EUROPEAN COMMISSION

volume I: ANALYSIS

Monitoring industrial research: the 2005 EU industrial R&D investment SCOREBOARD

Directorate General Joint Research Centre
Directorate General Research

Acknowledgements

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Scoreboard webpage and contact information

The *Scoreboard* webpage is: http://eu-iriscoreboard.jrc.es/index.htm where the electronic version of the *2005 EU Industrial R&D Investment Scoreboard* (both Analysis – Volume I - and Company Data – Volume II -) is available and can be downloaded.

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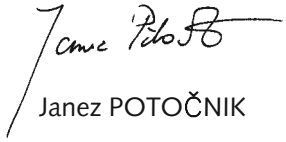
Foreword

Earlier this year, the Spring European Council endorsed the revised EU Lisbon Agenda, raising the profile of R&D policy as an instrument of economic policy, and renewing attention to the persistent deficit of private R&D investment in the EU compared to other advanced economies. It also confirmed the 2002 Barcelona European Council target for EU R&D investment to approach 3 % of GDP by 2010. The *EU Industrial R&D Investment Scoreboard* is part of the Commission's efforts to monitor trends and developments in private R&D. This second edition lists and analyses the worldwide R&D investments of 1,400 companies - the top EU 700 and top non-EU 700 – which together account for € 315 billion of R&D, or more than half the estimated world total enterprise R&D expenditure.

The *Scoreboard* views private R&D trends from the global 'corporate' perspective, and as such, complements analysis based on R&D data collected by international and national statistics offices. It can be used by companies, investors and financial analysts to benchmark R&D data and trends at company level, within and across countries and sectors, as well as to relate such data to measures of business performance. It is also a valuable source of information for policy makers. Its global corporate perspective is particularly relevant in the context of increasing internationalisation of company R&D strategies, which is becoming an increasingly important dimension of the research policy debate, complementary to the territorial focus of the 3 % goal.

A positive message in this year's *Scoreboard* is the turnaround since last year in the R&D investment growth rate for EU companies from an annual decline of 2 % to an increase of 0.7 %. We also see that top EU companies individually invest in R&D at least as much as their competitors from outside the EU. This year in addition, an EU firm tops the world list. However, many of last year's worrying findings are confirmed, such as lower R&D investment growth rate for EU companies leading to an increasing gap in aggregate R&D investment compared to their competitors, and a lower concentration of EU-company R&D investment in sectors of high R&D intensity. This year's *Scoreboard* also shows that EU companies account for a relatively lower proportion of R&D investment and lower R&D growth rates, in sectors with the highest annual R&D growth rates world-wide (mostly in services e.g. software & computer – especially internet, health, media & entertainment, leisure & hotels and general retail, but also pharmaceuticals & – in particular - biotechnology).

With global R&D investments by EU firms and EU sectoral dynamics lagging those elsewhere, and with the EU attracting a shrinking proportion of globally-mobile private R&D[1], the cause for concern remains, and is further enhanced by the emergence of large Asian economies on the international R&D landscape. While work must continue to better understand what is at stake, R&D and related policy efforts in the EU cannot wait idly by. The EU must equal, or better, conditions elsewhere in the world for private R&D investment by ensuring research and innovation excellence, full market integration and high demand sophistication.



Janez POTOČNIK

1 See Key Figures 2005 – Towards a European Research Area: Science, Technology and Innovation, EUR 21264.

Key Findings

This year's *EU Industrial R&D Investment Scoreboard* reports on the worldwide research and development (R&D)[2] of 1,400 companies: the top 700 R&D investors with registered offices in the EU and the top 700 registered elsewhere. Together they invest € 315 billion in R&D. This represents just over half of the total R&D investment by the private sector world-wide.

The EU-focus of this *Scoreboard* makes it unique. It is the only corporate scoreboard to present information in such depth on R&D investment by companies in the EU. It also provides an extensive comparison of the performance of EU companies with that of their competitors worldwide.

The snapshot provided by this year's *Scoreboard* is that of ***a reversal of the decline reported last year. One can observe a slight increase of R&D investment by EU companies* (0.7 %).** However that good news is toned down by the fact that competitors ***outside the EU continue to grow faster (6.9 %) - and so the R&D gap continues to increase.***

This year's *Scoreboard* also highlights some other interesting comparisons between EU and non-EU companies:

Sector by sector, the average R&D intensity of EU companies is comparable with that of their counterparts worldwide. However, relatively few EU companies are found in highly R&D intensive sectors. EU companies are much more active in medium R&D-intensive sectors, where they are heavily investing in R&D. This often translates into products which command a premium for quality and reputation.

The sectors with the highest rates of growth worldwide in R&D investment are in services and pharmaceuticals & biotechnology. EU companies are holding their own in several of these fast-growing sectors, notably in pharmaceuticals & biotechnology, leisure & hotels, and support services. However, EU companies are losing ground to the rest of the world in sectors with significant R&D investment and growth such as software & computer services, health services and media & entertainment.

Individually, EU companies perform at least as well in R&D investment as their counterparts outside the EU. An EU firm, DaimlerChrysler, tops this year's world list of R&D investors. Furthermore, there are few sectors where there is not at least one EU company in a leading position - even in highly R&D intensive sectors. Also, the EU is the region with the largest number of companies in the world's top 50. However, the EU appears to be less successful in enabling medium sized companies to grow into large R&D investors.

Below we summarise the key results of *The 2005 EU Industrial R&D Investment Scoreboard*:

2 A glossary which explains the main terms used in the *Scoreboard* is provided on the last page of this section.

1. R&D Investment by EU Companies Increased in 2004, though the Gap with their non-EU Counterparts Continues to Widen

In this year's *Scoreboard,* EU companies increased their aggregate R&D investment by 0.7 % in nominal euro terms. This is a significant improvement over last year's *Scoreboard,* where the EU companies reported a decline of 2.0 %. Still, while some 45 % of the EU 700 companies increased their R&D investment by more than 5 % this year, 36 % decreased theirs.

In contrast, the 700 non-EU companies boosted R&D investment by 6.9 % (in nominal euro terms), compared with an increase of 3.9 % in last year's *Scoreboard*. Furthermore, 58 % of these companies increased their R&D by more than 5 % while only 28 % decreased theirs.

Direct comparison of growth rates for EU and non-EU companies need some qualifications. The appreciation of the euro against the US dollar since last year's Scoreboards tends to inflate R&D growth rates of non-EU companies, particularly US companies, and deflate them for EU companies. To illustrate this, if we assume that EU Scoreboard companies spend 20 % of their R&D investment in the US and US companies spend 10 % in the EU the effect would be the following: The growth rate correcting for exchange rate changes would be closer to 2 % for EU companies, while it would be closer to 6 % for US companies. The message that non-EU companies overall are substantially outpacing their EU counterparts in R&D investment is, however, unaffected.

2. The very top EU Companies Have a World Leading Position in R&D Investment

In this year's *Scoreboard*, as in last year's one, there are more EU than US companies among the top 50 worldwide R&D investors. 18 EU companies account for 36 % of the total R&D investment of the world top 50, while 17 US companies for 35 % and 12 Japanese for 23 %.

Daimler-Chrysler now occupies the world's number one position with an R&D investment of € 5.66 billion. The next two EU companies are Siemens (€ 5.06 billion) and Volkswagen (€ 4.16 billion). The top three non-EU companies are Pfizer (€ 5.65 billion), Ford Motor (€ 5.44 billion), and Toyota Motor (€ 5.42 billion).

Comparing last year's *Scoreboard* with this year's, there are few movements of more than two positions in the ranking of the top 50 companies. For EU companies, the notable risers are Robert Bosch, BMW and Renault, all from the automobiles & parts sector (the relevant change for Sanofi-Aventis is the result of a merger). The most notable drop is for Ericsson - falling from 17th to 29th place.

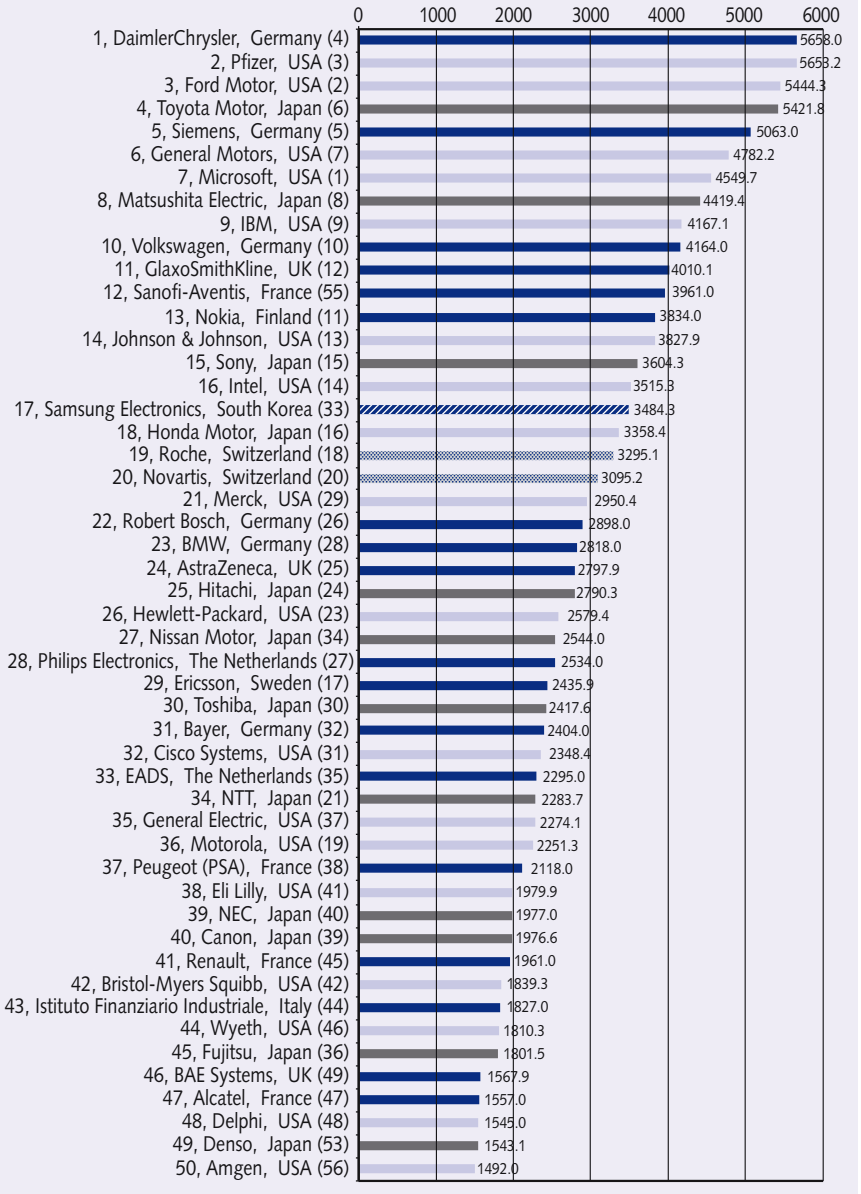
For US companies, the biggest rises in ranking were for Merck and Amgen, while the biggest drops were for Microsoft and Motorola.

Japan's Nissan improves its position in the ranking while NTT has a noticeable drop.

Finally, the only Korean company in the top 50, Samsung Electronics, made a spectacular rise in the ranking (from position 33 last year to 17 this year).

Figure 1

Ranking of world top 50 companies by their total R&D investment (million €) in 2004



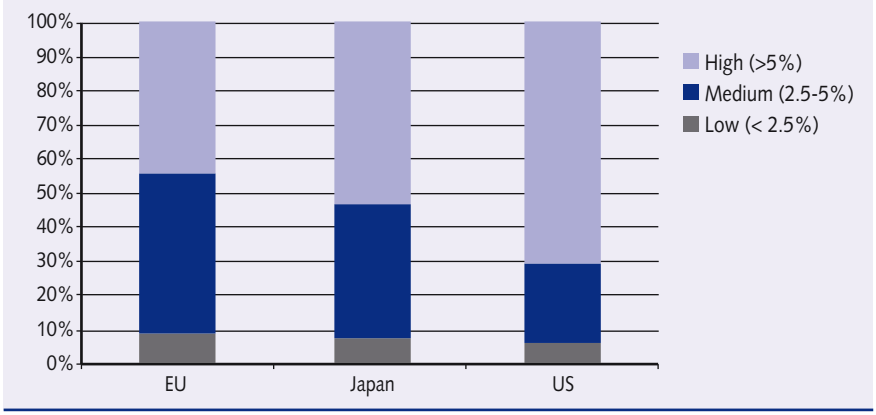
Note: The numbers in parentheses after the names of the companies refer to their rankings in last year's *Scoreboard*. It should be noted however that the rankings for last year have been adjusted to allow for the correct figures for Microsoft to be entered. These figures from their annual report became available only after the cut-off date for last year's *Scoreboard*, which contained figures based on an official "preliminary announcement" by the company.

3. EU Companies Have a Weaker Presence in R&D Intensive Sectors

The proportion of total R&D investment accounted for by *Scoreboard* companies in sectors with high R&D intensity (R&D investment/sales ratio higher than 5 %) is lower for EU companies than in the other main world economies.

Figure 2

Share of R&D investment by level of R&D intensity



It should be noted that EU companies account for a proportion of 31 % of world total R&D investment by *Scoreboard* companies, much higher than the share of the EU economy (21 %) in the world's gross domestic product (GDP). In addition, the proportion accounted for by the EU in total net sales of the *Scoreboard* companies is even higher, at 37 %. However, US companies account for a higher share of R&D investment (38 %) compared to their proportion of net sales (32 %).

4. Much Weight on a few Shoulders: In the R&D Intensive Sectors very few EU Companies Do most of the R&D

In the R&D intensive sectors where there are relatively fewer EU companies, those at the top dominate:

Despite the low number of EU companies in R&D intensive sectors such as "IT Hardware", the leading *Scoreboard* company is from the European Union: Nokia.

A similar picture is found for Electronics & electrical equipment: Siemens leads the *Scoreboard*.

Table 1

IT Hardware (R&D investment)

EU		Non-EU	
1	Nokia (€3.8 bn)	1	Intel (€3.5 bn)
2	Ericsson (€2.4 bn)	2	Hitachi (€2.8 bn)
3	Alcatel (€1.6 bn)	3	Hewlett-Packard (€2.6 bn)
4	Infineon Technologies (€1.2 bn)	4	Toshiba (€2.4 bn)
5	ASML (€0.3 bn)	5	Cisco Systems (€2.3 bn)
Top 5 as a percentage of total sector R&D = 86 %		Top 5 as a percentage of total sector R&D = 29 %	
Total R&D investment of top 5 = €9.3 bn		Total R&D investment of top 5 = €13.5 bn	

Electronics & Electrical Equipment (R&D investment)

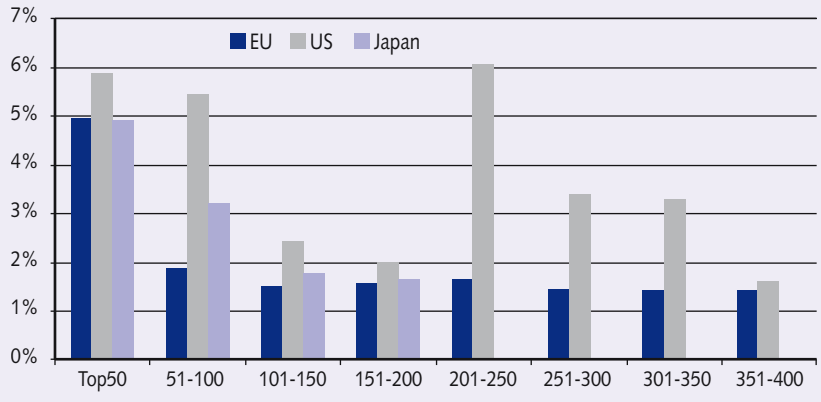
EU		Non-EU	
1	Siemens (€5.1 bn)	1	Matsushita Electric (€4.4 bn)
2	Philips Electronics (€2.5 bn)	2	Sony (€3.6 bn)
3	Schneider (€0.5 bn)	3	Samsung (€3.5 bn)
4	Alstom (€0.3 bn)	4	Canon (€2.0 bn)
5	Thomson (€0.3 bn)	5	LG Electronics (€1.1 bn)
Top 5 as a percentage of total sector R&D = 88 %		Top 5 as a percentage of total sector R&D = 58 %	
Total R&D investment of top 5 = €8.6 bn		Total R&D investment of top 5 = €14.6 bn	

5. The Largest R&D-investing EU, US and Japanese *Scoreboard* Companies Have Similar High R&D Intensities

The top 50 group of companies from the EU, US and Japan have similar levels of R&D intensity. As the volume of company R&D declines with *Scoreboard* ranking, the R&D intensity also reduces for Japanese and EU companies - the drop being steeper for the latter – This is not the case for US companies.

Figure 3

Share of R&D investment by level of R&D intensity



Note: There are 400 US and 200 Japanese companies in the *Scoreboard* that can be compared to the EU ones

6. There Is a Cluster of Medium-Sized US Companies which Is also Very R&D Intensive

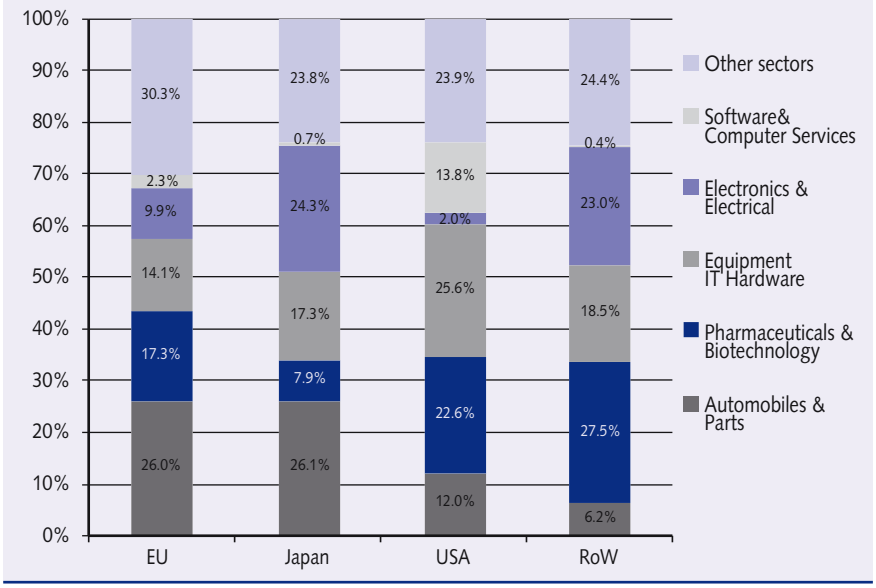
The overall profile for US companies is very different as one can see in the graph above, which reveals the group ranking 201-250 to have the highest R&D intensity. This group (mainly in IT hardware, Pharmaceuticals & Biotechnology and Software services sectors) has relatively low sales and shows large variations in profitability and is probably one of the hotbeds for the next generation of big innovative companies.

