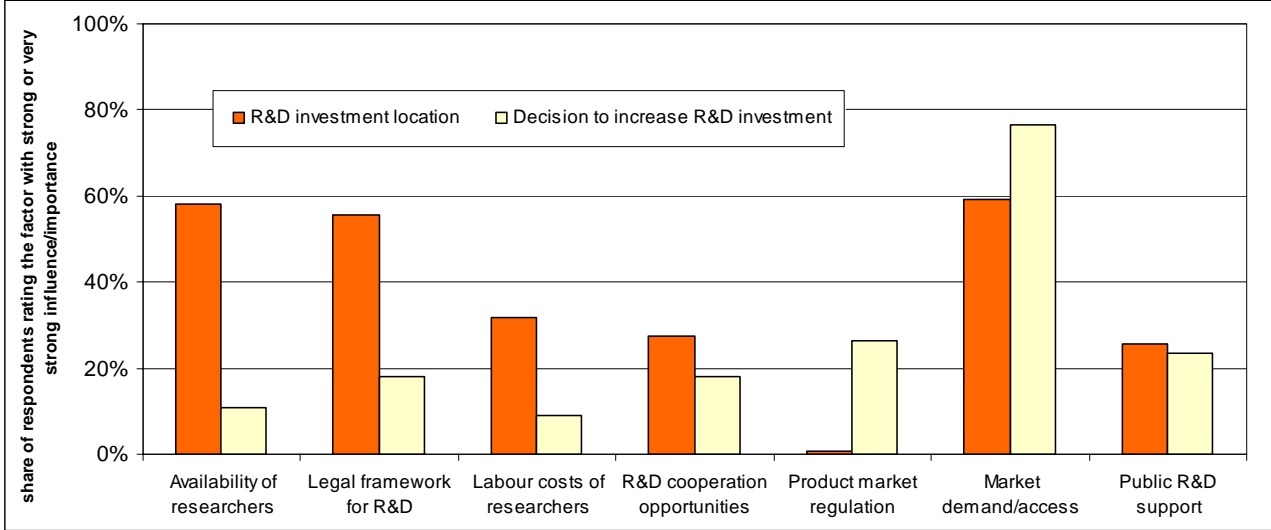
<sup>21</sup> "Less importance" means that the factor is very or crucially important for less than one third of the respondents.

<sup>22</sup> See: "The 2005 EU Survey on R&D Investment Business Trends in 10 Sectors", European Commission, JRC-IPTS, Technical Report EUR 22303 EN, <http://www.jrc.es/publications/pub.cfm?id=1454>, pp.5

<sup>23</sup> This factor was described as crucially important for the IT hardware and pharmaceuticals & biotechnology sectors in last year's Survey. This year, these sectors have a relatively lower share in the overall sample.

The impact of seven location factors on the company's decision to increase R&D investment was also examined. As presented in Figure 8, the availability of researchers, the legal framework for R&D, the labour costs of employing researchers and R&D cooperation opportunities are more important for the R&D investment location than for the decision to increase R&D investment. It seems that these factors matter when locating new facilities, and then become a boundary condition on the level of R&D investment once the facilities have been established.

**Figure 8: Factors for location vs. their impact on increasing R&D investment**



Note: The factors were addressed in two different questions and the wording was thus not always identical (see Annex B: The 2006 Questionnaire on R&D investment, question 16 for the decision to increase R&D investment and question 18 for the R&D investment location). The figure refers to 105 out of the 110 cases in the sample.

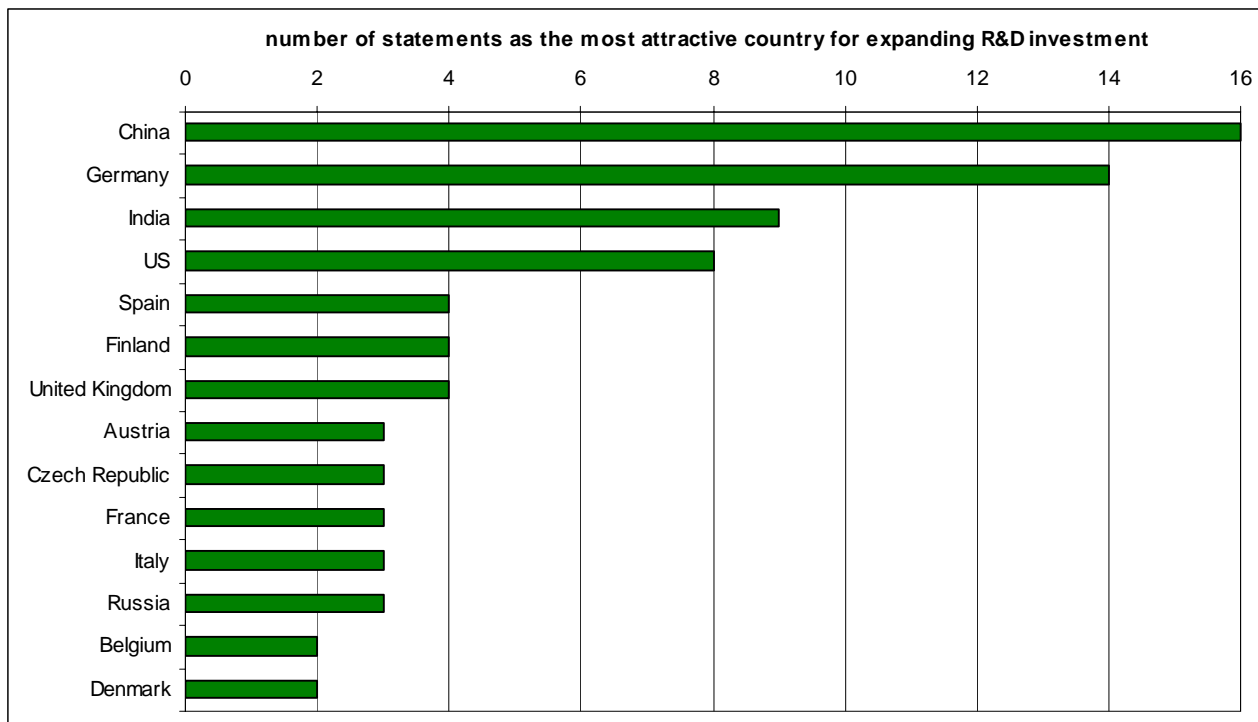
Source: European Commission JRC-IPTS (2007)

Product market regulation and market demand/access had less relative influence on location decisions than on the decision whether to increase R&D investment. This means that these factors may be an incentive to invest more in R&D in general, but do not tend to attract R&D investment to a specific location. Public R&D support has a relatively small influence on either location or expansion decisions.



In this survey, decisions as to where to locate R&D investments concern the choice of country. Respondents were asked to state the most and the least attractive country in which the company has R&D investments or is planning to expand them. Respondents' views as to the most attractive countries are shown in Figure 9 below.

**Figure 9: Most attractive countries for expanding R&D investment**



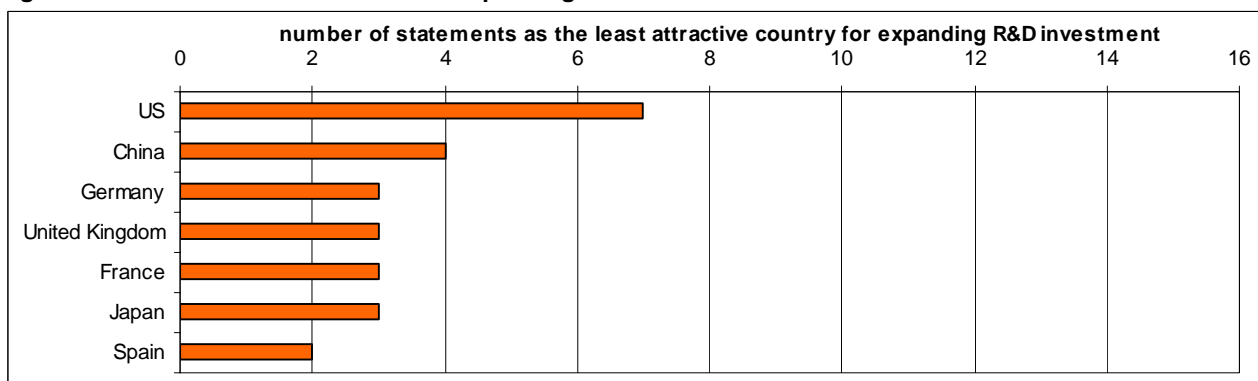
Note: Data for 79 cases, includes only countries mentioned at least twice.