7. Each Region of the World Has a Different Specialisation

Each region of the world has its own pattern of specialisation. In part these patterns reflect historical strengths in certain sectors. They also reflect the ability of the region to create new knowledge-based businesses.

Figure 4

Share of R&D investment of top *Scoreboard* companies by major sectors



- The EU, US and Switzerland (included in the Rest of the World group) show a specialisation in Pharmaceuticals & Biotechnology
- The same applies to Automobiles & Parts companies for the EU and Japan
- R&D data for companies from the US and the Rest of the World (particularly Taiwan and South Korea) suggests such an IT Hardware specialisation;
- Asian companies (Japan, South Korea, Taiwan) are strong in Electronics & Electrical equipment;
- In Software & Computer services, US companies are responsible for more than 85 % of global R&D spending by the top *Scoreboard* companies.

8. The World's Fastest Growth in R&D Investment Is in Service Sectors and in Pharmaceuticals & Biotechnology

Of the top three sectors in terms of world R&D investment by *Scoreboard* companies (Pharmaceuticals & Biotechnology, Automobiles & Parts, IT hardware), Pharmaceuticals & Biotechnology continues to be fast-growing with an annual average world R&D investment growth of 12.6 % for 2001-2004, compared to 4.9 % and -5.0 % for the other two sectors respectively.

Service sectors, including software & computer services, health, media & entertainment, leisure and hotels, general retail, and support services, have the fastest-growing R&D investment over 2001-2004. All together, the share of these service sectors grew from 8.3 to 10.4 % over the last five years. In many of these sectors the EU companies account for a relatively low share compared to their overall proportion (31 %) of total R&D worldwide. Delayed uptake of fast growing activities in Europe is an issue of concern.

EU companies show high rates of growth over the past four years and also account for a high proportion of worldwide sector's R&D in some of these fast-growing sectors, such as pharmaceuticals & biotechnology (11.9 % the annual average growth rate over 2001-2004), leisure & hotels (5.7 %) and support services (5.1 %). However, EU companies are losing ground compared to the rest of the world in media & entertainment (- 8.3 %), software & computer services (only 4.0 %) and health services (only 5.8 %).

Figure 5

Sector average growth rates of R&D investment for world top *Scoreboard* companies - 2001 to 2004 - (%)

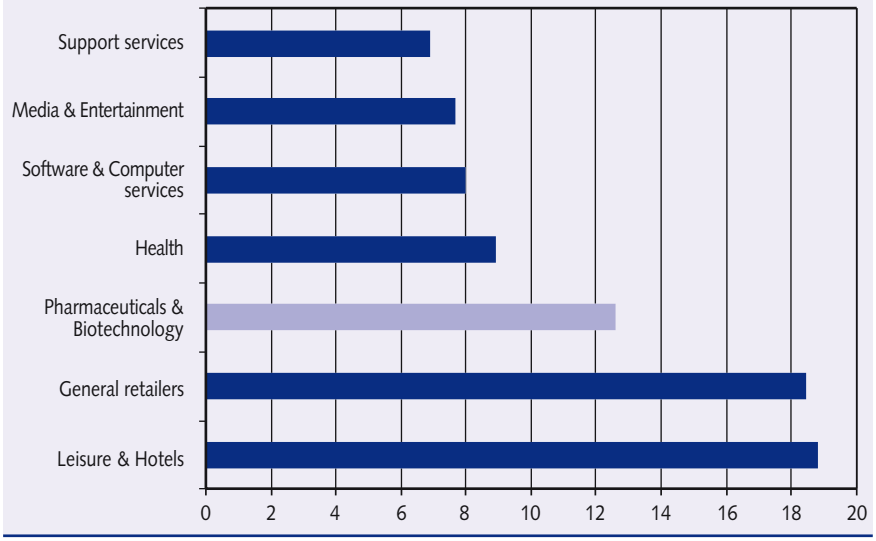
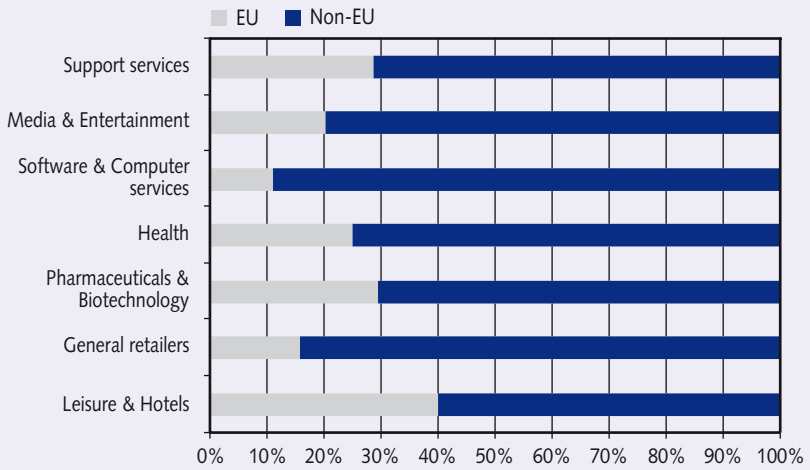


Figure 6

Share of R&D investment by EU and non-EU companies in fast-growing sectors



The *Scoreboard*: the way forward

This second edition of the *Scoreboard* provides further insight into the industrial R&D investment over the first edition. It constitutes a powerful means for comparison of company performance. Next year, it is envisaged that the *Scoreboard* will increase the number of companies in the EU and in 'the rest of the world' to 1,000 each.

Glossary

The terms "EU company, non-EU company or US company, Japanese company, etc." are used throughout this report to refer to a company whose ultimate parent has located its registered office in that country or region. Companies listed on official stock exchanges, private and state-owned companies are included, but companies that are subsidiaries of any other company are excluded to avoid double counting.

The term "R&D Investment" used in this report refers to corporate investment in R&D funded by companies themselves and their subsidiaries. It therefore excludes R&D financed by third parties such as governments or other companies. It also excludes a given company's share of any associated company or minority joint venture R&D investment. The definitions of "R&D" used by companies, following accepted international accounting standards, accord with definitions used in official statistics (as set out in the OECD's 'Frascati Manual').

The "sectors" in which groups of companies are classified in this report follow the definition by the FTSE (Financial Times Stock Exchange index) classification for sectors of main economic activity.

Introduction

Chapter 1

1.1 Background - Why Publish an R&D Investment *Scoreboard*?

The EU Industrial R&D Investment Scoreboard (the *Scoreboard*) is part of a broader industrial R&D investment monitoring activity designed to develop knowledge and a fuller understanding of trends in private-sector R&D investment and the factors driving these trends. The monitoring activity is implemented under the Commission's Research Investment Action Plan[3], which aims at helping to fill the EU's persistent R&D investment gap, in percentage of GDP terms, with respect to other developed economies - mainly due to a shortfall in private investment.

The *Scoreboard* is a unique EU-focused tool providing reliable up-to-date information with which to compare levels of R&D investment in conjunction with other economic and financial data.

The *Scoreboard* collects and analyses the worldwide R&D investment of firms, irrespective of where the investments are made, and is published in two volumes. This volume (Volume I – Analysis) analyses and compares the data and discusses the main findings and trends. The second volume (Volume II – Company Data) reproduces the database, with a classification of companies by R&D investment, company nationality[4] and sector of activity.

The *Scoreboard* is a unique[5] EU-focused benchmarking tool which provides reliable up-to-date information at company level for firms, investors, business associations and policymakers to compare levels of R&D investment and other economic and financial data. It allows companies' global R&D investment to be monitored on sectoral, national and 'world region' (e.g. EU, US, Japan) levels.

Annual publication of the *Scoreboard* is intended to promote awareness of the importance of R&D in companies' future business performance and also to stimulate the greater disclosure[6] of R&D investments and reporting by firms of their intellectual capital assets in general[7].

1.2 Company Data – The Database

The tables of data in Volume II report corporate R&D investments, capital expenditure, sales and other financial indicators disaggregated by company, sector and country. Data are taken from the publicly available audited accounts of each company's consolidated operations worldwide. The data cover the last four financial years. The database from which the tables have been taken can be downloaded free of charge from the *Scoreboard* web site[8]. The database lists the top 700 corporate R&D investors headquartered in the EU, together with the top 700 R&D-investing companies headquartered outside the EU.

Annual publication of the *Scoreboard* is intended to promote awareness of the importance of R&D in future business performance and to encourage reporting of R&D investments and other intellectual capital assets.

3 "Investing in research: and action plan for Europe" - COM(2003)266 final/2 - http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0226en02.pdf Implementation of the 3 % Action Plan is led by the European Commission's Research Directorate General (DG) under which the industrial R&D monitoring activity is conducted via a close collaboration between the Commission's Research and Joint Research Centre DGs.

4 The country where the registered offices of companies, at consolidated group level, are located.

5 Apart from *the EU Industrial R&D Investment Scoreboard*, it is not possible to derive comparable information on the distributions and concentrations of corporate R&D worldwide from the existing national or supra-national scoreboards.

6 The adoption of the disclosure requirements of the International Accounting Standards for intangible assets (IAS 38), which will be mandatory next year for company 2005 accounts, is already encouraging the capture of data relevant to the R&D *Scoreboard*

7 EC, DG Research (2005) - Report to the Commission of the High Level Expert Group on RICARDIS – Draft document - See also: EC – COM(2003)747

8 Both the Analysis – Volume I - and the Company Data - Volume II - are available on-line from http://eu-iriscoreboard.jrc.es/index.htm

The *Scoreboard* focuses on companies' R&D investment, and is intended to complement, rather than replace, the "territorially specific" data collected by national or international statistical agencies.

There are two main categories of companies included in the *Scoreboard*: stock-exchange listed companies and private companies. The *Scoreboard* also provides information on a limited number of foreign subsidiaries in eight EU countries (Volume II, Annex II.1.2 and II.1.6). This represents the result of pilot work undertaken for the first time this year.

The methodological approach and the scope and limitations of the *Scoreboard* data are explained in more detail in Volume II.

The data are classified by sector and by location of registered office[9]. This classification allocates a company's whole R&D investment to the country in which its registered office is located and not to the place where the money is actually spent. This fact should be borne in mind when interpreting the *Scoreboard*'s classifications by country. The *Scoreboard* is intended to complement, rather than replace, the "territorially specific" data collected by national or international statistical agencies. The *Scoreboard*'s approach is, in fact, fundamentally different from that followed by Eurostat, the OECD and national statistics offices when preparing Business Enterprise Expenditure on R&D (BERD) data[10]. The *Scoreboard* data is primarily of interest to those concerned with benchmarking company commitments and performance (e.g. companies, investors and policymakers). BERD data is primarily used by economists, governments and international organisations interested in the R&D performance of territorial units defined by political boundaries.

1.3 The Analytical Report

This volume (Volume I) of the *Scoreboard* analyses the economic and financial data and discusses some of the main features and trends emerging from the data collected. It also suggests ways in which readers can use the *Scoreboard* database for their own analytical purposes and presents an extract of the dataset showing *Scoreboard* companies ranked by their R&D investment in 2004 (Annex 1, Volume I).

The analysis rests mainly on top-level measures such as total R&D investment, R&D investment as a percentage of net sales, and business performance (measured by sales growth, profitability, capital expenditure, etc). The report contains six core analytical chapters:

a) **Overall R&D investment.** This section reports the levels overall R&D investment of *Scoreboard* companies, highlights the trends, and points out the main changes, including company dynamics (*Scoreboard* exits and entries), compared to the previous year.

9 The terms "EU company, non-EU company or German company, Finnish company, US company, Japanese company, etc. " are used throughout this report to refer to a company whose ultimate parent has located its registered office in the country or world region in question.

10 The main difference lies in the data provided. The *Scoreboard* refers to all R&D financed by a particular company from its own funds, regardless of where that R&D activity is performed. BERD refers to all R&D activities performed by businesses within a particular sector and territory, regardless of the location of the business's headquarters, and regardless of the sources of finance.
A further important difference concerns the source of data. The *Scoreboard* collects data from audited financial accounts and reports. BERD typically takes a stratified sample, covering all large companies and a representative sample of smaller companies.
Additional differences concern the definition of R&D intensity (BERD uses the percentage of value added, while the *Scoreboard* measures it as R&D/sales ratio) and the sectoral classification they use (BERD follows NACE – the European statistical classification of economic sectors - while the *Scoreboard* classifies companies' economic activities according to Financial Times Stock Exchange index – FTSE – classification).

b) **Major companies.** This section analyses the evolution of R&D investment by the top *Scoreboard* companies, including an analysis of company size distribution and their mobility within *Scoreboard* ranking.

c) **Major sectors.** This section examines the way in which differences in sector composition (sector mix), sector size and the specific differences in the performance of different sectors affect the overall R&D investment totals and the overall R&D/sales ratio. An analysis of trends is also provided.

d) **World regions.** This section compares R&D investment by companies and by sectors across major world regions (EU vs. US vs. Japan vs. the rest of the world). It also explores possible strengths and weaknesses in the industrial R&D investments of companies in the different regions.

e) **EU countries.** This section compares the R&D investment of the EU *Scoreboard* companies by EU Member State.

f) **Business and financial performance.** This section offers an overview of the business climate experienced by *Scoreboard* companies, and analyses the relationships between the evolution of their R&D investment and their other economic and financial performance indicators.

1.4 New Features in the 2005 EU *Scoreboard*

The European Commission published its first *EU Industrial R&D Investment Scoreboard* in 2004. The current edition builds on last year's experience.

The main company data and elements of analysis in the 2004 *Scoreboard* have been updated this year and the main trends identified. Some improvements have also been made and new features added, including:

- The number of companies in the *Scoreboard* has been increased from 500 to 700 for both EU and non-EU groups;
- An illustration of the effects of exchange rate fluctuations on company R&D investment and sales has been included;
- The level of the sector analysis in some cases has been further disaggregated;
- A separate list of the companies in each EU Member State has been added. It lists the R&D investments for up to the ten largest R&D investing companies (i.e. registered in at consolidated group level) for each Member State. In some cases, where it is available, data on significant R&D investment made in the Member State in question by subsidiaries and affiliates of foreign multinational companies, is also reported.

1.5 Target Audience

The *Scoreboard* will be of interest to three main audiences.

- *Companies.* Companies can use the *Scoreboard* to benchmark their R&D investment and thus situate themselves within the EU and global industrial R&D landscape. This information could be of value in helping to shape business or R&D strategy.

- *Investors and financial analysts:* The *Scoreboard* can also be used to assess risks of, and opportunities for, investment.

- *Government and business organisations:* National, European and international institutions and policy-makers can use R&D investment information as an input to their actions or policy-formulation.

Furthermore, as the *Scoreboard* dataset is freely accessible, it can encourage economic and financial analyses and research by all interested parties.

1.6 Possible Use of *Scoreboard* Information

The *Scoreboard* provides a picture of global private R&D investment which can help to inform business and policy decisions. It is worth highlighting that the 1,400 companies listed in this year's *Scoreboard* account for more than 50 % of the business enterprise expenditure on R&D (BERD) worldwide.

The *Scoreboard* includes the most recent data available at company level. In addition, the data in the *Scoreboard* are published as a four-year time-series, which supports further in-depth trend analyses.

Companies and financial analysts can use the *Scoreboard* data to examine the evolution of the links between business performance and R&D investment, and to compare firms operating in the same sector. Some examples are provided in Chapter 7.

Policy-makers can use the *Scoreboard* to get a good appreciation of trends in global R&D investment (volumes and intensities) at company level (see Chapter 2), and of the differences in the mix of industrial sectors between countries and world regions – e.g. EU versus non-EU (see Chapter 3).

Box 1.1 Methodological note and glossary

- The definition of "**R&D**" is that used by companies, following accepted international accounting standards (IAS 38), in accordance with the definitions used in official statistics (as defined in the OECD's Frascati Manual).

- The term "**R&D Investment**" used in this report refers to a company's cash investment in R&D - conducted on its own behalf and funded by the company itself. It excludes R&D undertaken under contract for customers such as governments or other companies. It also excludes the company's share of any associated company or joint-venture R&D investment. Where part or all of a company's R&D costs have been capitalised, the additions to the appropriate intangible assets are included to calculate the cash investment net of amortisation.

- The Scoreboard reports the **R&D investment level** of companies above a minimum threshold (over € 4.1 million for EU-based companies and over € 32.7 million for non-EU companies).

- The Scoreboard is compiled by taking data from the latest annual report and accounts **as of 1 August 2005**.

- Since the Scoreboard includes companies reporting in different currencies, all currencies are converted to **euros at the exchange rates prevailing on 31 December 2004.**

- The terms "**EU company, non-EU company, German company, Finnish company, US company, Japanese company, etc**. " are used throughout this report to refer to a company whose ultimate parent has located its registered office in that country or region.

- The term "**world regions**" is used throughout this report to refer to EU, US, Japan and rest of the world.

- The term "**R&D/sales ratio**" is used to mean the ratio of company's R&D investment to its net sales, as a proxy for "R&D intensity".

- The term "**Profit/sales ratio**" is used to mean the ratio of company's operating profits to net sales ("profitability")

- The "**sectors**" into which groups of companies are classified are those sectors of economic activity as defined by the FTSE (Financial Times Stock Exchange index) sectorial classifications, and correspond to the sectors in which individual companies themselves declare their main activity to be.

- When a **year** is mentioned in the analysis of company data, it refers to the given financial year of a company's published accounts. Companies from most countries have discretion in the choice of accounting period end. As a result, the given 'current year' can include accounts ending on a range of dates from the middle of one year to early the following year.

More detailed information on methodology is provided in Volume II.

Overview of Industrial R&D Investment

Chapter 2

This chapter briefly discusses the overall R&D investment levels and trends among *Scoreboard* companies, and highlights the main changes since last year's *Scoreboard*, including the dynamics of entries and exits to and from the *Scoreboard*.