Source: European Commission JRC-IPTS (2007)

China and Germany are the countries most frequently mentioned as the most attractive R&D investment locations. About one third of respondents, all from the EU, chose their home country as the most attractive R&D investment location. For Germany, this share was somewhat higher. India and the US follow China and Germany with a similar number of mentions as the most attractive country. The eleven remaining countries make up for less than 10% of the statements each. Spain, Finland and the Czech Republic received an above average number of statements compared to their share as a home country of the companies in the sample. The opposite is true for the United Kingdom, France and Italy.

Figure 10 shows the number of statements as the least attractive R&D investment location.

**Figure 10: Least attractive countries for expanding R&D investment**



Note: Data for 29 cases, includes only countries mentioned at least twice.

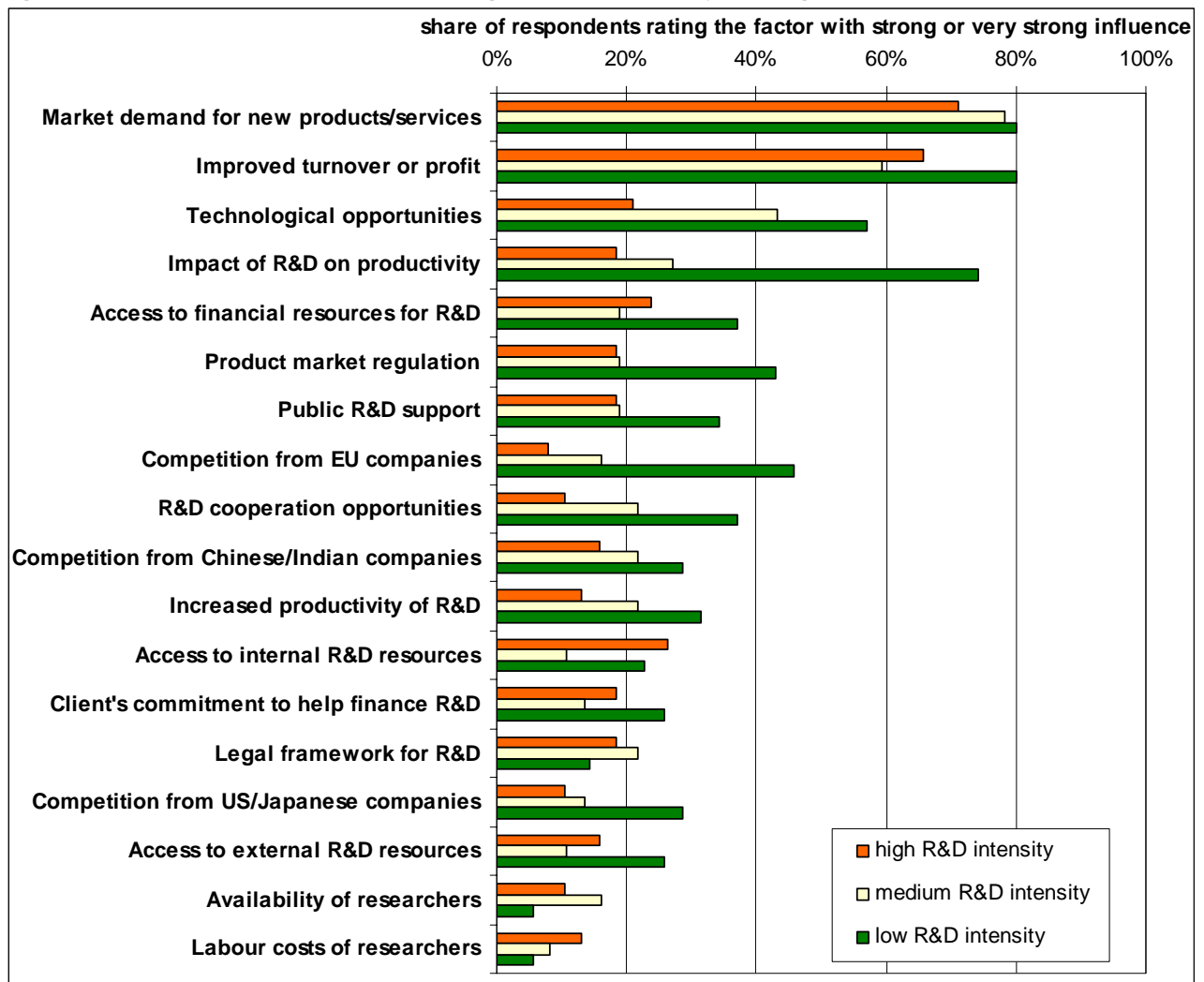
Source: European Commission JRC-IPTS (2007)

The US received the highest number of statements as the least attractive country, mainly from the medium and low R&D intensity sectors.

## 4 Reasons for increasing R&D Investment

The Survey addressed the influence of factors in the company's decision to increase R&D investment. Two main incentives for increasing R&D investments were reported: evidence of market demand for new products and services and improved company turnover or profit (see Figure 11 below). These factors had a strong or very strong influence for more than two thirds of respondents. This underlines the role of market pull for R&D and the finding that companies' own resources are the most important source of R&D investment<sup>24</sup>.

Figure 11: Importance of factors for increasing R&D investment, by sector group



Note: The factors are sorted by average importance. The figure refers to the 110 cases in the sample.

Source: European Commission JRC-IPTS (2007)

Technological opportunities and the impact of R&D on productivity can have some influence<sup>25</sup> on a company's decision to increase R&D investment. These two factors stress the importance of the technological rather than the market side of R&D. This technological component is very clear in the low R&D intensity sectors, suggesting that these sectors only perform R&D if they perceive clear technological opportunities, with an emphasis on improving corporate productivity.

The remaining factors have less influence<sup>26</sup> on the decision to increase R&D investment, especially given their limited role in the high and medium R&D intensity sectors. There are a few factors that have some influence in the low R&D intensity sectors:

<sup>24</sup> See Section 5: Sources of R&D Investment

<sup>25</sup> "Some influence" means that the factor has a strong or very strong influence for more than one third but less than two thirds of the respondents.

<sup>26</sup> "Less influence" means that the factor has a strong or very strong influence for less than one third of the respondents.

- ♦ Access to financial resources for R&D, product market regulation, public R&D support, worldwide competition, R&D cooperation opportunities, and the expected increase in productivity of the R&D process.

These findings suggest that medium and high R&D intensity sectors, on the one hand, and the low R&D intensity sectors, on the other, have a different R&D investment profile. The former see evidence of market demand and improved company turnover and profit as the main factors for increasing R&D investment and thus have a smaller range of motivations for increasing R&D investment than the low R&D intensity sectors. Researcher availability and labour costs have the smallest influence on the level of R&D investment<sup>27</sup>. This may be due to these two factors being parameters of the labour market, which is taken as a given external framework once a company has chosen an R&D investment location<sup>28</sup>.