Key Findings

Levels of R&D investment

- In 2004, the top 700 EU firms invested € 102.2 billion in R&D while the top 700 non-EU firms invested € 212.8 billion. The sum of both - € 315 billion - represents just over half of the estimated world business R&D expenditure.

Company dynamics (entries and exits to and from the *Scoreboard*)

- Daimler-Chrysler has taken over the world's number one *Scoreboard* position for R&D investment in 2004.
- Within the EU group, pharmaceuticals and biotechnology were the most dynamic sectors with eight new entries and six exits compared to last year's top 500.
- In the non-EU group, the largest numbers of new entries were in pharmaceuticals & biotechnology, IT hardware and chemicals sectors. Exits were spread across sectors, with more companies in general retail and health leaving the top 500.

Trends[11]

- Over the past year, R&D investment – in euro terms – has risen by 0.7 % for the EU 700 and increased by 6.9 % for the non-EU 700 companies.
- Over the past three years R&D investment – in euro terms - has grown, on average, by 0.1 % p.a. for the EU 700 and by about 4 % p.a. for the non-EU 700 companies.
- Net sales and operating profits increased at significant rates in 2004, in both EU and non-EU regions.
- R&D investment of the world's top *Scoreboard* companies[12] – in euro terms - rose by around 5 % in 2004, while the R&D/sales ratio declined slightly as net sales grew even faster than R&D investment.

11 Given that all investment levels and trends are calculated in euros, the appreciation of the euro relative to other currencies has inflated the value of the R&D investments by firms outside the EU (especially in the US) relative to those of EU firms – a detailed illustration of this is given in Chapter 2, box 2.1 and in Annex 2, Volume I.

12 A subset of 942 companies, each with R&D investment of over €35 million, out of the 1400 world's *Scoreboard* total – see section 2.2.

2.1 *Scoreboard* Company Dynamics

Given that this is the second edition of the *Scoreboard* and considering the increase in the number of companies included this year, a number of observations can be made on the turnover of firms in the EU and non-EU lists.

Towards the top of the rankings, there has been some slight reshuffling of positions with, in particular, Daimler-Chrysler (D) taking over the world number one place in the *Scoreboard*. This is explored in more detail in Chapter 3.

Comparing last year's and this year's top 500 lists, there is a 4-5 % turnover effect with 25 new entries to the EU list and 21 to the non-EU one. New entrants such as Wanderer-Werke (D), Carlsberg (DK) and Omega Pharma (BE) replace firms whose 2004 R&D investment decreased to below this year's top-500 threshold and others which have undergone mergers or have been acquired, such as Aventis (F) or Merant (UK).

Among EU companies, most of the turnover occurred in the pharmaceuticals & biotechnology sector with eight new entries and six exits from the top 500 EU list, four of which were acquired by other companies. The most prominent example is Sanofi's acquisition of Aventis, the new French giant becoming the third largest pharmaceuticals R&D investor in the world. Other sectors in which there were quite a number of entries and exits are engineering & machinery, with three new entries and six exits, and software & computer services, with three new entries and two exits.

Mergers and acquisitions have been responsible for some important changes in both the EU and non-EU rankings, particularly in the pharmaceuticals and biotechnology sector.

Among non-EU companies, the three sectors which had most new entries are pharmaceuticals & biotechnology (six new firms), IT hardware (five) and chemicals (three). On the other hand, the number of exits are more evenly spread across the sectors with four firms in general retail and three in the health sector leaving the top 500. There were fewer changes (3) as the result of a mergers or acquisitions compared to the EU list (9).

2.2. Basis for Comparative Analysis

For the overall analysis, comparisons can be made within and between the following main groups of *Scoreboard* companies:

- The 500 EU[13] and the 500 non-EU[14] companies from the first edition of the *Scoreboard* and the current top 500 groups in the present edition of the *Scoreboard*.
- The top 700 EU companies and the top 700 non-EU companies of the current *Scoreboard*.
- Top EU and non-EU companies in the same size range of their R&D investment.

Comparing data for last year's top 500s with this year's top 500s is subject to a number of caveats. Firstly, the two groups of top 500 companies are different because of the exits and entries of *Scoreboard* companies due

13 All having an R&D investment of more than €8.5 million
14 All with an R&D investment over €51.4 million

to real increases and decreases in company R&D investment, mergers and acquisitions, etc. Secondly, other changes result from improved disclosure of R&D investments by firms, including, in some cases, retroactive modifications of data for previous financial years. This makes it more meaningful to conduct comparisons and analyses on the consolidated data in the present edition of the *Scoreboard* covering four years. For example, Gaz de France (FR) and Telefonica (ES) have made their R&D investment more visible in their audited financial reports, while some other companies, such as Sorin (IT), have already adopted the disclosure requirements of the International Accounting Standards for intangible assets (IAS 38), which will be mandatory next year for companies' 2005 accounts, improving the collection of data relating to R&D investment. Microsoft (US) also rectified their R&D data for last year[15].

The groups of top 700 companies (EU and non-EU) are not directly comparable as the average size of firm is bigger in the non-EU group, given that the two groups span different size ranges in terms of R&D investment.

While the total R&D investment of the 700 EU companies can be contrasted with that of the 700 non-EU companies, a very detailed comparison of the two groups should be avoided for the following reasons:

- For companies to be included in the non-EU group the minimum R&D investment is € 35 million, whereas for the EU group it is € 4.7 million. The non-EU 700 *Scoreboard* companies are bigger on average than the EU 700 since they are drawn from the larger pool of firms in the world economy as a whole (excluding the EU). The two groups therefore span different size ranges.

- The smaller companies in the EU group are likely to have different characteristics to the larger companies in the non-EU group. For example, R&D intensity (R&D as a percentage of sales) is frequently higher among smaller companies in a sector since they are likely to have lower sales for a given product family.

For these reasons, the non-EU 700 are compared in detail only with the subset of 242 companies from the EU 700 that invested over € 35m in R&D and are therefore in the same size range (in terms of R&D investments). These 942 companies form a coherent group for which highlights and an overview comparison are presented below, with a more detailed analysis reported in chapter 5. The 458 EU companies with R&D below € 35 million have a total R&D of only 6 % of the EU 700, so the EU 242 captures 94 % of the total R&D investment of the EU 700.

2.3 Overview of R&D Investment of *Scoreboard* Companies

The overall volume of R&D investment (€ 315 billion) of the 1400 companies in the 2005 *Scoreboard* represents about the 53 % of the world's estimated business R&D expenditure[16].

The R&D investment totals, growth rates and R&D/sales ratios for the EU 700 *Scoreboard* companies and non-EU 700 in this year's *Scoreboard* are given Table 2.1. Also included are the corresponding data for this year's top 500 and for the top 500 in last year's *Scoreboard*.

15 The 2004 *Scoreboard* contained figures for Microsoft based on an official "preliminary announcement" by the company. The annual report with rectified figures became available only after the cut-off date for last year's *Scoreboard*.

16 Source: own estimation based on Eurostat data and on unpublished information provided by the European Industrial Research Management Association (EIRMA).

Table 2.1

Total R&D investment volume, growth rate and R&D/sales of EU and non-EU companies – 2005 *Scoreboard* versus 2004 *Scoreboard*

		R&D investment			R&D/sales (%)
		Volume (billion €)	Growth (%)		
			1year	3 years	
2005 *Scoreboard*	EU top 700	102.2	0.7	0.1 p.a.	2.9
	EU top 500	*100.8*	*0.7*	*0.1 p.a.*	*3.0*
	Non EU top 700	212.8	6.9	4.0 p.a.	4.2
	Non EU top 500	*203.7*	*7.0*	*4.5 p.a.*	*4.3*
2004 *Scoreboard*	EU top 500	100.8	- 2.0	1.2 p.a.	3.2
	Non-EU top 500	195.6	3.9	3.7 p.a.	4.5

The first message this year is one of optimism in so far as last year's negative growth rate for top EU *Scoreboard* companies has been replaced by a positive growth rate this year.

More specifically, the main trends in Table 2.1 are:

- Over the past year R&D investment – in euro terms - has increased by 0.7 % for the EU700 and increased by 6.9 % for the non-EU700 companies.
- Over the past three years R&D investment in euro terms has grown, on average, by 0.1 % p.a. for the EU700 and by about 4 % p.a. for the non-EU700 companies.
- The R&D/sales ratio is lower for the EU-700 than for the non-EU700 group. For both, the decline of the average R&D/sales ratio in 2004 is due to higher growth in total net sales than in total R&D investment.

In spite of the positive turnaround, the R&D investment gap between EU and non-EU companies seems to be increasing. However, the *Scoreboard* does not report the real changes in R&D spending or sales, but nominal changes expressed in the current year's currency equivalents. In this regard, it is important to underline that exchange rate effects, which cannot be corrected for systematically, tend to amplify growth rates for non-EU companies and attenuate them for EU companies (see Box 2.1 at the end of the Chapter and in Annex 2 of Volume I). Nonetheless, the *Scoreboard* analyses concentrate on those parameters that are least affected by exchange rates. These are key ratios such as R&D intensity (R&D as % sales) and profitability (operating profit as % sales) and company growth rates such as the % change in R&D from one year to the next.

2.4 Overall Trends for the World's Top 942 R&D Investing Firms

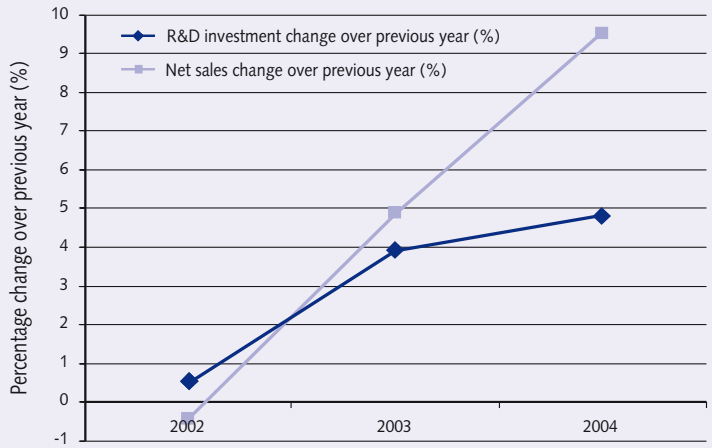
2004 saw further recovery from the difficult period of 2001-2003, when many technology-based companies, which had previously enjoyed something of a boom in 1999-2000, suffered a downturn. As already pointed out, the non-EU 700 is comparable only with the subset of 242 companies from the

EU 700 that are in the same size range in terms of R&D investments. The total R&D investment in 2004 by the top 942 *Scoreboard* companies was € 309 billion, up 5.1 % from the previous year's figure in nominal terms.

The recovery among the top 942 *Scoreboard* companies, which started in 2003 and continued strongly in 2004, can be seen in figure 2.1. Net sales rose strongly from a negative growth rate in 2002 to 5 % in 2003 and this growth almost doubled last year. R&D investment has recovered more slowly, but still reached almost 5 % in 2004.

Figure 2.1

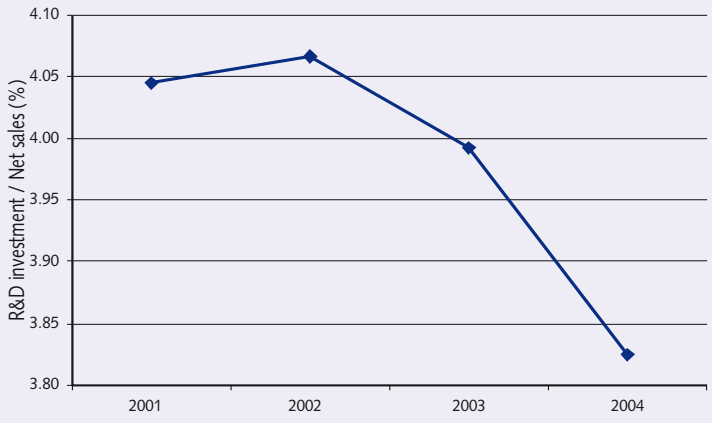
The change in annual growth rates of R&D investment and net sales from 2001-2004 for the top 942 world *Scoreboard* companies (%)



As figure 8 shows, the R&D/sales ratio of the top 942 *Scoreboard* companies changed by more than 6 % over the period 2001-2004. Consequently, the R&D/sales ratio fell slightly from 4.1 % in 2002 to 3.8 %[17] in 2004, as a result of a higher rate of growth in sales than in R&D spending.

Figure 2.2

The change in the R&D/sales ratio (%) during 2001-2004 for the top 942 world *Scoreboard* companies



17 For a more detailed analysis of the consequences of changes in exchange rates, based on an example for an individual company (ST Microelectronics – CH), see Annex 2, Volume I.

2.5. Comparison of EU and non-EU Companies

A first comparison of EU and non-EU *Scoreboard* companies is made on the basis of headline R&D data and other key figures given in Table 2.2 for the EU700, the non-EU700 and the top EU242 companies. The differences between the EU700 and EU242 groups are small except in R&D investment per company and in R&D/Net Sales ratio (higher for the EU-242 group).

2004 was a better year than 2003 in terms of R&D results for the *Scoreboard* companies in both EU and non-EU regions. However, growth in R&D investment by EU companies was just 0.7 %, compared with 6.9 % outside the EU.

Table 2.2

Overall performance of *Scoreboard* companies in 2004

Factor	Non-EU700	EU242	*EU700*
R&D Investment (€ bn)	**212.8**	**95.9**	*102.2*
R&D Investment per Company (€ bn)	0.30	0.40	*0.15*
Change in R&D Investment over previous year	**6.9 %**	**0.7 %**	*0.7 %*
R&D Investment / Employee (€)	11326	9229	*7469*
Net Sales (€ bn)	5122.2	2947.3	*3579.5*
Change in Net Sales over previous year	**10.9 %**	**7.2 %**	*7.2 %*
Net Sales / Employee (€ k)	271.2	284.4	*261.5*
Change in Number of Employees over previous year	1.3 %	-1.4 %	*-0.3 %*
R&D Investment / Net Sales Ratio	**4.2 %**	**3.3 %**	*2.9 %*
- difference as compared to previous year	**-0.2 %**	**-0.2 %**	*-0.2 %*
Change in Operating Profit over previous year	30.5 %	46.2 %	*49.1 %*

Note: All values are for the 2004 financial year; growth rates have been calculated by comparing 2004 to 2003. For comparability, the annual growth rates and the ratios are adjusted according to the available sample of companies in each year (if no data are available for a given company in any year, hence preventing calculation of a growth rate or a ratio, that particular company is excluded from the aggregate growth rate calculation)

The key points from Table 2.2 are:

- 2004 was a better year than the previous one in terms of R&D results for the both EU and non-EU *Scoreboard* companies, given that net sales, operating profits and capital expenditures increased at significant rates.
- Following two years of decline, 2004 R&D investment increased slightly for EU companies by 0.7 % (in euro equivalent terms), while the non-EU companies increased their R&D investment by almost 7 %, widening the gap between the two groups of companies.
- The change in sales also shows a gap, with EU companies increasing by more than 7 %, below the rate of almost 11 % for non-EU companies. The difference in annual growth rates lies mainly in the dispersed geographic distribution of sales and R&D amongst the biggest R&D-investing companies and in the effect the appreciation of the euro against the US dollar.
- The average R&D investment per EU242 *Scoreboard* company was € 0.4 bn, significantly higher than the € 0.3 bn for the non-EU companies. This is a consequence of the group of very large EU companies at the top of the *Scoreboard* and of the appreciating euro. The value is also more than double what it is for all EU700 companies taken together, demonstrating that R&D investment is strongly concentrated in larger firms.
- At € 96 bn, the top EU242 companies account for almost 94 % of total R&D investment of the EU700; the other 458 EU *Scoreboard* companies account for only about 6.2 % of the EU700's total R&D investment.

- The average R&D/sales ratio of *Scoreboard* companies decreased by 0.16-0.20 % during the last financial year for both groups of 700 companies, due to a higher growth rate of companies' net sales than R&D investment. As a consequence, the EU companies maintained a lower average R&D/sales ratio than non-EU companies, with the EU242 at only 78 % of the value calculated for the non-EU 700.

- Average net sales per employee are 5 % higher in the EU242 than in the non-EU *Scoreboard* companies, while the average R&D investment per employee continues to be much lower for EU companies, at 81 % of the non-EU level.

The caveats applicable to year-on-year changes in *Scoreboard* parameters are that they can be affected by exchange rates fluctuations, non-synchronisation of the business cycle between different economies, and the potentially significant impact of large mergers and acquisitions. The degree of confidence in the importance of any particular trend will obviously be stronger if it persists over several years and is seen in many different companies in a sector or economy.

Box 2.1 The effect of changes in exchange rates on *Scoreboard* data

The business results and the financial position of a given firm are generally affected by changes in the exchange rates between the currencies which are used in that firm's operations in various regions/countries, and also depend on the currency in which financial statements are reported. In particular, the depreciation of the dollar against the euro in 2004 (from $1.26 in December 2003 to $1.36 in December 2004) has an impact.

For example, if a company operates only in a US dollar region, its ranking in net sales relative to another company that is present only in the euro area will deteriorate when the US$ depreciates against the euro. The same will happen to all its indicators expressed in monetary terms (including R&D expenditure). Therefore, when the euro rises against the dollar, the relative positions of US firms operating domestically will be lower than those of firms operating entirely in euro markets.

When companies operate in various markets (using different currencies), as is the case of many of the *Scoreboard* companies, their results – including the nominal growth rates of their main financial/accounting ratios– will also be subject to exchange-rate fluctuations. Consider, for example, a company that invests half of its R&D in the euro area and the other half in the US $ area, but reports its financial accounts in euro. If the company increases its R&D by 5 % in each region where it has R&D operations, the nominal figures will indicate these increases when each is expressed in the currency of the corresponding region. If the US $ depreciates by 10 % in that year against the euro, when converting the value of the US $ R&D expenses made in the non-euro area into euro financial equivalent, the company will face a nominal reduction in its expenses, by 5.5 %. On aggregate, at the end of the year, the company will report a decline of 0.25 % of its R&D investment expressed in euro, despite the fact of having increased by 5 % its R&D operations in real terms.

For a significant number of EU *Scoreboard* companies operating worldwide (many of them having part of their R&D operations located outside the euro area), the real effective growth rates would have been higher than those reported in the *Scoreboard* tables, during the entire period 2001-2004 (characterised by continuous appreciation of the euro) in the case of R&D investment, net sales and other financial account figures. The opposite is true in the case of non-EU firms which carry out some of their operations in the EU.

Consequently, the perceived gap between EU and non-EU *Scoreboard* companies in terms of annual growth rates could be smaller[18]. For example the growth rate of EU companies in 2004 over the previous year would be 2.2 % instead of the reported 0.7 % while for US companies it would be 5.9 % instead of 6.7 %. This under the assumption that the EU *Scoreboard* companies spend 20 % o their R&D investment in the US and likewise that US companies spend 10 % in the EU. In 2001, 14 % of the EU total business sector R&D was invested in the US while 6 % of the US total business sector R&D was invested in the EU. It is assumed that the R&D flows between the US and the EU have increased since and that the respective shares have augmented by one half.

However, the message that non-EU companies are substantially outpacing their EU counterparts in R&D investment remains unaffected.

18 The ranking is based on cumulated R&D investment of all companies in the given sectors.

Top R&D – Investing Companies

Chapter 3

This chapter analyses research investment and a number of financial indicators relating to the top R&D-investing companies[19]. It also reports some findings concerning the demographics and size distribution of the companies in the *Scoreboard*.

Key Findings

- Unlike last year, the company with the world's largest R&D investment in 2004 is an EU company, Daimler-Chrysler (DE), with an investment of almost € 5.7 billion; Pfizer (US) follows very closely in second place (€ 5.6 bn).
- R&D investment by the top 50 EU firms has progressed unfavourably over the last three years. Over the past three years on average 22 of the top 50 EU firms increased R&D investment by more than 5 % per year compared to 33 non-EU firms, while the number of firms that decreased R&D investment were 16 in EU and 12 in non-EU.
- The top 50 EU firms all together increased 1 % and 0.9 % their R&D investment in nominal euro terms in the last year and over the last three years, respectively; while the top 50 non-EU firms increased 6.5 % and 4.6 % their R&D investment in the last year and over the last three years, respectively.
- The EU has one more firm than the US in the world top 50 (18 versus 17), although the total R&D investment over all the EU *Scoreboard* companies is significantly lower than that of the US firms.
- By country, South Korea provides the largest jumps in rankings in the world top 50 list with Samsung climbing from 33rd to 17th. Entries to and exits from the top 50 EU and non-EU rankings are influenced by mergers & acquisitions to a large extent.
- For both the EU and non-EU groups of companies, R&D investment is highly concentrated in a small number of firms and in a few sectors: the top five companies in three of the five largest sectors[20] account for more than 50 % of the total R&D investment for all *Scoreboard* firms in each of these sectors. The degree of concentration is higher in the EU than elsewhere.

19 The reference sample for this chapter is the top 942 *Scoreboard* companies. In order to ensure the EU and non-EU companies analysed have levels of R&D investment in the same range, this sample comprises those companies on the combined EU and non-EU lists which reported R&D investment of € 35m or more in the 2004 financial year. The € 35m cut-off point ensures all 700 non-EU companies are included, hence yielding the largest uniform sample from the *Scoreboard* data.

20 In their 2003 Annual Report, Microsoft reported €5,723 million R&D investment – which included upward revised items – figure that would have placed the company on top of the list of world R&D investors. It should be noted, however, that the rankings for last year have been adjusted to allow for the correct figures for Microsoft to be entered. These figures from their annual report became available only after the cut-off date for last year's *Scoreboard*, which contained figures based on an official "preliminary announcement" by the company.

3.1 The Ranking of Top World Companies

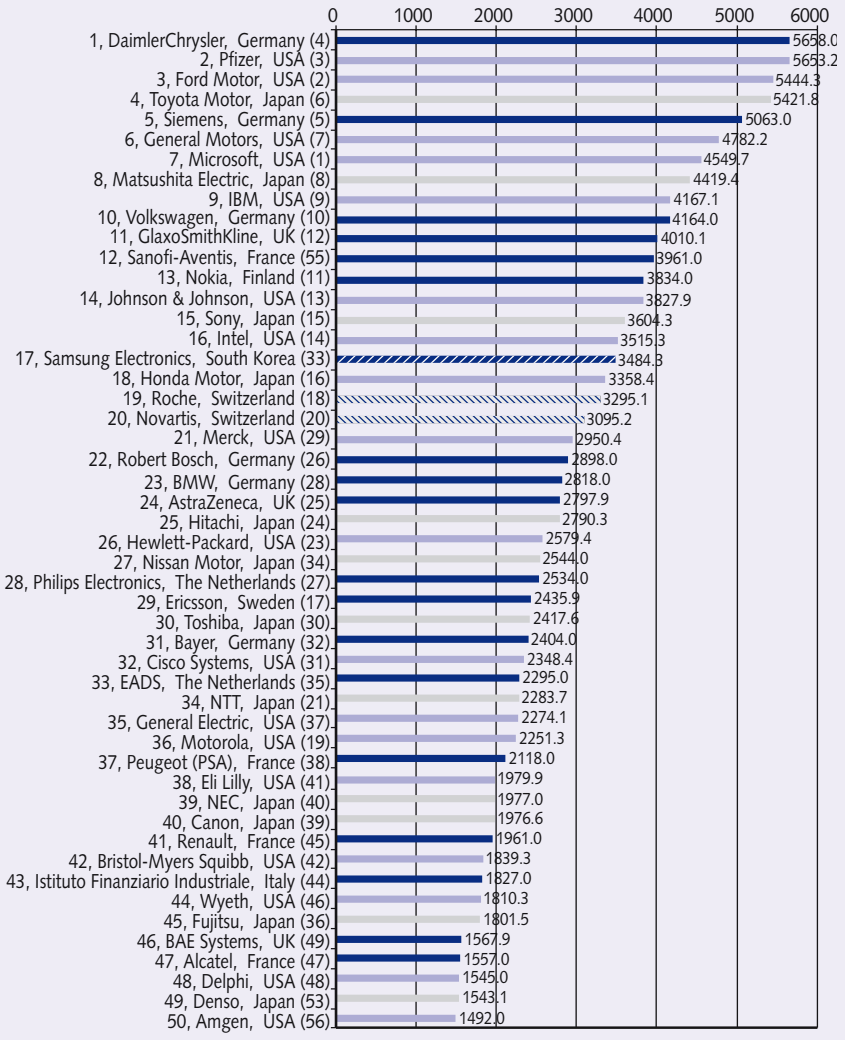
3.1.1 The overall world ranking of the top 50 companies

The overall world ranking of the top 50 companies in 2004 is shown in Figure 3.1 together with each company's ranking for the previous year.

An EU-based company, Daimler-Chrysler, takes first place in this year's *Scoreboard* due to its growth in R&D investment and the fact that Microsoft's R&D has dropped back to pre-2003 peak levels. Daimler-Chrysler increased its R&D investment by 2 % in 2004, more than its main rivals in the overall ranking (namely Ford, Siemens and Microsoft) but less than Pfizer, which has still dropped to second place as a result of the appreciation of the euro.

Figure 3.1

Ranking of world top 50 companies by R&D investment (million €) in 2004



Note: The numbers in parentheses after the names of the companies refer to their rankings in last year's *Scoreboard*. It should be noted however that the rankings for last year have been adjusted to allow for the correct figures for Microsoft to be entered. These figures from their annual report became available only after the cut-off date for last year's *Scoreboard*, which contained figures based on an official "preliminary announcement" by the company.

There are 18 EU companies among the top 50 R&D investors worldwide, compared to 17 US and 12 Japanese companies. The remaining three companies are Swiss (Roche and Novartis) and South Korean (Samsung Electronics). The 18 EU companies account for 35.7 % of the total R&D investment by the world's top 50 R&D investors, while the 17 US firms account for 35.1 % and the 12 Japanese ones for 22.6 %. Their respective shares in total net sales by the world's top 50 are 33.7 %, 33.3 % and 28.6 %, which gives the interesting result that, at 7 %, the R&D/sales ratio is the same for both the EU and US groups of companies in the world top 50.

There are 18 EU companies among the top 50 R&D investors worldwide, compared to 17 US and 12 Japanese companies. The remaining three companies are Swiss and South Korean.

The world's top 50 R&D investors are mainly in the automobiles & parts (14 companies, seven of which are EU-based), pharmaceuticals (12, one of which is in biotechnology), IT hardware (11, five of which are in telecommunications equipment and five in computer hardware) and electronics & electrical equipment (six, five of which are in electronics) sectors.

3.1.2 Top 5 EU and non-EU companies in the five main sectors

The five largest sectors in terms of the R&D Investment by *Scoreboard* companies are: automobiles & parts, pharmaceuticals & biotechnology, IT hardware, electronics & electrical equipment and software & computer services. The top five companies in each of these sectors are listed in Table 3.1, for both the EU and the non-EU groups in the *Scoreboard*. The table also shows the proportion of total R&D investment in each sector accounted for by the top five.

Table 3.1

Top 5 EU and non-EU companies in the five largest sectors by R&D investment (billion euros)

A. Automobiles & Parts			
EU		**Non-EU**	
1	Daimler Chrysler (€5.7 bn)	1	Ford Motor (€5.4 bn)
2	Volkswagen (€4.2 bn)	2	Toyota Motor (€5.4 bn)
3	Robert Bosch (€2.9 bn)	3	General Motors (€4.8 bn)
4	BMW (€2.8 bn)	4	Honda Motor (€3.4 bn)
5	Peugeot (PSA) (€2.1 bn)	5	Nissan Motor (€2.5 bn)
Top 5 as a percentage of total sector R&D = 70 %		Top 5 as a percentage of total sector R&D = 64 %	

B. Pharmaceuticals & Biotechnology			
EU		**Non-EU**	
1	GlaxoSmithKline (€4.0 bn)	1	Pfizer (€5.7 bn)
2	Sanofi-Aventis (€4.0 bn)	2	Johnson & Johnson (€3.8 bn)
3	AstraZeneca (€2.8 bn)	3	Roche (€3.3 bn)
4	Boehringer Ingelheim (€1.2 bn)	4	Novartis (€3.1 bn)
5	Schering (€0.9 bn)	5	Merck (€3.0 bn)
Top 5 as a percentage of total sector R&D = 74 %		Top 5 as a percentage of total sector R&D = 48 %	

C. IT Hardware			
EU		Non-EU	
1	Nokia (€3.8 bn)	1	Intel (€3.5 bn)
2	Ericsson (€2.4 bn)	2	Hitachi (€2.8 bn)
3	Alcatel (€1.6 bn)	3	Hewlett-Packard (€2.6 bn)
4	Infineon Technologies (€1.2 bn)	4	Toshiba (€2.4 bn)
5	ASML (€0.3 bn)	5	Cisco Systems (€2.3 bn)
Top 5 as a percentage of total sector R&D = 86 %		Top 5 as a percentage of total sector R&D = 29 %	

D. Electronics & Electrical Equipment			
EU		Non-EU	
1	Siemens (€5.1 bn)	1	Matsushita Electric (€4.4 bn)
2	Philips Electronics (€2.5 bn)	2	Sony (€3.6 bn)
3	Schneider (€0.5 bn)	3	Samsung (€3.5 bn)
4	Alstom (€0.3 bn)	4	Canon (€2.0 bn)
5	Thomson (€0.3 bn)	5	LG Electronics (€1.1 bn)
Top 5 as a percentage of total sector R&D = 88 %		Top 5 as a percentage of total sector R&D = 58 %	

E. Software & Computer Services			
EU		Non-EU	
1	SAP (€1.0 bn)	1	Microsoft (€4.6 bn)
2	Dassault Systemes (€0.2 bn)	2	IBM (€4.2 bn)
3	Misys (€0.1 bn)	3	Oracle (€1.1 bn)
4	Business Objects (€0.1 bn)	4	Computer Associates (€0.6 bn)
5	Infogrames Entertainment (€0.1 bn)	5	Electronic Arts (€0.5 bn)
Top 5 as a percentage of total sector R&D = 53 %		Top 5 as a percentage of total sector R&D = 62 %	

Notes: Company R&D investment in 2004 is given in brackets. Total sector R&D refers to the total amount for all EU - or all non-EU - *Scoreboard* firms in the sector.

The data show the top R&D investors in the EU to be in automobiles & parts. The dominance of the IT sectors by non-EU companies is reflected in the higher R&D investment in such sectors outside the EU.

Three interesting conclusions can be drawn from Table 3.1: a) R&D is highly concentrated in a small number of companies within each sector, b) the strength of the top EU companies in automobiles & parts, and c) the considerably larger R&D investment in software & computer services and IT hardware by non-EU companies, reflecting their dominance of the world IT market.

More specifically:

- In all five sectors, with only two exceptions (pharmaceuticals & biotechnology and IT hardware, in the case of non-EU companies), the top five companies account for more than 50 % of the sector's total R&D.
- The top EU companies in the automobiles & parts sector show a strong position despite the difference in size between the EU economy and the combined economies of the rest of the world.

- The largest difference in R&D investment between top EU and non-EU companies is in software & computer services: US companies dominate the world markets (software, internet and computer services) and the top EU company (SAP - DE) is less than quarter the size of either of the top two non-EU companies (Microsoft and IBM - both from the US). R&D investment by the EU firm in fifth place in 2004 was only 20 % of the amount invested by the non-EU firm in fifth place.

In the majority of cases, the top 5 companies in each sector account for more than 50 % of the sector's R&D investment.

Analysing in more detail the data (see Volume II – Tables II.1.3 and II.1.7) for the *growth rates* of R&D investment by the top 10 companies in each of the five largest R&D intensive sectors, 35 out of 50 EU companies underwent growth in R&D investment, compared to 39 out of 50 non-EU companies.

The *sectors* with the highest number of companies which increased R&D investment were automobiles & parts (9 out of 10 EU companies and 8 out of 10 non-EU companies), pharmaceuticals (7 out of 10, and 10 out of 10 respectively) and software & computer services (10 out of 10, and 8 out of 10 respectively). The R&D investment of the top 10 EU and top 10 non-EU *Scoreboard* companies in electronics & electrical equipment and in IT hardware, show different patterns in 2004 for different sub-sectors (electronic vs. electrical equipment, respectively semiconductors vs. telecommunications equipment)

3.1.3 Top R&D/sales ratios of EU and non-EU *Scoreboard* companies

Table 2.2 shows the top 10 EU and non-EU *Scoreboard* companies in terms of R&D/sales ratio – considering only those companies with net sales above € 200 million in the 2004 financial year. This sales criterion is used to filter out companies in their early stages of existence which may have significant R&D investment but very small net sales, and so anomalously high R&D/sales ratios.

The EU list is drawn from six EU countries while nine out of the ten non-EU companies are US-based. Firms in both lists are mostly in the pharmaceuticals & biotechnology and the ICT sectors, with two aerospace & defence firms among the EU top 10.

The R&D/sales ratios of the companies in the non-EU list are higher than those of all but two of the companies in the EU list. In addition, total R&D investment accounted for by the ten companies is very different in the case of the EU total as it is four times larger than the non-EU total and thus ranking higher in the top 700 lists. The higher R&D/sales ratio among US companies reflects the generally greater R&D efforts by US companies during their growth phase compared to EU companies. The tables also show the average annual growth rate of R&D investment for these companies during the last four years. The higher degree of variability of R&D investment among US companies can be clearly seen. This phenomenon is often associated with emerging businesses.

The R&D/sales ratios of the companies in the top 10 non-EU list are higher than those of all but two of the companies in the similar EU list. Moreover, smaller US companies appear to devote more resources to R&D while growing than do their EU counterparts.

The considerably higher total R&D investment for the ten EU companies suggests that while the EU's largest companies are outstanding performers in the global R&D arena, the EU is still short of fast-growing medium-sized companies that are as strong in R&D as their counterparts in the United States.

Table 3.2

Top 10 companies with more than € 200m net sales by R&D/sales Ratio

Top 10 EU Companies					Top 10 Non-EU Companies				
No	Company name	R&D/sales ratio	CAGR 2001-2004 (%)	Rank in 2005 *Scoreboard*	No	Company name	R&D/sales ratio	CAGR 2001-2004 (%)	Rank in 2005 *Scoreboard*
1	Elan (IE)	39.9	-23	98	1	Ciena	68.7	-5	248
2	ARM (UK)	32.8	9	155	2	Millennium Pharmaceuticals	59.4	39	193
3	Dassault Systemes (FR)	27.8	2	69	3	Sepracor	42.0	-12	289
4	Industria de Turbo Propulsores (ES)	21.6	34	141	4	PMC-Sierra	40.5	-16	360
5	Schwarz Pharma (DE)	20.9	23	74	5	Celgene	37.3	53	320
6	Finmeccanica (IT)	19.3	19	19	6	Openwave Systems	32.1	-30	445
7	Schering (DE)	19.0	3	26	7	Cadence Design Systems	31.1	8	134
8	Ipsen (Lux)	18.5	4	97	8	Biogen Idec	30.6	99	85
9	AstraZeneca (UK)	17.7	11	9	9	Actelion (CH)	28.9	21	361
10	Infineon Technologies (DE)	16.9	8	21	10	MedImmune	28.7	58	153
Total R&D investment		**€7.2 bn**			**Total R&D investment**		**€1.8 bn**		

Note: The country of registration is shown in brackets after the company name; for the non-EU group, all but one are US companies, therefore the country was not mentioned in these cases; CAGR stands for compound annual growth rate over the period of reference.