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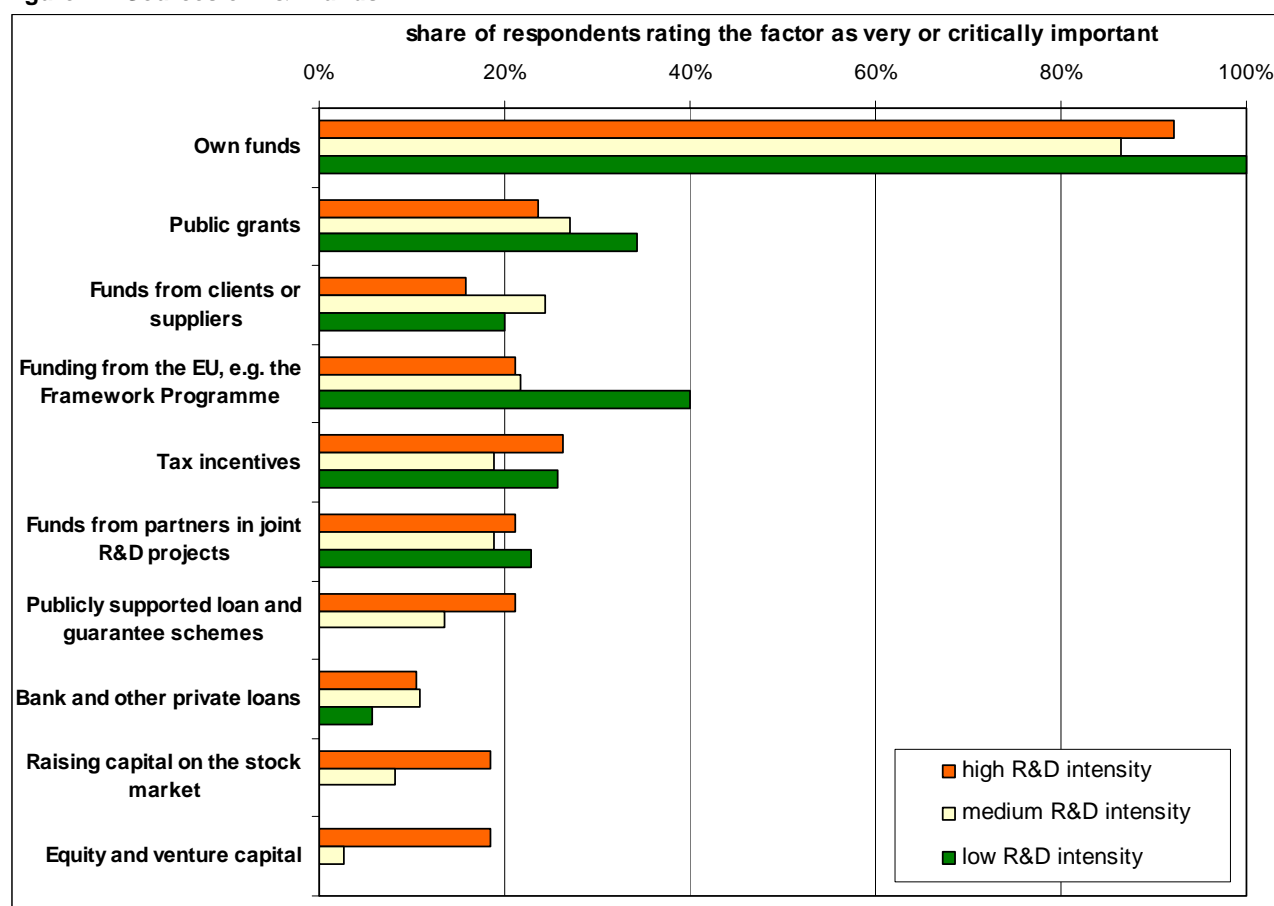
<sup>27</sup> This has also been observed in last year's Survey (see: "The 2005 EU Survey on R&D Investment Business Trends in 10 Sectors", European Commission, JRC-IPTS, Technical Report EUR 22303 EN, <http://www.jrc.es/publications/pub.cfm?id=1454>, pp.5).

<sup>28</sup> For more information see Section 9: "R" vs. "D"

## 5 Sources of R&D Investment

For the companies in the sample, companies' own resources are by far the most important source of funding for R&D investments<sup>29</sup>. They are seen as very, or crucially, important by nine out of ten respondents. Own funds are followed by six less important<sup>30</sup> external sources: public grants, funding from the EU (e.g. the Framework Programme), tax incentives, funds from partners in joint R&D projects, funds from clients or suppliers and publicly supported loan and guarantee schemes. Private sources, like raising capital on the stock market, private loans, equity and venture capital play a negligible role. An overview is shown in Figure 12 below.

Figure 12: Sources of R&D funds



Note: The factors are sorted by average importance. The figure refers to the 110 cases in the sample.  
Source: European Commission JRC-IPTS (2007)

The figure shows that public funding has some importance for two sector groups: in the form of public grants for the low R&D intensity sectors, which is probably due to the large number of companies from the industrial metals sector, and as funding from the EU for low R&D intensity sectors.

Publicly supported loan and guarantee schemes and the three private sources of R&D investment ("raising capital on the stock market", "bank and other private loans" and "equity and venture capital") play a small role in the high R&D intensity sectors and virtually none outside.

In the suggestions part of the questionnaire, a large number of respondents called for a stronger role of research support from the public sector through direct and indirect instruments with simpler procedures.

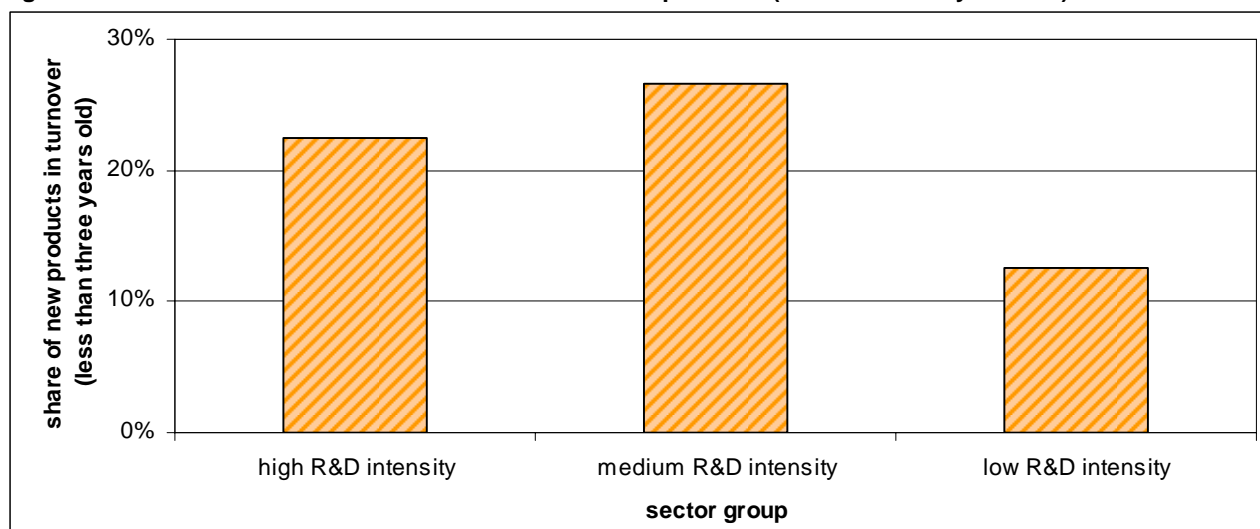
<sup>29</sup> The importance of own funds becomes even more apparent when taking into account that equity and venture capital and raising capital on the stock market are in fact sub-categories of own funds.

<sup>30</sup> "Less importance" means that the factor is described as very or crucially important by less than one third of the respondents.

## 6 R&D and New Products

According to the survey's respondents, the average share of turnover attributed to new products less than three years old is 20%. This is about twice the average share stated in the last Community Innovation Survey (CIS)<sup>31</sup>. One reason for this large share of new products may be that the respondents to the present Survey were very large companies with a higher propensity to innovate than the smaller companies which form part of the CIS<sup>32</sup>. Figure 13 shows an overview of the shares of new products by sector.

**Figure 13: Share of turnover that can be attributed to new products (less than three years old)**



Note: The figure refers to 87 out of the 110 cases in the sample, weighted by turnover.

Source: European Commission JRC-IPTS (2007)

The sectors fall into two groups. The new product share is considerably bigger in the high and medium R&D intensity sectors than in the low R&D intensity ones. One explanation may be differences in product maturities.