3.2 Top EU Companies in the World

3.2.1 Top 50 EU and top 50 non-EU companies

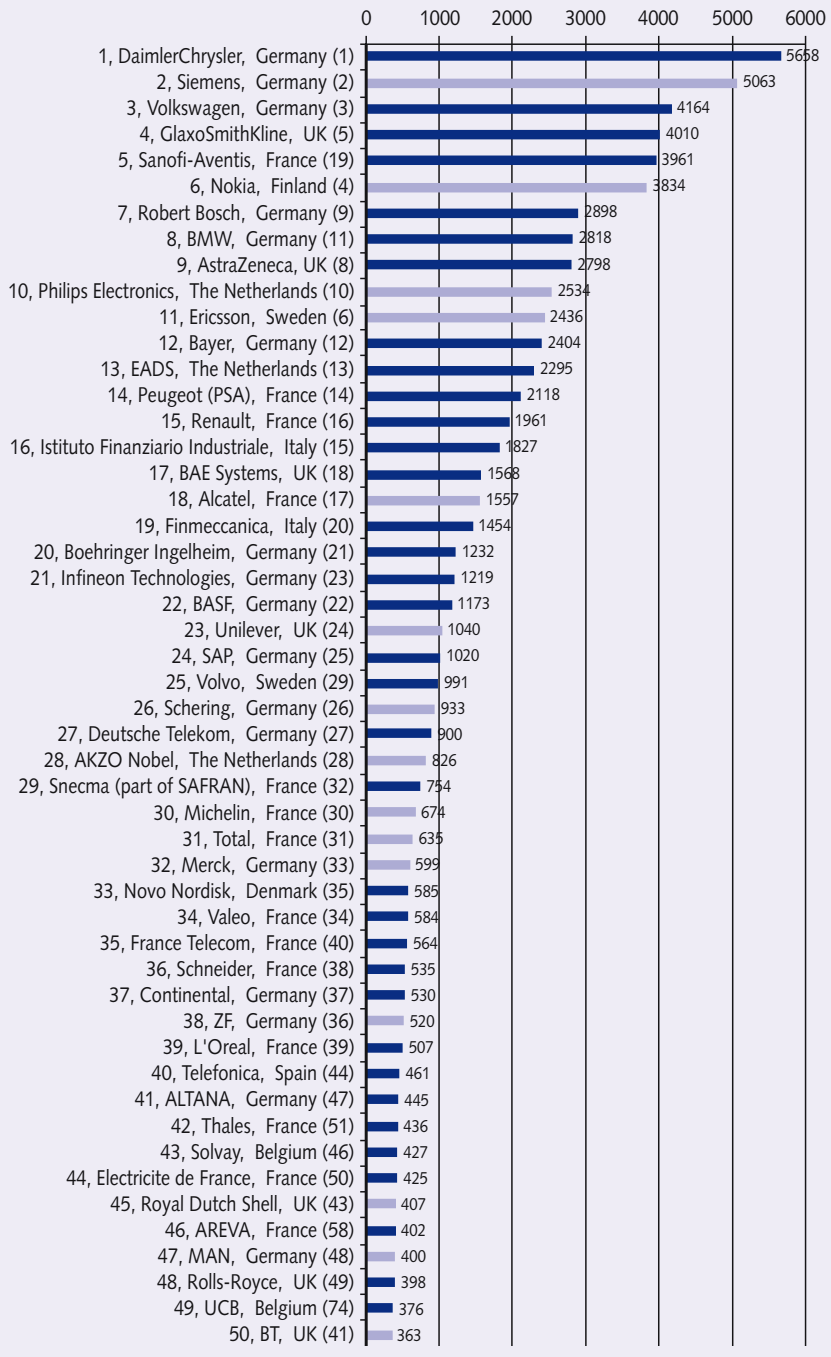
Figure 3.2 shows the top 50 EU companies and the top 50 non-EU companies. Both groups are ranked by worldwide R&D investment.

DaimlerChrysler, Siemens and Volkswagen dominate the EU ranking, while Pfizer, Ford and Toyota dominate the non-EU ranking. These two groups of top three *Scoreboard* companies represent 14.6 % and 7.8 % of the overall R&D investment in the EU and non-EU top 50 lists, respectively.

All the top 50 EU companies have R&D investments of over € 360 million, while the top 50 non-EU companies have total R&D investments of over € 910 million. The top 50 EU firms increased their R&D investment in the last year and over the last three years by 1 % and 0.9 %, respectively; while the top 50 non-EU firms increased their R&D investment in the last year and over the last three years by 6.5 % and 4.6 %, respectively.

Figure 3.2a

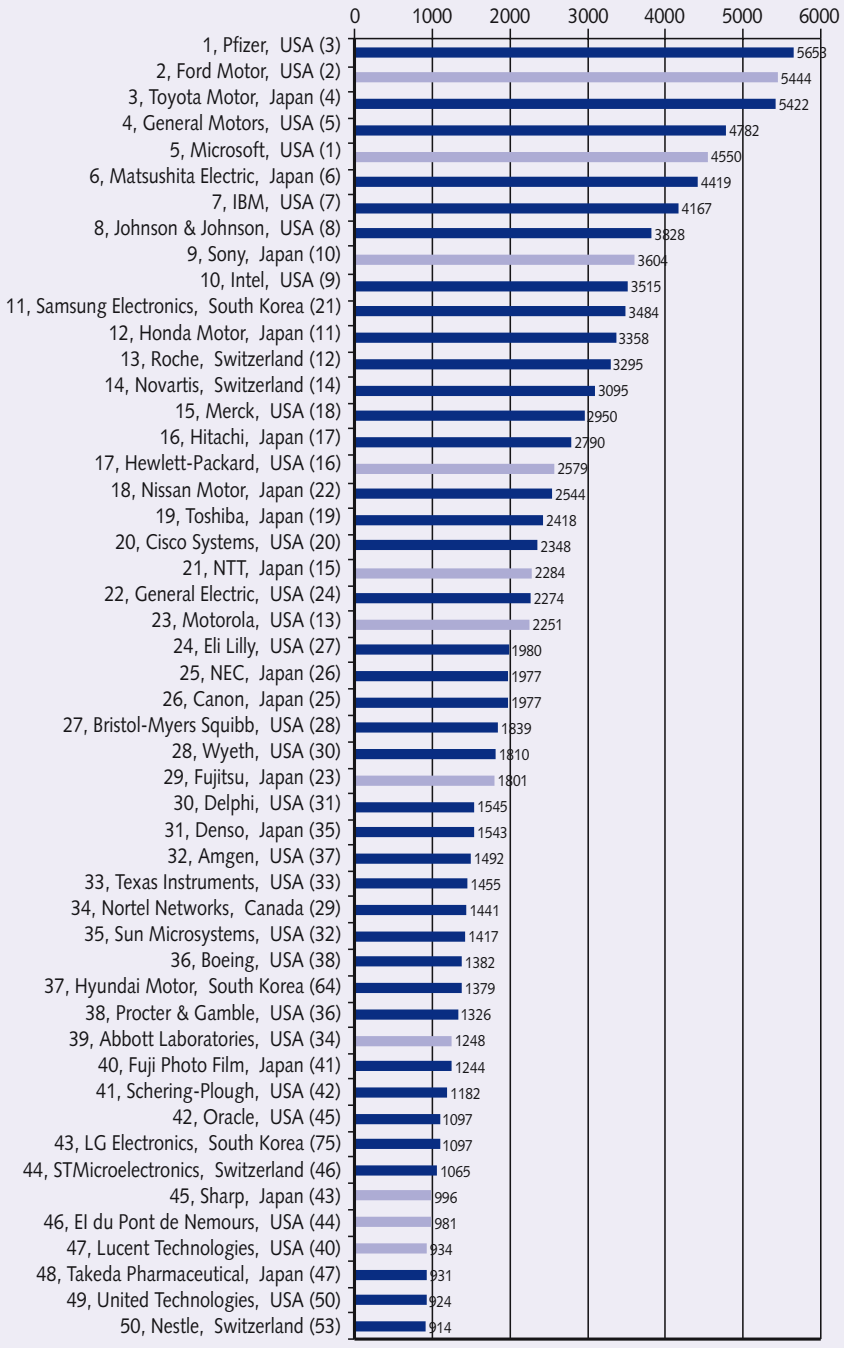
Ranking of the top 50 EU-registered companies by worldwide R&D investment (€ million) in 2004



Note: The numbers in brackets after the names of the companies refer to their ranking in last year's *Scoreboard*. The light blue bars show companies that reduced their R&D expenditure in 2004.

Figure 3.2b

Ranking of top 50 non-EU companies by worldwide R&D investment (€ million) in 2004



Note: The numbers in parentheses after the names of the companies refer to their rankings in last year's *Scoreboard*. The light blue bars show companies that reduced their R&D expenditure in 2004. It should be noted, however, that the rankings for last year have been adjusted to allow for the correct figures for Microsoft to be entered. These figures from their annual report became available only after the cut-off date for last year's *Scoreboard*, which contained figures based on an official "preliminary announcement" by the company.

Comparing figures 3.2a and 3.2b, the R&D investment distribution in the EU group falls off much faster with ranking, than in the case of non-EU companies. This is consistent with the general finding for the two sets of 700 *Scoreboard* companies that there is a lower concentration of R&D investment among the middle and low ranked EU companies than in the similar group of non-EU companies.

3.2.2 R&D investment trends among companies in the top 50 EU and non-EU groups

Comparing the data for the EU and non-EU companies shows R&D investment to be lower among medium-ranked firms in the EU than elsewhere.

The numbers of companies in the two top 50 groups that either increased or decreased their R&D investment are given in Table 3.3. Many more non-EU (33) than EU companies (22) made large increases (> 5 %) in R&D investment in 2004, with more decreases amongst the EU companies. The corresponding numbers, considering 3-year compound annual growth rates (CAGRs) from 2001 to 2004 shown in Table 3.4, confirm this to be the case over several years.

Table 3.3

Changes in R&D investment for Top 50 companies in 2004

	Number of companies with R&D investment change in 2004			
	Increase > 5 %	Increase 0-5 %	Total Increases	Total Decreases
EU Top 50	22	13	33	15
Non-EU Top 50	33	5	38	11

Table 3.4

Changes in R&D investment for Top 50 companies in 2001-2004

	Number of companies with R&D compound annual change over 2001-2004			
	Increase > 5 %	Increase 0-5 %	Total Increases	Total Decreases
EU Top 50	17	15	32	16
Non-EU Top 50	25	12	37	12

Note: No data were available for two of the EU companies and one non-EU company.

3.2.3 Dynamism within the top 50 EU and non-EU groups

South Korean companies have performed strongly in this year's *Scoreboard*.

Looking at the progress of company R&D investment by sector, 15 of the top 50 companies that decreased their R&D investment in 2004 are in sectors such as IT hardware (all three telecommunication equipment companies - Nokia, Eriksson, and Alcatel - in the EU top 50 reduced their R&D spending last year), pharmaceuticals, automobiles & parts, oil & gas, and electronics & electrical equipment (Siemens and Philips both reduced their R&D spending).

The 11 non-EU top 50 companies that reduced their R&D spending in 2004 are in the ICT sectors (four in IT hardware – Hewlett-Packard, Motorola, Fujitsu, and Lucent Technologies - one in telecom services (NTT) and one in software (Microsoft)) or electronics, where US and Japanese firms have been facing strong competition lately from Korean firms such as Samsung or LG Electronics.

South Korean companies are the best performers in this year's R&D *Scoreboard*, with Samsung Electronics climbing 10 positions in the non-EU list from 21st place last year, and Hyundai Motors and LG Electronics entering the top 50, the former climbing from 64th to 37th place, the latter from 75th to 43rd. The reasons for the exits and entries in the case of both the non-EU and EU top 50 rankings are due to variations in R&D investment but also to the effects of mergers and acquisitions. Examples for decline in R&D investment related to the process of mergers and acquisitions from last year include Sanofi-Aventis (F) and Motorola-Freescale (US).

3.2.4 Concentration

The top 50 EU companies invested a total of € 75.7 billion in R&D in 2004, which represents a 74.1 % share of the overall R&D investment by EU *Scoreboard* companies. Similarly, the top 50 non-EU companies invested € 118 billion in R&D in 2004, a 55.5 % share of the total R&D invested by the non-EU *Scoreboard* companies. Table 3.5 shows these figures along with others illustrating further concentration effects by country and by sector.

The top 5 sectors - automobiles & parts, IT hardware, pharmaceuticals & biotechnology, electronic & electric equipment and aerospace & defence (for EU) or software & computer services (for non-EU) - account for more than 70 % of total R&D investment by the top 700 in each case. Companies from just three EU countries –Germany, France and the UK– account for almost three quarters of the EU's R&D investment. On the other hand, companies from the US, Japan and Switzerland represent more than 93 % of the total non-EU *Scoreboard* R&D investment.

Companies from just three EU countries –Germany, France and the UK– account for almost three quarters of the EU's R&D investment.

Table 3.5

Incidence of top companies, sectors and countries on the total R&D investment for the EU-700 and non-EU 700 *Scoreboard* companies in 2004

% of Total R&D Contributed by	EU-700	Non-EU 700
Top 50 Companies	74 %	56 %
Top 3 Countries	73 %	93 %
Top 5 Sectors	70 %	76 %

Note: The top 5 sectors in each of the two groups (EU and non-EU) were considered according to the specific sector mix of the respective group.

3.3. Top 10 R&D Investors in the Three Main World Economies

Tables 3.6 to 3.8 show the top 10 companies in each of the three so-called Triad economies (EU, US and Japan), ranked by their R&D investment. Each company's sector of activity, the volume of their R&D investment in 2004 and their position in the ranking 10 years ago in the UK Department of Trade and Industry's (DTI) 1995 R&D scoreboard, are also shown.

The range of R&D investment from the first to tenth company in each list is similar (€ 5.7 to 2.5 bn for the EU, € 5.7 to 2.4 bn for the US and € 5.4 to 2 bn for Japan), but with the smaller Japanese economy having somewhat smaller companies in terms of R&D investment. The data show the top 10 EU and US companies to invest a comparable amount in R&D.

Of the top 10 EU companies, five are German, two British and one French, one Finnish and one Dutch. If we extend the list to 20 companies, firms based in Sweden and Italy (2 each) enter the list, while the number of French companies increases to 4 out of 20.

A top 10 for North American companies (including Canada, Bermuda and Mexico, apart from US) would have only US companies listed; a top 10 for Asia and Australia would have Samsung (South Korea) in 4th place, as a result of its spectacular increase in R&D since 2003, knocking Canon out of the top 10.

Table 3.6

The top 10 EU companies by their R&D investment in 2004

Top 10 EU Companies					
No	**Company name**	**Country**	**Sector of activity**	**R&D investment (€bn)**	**Rank in 1995 DTI *Scoreboard***
1	DaimlerChrysler	Germany	Automobiles & parts	5.66	2
2	Siemens	Germany	Electrical Equipment	5.06	1
3	Volkswagen	Germany	Automobiles & parts	4.16	7
4	GlaxoSmithKline	UK	Pharmaceuticals	4.01	11
5	Sanofi-Aventis	France	Pharmaceuticals	3.96	-
6	Nokia	Finland	Telecom. Equipment	3.83	37
7	Robert Bosch	Germany	Automobiles & parts	2.90	9
8	BMW	Germany	Automobiles & parts	2.82	-
9	AstraZeneca	UK	Pharmaceuticals	2.80	19
10	Philips Electronics	The Netherlands	Electronic Equipment	2.53	4
Total R&D investment of top 10				**€ 37.7 bn**	
Share of top 10 in total EU companies comparable at world level				**39.4 %**	

Note: "-" in the last column means that no data are available for 1995; the "Sector of activity" column shows the FTSE 3-digit classification where data were available.

Table 3.7

The top 10 US companies by their R&D investment in 2004

Top 10 US Companies				
No	**Company name**	**Sector of activity**	**R&D investment (€bn)**	**Rank in 1995 *Scoreboard***
1	Pfizer	Pharmaceuticals	5.65	14
2	Ford Motor	Automobiles & parts	5.44	2
3	General Motors	Automobiles & parts	4.78	1
4	Microsoft	Software	4.55	27
5	IBM	Computer Services	4.17	3
6	Johnson & Johnson	Pharmaceuticals	3.83	10
7	Intel	Semiconductors	3.52	15
8	Merck	Pharmaceuticals	2.95	12
9	Hewlett-Packard	Computer Hardware	2.58	5
10	Cisco Systems	Telecom. Equipment	2.35	-
Total R&D investment of top 10			**€ 39.8 bn**	
Share of top 10 in total US-398			**33.9 %**	

Note: "-" in the last column means that no data are available for 1995; the "Sector of activity" column shows the FTSE 3-digit classification where data were available.

Table 3.8

The top 10 Japanese companies by their R&D investment in 2004

Top 10 Japanese Companies				
No	**Company name**	**Sector of activity**	**R&D investment (€bn)**	**Rank in 1995** *Scoreboard*
1	Toyota Motor	Automobiles & parts	5.42	-
2	Matsushita Electric	Electronic Equipment	4.42	2
3	Sony	Electronic Equipment	3.60	7
4	Honda Motor	Automobiles & parts	3.36	8
5	Hitachi	Computer Hardware	2.79	1
6	Nissan Motor	Automobiles & parts	2.54	-
7	Toshiba	Computer Hardware	2.42	4
8	NTT	Telecom. services	2.28	5
9	NEC	Computer Hardware	1.98	6
10	Canon	Electronic Equipment	1.98	10
Total R&D investment of top 10			**€ 30.8 bn**	
Share of top 10 in total Japan-198			**45.1 %**	

Note: "-" in the last column means that no data are available for 1995; the "Sector of activity" column shows the FTSE 3-digit classification where data were available.

Chapter 4

R&D of World Scoreboard Companies by Sector

The analysis in this chapter focuses on the sectoral breakdown, particularly in the case of those sectors in which the greatest number of global top R&D investing companies listed in the *Scoreboard* is concentrated[21].

Of particular interest is to identify those sectors for which *Scoreboard* companies have the highest and the lowest R&D investment growth rates. Another important issue is whether R&D investment and net sales of companies worldwide show similar trends, and whether this varies between sectors. The analysis also examines whether some sector-level features are also valid at individual company level.

The main sectors analysed are ranked according to their contribution to the total R&D investment by all the top 942 *Scoreboard* companies – i.e. those reporting R&D investments of over € 35 million.

Key Findings:

- Industrial R&D investment worldwide continues to be highly concentrated in just three sectors: automobiles & parts, IT hardware, and pharmaceuticals & biotechnology. Together, these account for more than half of global R&D investments in 2004 by the top 942 *Scoreboard* companies.
- These three sectors account for comparable proportions of total *Scoreboard* R&D investment (automobiles & parts € 58.5 billion; IT hardware € 57.3 billion; pharmaceuticals & biotechnology € 56.0 billion)
- The highest average annual R&D investment growth rates over the last four years (between 6.9 and 18.8 %) were shown by a number of services sectors: software & computer services, leisure & hotels, media & entertainment, health, and support services. In addition, companies in the pharmaceuticals & biotechnology sector had very high annual growth rates over the same period – often exceeding 10 % a year.
- The data suggest that *Scoreboard* companies may treat fixed capital and R&D as complementary investments. However, the level of capital expenditure correlates more strongly with short term financial performance than R&D investment does. Therefore, R&D investment is apparently less directly influenced by short-term changes in a company's financial position than is capital expenditure.

4.1. R&D Investment by Sector

Scoreboard companies spent almost € 310 billion on R&D in 2004 worldwide. This represents more than half of the estimated world total corporate R&D

21 The reference sample for this chapter is the top 942 *Scoreboard* companies. In order to ensure the EU and non-EU companies analysed have levels of R&D investment in the same range, this sample comprises those companies on the combined EU and non-EU lists which reported R&D investment of € 35m or more in the 2004 financial year. The € 35m cut-off point ensures all 700 non-EU companies are included, hence yielding the largest uniform sample from the *Scoreboard* data.

investment. In simple terms, this means that 942 companies are responsible for just more than half of world's total industrial R&D[22].

Table 4.1 shows the proportions of *Scoreboard* companies' worldwide R&D investment in the 15 sectors[23] with the greater R&D spending, together with the following indicators: the number of companies in each sector, the sum of R&D investments in 2004 by companies in each sector, the proportion of the total by sector, and, the average R&D investment per company.

Table 4.1

The largest sectors by aggregate R&D investment from the world top *Scoreboard* companies, in 2004

Rank	Sectors	Total R&D investment (€ m)	Sector share (%)	R&D Investment /company (€ m)
1	Automobiles & Parts (65)	58516	19.0	900.3
2	IT Hardware (169)	57351	18.6	339.4
3	Pharmaceuticals & Biotechnology (121)	56028	18.2	463.0
4	Electronic & Electrical Equipment (78)	34652	11.2	444.3
5	Software & Computer Services (80)	19625	6.4	245.3
6	Chemicals (80)	15656	5.1	195.7
7	Aerospace & Defence (24)	11718	3.8	488.2
8	Engineering & Machinery (68)	9015	2.9	132.6
9	Health (36)	6343	2.1	176.2
10	Telecommunication Services (18)	6329	2.1	351.6
11	Diversified Industrials (18)	5891	1.9	327.3
12	Oil & Gas (23)	4279	1.4	186.0
13	Personal Care & Households (15)	3646	1.2	243.1
14	Media & Entertainment (13)	3624	1.2	278.7
15	Food Producers (15)	3162	1.0	210.8
	Total 15 Sectors (823)	295835	95.8	359.5
	Rest of 16 Sectors (119)	12813	4.2	107.7
	TOTAL 942 companies	308648	100,0	327.7

Note: The number of companies (from the top 942) operating in each sector is given in brackets, after the name of each sector. The 942 companies are spread across 31 sectors.

Industrial R&D investment worldwide continues to be highly concentrated in just three sectors: automobiles & parts, IT hardware, and pharmaceuticals & biotechnology. Together, these account for more than half of global R&D investments in 2004 by the top 942 *Scoreboard* companies.

The main points to note are:

- Three sectors alone account, with almost similar weights, for over half (55.8 %) of the global R&D investment in 2004 by *Scoreboard* companies: automobiles & parts, IT hardware[24] and pharmaceuticals & biotechnology.

22 The R&D financed by the corporate sector is estimated to have totalled € 600 bn in 2004 (source: own estimation based on Eurostat data and on unpublished information provided by the European Industrial Research Management Association (EIRMA)).

23 *Scoreboard* companies' sectors of economic activity according to the FTSE 2-digit classification.

24 The companies operating in this sector can be further subdivided into three large sub-sectors with somewhat different profiles using the next level of dis-aggregation in FTSE classification: computer hardware, telecommunication equipment and semiconductors.

- The ranking of sectors by R&D investment is the same as in the previous edition of the *Scoreboard*, with two exceptions. The automobiles & parts sector has taken over first place because of the strong increase in R&D spending by the largest automotive firms and the mixed performance of the companies in the IT hardware sector. In the case of IT hardware, while firms in semiconductors increased their R&D investment, many in telecommunications equipment continued to cut their research spending even though their financial results (net sales, operating profits, fixed investments) were recovering from the downturn between 2001 and 2003.

- The average sector R&D investment per company varies widely[25]. For example, the average R&D investment of a *Scoreboard* company in automobiles & parts (€ 0.9 billion) is almost seven times that of a company in the engineering & machinery sector (€ 133 million)[26].

Worldwide the automobiles & parts, IT hardware, and pharmaceuticals & biotechnology accounted for similar shares of total *Scoreboard* R&D investment, ranging from € 56 to 58 billion.

4.2. R&D Investment Growth by Sector in Recent Years

Table 4.2 lists the sectors ranked by average compound annual growth rate of the R&D investment over the last three years to 2004 (3-year CAGR)[27]. It also shows each sector's annual growth rate in R&D for 2004.

Services sectors are at both ends of the scale, with both the highest and the lowest (in fact negative) R&D investment growth rates (shown in Table 4.2). Those with high growth are the 'market-exposed'[28] services, such as software and computer services (including internet providers), support services[29], general retailers, media and entertainment, hotels and leisure, and health. Their cumulated proportion of total R&D investment grew from 8.3 % in 2000 to 10.3 % in 2004. This finding is in line with recent reports on world R&D[30] state that market services are rapidly emerging on the world scene in terms of R&D activity. On the other hand, most of the *Scoreboard* companies operating in utilities (such as electricity, utilities–others, and telecommunication services) reduced their R&D spending last year, as well as during 2001-2004. Consequently, their share of world R&D investment declined from 3.6 % in 2000 to 2.9 % in 2004.

There is little difference between the R&D-growth performance of companies by sector in 2004 and the compound change over the last four years, indicating that the evolution of R&D investment in 2004 is a continuation of trends are already visible since the turn of the millennium. There is one

The highest average annual R&D investment growth rates over the last four years were shown by a number of services sectors: software & computer services, leisure & hotels, media & entertainment, health, and support services. Companies in the pharmaceuticals and biotechnology sector had very high annual growth rates over the same period –often exceeding 10 % a year.

25 Note however, that this finding refers only to the top R&D-investing companies listed in the *Scoreboard*.
26 In terms of sales, the 68 companies in automobiles & parts are about four times as big like the 65 companies in engineering & machinery.
27 3-year CAGR is defined as the compound average annual growth rate computed over the period 2001-2004 for the group of companies operating in the given sector. They are reported for each *Scoreboard* company in Volume II, tables II.1.1 and II.1.5.
28 As opposed to services of public utilities.
29 This group includes a variety of services such as: business support, delivery, education, training & employment agencies, transaction & payroll, environmental control and security & alarm services.
30 OECD, US Science and Technology Indicators, EC, DG RTD, Key Figures 2005, EUR 21264, DG JRC-IPTS and RTD Annual Digest of Industrial Research (unpublished working document), 2005.

noticeable exception in the case of IT hardware, where the decline in R&D appears to have ceased in 2004, mainly due to the outstanding performance of semiconductor companies. On the other hand, oil & gas and electricity decreased R&D investment in 2004, in contrast to the previous three years.

Table 4.2

Nominal R&D growth rates for the world's top 942 *Scoreboard* companies, by sector

Name of Sector	Number of companies	R&D growth rate in 2004 (%)	R&D growth rate yearly average (%) 2001-2004
Leisure & Hotels (€ 382m)	4	21.3	18.8
General retailers (€ 602m)	4	26.5	18.5
Pharmaceuticals & Biotechnology	121	9.7	12.6
Health	36	5.4	8.9
Software & Computer services	80	1.3	8.0
Media & Entertainment	13	9.6	7.7
Support services (€ 1,419m)	12	17.7	6.9
Diversified industrials	18	13.6	6.1
Aerospace & Defence	24	9.4	6.1
Household goods & Textiles (€ 1,921m)	20	5.5	4.9
Automobiles & Parts	65	7.2	4.9
Electronics & Electrical Equipment	78	7.2	3.7
Food producers	15	6.3	3.1
Tobacco (€ 1,028m)	4	0.5	2.9
WORLD SCOREBOARD AVERAGE	942	5.1	2.9
Oil & Gas	23	-2.1	2.6
Personal care & Household	15	5.8	1.6
Engineering & Machinery	68	4.3	1.3
Steel & Other metals (€ 1,625m)	15	10.6	0.4
Chemicals	80	1.7	0.4
Construction & Building (€ 1,664m)	19	-2.9	-1.7
Forestry & Paper (€ 511m)	9	-1.9	-2.5
Telecommunication services	18	-6.2	-3.8
IT Hardware	169	0.6	-5.0
Electricity (€ 2086m)	13	6.9	-5.1
Utilities other (€ 606m)	7	-33.8	-34.5

Note: The overall R&D investment is given in brackets after the sector's name for those sectors which are not listed in Table 4.1 and which account for less than 1 % of the world total. Sectors in which less than 3 companies operate have been excluded from this ranking, as their financial results can be heavily influenced by the performance of a single company in a given year. Consequently, only 25 out of the 31 sectors are shown. Lines shaded in light blue are market services sectors and in deep blue are utilities sectors.

EU companies show high rates of growth over the past four years and also account for a high proportion[31] of worldwide R&D in some of these fast growing sectors, such as pharmaceuticals & biotechnology (where the annual

31 Compared to the overall proportion (31 %) of total R&D worldwide accounted for by EU scoreboard companies (see, in detail, Chapter 5, Table 5.3).

average growth rate is 11.9 % over 2001-2004, compared to 12.7 % for companies outside EU) and support services (5.1 % vs. 4.2 %). However, EU companies are further losing ground compared to the rest of the world in media & entertainment (- 8.3 % as opposed to 14.9 %), software & computer services (only 4.0 % compared to 8.0 %) and health services (only 5.8 % vs. 10.0 %). Detailed information on sector-average growth rates for the two groups of 700 companies is presented in Volume 2, Tables II.1.3 and II.1.7.

Table 4.3 disaggregates the indicators in Table 4.2 for the five sectors with the largest number of companies using the FTSE 3-digits classification:

Table 4.3

Growth rates of R&D investment by sub-sector for world top 942 *Scoreboard* companies (for five selected sectors)

Sector (FTSE-2 or FTSE-3)	Number of companies	Sub-sector share (%) in top 942 R&D	R&D growth rate in 2004 (%)	R&D growth rate yearly average (%) 2001-2004
Pharmaceuticals & Biotechnology			9.7	12.6
Biotechnology	*28*	*1.5*	*20.0*	*22.1*
Pharmaceuticals	*93*	*16.7*	*8.9*	*11.9*
IT Hardware			0.6	-5.0
Computer hardware	*50*	*6.4*	*1.0*	*-1.9*
Semiconductors	*76*	*6.0*	*9.5*	*4.0*
Telecommunication equipment	*43*	*6.1*	*-6.9*	*-12.8*
Electronics & Electrical Equipment			7.2	3.7
Electrical equipment	*22*	*2.8*	*-3.4*	*-6.4*
Electronic equipment	*56*	*8.4*	*7.6*	*4.2*
Engineering & Machinery			4.3	1.3
Commercial vehicles & trucks	*10*	*1.0*	*15.7*	*6.0*
Engineering - contractors	*3*	*0.1*	*-1.3*	*4.4*
Engineering - fabricators	*3*	*0.1*	*9.6*	*3.0*
Engineering - general	*52*	*1.7*	*-1.4*	*-1.3*
Software & Computer services			1.3	8.0
Computer services	*8*	*1.6*	*11.3*	*5.7*
Internet	*3*	*0.2*	*72.6*	*30.6*
Software	*69*	*4.5*	*-3.6*	*7.7*

In two of these sectors - pharmaceuticals & biotechnology and software & computer services, companies have shown strong growth in R&D investment in recent years[32]. Of note is the boom experienced by firms operating in the internet sector, with exploding growth rates, mainly due to the performances of the two big global players, Yahoo and Google. The compound annual growth rates of R&D investment for these two companies have been over 45 % since 2001. Biotechnology companies also increased their R&D investment in recent years, many of them at rates above 20 % per year.

32 The negative sign of the annual growth rate in 2004 in the case of software companies is a consequence of the Microsoft's upward revision of its R&D in 2003.

With the shift in R&D from materials-intensive sectors, such as construction & building, forestry & paper, engineering & machinery, and telecommunications equipment, to service and health-related sectors, past success stories like those of Microsoft, Nokia, Pfizer or Cisco Systems could be repeated by companies operating in emerging sectors, such as biotechnology, the internet, health, software and leisure-related services. New entrants of firms from these sectors into the world's top few hundred R&D investing firms may well be expected in the coming years, similar to the cases of Amgen (US) and Serono (CH) in biotechnology (a yearly growth rate of 26 % over the last four years) or Boston Scientific (US) in health, eBay (US) and Amazon (US) in general retail, all of which show compound annual growth rates in R&D spending of over 25 %.

In the other three sectors, company behaviour is mixed depending on the sub-sector, with electronic firms increasing their R&D spending, but electrical equipment firms reducing theirs. Similarly, firms in the commercial vehicles & trucks sector performed better than general engineering companies. The most striking picture comes from IT hardware, where the three sub-groups show different trends: computer hardware firms are keeping their R&D spending at almost constant levels, semiconductor companies increased their R&D investment while the telecoms equipment companies continued to reduce R&D as a result of their poor financial results. Out of the world top 20 R&D investors in telecoms equipment, only five do not show negative compound annual growth rate over the period 2001-2004.

4.3. R&D Investment/Sales Ratios by Sector in 2004

Table 4.4 shows the ranking by average R&D investment/Sales ratio of the main *Scoreboard* company sectors with the corresponding proportions of the sectors in total R&D investment.

The sectors with the highest ratio of R&D investment to net sales are pharmaceuticals & biotechnology, software & computer services and IT hardware, while sectors like telecommunications services or oil & gas appear to have relatively low R&D/sales ratios.

The sectors with the highest ratio of R&D investment to net sales are pharmaceuticals & biotechnology, software & computer services and IT hardware, while sectors like telecommunication services or oil & gas have relatively low average R&D/sales ratios. A closer examination of the various sub-sectors within a given sector (in italics in Table 4.4) shows large differences between the average R&D/sales ratios for each sub-sector in many cases. On average, companies in biotechnology invest more in R&D, in relative terms, than those in pharmaceuticals; firms in electronics more than those in electrical equipment; and semiconductor firms more than computer hardware manufacturers.

This suggests that it is worth exploring the variation of average R&D/sales ratios in more detail at the level of sub-sectors. The average R&D/sales ratio of the pharmaceuticals & biotechnology sector is mainly determined by the R&D/sales ratio of the pharmaceuticals sub-sector, because the latter constitutes more than 90 % of the total R&D investment of pharmaceuticals & biotechnology. Obviously, the bigger the share of sub-sectors with comparatively low R&D/sales ratios in total sector R&D investment, the lower the average R&D/sales ratio for the overall sector. Thus, by extension, the sectoral structure of an economy determines its overall R&D/sales ratio.

Tables II.1.3 and II.1.7 in Volume II allow for a comparison between the EU 700 companies and the non-EU 700 *Scoreboard* companies in terms of sector shares in total R&D investment and in terms of sector-average R&D/sales ratio. The non-EU 700 group of *Scoreboard* companies has much larger proportions of IT hardware (22.1 % compared to 10.6 %) and of software & computer

services (8.2 % vs. 3.0 %) than the EU-700 group of companies. These two sectors are globally characterised by high R&D/sales ratio, thus are to a large degree responsible for the R&D/sales ratio overall being higher for non-EU companies. However, the average sector R&D/sales ratios for companies in these two particular sectors are higher for the EU *Scoreboard* group of companies than for the group of non-EU *Scoreboard* companies (13.7 % in IT hardware and 11.3 % in software & computer services for EU companies compared to 7.9 % and 10.6 %, respectively). Actually, the average R&D/sales ratio of EU companies is higher for five out of the top six sectors listed in Table 4.1, the only exception being pharmaceuticals & biotechnology.

Table 4.4

Top R&D-Intensive Sectors for *Scoreboard* companies, in 2004

Sector	Sector R&D investment as a percentage of all sectors (%)	Average R&D/ Sales ratio (%)
Pharmaceuticals & Biotechnology	**18.2**	**15.3**
Biotechnology	*1.5*	*23.3*
Pharmaceuticals	*16.7*	*14.9*
Software & Computer services	**6.4**	**10.7**
Software	*4.5*	*15.3*
Internet	*0.2*	*10.7*
Computer services	*1.6*	*5.8*
IT Hardware	**18.6**	**8.6**
Semiconductors	*6.0*	*14.2*
Telecommunications equipment	*6.1*	*12.1*
Computer hardware	*6.4*	*5.2*
Health	**2.1**	**6.8**
Electronics & Electrical Equipment	**11.2**	**5.6**
Electronic equipment	*8.4*	*6.0*
Electrical equipment	*2.8*	*4.6*
Aerospace & defence	**3.8**	**4.9**
Automobiles & parts	**19.0**	**4.3**
Chemicals	**5.1**	**3.7**
Personal care & household	**1.2**	**2.9**
Media & entertainment	**1.2**	**2.7**
Engineering & Machinery	**2.9**	**2.5**
Commercial vehicles & trucks	*1.0*	*3.2*
Engineering - general	*1.7*	*2.3*
Engineering - contractors	*0.1*	*2.2*
Engineering fabricators	*0.1*	*1.9*
Diversified industrials	**1.9**	**2.4**
Food producers	**1.0**	**1.8**
Telecommunication services	**2.1**	**1.5**
Oil & gas	**1.4**	**0.3**
Rest of 16 Sectors	**4.2**	**1.4**
TOTAL top 942 *Scoreboard* Companies	**100.0**	**3.8**

Note: Only the average sector R&D/sales ratios for the top 15 sectors from Table 4.1 are shown here, together with the averages for sub-sectors.

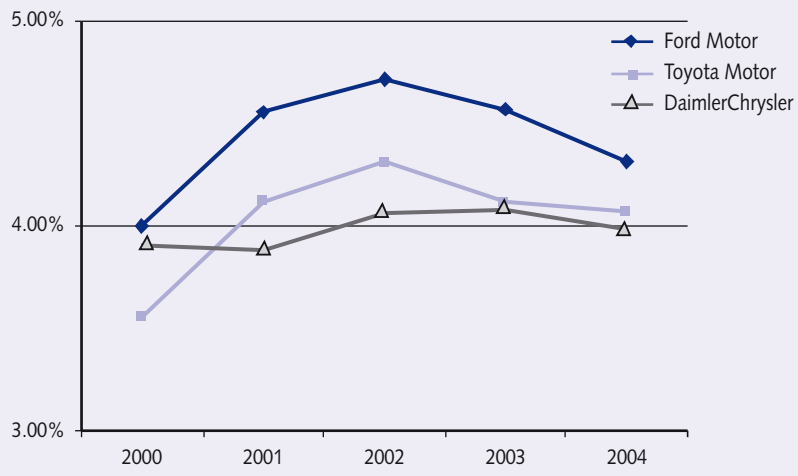
The sectors with the highest ratio of R&D investment to net sales are pharmaceuticals & biotechnology, software & computer services and IT hardware, while sectors like telecommunications services or oil & gas appear to have relatively low R&D/sales ratios.