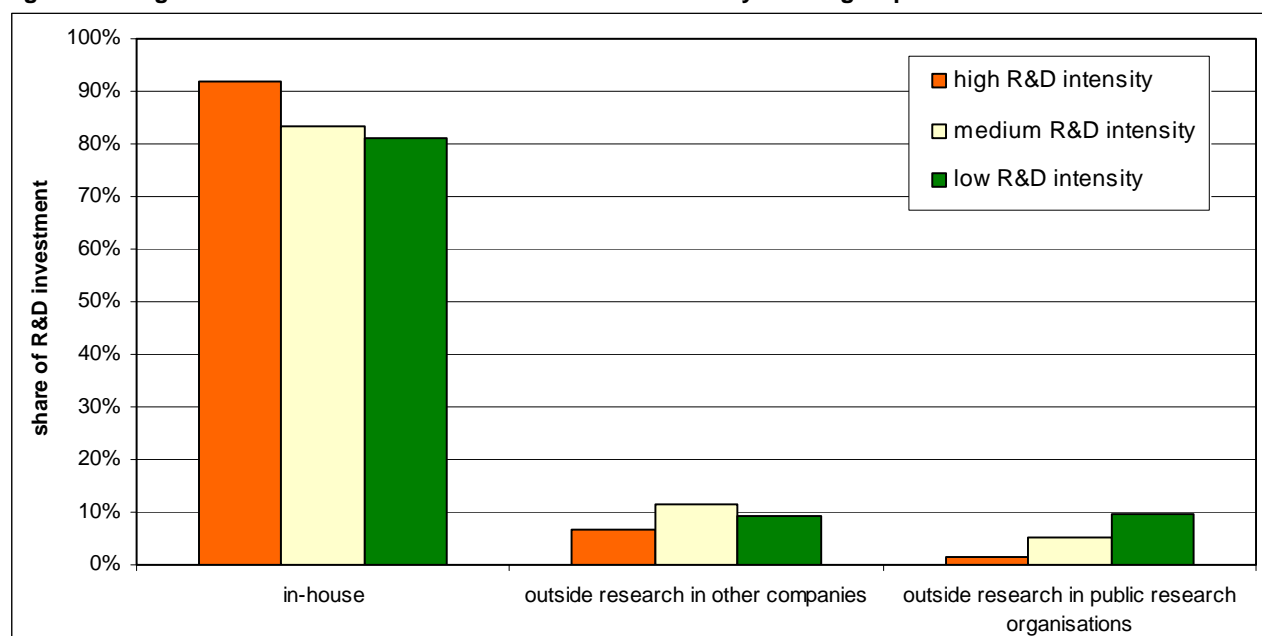
<sup>31</sup> The share of the total turnover of enterprises engaged in innovation activities generated by new or significantly improved products (new to the market) is 8.6% in the EU-27 (see: "Community Innovation Statistics: Is Europe Growing more Innovative?", Eurostat, Statistics in Focus, 61, 2007, p.3).

<sup>32</sup> The propensity to innovate increases with the size of the company. The propensity of large companies is twice that of small ones (see: "Innovation in Europe, Third Community Innovation Survey (Data 1998-2001)", European Commission, ISBN 92-894-7262-6, 2004, p.40)

## 7 In-house R&D and Outsourcing

Most companies<sup>33</sup> use external resources to complement their internal R&D. The respondents devoted an average of 15% of their R&D investments to outsourced R&D<sup>34</sup>. This matches last year's figure and the findings of similar studies<sup>35</sup>. On average, two thirds of outsourced R&D is performed by other companies and one third by public research organisations (see Figure 14).

**Figure 14: Degree of in-house and outsourced R&D investment by sector group**



Note: The figure refers to 104 out of the 110 cases in the sample, weighted by R&D investment.

Source: European Commission JRC-IPTS (2007)

Companies from the highly R&D intensive sectors execute more of their R&D in-house and outsource only half as much as companies from the other sectors. While the shares of R&D outsourced by the other sectors are comparable, the distribution between other companies and public research organisations is different. Companies in the medium R&D intensity sectors outsource two thirds of their external R&D to other companies and one third to public research organisations. Those in the low R&D intensity sectors outsource about half of their external R&D to other companies and half to public research organisations.

<sup>33</sup> More than 95% of the respondents outsource some R&D.

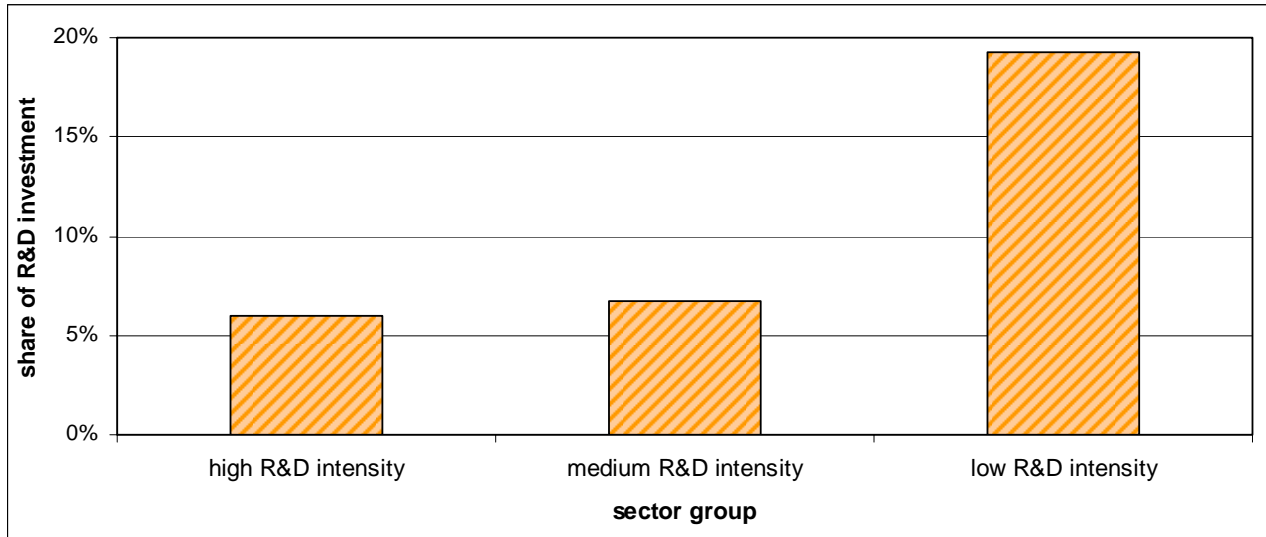
<sup>34</sup> This figure does not include two outliers from the automobiles & parts sector which had a much higher level of R&D outsourcing.

<sup>35</sup> The figure corresponds to the 15% reported in other studies on the level of outsourcing, see e.g. EIRMA: "Responsible Partnering: Joining Forces in a World of Open Innovation", European Industrial Research Management Association, January 2005, <http://www.responsible-partnering.org/library/rp2006.pdf>

## 8 R&D Collaboration with other companies

On average, the respondents devoted 11% of their R&D investments to collaborative research with other companies. As shown in Figure 15 below, there are differences between the sector groups.

**Figure 15: Share of R&D investment used for collaborative research with other companies**

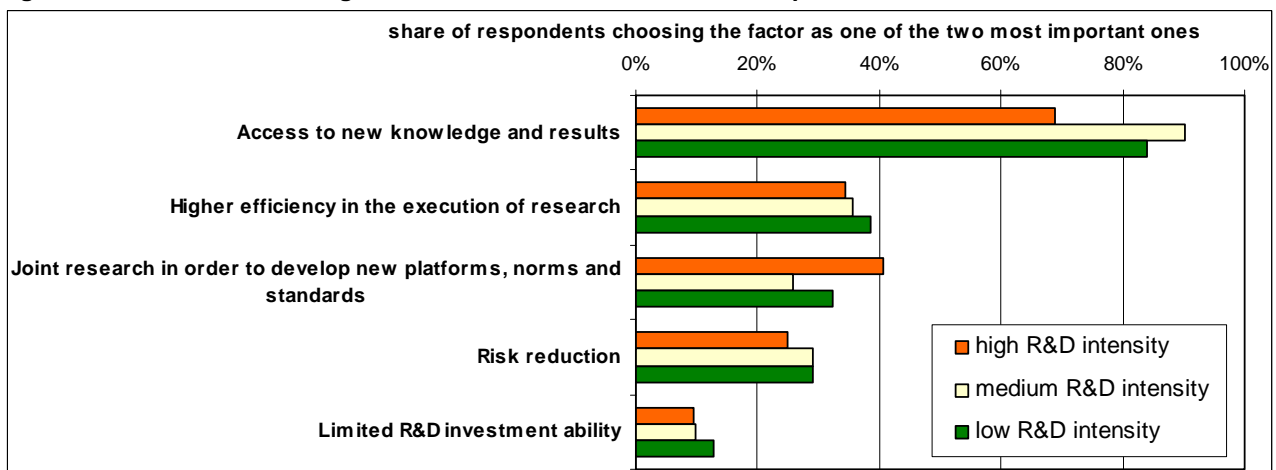


Note: The figure refers to 98 out of the 110 cases in the sample, weighted by R&D investment.  
Source: European Commission JRC-IPTS (2007)

R&D collaboration increases the lower the R&D intensity of the sector group. Within the high, medium and low R&D intensity sector groups, the share of collaboration is between 6 and 9 percent. This is more than twice that in the low R&D intensity sector group, mainly because of three very large R&D investors devoting more than a third of their R&D investment to collaborative research with other companies. It should be noted that the degree of collaboration varies a great deal from one company to another, to a much greater extent than does the degree of outsourcing<sup>36</sup>.

Collaboration is a means to an end. This is highlighted by the fact that access to new knowledge and results is cited as by far the most important factor for funding collaborative research with other companies. More than 80% of respondents chose this factor as one of the two most important (see Figure 16 below).

**Figure 16: Reasons for funding collaborative research with other companies**



Note: The factors are sorted by average importance. The figure refers to 96 out of the 110 cases in the sample.  
Source: European Commission JRC-IPTS (2007)

<sup>36</sup> See Section 7: In-house R&D and Outsourcing

Higher efficiency in the execution of research, joint research to develop new platforms, norms and standards, risk reduction and limited R&D investment ability are less important<sup>37</sup> factors in R&D collaboration with other companies. Together with the fact that the companies in the sample are very large, with access to a wide range of resources, and that funds from partners in joint R&D projects are not a critical source of R&D funding<sup>38</sup>, this suggests that R&D collaboration as a means of pooling resources to pay for R&D is not a model frequently used by the companies in the sample.

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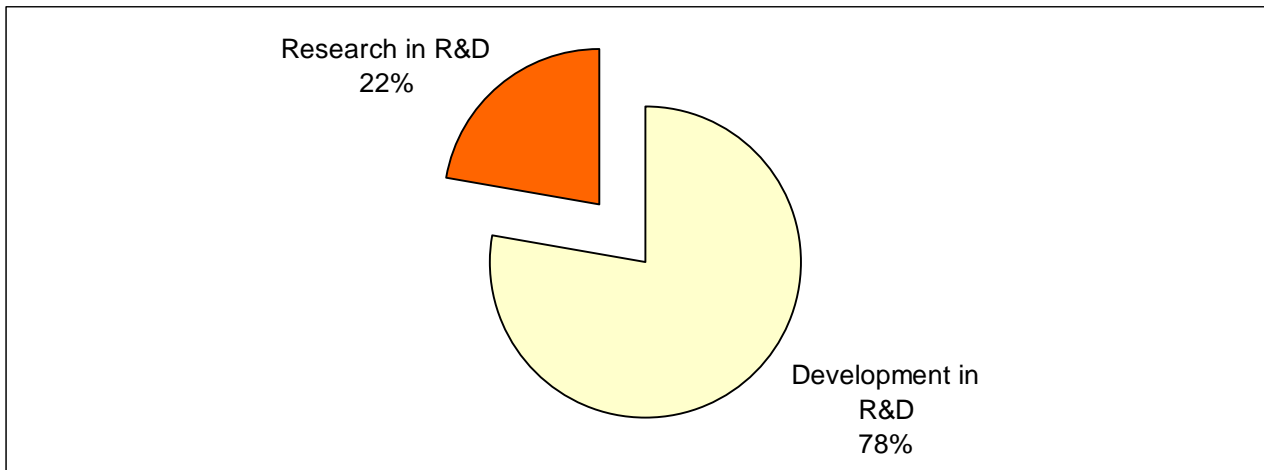
<sup>37</sup> "Less importance" means that the factor is chosen as one of the two most important ones for less than one third of the respondents.  
<sup>38</sup> See Section 5: Sources of R&D Investment



## 9 “R” vs. “D”

The questionnaire asked how much R&D investment both inside and outside the EU could be classed as “Research” and how much as “Development”. The responding companies, all from the EU, described 78% of their R&D investment as Development and 22% as Research (see Figure 17).

**Figure 17: Shares of R&D carried out as Research and as Development**

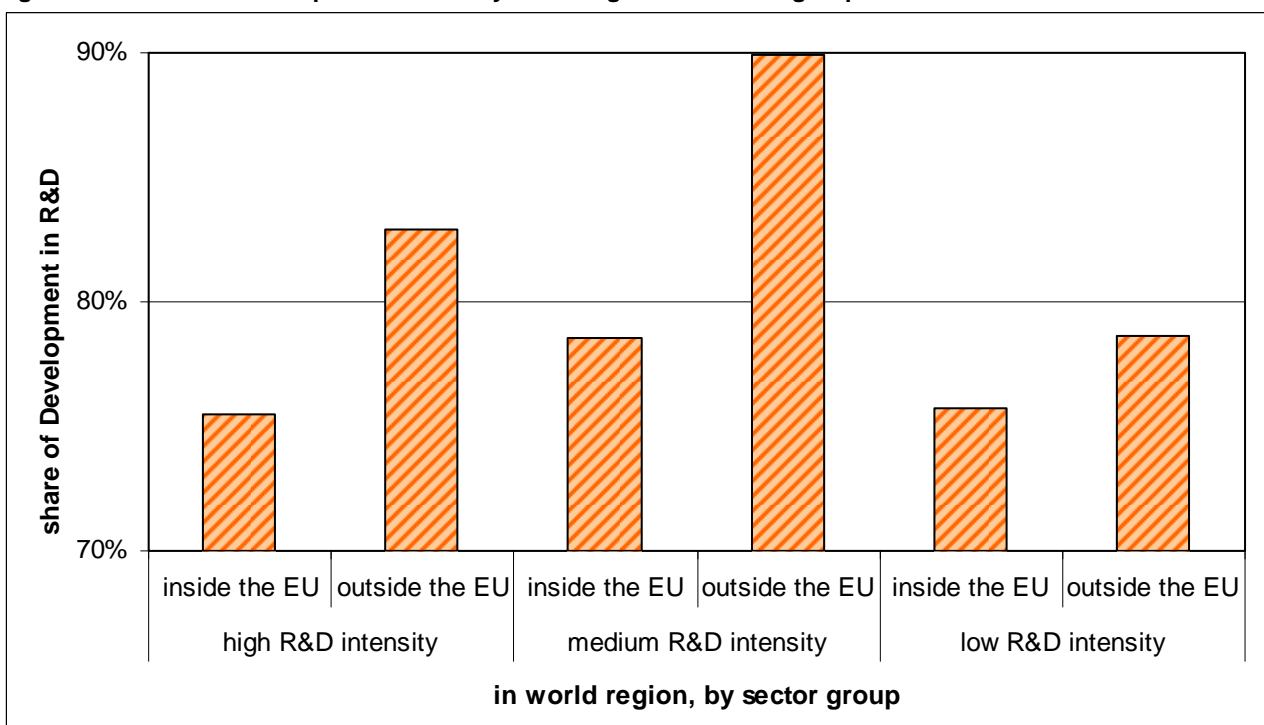


Note: The figure refers to 88 out of the 110 cases in the sample.

Source: European Commission JRC-IPTS (2007)

Figure 18 shows the distribution of Research vs. Development per sector group and world region. There are few sector differences in the content of R&D inside the EU, but considerable differences outside it.

**Figure 18: Shares of Development in R&D by world region and sector group**



Note: The figure refers to 88 out of the 110 cases in the sample.

Source: European Commission JRC-IPTS (2007)

On average, the share of development in R&D is around 10% higher outside the EU than inside. The difference is more marked in the high and medium R&D intensity sectors and less so in the low R&D intensity ones. An explanation for higher shares of development outside the EU may be that these R&D activities are directed towards adapting products to local markets.

## 10 The way forward

The present 2006 Survey provides important insights into company expectations about future R&D investment and companies' motivations for investing in research.

Data collection for the 2007 Survey, with a revised and simplified questionnaire, ended in November 2007. The questionnaire for the 2007 Survey again tackled the present and expected distribution of R&D investment in order to provide further insights about trends in R&D. Furthermore, while the 2006 Survey addressed the 700 European companies of the 2005 Scoreboard, the 2007 Survey was addressed to the 1000 European companies of the 2006 Scoreboard.

The analysis of the data collected is now underway. As soon as possible, the results of the 2007 Survey will be available at <http://iri.jrc.es/>.

# 11 Annex A: The Methodology of the 2006 Survey

## Background and Approach

A mapping of the available information on industrial R&D at individual country level<sup>39</sup> revealed the main sources of data to be the official R&D, innovation, and some occasional country-specific statistics. Private sources exist but are rarely published. In particular, there is a shortage of qualitative and prospective information on industrial R&D. Another mapping and analysis of available trans-national data sources on industrial R&D<sup>40</sup>, from the European Commission, OECD and European industry associations, showed that data on business enterprise R&D essentially draws upon retrospective surveys and is based on differing approaches. Statistical offices generally collect R&D data in the form of Business Expenditure on R&D (BERD), which defines R&D from a top-down perspective. Surveys by industrial associations are undertaken sporadically, their scope is limited and the results are not often fully disclosed. The industrial R&D perspective taken in most of these surveys does not permit cross-sector comparisons at the European level. This survey activity tackles the information gap identified through an approach at the European level to gather qualitative information on factors and issues surrounding and influencing current and prospective R&D investment strategies in companies.