The information on R&D/sales ratios may be used by individual companies to benchmark against other firms operating in the same or similar markets. For major firms operating in a given market in which R&D and innovation play an important role, knowing global net sales and R&D investment trends, at sector level as well as for individual competitors, may be valuable information.

In some cases, the variation of R&D/sales ratios over several years may be similar for the main firms operating in a given global product market, which leads to similar average performance for the entire sector. But it may also be that different R&D investment decisions or consequences of other factors influencing management decisions by companies result in very different patterns in the time variation of their R&D/sales ratios.

Figure 4.1

Trends in R&D/sales ratios for the world top three R&D-investing automobile manufacturers during 2000-2004



For example, Figure 4.1 shows the time variation of the R&D/sales ratio of the top three R&D-investing companies in the automobiles & parts sector[33] to be rather similar. However, this is not the case if we extend the comparison to more companies in this sector. Figure 4.1 also shows that the R&D/sales ratio for individual companies may vary widely over a relatively short period, e.g. 2000-2004. This is the case with Ford and Toyota, for which the ups and downs in R&D investment did not follow the upward trend in net sales, thus causing their R&D/sales ratio to vary by 20 % over a period of just two years.

Repeating this analysis for top companies in the other two big R&D sector groups – pharmaceuticals & biotechnology and IT hardware – does not show the same effect. However, if the IT hardware sector is disaggregated into sub-sectors (FTSE 3-digits classification), we find similar patterns for a number of companies in some years. In addition, if we examine all the financial data available for the *Scoreboard* companies (Volume II tables II.1.3 and II.1.7 by sector), the difference in R&D intensity patterns between sub-sectors seem to be caused by different factors in each case, such as: the end of the boom in the telecommunications equipment market; recent mergers & acquisitions in semiconductors; or the redistribution of market shares in computer hardware.

33 The top three companies in terms of 2004 world market share would be General Motors, Daimler-Chrysler and Toyota.

4.4. R&D Investment vs. Investment in Fixed Assets

Firms can innovate by investing either in R&D or fixed capital. Fixed capital can be regarded as buying in innovation from outside. However, whereas a company's own R&D is likely to yield benefits over the longer term, the impact of capital investments tend to be medium term. The accounting treatment also differs, as R&D is financed from gross profit[34] whereas capital expenditure (Capex) is financed from operating profit[35].

Comparing the capital expenditure and R&D investment behaviour of *Scoreboard* companies at the sector and company levels suggests the extent to which firms treat these two categories as complementary or substitutes for each other. To make such comparisons, the following (average) ratios were computed for each company and for each sector group of companies:

- R&D/sales;
- Capex/Sales[36];
- Capex/Operating profit[37];
- R&D/(R&D + Operating profit)[38];

Figure 4.2 plots CAPEX/Sales versus R&D/sales by sector for the 942 *Scoreboard* companies.

The distribution of sector groups in the diagram in Figure 4.2 show that for many of the sector groups (including automobiles & parts, chemicals, electronics & electrical equipment, engineering & machinery, aerospace, leisure & hotels) the two types of investment (R&D and fixed assets) are roughly balanced, as they cluster close to the 45° diagonal (where R&D/sales equals Capex/Sales).

The graph also shows that there are two other groups of sectors, in which companies have an obvious preference for one or other type of investment:

- R&D intensive sectors, such as pharmaceuticals & biotechnology, software & computer services, IT hardware. The positioning of the latter two sectors below the diagonal is a consequence of the very high R&D intensity (compared to the fixed capital investment rate) for companies in sub-sectors such as software, telecommunications equipment or semiconductors[39].

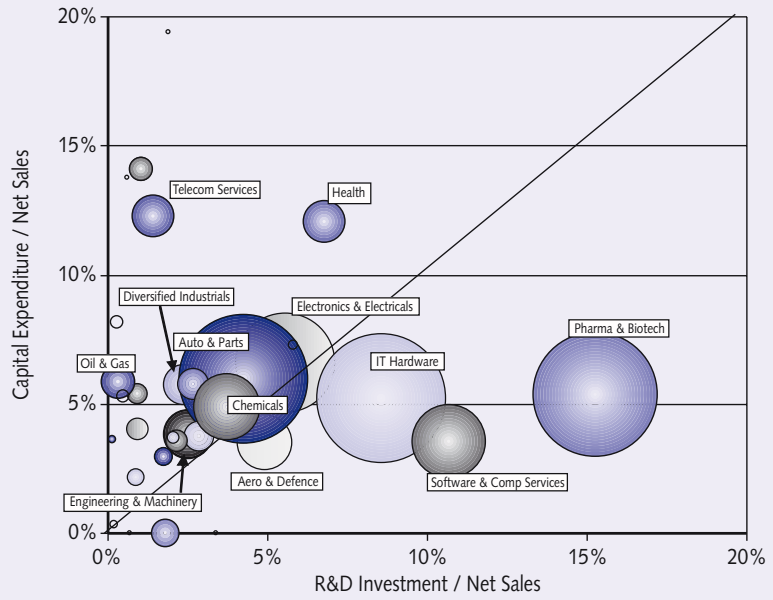
Firms can innovate by investing either in R&D or fixed capital. Fixed capital acquisition often involves buying in innovation from outside. However, whereas a company's own R&D is likely to yield benefits only over the longer term, the impact of capital investments tend to be medium term.

34 Gross profit = Sales - Cost of goods sold (including labour costs, but not research labour costs).
35 Operating profit = Gross Profit – marketing, engineering & administration costs – R&D costs.
36 Capital expenditure as a percentage of net sales, for a company or as an average for a group of companies.
37 Capital expenditure as a percentage of operating profit, that is how much of this profit is spent by the company on new capital.
38 R&D expenditure as a percentage of the sum of R&D and operating profit. The firms actually take decision about their R&D investment and spending from the gross profits, but this indicator is not available among the *Scoreboard* data set.
39 Sub-sector groups according to the FTSE 3-digit classification.

- Fixed capital investment intensive sectors, such as telecommunication services, oil & gas, diversified industrials, health, mining, forestry & paper, constructions & buildings, transport. The presence of a sector (e.g. health) in this group does not imply that companies in that particular sector are not R&D intensive, only that they spend, on average, much more on fixed capital than they invest in R&D.

Figure 4.2

Sector average R&D investment and capital expenditure as percentages of net sales for top world *Scoreboard* companies in 2004



Note: The size of each circle is proportional to the total 2004 R&D investment of each sector group of companies.

Figure 4.3 plots the changes in the sector averages of the R&D / (R&D + operating profit) ratio and the Capex/Operating profit ratio for *Scoreboard* companies over the period 2001-2004. The diamonds in the figure represent the changes in 2004 with respect to 2003, while the squares represent changes in 2002 with respect to 2001[40]. The changes between 2003 and 2002 are not shown because they show mixed behaviour for different sectors.

The scatter plot clearly shows a shift from a concentration in the top right-hand quadrant in 2002/2001 to the bottom left-hand quadrant in 2004/2003. This is a reflection of the upturn in business seen by most of the companies concerned in 2004. Companies' investments (whether in fixed capital or in R&D) tend to be more stable than profits, so as profits fall, the ratio of investments to profits rises. Conversely, in an upturn, as profits rise, the ratio of investments to profits falls. These fluctuations in the ratios are independent of the absolute values of investments, so they do not imply that as profits improve companies invest less.

40 Some points are missing as data in a few sectors were not available for some years (impeding the calculation of growth rates) and others were left out as statistical outliers.

Figure 4.3

Changes in sector averages of R&D/(R&D + profit) and in capital expenditure/ profit for top 942 *Scoreboard* companies, 2001-2004

Note: The diamonds in blue represent changes in 2004 with respect to 2003; the squares in gray represent changes in 2002 over 2001.

The data suggest that *Scoreboard* companies treat fixed capital and R&D as complementary types of investment. However, the level of capital expenditure correlates more strongly with short term financial performance than R&D investment does. It would emerge therefore, that R&D investment is less directly influenced by short-term changes in a company's financial position.

Perhaps the most interesting feature of the graph shown in Figure 4.3 is that the indicators seem to have moved along the 45° diagonal[41]. This would indicate that the *Scoreboard*'s R&D and investment ratios move up and down in unison, implying that *Scoreboard* companies in general tend to treat R&D and fixed assets (capital) as complementary types of investment. Nevertheless, we did find that groups of companies in some sectors increased their R&D/(R&D+Operating profit) ratio, while decreasing the Capex/operating profit ratio during the upturn in 2003-2004[42], suggesting a preference for R&D investment in these cases. Reasons for this could include the fact that the *Scoreboard* considers specifically R&D-intensive firms and that R&D investment is less volatile than investment in fixed assets because of internal constraints (such as the cost of research personnel and the need to face competition in the innovation field).

41 The R&D-to-(R&D+profit) ratio and the Capex-to-profit ratio are simultaneously increasing or, respectively, decreases for the sector group of companies and the one year period represented by a given point.

42 The points in the lower-right quadrant of the diagram represent 9 % of all points.

Chapter 5

Scoreboard Companies – EU vs. non-EU Main World Regions

This chapter aims to analyse and compare the average R&D performance of *Scoreboard* companies in the main world regions and sectors. Although the conditions in the major economies (US, EU, Japan and Rest of the World) may differ and each sector may be influenced by different factors, all *Scoreboard* companies are affected to some extent by the global business cycle and by relevant worldwide R&D and innovation developments.

Key findings

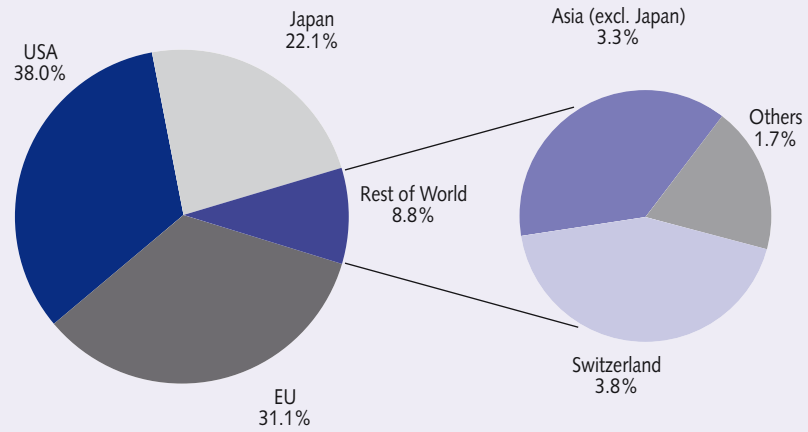
- All regions showed an increase in R&D investment in 2004 compared with 2003.
- As in last year's *Scoreboard*, EU companies performed worse than non-EU companies in terms of R&D investment growth, although this year sees a turn around for EU companies from a decrease of 2.0 % (top 500) to an increase of 0.7 % (top700). For US companies the growth rate increased from 4.7 % in last year's *Scoreboard* (top 288) to 6.7 % in this year's (top 398).
- Almost 45 % of the 700 EU firms increased their R&D investment by more than 5 % in 2004 compared to 58 % of the 700 non-EU firms, and compared to respectively 38 % and 47 % in last year's *Scoreboard* (top 500s). The percentages of firms which decreased R&D for EU and non-EU 700s were respectively 40 % and less than 28 %, compared to 46 % (EU) and 37 % (non-EU) last year's *Scoreboard*.
- R&D/sales ratios have decreased as sales have grown faster than R&D investment, in all regions, except Japan.
- The higher R&D/sales ratios of US companies compared to those for EU or Japanese companies are mainly explained by the higher proportion of US *Scoreboard* companies operating in sectors with intrinsically high R&D intensities, such as pharmaceuticals, biotechnology, software, internet, computer services, semiconductors, and health.
- The top 50 EU and top 50 US *Scoreboard* companies made practically the same total R&D investment in 2004, well above the corresponding amount spent by Japanese firms. However, the US firms in the bottom-ranked groups invest more in R&D and have much higher R&D/sales ratios than their EU and Japanese counterparts.

5.1. R&D Investment Performance of *Scoreboard* Companies by Main World Regions

Given the differences in business conditions in the major world economies, the companies in the *Scoreboard* are grouped into four main world regions according to the location of their registered offices. These regions, which are used for comparative purposes in several sections of this *Scoreboard*, are the European Union, the United States, Japan, and the Rest of the World (a category that includes companies from the non-EU part of Europe, along with those from South Korea, Canada, China, Brazil, Australia, Israel, South Africa, etc.). The breakdown of the R&D investment by the 942 *Scoreboard* companies in the same R&D-size range (700 non-EU and 242 EU companies), by main world region, is shown in Figure 5.1.

Figure 5.1

The breakdown by main world region of R&D investment by the top 942 companies in 2004 (% of total)



The comparison in Table 5.1 provides several R&D-related indicators for EU 242 companies and for the comparable groups of companies in the other world regions. It shows that in 2004 the companies registered in the Rest of the World (particularly in South Korea and in emerging economies, such as China and also Hong-Kong, Taiwan, Singapore and Malaysia) were ahead of all the other groups in terms of R&D growth. For some other R&D specific indicators, US companies are still in the lead, having average R&D/sales ratio of 4.5 % in 2004 and the highest average for the R&D spent per employee (around € 13,000 in 2004). Compared to the *Scoreboard* companies in Japan and in the Rest of the World, EU companies had a negative employment growth rate in 2004.

Table 5.1

Overall comparison of *Scoreboard* companies, by main world region, in 2004

Factor	EU	US	Japan	Rest of World
Number of companies	242	398	198	104
R&D Investment (€ bn)	95.9	117.4	68.3	27.2
R&D Investment / Net Sales ratio	3.3 %	4.5 %	4.0 %	3.4 %
R&D Investment / Company (€ m)	396	295	345	261
Change of R&D Investment over previous year	0.7 %	6.7 %	3.5 %	17.1 %
Change of Net Sales over previous year	7.2 %	14.8 %	3.4 %	16.6 %
Change of Number of Employees over previous year	-1.4 %	-0.0 %	2.3 %	3.3 %
R&D Investment / Employee (€)	9229	13194	11876	5683
R&D Investment CAGR for last 3 years	0.1 %	4.6 %	3.2 %	7.5 %
Net Sales CAGR for last 3 years	1.9 %	7.8 %	2.0 %	10.1 %

Average annual growth rates of R&D investment and of net sales were positive in all world regions considered by the *Scoreboard* in 2004. After four years of continuous appreciation of the euro against the US dollar, the compound annual growth rates of R&D and sales over the period 2001-2004 show EU firms lagging behind the groups of companies in all the other main regions.

In the Rest-of-the-World group, the performance of Swiss firms is markedly different from that of Asian firms. In 2004, Swiss companies had an average

R&D/sales ratio of 6.5 %, due to the fact that many of them are active in R&D-intensive sectors such as pharmaceuticals, biotechnology and IT hardware (semiconductors).

US companies continue to hold the leading position among the *Scoreboard* companies in 2004.

Other key findings to emerge from Table 5.1 are:

- On aggregate, US companies continue to hold the leading position in terms of R&D investment among the *Scoreboard* companies in 2004. They also have the highest R&D/sales ratio, the highest R&D investment growth rate and the highest net sales growth rate, compared to the companies from the EU and Japan. In 2004, EU companies registered a much lower average growth rate in R&D investment than non-EU *Scoreboard* firms mainly due to the devaluation of their overseas R&D investment figures, which further increased the gap with their US counterparts from 84.7 % of the US figure in 2003 to 81.7 % in 2004. Compared to the Japanese and US *Scoreboard* companies, EU companies still have the lowest R&D/sales ratio (3.2 %), the lowest average R&D investment per employee and a negative employment growth rate. However, the R&D investment per company is the highest as a group average for the EU242 companies.

- The fastest growing group among the main world regions includes *Scoreboard* companies from Asia (not including Japan) and Switzerland which saw both their R&D investment and net sales grow by 17 % in 2004.

The fastest growing group among the main world regions includes *Scoreboard* companies from Asia and Switzerland.

- In 2004, a substantial difference became apparent between the EU and non-EU companies in terms of the changes in their R&D investment during the period covered by the *Scoreboard* (Table 5.2).

Table 5.2

Distribution of *Scoreboard* companies by changes in their R&D investment in 2001-2004

	Changes in R&D investment by companies, 2004 over the previous year (% of all companies)		
	R&D increase ≥ 5 %	R&D increase 0-5 %	R&D decrease
EU 700	44.9	15.9	39.2
NON-EU 700	57.6	14.7	27.7

	Average annual changes in R&D investment by companies, during 2001-04 (% of all companies)		
	R&D increase ≥ 5 % p.a.	R&D increase 0-5 % p.a.	R&D decrease p.a.
EU 700	46.3	18.0	35.7
NON-EU 700	52.0	19.6	28.4

- More than 35 % of EU-based *Scoreboard* companies decreased their R&D investment during 2001-2004 as a consequence of the poorer business performance registered in 2003 and 2004 compared with non-EU companies and of the appreciation of the euro. Even though EU companies increased their R&D in 2002 more than companies in the Rest of the World category, due to the worsening performance in 2003 and 2004, the latest 3-year average growth rate of R&D expenditure was lower in the EU. Also, the number of companies with a strong increase in R&D (more than 5 % per year) was smaller, in percentage terms, for the 700 EU companies than for the non-EU ones, in 2004 and on average during 2001-2004.

5.2. Three-Year Trends in R&D and Related Indicators for the *Scoreboard* Companies by Main Region

According to data in Table 5.3, the proportion of total R&D investment of the top 942 *Scoreboard* companies accounted for by the EU 242 group has decreased continuously over the last four years, while the US and the Rest of the World categories increased their share, particularly in the last two years.

Table 5.3

The proportions of main world regions in total R&D investment of *Scoreboard* companies during 2001-2004 (%)

REGIONAL GROUPS (in 2004)	2001	2002	2003	2004
EU (242)	34.0 %	33.4 %	32.5 %	31.1 %
US (398)	36.6 %	36.4 %	37.2 %	38.0 %
Japan (198)	22.2 %	22.6 %	22.4 %	22.1 %
Rest of the World (104)	7.3 %	7.5 %	7.9 %	8.8 %
World R&D investment by top 942 (€ **bn** equivalent, at 2004 current prices)	**274.2**	**277.9**	**293.2**	**308.6**

Note: In the first column, the number of companies by region in 2004 is given in brackets after the name of the main world region. Less data are available for previous years than for 2004. The proportions have therefore been calculated for a comparable group of *Scoreboard* companies in each year.