The specificity of the information required made it necessary to generate primary data through a self-completed questionnaire under three main headings: R&D investment levels and trends; R&D location strategy and management; and outcomes of R&D investment strategy.

The survey explicitly avoids duplication with other R&D investment related surveys and data collection exercises (e.g. Innobarometer, the Trend Chart on Innovation, the results from the Knowledge Economy Indicators project<sup>41</sup>, EUROSTAT's data collection of structural indicators or other ongoing surveys).

## Pilot Survey

The pilot survey in 2005 tested three different channels for approaching firms:

- a) The 500 European companies appearing in the *2004 EU Industrial R&D Investment Scoreboard*<sup>42</sup>.
- b) Firms were also approached indirectly through five industrial associations:
  - European Industrial Research Management Association (EIRMA)
  - European Council for Automotive R&D (EUCAR)
  - European Association of Automotive Suppliers (CLEPA)
  - European Association for Bioindustries (EuropaBio)
  - European Federation of Pharmaceutical Industries and Associations (EFPIA)
- c) A quantitative sample of 6100 companies in three sectors was compiled according to sample composition criteria for the 25 EU Member States:
  - 3092 companies in pharmaceuticals & biotechnology,
  - 1499 companies in chemicals, and
  - 1509 companies in engineering & machinery.

A total of 583 responses from 29 sectors were received in the pilot survey. Due to the high concentration of responses by sector, the results for the pilot survey were drawn from 449 responses in ten sectors: Automobiles & parts, Chemicals, Electronic & electrical equipment, Engineering & machinery, Food producers & processors, Health, mainly medical equipment companies, IT hardware, Pharmaceuticals & biotechnology, Steel & other metals, and Support services. The analysis of these responses is presented in the report "The 2005 EU Survey on R&D Investment Business Trends in 10 Sectors"<sup>43</sup>.

<sup>39</sup> See the results of the European Science and Technology Observatory (ESTO) study: "Mapping Surveys and other data sources on Industrial R&D in the EU-25 countries", Seville, June 2004

<sup>40</sup> See the results of the JRC-IPTS study: "Description of Information Sources on Industrial R&D data : European Commission, OECD and European Industry Associations", Seville, July 2004

<sup>41</sup> See <http://kei.publicstatistics.net/index.html>

<sup>42</sup> See [http://iri.jrc.es/research/scoreboard\\_2004.htm](http://iri.jrc.es/research/scoreboard_2004.htm)

<sup>43</sup> See: <http://www.jrc.es/home/pages/detail.cfm?prs=1454>

## R&D Investment Definition

The objective of the survey is to address R&D investment, and not R&D expenditure, due to its direct link to the Barcelona targets. In order to avoid a straightforward rejection of the questionnaire and make its completion as easy as possible, only a short definition of R&D investment, which is as close as possible to accounting standards, is provided in the questionnaire<sup>44</sup>. The definition refers mainly to the R&D as reported in the company's most recent accounts. The definition used in the questionnaire is thus closely related to the International Accounting Standard (IAS) 38 "Intangible Assets"<sup>45</sup>, which is based on the OECD "Frascati" manual<sup>46</sup>, and the definition used in the EU Industrial R&D Investment Scoreboard.

## Composition of the Responses

Following the experience with the pilot phase of the Survey and the analysis of the different subsamples it was decided to focus on the European companies in the Scoreboard. For the present edition, the 700 companies on the "2005 EU Industrial R&D Investment Scoreboard" were addressed<sup>47</sup>. A written questionnaire was addressed personally to the highest company executive (i.e. at CEO level). Two reminders were sent. In the end, responses from 110 companies were received. They correspond to an overall response rate of 15.7% by number although the proportion of the total R&D by the European Scoreboard companies they represent is higher<sup>48</sup>.

It should be noted that self-completion questionnaires are always subject to a self-selection bias.

The responses were not filtered by the job title of the respondent as different company cultures have different policies regarding who is considered the right person to answer a letter. Some may be more inclined to give the true position while in others the answer may be given on behalf of the person to whom the letter was addressed.

The 110 responses were then filtered by the organisational unit the response came from. In one case, two different business units of the same company had submitted one response each. These responses are not consolidated because, despite being part of the same company, they regard the different organisational units indicated in the responses, which are taken as if they were individual firms. Because of the lack of overlap between the organisational units, this did not lead to double-counting of R&D investment amounts.

All responses came from independent EU companies which were identified as not being controlled by another company at the time of the survey.

The 110 responses were subsequently classified in the ICB sector<sup>49</sup> corresponding to the sector indicated in the questionnaire. Sector classifications of individual companies were cross-checked with information appearing in the "2006 EU Industrial R&D Investment Scoreboard". In the event of a conflict between the classification in the Scoreboard and the indication of the respondent, the final classification was decided on a case-by-case basis<sup>50</sup>.

The sectors were combined into three groups by their average R&D intensities in the 2006 Scoreboard<sup>51</sup>:

- ⇒ **High (more than 5%) R&D intensity:** electronics & electrical equipment, health care equipment & services, pharmaceuticals & biotechnology, software & computer services, and technology hardware & equipment.
- ⇒ **Medium (between 2 and 5%) R&D intensity:** aerospace & defence, automobiles & parts, chemicals, general industrials, industrial engineering, and personal and household goods.
- ⇒ **Low (less than 2%) R&D intensity:** beverages, construction & materials, electricity, fixed line telecommunications, food producers, forestry & paper, gas, water & multiutilities, industrial metals, industrial transportation, oil & gas equipment, producers and services, and tobacco.

Table 2 shows the distribution of the responses among the sectors with their respective R&D investment shares.

<sup>44</sup> See Annex B

<sup>45</sup> See <http://www.iasplus.com/standard/ias38.htm>

<sup>46</sup> See "Proposed Standard Practice for Surveys on Research and Experimental Development: Frascati Manual", OECD, Paris, 2002, <http://www1.oecd.org/publications/e-book/9202081E.PDF>

<sup>47</sup> See [http://iri.jrc.es/research/scoreboard\\_2005.htm](http://iri.jrc.es/research/scoreboard_2005.htm)

<sup>48</sup> The overall R&D investment amount stated by the respondents is 24.3 % of the total R&D investment of the European Scoreboard companies.

<sup>49</sup> ICB Industry Classification Benchmark (see: [http://www.icbenchmark.com/docs/ICB\\_StructureSheet\\_120104.pdf](http://www.icbenchmark.com/docs/ICB_StructureSheet_120104.pdf))

<sup>50</sup> However, this happened only in one case where the company was finally classified into the same sector as in the Scoreboard.

<sup>51</sup> See: The 2006 EU Industrial R&D Investment Scoreboard, pp.80

**Table 2: Distribution of the responses by sectors**

ICB Sector	Number of responses	Number of Scoreboard companies	Response rate by sector	Total R&D investment share compared to the Scoreboard*	R&D intensity sector group**
Electronic & electrical equipment	10	50	20.0%	between 20 and 40 %	High
Health care equipment & services	5	23	21.7%	between 20 and 40 %	High
Pharmaceuticals & biotechnology	15	94	16.0%	between 20 and 40 %	High
Software & computer services	2	83	2.4%	below 20 %	High
Technology hardware & equipment	6	49	12.2%	below 20 %	High
<b>Subtotal high R&amp;D intensive sectors</b>	<b>38</b>	<b>299</b>	<b>12.7%</b>	<b>17.8%</b>	
Aerospace & defence	4	19	21.1%	above 40 %	Medium
Automobiles & parts	3	37	8.1%	below 20 %	Medium
Chemicals	12	38	31.6%	above 40 %	Medium
General industrials	4	10	40.0%	between 20 and 40 %	Medium
Industrial machinery	10	81	12.3%	below 20 %	Medium
Personal & household goods	4	25	16.0%	above 40 %	Medium
Other medium R&D intensive sectors	0	31	0.0%		Medium
<b>Subtotal medium R&amp;D intensive sectors</b>	<b>37</b>	<b>241</b>	<b>15.4%</b>	<b>27.1%</b>	
Beverages	1	3	33.3%	above 20 %	Low
Electricity	7	10	70.0%	above 40 %	Low
Fixed line telecommunications	5	16	31.3%	between 20 and 40 %	Low
Food producers	4	24	16.7%	below 20 %	Low
Other low R&D intensive sectors	0	32	0.0%		Low
<b>Subtotal low R&amp;D intensive sectors</b>	<b>17</b>	<b>85</b>	<b>20.0%</b>	<b>24.8%</b>	
Construction & materials	5	18	27.8%	above 40 %	Very low
Forestry & paper	1	7	14.3%	between 20 and 40 %	Very low
Industrial metals	6	12	50.0%	above 40 %	Very low
Industrial transportation	1	4	25.0%	below 20 %	Very low
Oil & gas equipment, producers & services and gas,	5	13	38.5%	between 20 and 40 %	Very low
Other very low R&D intensive sectors	0	21	0.0%		Very low
<b>Subtotal very low R&amp;D intensive sectors</b>	<b>18</b>	<b>75</b>	<b>24.0%</b>	<b>37.3%</b>	
<b>Total</b>	<b>110</b>	<b>700</b>	<b>15.7%</b>	<b>24.3%</b>	

Note: \* For confidentiality, R&D investment shares of individual sectors are shown in ranges.

\*\* Sector group according to the average Scoreboard R&D intensity of each sector.

Source: European Commission JRC-IPTS (2007)

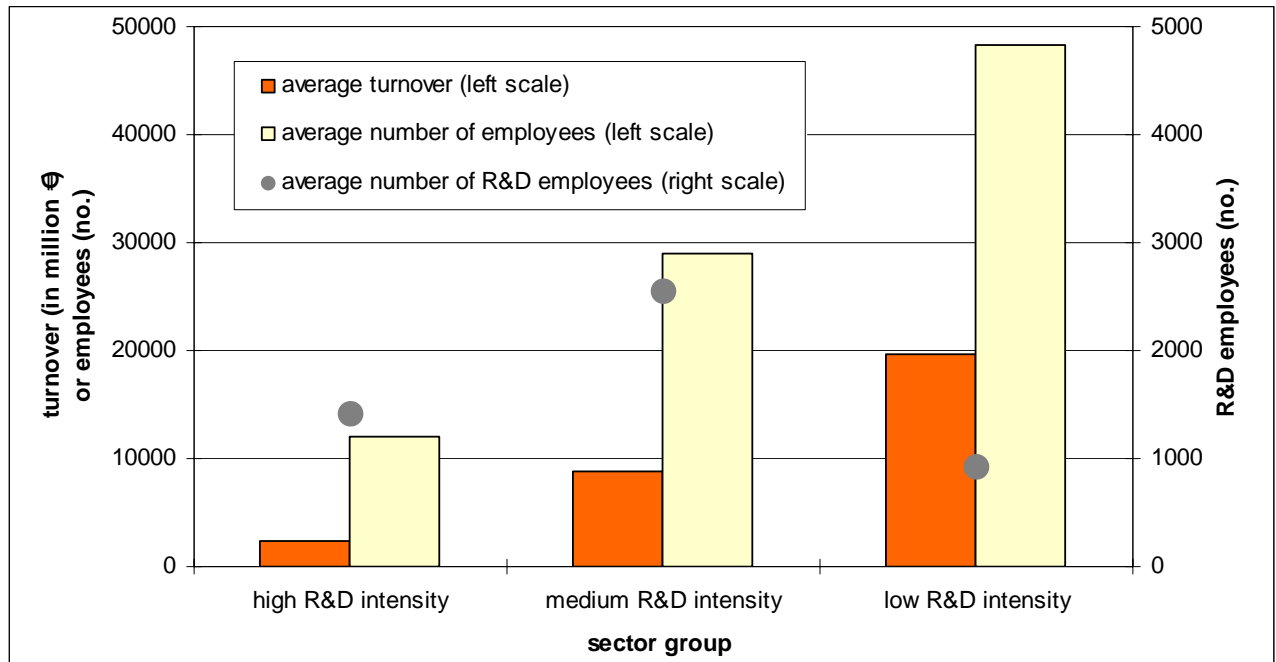
The largest number of responses came from the high and medium R&D intensity sector groups. Compared to the R&D investment in the Scoreboard, around one third is represented by the responses from low R&D intensity sectors, slightly less by the medium R&D intensity sectors, and just 18% for high R&D intensity sectors. As explained in Figure 1 of Section 1, the Survey reflects the distribution of R&D investment of the EU in the Scoreboard with a concentration of R&D investment in the medium R&D intensity sectors<sup>52</sup>.

As shown in Figure 19, the average respondent to the present Survey is a very large company<sup>53</sup>. However, there are differences of company size among the sector groups.

<sup>52</sup> In the 2006 Scoreboard, US corporate R&D investment by companies belonging to high R&D intensity sectors was almost twice that of similar EU companies (see The 2006 EU R&D Investment Scoreboard, p.12).

<sup>53</sup> Per company, the average turnover is €13 billion with 36 000 employees and 1 900 R&D employees. Among the 110 respondents there are only five medium-sized companies according to the European Commission's SME definition (see: [http://ec.europa.eu/enterprise/enterprise\\_policy/sme\\_definition/index\\_en.htm](http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm)).

**Figure 19: Average turnover and employees of the responding companies, by sector group**



Note: The figure refers to all 110 companies in the sample.

Source: European Commission JRC-IPTS (2007)

The figure reveals that the average turnover and number of employees are bigger the lower the R&D intensity of the sector group. However, the average number of R&D employees is considerably higher in the medium R&D intensity sectors than in the others. This reflects the high share in overall R&D employees of sectors such as automobiles, chemicals, or general industrials<sup>54</sup>. Unless otherwise stated, the weighted figures presented in this report are weighted by R&D investment.

<sup>54</sup> See also: "Industrial R&D Employment in the United States and in U.S. Multinational Corporations", table 2, <http://www.nsf.gov/statistics/infbrief/nsf05302/>

## 12 Annex B: The 2006 Questionnaire on R&D Investment

### A. Introduction

The purpose of this survey is to assist in the formulation of EU policies relevant to business investment in R&D in Europe<sup>1</sup>. The data we wish to collect provide a baseline against which to understand **business trends in R&D investment**. Its results are relevant both to firms and to policy-makers. Your contribution to this survey is important as it can help to shape **EU policies** in this field. The information you provide will be treated as **confidential**. It will be used only within this study and will be aggregated for the analysis. No access will be granted to individual answers.

We estimate that it will take about **40 minutes** to complete the questionnaire.

We would appreciate your response by **deadline**, preferably by using the questionnaire on our **website** at: [weblink](#). Alternatively, you can send this completed form by fax, e-mail or post to the following contact details:

Institute for Prospective Technological Studies (PTS)  
Attn.: Alexander Tübke<sup>2</sup>  
Edificio Expo, Calle Inca Garcilaso s/n  
Isla de la Cartuja  
E-41092 Seville, Spain

We will send you a priority copy of the results by email.

Thank you very much for your assistance!

Name of the company you are responding for: \_\_\_\_\_

This company's primary sectors of activity: \_\_\_\_\_

The company's home country: \_\_\_\_\_

Your name: \_\_\_\_\_

Job title: \_\_\_\_\_

E-mail: \_\_\_\_\_

If you would like to be informed of the results of the survey when they are available, please **tick here**  (please ensure that you have provided your e-mail address above).

The European Commission plans to carry out more detailed investigations to clarify the trends revealed in the analysis. This will probably involve follow-up discussions with a smaller group of companies. Please **tick here**  if you are willing to be approached for this purpose.

If your company belongs to a group, please state name and location of the parent company:

\_\_\_\_\_

#### Definition of R&D investment

Research and Development (R&D) is creative work undertaken on a systematic basis to increase knowledge and to apply it, for example, to create new processes, products and services. R&D can be carried out in-house or outsourced to third parties. For the purposes of this questionnaire, 'R&D investment' is the total amount of R&D financed by your company (as typically reported in its accounts). If R&D costs have been capitalised, the additions to the appropriate intangible assets should be included and any amortisation eliminated.

<sup>1</sup> Increasing and improving R&D investment in Europe is at the heart of the EU's Lisbon Strategy (see also the joint EU research and innovation action plan: <http://europa.eu.int/invest-in-research/>)

<sup>2</sup> Fax: +34 95 448 83 26; Tel : +34 95 448 83 80, email: [Alexander.Tuebke@cec.eu.int](mailto:Alexander.Tuebke@cec.eu.int)

## B. Corporate background

1. How many employees are currently working in the company you named on page 1?  
About \_\_\_\_\_ employees
2. What was the total turnover of this company in the last financial year?  
About € \_\_\_\_\_ million in the financial year \_\_\_\_\_,  
which refers to the reference period \_\_\_\_\_.
3. In the last financial year, what approximate percentage of the company's turnover can be attributed to new products (less than three years old)?  
About \_\_\_\_\_% of the company's total turnover can be attributed to new products.

## C. R&D investment levels and trends

4. How much did your company invest in total in R&D in the last financial year?  
About € \_\_\_\_\_ million in the financial year \_\_\_\_\_.
5. Please estimate the proportion of the company's R&D investment that is used to fund in-house activity and the proportion that is funding outside research?  
\_\_\_\_\_ % in-house  
+ \_\_\_\_\_ % funding outside research in companies  
+ \_\_\_\_\_ % funding outside research in public research organisations<sup>3</sup>  
= 100 % total R&D budget
6. Approximately which percentage of the company's R&D investment is used for collaborative research with other companies? *Please bear in mind that 'funding outside research' and 'funding collaborative research' are not necessarily equivalent.*  
About \_\_\_\_\_% of R&D investment is used for collaborative research with other companies.
7. For what reasons does the company fund collaborative research with other companies? *Please choose up to two reasons.*
  - Limited R&D investment ability
  - Access to new knowledge and results
  - Risk reduction
  - Higher efficiency in the execution of the research
  - Joint research in order to develop platforms, norms and standards
  - other: \_\_\_\_\_
8. How many employees are currently working on R&D in the company?  
About \_\_\_\_\_ employees in Full Time Equivalent (FTE).

<sup>3</sup> including universities



9. Please estimate how much of the company's total R&D investment has been carried out in the following regions of the world in the last financial year?

\_\_\_\_\_ % in the European Union  
 + \_\_\_\_\_ % in other European countries<sup>4</sup>  
 + \_\_\_\_\_ % in the US and Canada  
 + \_\_\_\_\_ % in Japan  
 + \_\_\_\_\_ % in China  
 + \_\_\_\_\_ % in India  
 + \_\_\_\_\_ % in the Rest of the World  
 = 100 % total R&D budget

10. By how much do you expect the company to increase R&D investment in the next three years, per annum?

The increase is expected to be:

None/negative |  Small (< 2 % p.a.) |  Moderate (2 % to 5 % p.a.) |  Large (5 % to 10 % p.a.) |  Very large (> 10 % p.a.)

11. By how much do you expect the company's R&D investment to change in the following regions of the world over the next three years, per annum?

\_\_\_\_\_ % p.a. in the European Union  
 \_\_\_\_\_ % p.a. in other European countries<sup>4</sup>  
 \_\_\_\_\_ % p.a. in the US and Canada  
 \_\_\_\_\_ % p.a. in Japan  
 \_\_\_\_\_ % p.a. in China  
 \_\_\_\_\_ % p.a. in India  
 \_\_\_\_\_ % p.a. in the Rest of the World

12. Approximately which percentage of the company's R&D investment carried out in the EU falls into the following categories?

\_\_\_\_\_ % in research  
 + \_\_\_\_\_ % in development  
 = 100 % of R&D investment carried out in the EU

13. Approximately which percentage of the company's R&D investment carried out outside the EU falls into the following categories?

\_\_\_\_\_ % in research  
 + \_\_\_\_\_ % in development  
 = 100 % of R&D investment carried out outside the EU

14. What is the likelihood that your company will start new R&D ventures outside the EU within the next three years?

None |  Small |  Moderate |  Large |  Very large

15. What is the likelihood that your company will move current R&D activities conducted in the EU outside the EU within the next three years?

None |  Small |  Moderate |  Large |  Very large

<sup>4</sup> not including the former Soviet Union (e.g. Russia, Ukraine, Belorussia)

16. To what extent do the following factors influence the company's decision to **increase** its R&D investment? *Please rate on a scale from 1 (no influence) to 5 (very strong influence).*

	No influence					Very strong influence
	1	2	3	4	5	
(a) Evidence of market demand for new products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(b) Evidence of technological opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(c) Improved turnover or profit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(d) Growing competition from companies located in:						
(d1) the European Union	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(d2) other developed countries, e.g. the US or Japan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(d3) emerging countries, e.g. China or India	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(e) Expected impact of R&D on improved productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(f) Expected increase in productivity of your R&D process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(g) Current access to internal R&D resources, e.g. specialised knowledge, results or infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(h) Current access to external R&D resources, e.g. specialised knowledge, results or infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(i) Current access to financial resources for R&D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(j) Your clients' commitment to help finance your R&D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(k) Current public (i.e. government) R&D support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(l) Current regulation in your product markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(m) Current legal framework for R&D, e.g. Intellectual Property Rights or R&D regulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(n) Current availability of researchers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(o) Current labour costs of researchers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(p) Current R&D cooperation opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(q) Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

17. How important are the following sources of funds for financing the company's R&D investment, whether it is financed by your company or from external sources? *Please rate on a scale from 1 (unimportant) to 5 (critically important).*

	Un-important					Critically important
	1	2	3	4	5	
(a) The company's or group's own funds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(b) Equity and venture capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(c) Raising capital on the stock market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(d) Bank and other private loans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(e) Tax incentives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(f) Funds provided by clients or suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(g) Funds provided by partners in joint R&D projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(h) Public grants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(i) Publicly supported loan and guarantee schemes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(j) Funding from the EU, e.g. the Framework Programme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(k) Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## D. R&D location strategy and management

18. a) If you had to locate or increase some of the company's R&D investment in a country other than your home country, what importance would the following factors have for your choice? *Please rate on a scale from 1 (unimportant) to 5 (critically important).*

Please **tick here**  if the answers you provide refer to a specific case of R&D relocation or increase, either from the recent past or planned for the near future.

	Un- important 1	2	3	4	Critically important 5
(a) Access to markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) High availability of researchers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Low labour costs of researchers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Access to specialised R&D knowledge and results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Predictable legal framework for R&D, e.g. Intellectual Property Rights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) Macroeconomic and political stability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) Proximity to technology poles <sup>5</sup> and incubators <sup>6</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(h) Proximity to other activities of your company, e.g. production or sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(i) Proximity to suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(j) R&D cooperation opportunities, including with regulatory bodies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(k) Access to public support for R&D, e.g. funds or procurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(l) Low degree of regulation of your product markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(m) Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b) Which of the countries in which the company does or is planning to do business is currently the *most attractive* for expanding its R&D investment? *Please state only one country (under the possible inclusion of your home country).*

\_\_\_\_\_

c) Which of the countries in which the company does or is planning to do business is currently the *least attractive* for expanding its R&D investment? *Please state only one country (under the possible inclusion of your home country).*

\_\_\_\_\_

## E. Suggestions

19. Any further suggestions or comments regarding European actions<sup>7</sup> to raise R&D investment you would like to add:

\_\_\_\_\_

**Note:** We would highly appreciate any additional information, particularly in the form of company reports or other publications, regarding your company's R&D investment strategy.

**Thank you very much for your contribution!**

<sup>5</sup> "Technology poles" are areas where R&D active companies, institutions and universities are concentrated.

<sup>6</sup> "Incubators" are structures that support innovative startup companies in order to increase their survival rates.

<sup>7</sup> See also: <http://europa.eu.int/invest-in-research/> and <http://eu-iriscoreboard.jrc.es/index.htm>.

**European Commission**

**EUR 23279 EN – Joint Research Centre – Institute for Prospective Technological Studies  
Directorate General Research**

Title: The 2006 EU Survey on R&D Investment Business Trends

Authors: Alexander Tübke and René van Bavel

Luxembourg: Office for Official Publications of the European Communities

2007

EUR – Scientific and Technical Research series – ISSN 1018-5593

Abstract

This report presents the results of "The 2006 EU Survey on R&D Investment Business Trends" (Survey). It provides new insights into company expectations about future R&D investments and their motivations to invest in research. The results are drawn from the responses received from 110 large companies in the EU. They are responsible for a total global R&D investment of almost €25 billion, constituting a considerable share (24.3%) of total R&D investment of the European Scoreboard companies.

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