In each of the last four years, US companies were the biggest R&D investors among the top 942 companies (accounting for 38 % of the total in 2004), followed by EU companies (less than one third of the total) and Japanese companies (around 22 %). EU companies account for a proportion of 31.1 % of world total R&D investment, much higher than the share of the EU economy (21 %) in the world's gross domestic product (GDP). In addition, the proportion accounted for by EU in total net sales of the *Scoreboard* companies is even higher, at 37 %. However, US companies show a higher share of R&D investment compared to the proportion of their net sales (32 %)[43].

In Tables 5.4 and 5.5, we compare the data on actual growth rates of R&D investment and net sales for the main world regions, during recent years. The economic cycle appears to be highly synchronised for most of the *Scoreboard* companies.

The R&D investment gap between EU companies and those from the other Triad regions continues to grow as EU companies have consistently shown the lowest R&D growth rates over the past three years.

Table 5.4

R&D investment growth rates (% over the previous year) for top 942 *Scoreboard* companies by main world region, for top EU/non-EU 700s

REGIONS	2002	2003	2004
EU-242	-1.6	1.4	0.7
US-398	0.6	6.4	6.8
Japan-198	3.5	2.1	3.5
RoW-104	-0.7	8.4	17.5
EU 700	-0.4	1.1	0.7
Non-EU 700	1.4	5.2	6.9

43 See figures for net sales per country and region in Volume II, Table II.1.6, in more detail.

Both R&D investment and net sales by *Scoreboard* companies, in each of the main world regions, were on an upward trend over the period 2002-2004. Consequently, the average compound annual growth rates of R&D investment over the four-year period of analysis are positive for all regions.

Table 5.5

Net Sales growth rates (% over the previous year) for top 942 *Scoreboard* companies by main world region, for top EU/non-EU 700s

REGIONS	2002	2003	2004
EU-242	-1.1	0.1	7.2
US-398	-1.1	10. 8	14.9
Japan-198	-0.1	2.8	3.4
RoW-104	3.8	11.9	16.2
EU 700	-0.9	0.2	7.2
Non-EU 700	0.0	7.9	10.9

Note: The calculations of annual growth rates and of other indicators involving past years' data (2001-2003) use the exchange rate reported on 31 December 2004 for all the currency conversions to align all the financial data to the single currency unit (euro) used in the *Scoreboard*.

EU companies saw their net sales and R&D investment grow in nominal terms from 2003 levels, but at a slow pace - except for the good sales performance registered in 2004. Part of their comparatively disappointing performance during 2002-2004 could be explained by the negative impact of the rising euro on overseas net sales and R&D investment.

Japanese companies are the only group not showing a clear recovery in net sales in 2004, as the growth rate is still the lowest among all the groups of *Scoreboard* companies.

The changes over a period of several years can also be estimated from the compound annual growth rates, given in Table 5.1. The four large regional groupings of companies show different patterns in the way the various indicators have evolved over the period. EU, US and Rest of the World groups have a 3-year CAGR for R&D investment below that of their net sales, so there has been a negative change in their average R&D/sales ratio from 2001 to 2004. The Japanese group, on the other hand, have a 3-year CAGR for R&D investment higher than for net sales so their R&D/sales ratio has increased on average over the last three years. These changes need to be monitored in the medium to long term and need to be related to what has happened in the main sectors in the three large economies. Given their different structures, a positive change in the R&D/sales ratio may result either from an increase in R&D investment or from a comparatively weaker performance in net sales.

The trend in the average R&D/sales ratio in each main world region can be seen in Figure 5.2 below. In the most recent years, as growth rates were higher in net sales than in R&D investment, the R&D/sales ratio has decreased slightly (on average) for *Scoreboard* companies. Considering the two groups of EU and non-EU *Scoreboard* companies, the trend for 2001-2004 is downward, with average R&D/sales ratios dropping from 3.2 % to 2.9 % in the EU and from 4.5 % to 4.2 % outside the EU.

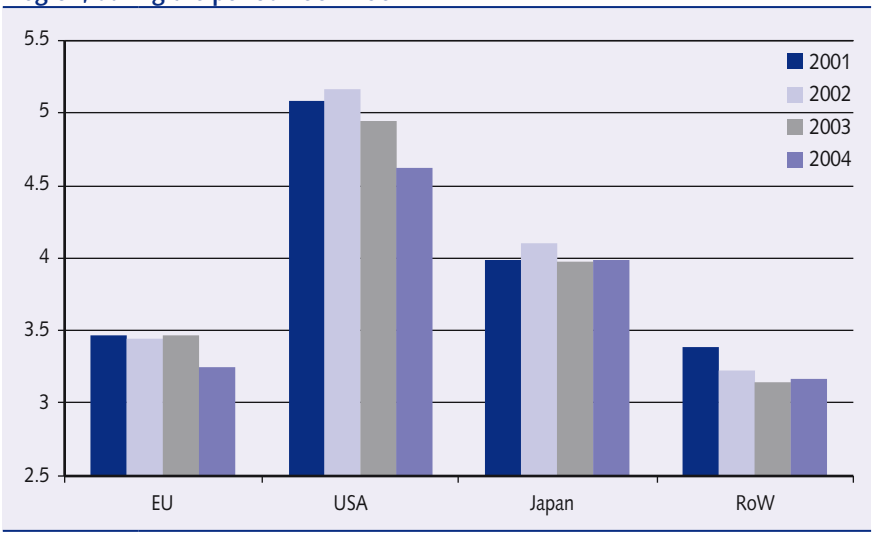
The EU *Scoreboard* companies saw a sudden drop in their R&D/sales ratio in 2004 and US companies have seen a decline since 2002. Japanese

companies show almost no change in their average R&D/sales ratios, while this ratio fell between 2001 and 2003 for *Scoreboard* companies in the Rest of the World category.

Since 2003, the R&D/sales ratio has, in average, decreased slightly for *Scoreboard* companies, as growth rates were higher in net sales than in R&D investment.

Figure 5.2

The R&D/sales ratio for the top 942 *Scoreboard* companies, by main world region, during the period 2001-2004



As mentioned, in 2004 the aggregate R&D/sales ratio of the US group was much higher than that of the EU companies, while Japanese companies had an aggregate R&D/sales ratio somewhere in between. The explanation lies mainly in the structure of the economies of EU, Japan and EU, with the US economy having a higher share of R&D-intensive sectors than the EU. The next section analyses this point in more detail.

5.3. Sector Group Analysis for the *Scoreboard* Companies by Main World Region

In this Section we examine the effect of the sector structure (sector mix) on the main R&D-related indicators in more detail. This is particularly important in order to understand the factors behind the overall differences in the performance of the groups of companies in each region (e.g. differences in R&D/sales ratio or investment/profit ratio). The question here is why there has been a decline in the average R&D/sales ratio among EU *Scoreboard* companies and, more recently, among US companies. Why does the EU average R&D/sales ratio lag behind the US? In the previous chapter, which looked at analyses by sector, we saw that this gap is not a consequence of EU companies having lower performance than their competitors within sectors and is generally not produced by differences in average R&D/sales ratios between similar sectors or between companies. The analysis based on *Scoreboard* company data shows that the reason lies in a composition effect, with the EU economy being more specialised in sectors with lower R&D intensity compared to elsewhere.

As mentioned in the previous chapter, the five largest sectors with top 942 *Scoreboard* companies are automobiles & parts, IT hardware, pharmaceuticals & biotechnology, electronics & electrical equipment and software & computer services.

The top 10 companies in each of the world's three main economies (presented in Tables 3.6-3.8) are (with one exception) from the five main sectors, as shown in Table 5.6.

Table 5.6

The sector mix of Top 10 companies by main world region

	EU	US	Japan**
Automobiles & Parts	4	2	3
IT Hardware*	1	3	3
Pharmaceuticals (& Biotechnology)	3	3	0
Electronics & Electrical Equipment	2	0	3
Software & Computer Services	0	2	0

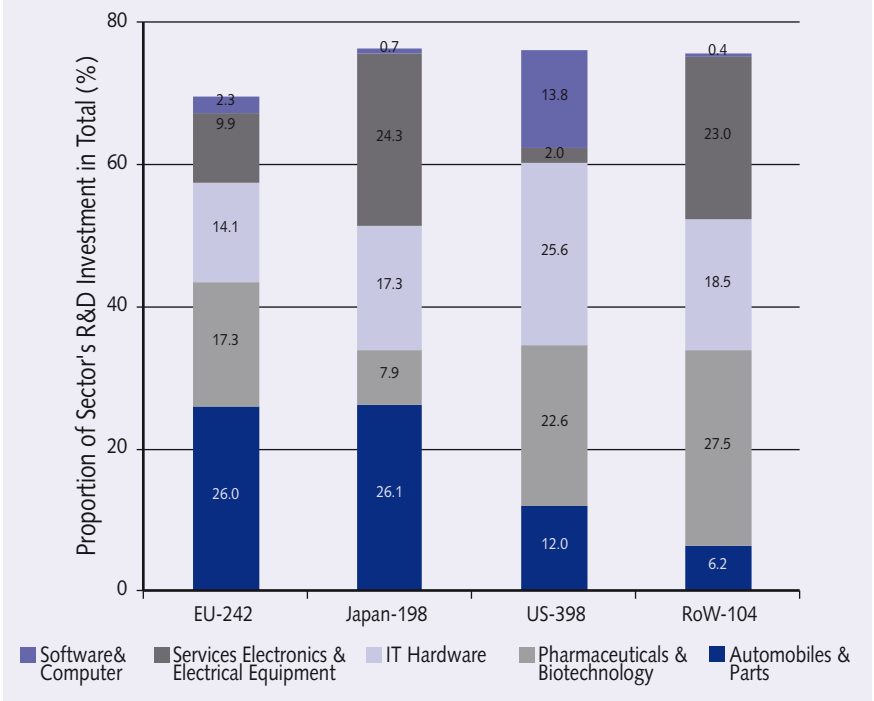
* Includes Computer Hardware, Semiconductors, Telecom equipment.
** Among top 10 Japanese companies there is one active in Telecommunication services (thus the aggregate of only 9 companies out of 10 listed for Japan).

There are EU firms in four of the five sectors, but not in software & computer services. There are US firms also in four of the five sectors, but not in electronics and electrical equipment (the US dominates software and computer services with giants like IBM and Microsoft). There are no Japanese firms in software and computer services, or in pharmaceuticals & biotechnology.

Figure 5.3 applies the same analysis to the aggregate level of all *Scoreboard* companies and shows significant differences in the proportions of the five largest sectors in total R&D investment by the main world regions. Between two thirds and three quarters of total R&D investment is accounted for by these five sectors regardless of the region.

Figure 5.3

Shares of top 5 sectors in total R&D investment by top 942 *Scoreboard* companies by main world region in 2004



The EU 242 companies have a slightly higher proportion of R&D investment falling outside the five largest sectors – 30 % compared to 24 % for the US companies. Figure 5.3 also suggests the way in which different economies (or, in any case, the large R&D-investing *Scoreboard* companies) have developed different specialisations in their R&D investment.

- EU, US and Swiss companies are specialised in pharmaceuticals & biotechnology;
- EU and Japanese companies appear to be more specialised in automobiles & parts than US firms;
- Companies registered in the US and in the Rest of the World (particularly Taiwan and South Korea) are specialised in IT hardware;
- Asian companies (Japan, South Korea, Taiwan) are specialised in electronics & electrical equipment;
- The US companies are responsible for more than 85 % of world R&D spending by software & computer services companies among the top 942.

As already highlighted in last years's *Scoreboard*, it is these differences in the sector mix, particularly in sectors with high R&D/sales ratios such as IT hardware or software services, which account for much of the difference in the overall R&D/sales ratio between the EU and the US *Scoreboard* companies of similar R&D size. Therefore, the main conclusion is that the average overall R&D/sales ratio of EU companies is below that of the US companies mainly as a result of the effect of the different mix of industrial sectors.

The average overall R&D/sales ratio of EU companies is below that of the US companies mainly because the former have a relatively smaller share in the highly R&D-intensive sectors. The underlying cause is the structure of the economy, rather than the performance of individual companies.

This analysis is taken further by combining all sectors into five broad groups, each group containing a set of sectors with similar R&D/sales ratios and similar research and innovation characteristics. These are:

- Group 1 - Pharmaceuticals & biotechnology and health, which are closely related and also two out of five most R&D intensive sectors (see Table 3.4).
- Group 2 - High-tech engineering and IT (electronics & electrical equipment, IT hardware, software & computer services), which are the other three top R&D-intensive sectors, with R&D/sales ratios over 5 %.
- Group 3 - Engineering & chemicals (automobiles & parts, aerospace & defence, engineering & machinery, chemicals and other sectors, such as personal care & households, leisure & hotels or media & entertainment) in which companies have an average R&D/sales ratio of between 2.5-5 %.
- Group 4 - Lower R&D intensity sectors with an R&D/sales ratio of 1-2.5 % (examples being food producers, diversified industrials, support services, general retailers, household goods and telecommunication services).
- Group 5 - Very low R&D intensity sectors with an R&D/sales ratios generally below 1 % (examples are electricity, oil & gas, steel & other metals, constructions & building materials, food retailers).

The sectors have been assigned to these groups by intervals of R&D/sales ratio on the basis of the average sector R&D/sales ratios[44] computed for the top 942 *Scoreboard* companies. These five groups have then been used to analyse the companies by main world regions. The aim of the analysis is to identify the proportions of R&D investment in each of the five groups and the R&D/sales ratio of each individual group and hence to explain the reasons for the difference in average R&D/sales ratio between groups of companies from various main world regions.

Based on 2004 data, the proportions of R&D investment of the regional groups of companies in each of the five R&D intensity groups are shown in Table 5.7 together with the average R&D/sales ratio for each group.

Table 5.7

Proportions of total R&D investment and R&D/sales ratios† in the five sector groups of *Scoreboard* companies by main world region, in 2004

	Proportions of total R&D investment in each group (%)				
Main World Region	Group 1 Pharmaceuticals & Biotechnology and Health	Group 2 High Tech Engineering and IT	Group 3 Engineering & Chemicals	Group 4 Lower R&D/ sales ratio	Group 5 Very Low R&D/sales ratio
EU-242 (I_T = 3.3 %)	19 (12.8 %) †	23 (8.8 %)	46 (4.4 %)	7 (1.4 %)	5 (0.4 %)
Japan-198 (I_T = 4.0 %)	8 (13.6 %)	42 (5.7 %)	39 (4.1 %)	5 (2.3 %)	5 (0.9 %)
US-398 (I_T = 4.5 %)	27 (13.8 %)	42 (9.6 %)	23 (3.1 %)	6 (2.3 %)	2 (0.4 %)
RoW-104 (I_T = 3.4 %)	28 (15.0 %)	42 (5.6 %)	13 (3.4 %)	10 (1.8 %)	7 (0.7 %)

† The R&D/sales ratios for each group are shown in brackets

The main conclusions are:

- The US companies and the companies from the Rest of the World have over two-thirds (69-70 %) of their R&D investment allocated to the highly R&D-intensive groups 1 and 2. The large share allocated to the Rest of the World group is due to the presence of two important Swiss pharmaceutical companies (Roche and Novartis) and of several large South Korean, Swiss and Taiwanese companies operating in IT hardware and electronics & electrical equipment sector.

- There is a very small proportion of US companies in low R&D/sales ratio Groups 4 and 5, and 23 % in the medium R&D/sales ratio Group 3 – substantially less than the equivalent proportion of EU and Japanese companies. For this third group, the US companies prove to have the smallest R&D/sales ratio in comparison to their market competitors from other regions. It is therefore the high proportions in Groups 1 and 2 that give the top US *Scoreboard* companies the high average R&D/sales ratio of 4.5 %, aided by the very low proportions in Groups 4 and 5 (8 % taken together).

44 Although the aerospace & defence sector has increased its average R&D/sales ratio in 2004, bringing it close to the threshold of 5 %, and despite its highly innovative potential, we maintained this sector in the 3rd group in order to be consistent with last year's analyses and offer the possibility of past references. The inclusion of this sector in the 2nd group would considerably alter the analysis and diminish the apparent gap between EU and US companies.

- Japanese companies concentrate 81 % of their overall R&D investment in Groups 2 and 3 and slightly more than 10 % in Groups 4 and 5. They have a significantly higher R&D/sales ratio than the US companies in Group 3 but this is more than offset by their having a much lower ratio than the US companies in Group 2. The reason for Japan's low Group 2 average R&D/sales ratio is its large proportion of electronics & electrical equipment R&D investment in sector-Group 2 compared to the US companies' large presence in IT hardware and software & computer services, which both have higher R&D/sales ratios. In fact, the main weakness of the Japanese companies listed in the *Scoreboard* resides in the low proportion of companies operating in the most R&D-intensive sectors: pharmaceuticals & biotechnology and software & computer & services. The overall effect is to lower the Japanese average overall R&D/sales ratio to the level of EU companies, despite the higher combined share of the first two groups.

- The EU *Scoreboard* companies have the lowest proportion of R&D investment in Groups 1 and 2 (42 %) but the highest proportion in Group 3. The EU also has a slightly higher proportion of R&D investment in Groups 4 and 5 compared to Japan and the US. Hence, one reason for the EU companies' low overall R&D/sales ratio is its small proportion of R&D investment and lower R&D/sales ratios than US companies in Groups 1 and 2 (particularly Group 2) which is not compensated for by its higher proportion (and higher R&D/sales ratio) in Group 3.

- Taken together, the *Scoreboard* companies in the Rest of the World category show a sector pattern similar to the US companies from the point of view of R&D investment. However, their overall average R&D/sales ratio (as a group over all sectors) is lowered by the very high proportions of Groups 4 and 5 (a total of 17 %), characterised by very low R&D intensities. The reason is the presence of some large companies from China, India, Brazil and Australia operating in utilities (transport, mining, oil & gas, electricity) and accounting for significantly higher shares in region's aggregate net sales than in the total R&D investment.

5.4. Concentration and Dynamics of *Scoreboard* Companies by Main World Region

This section looks at the distribution of R&D investment and R&D performance by groups of 50 companies taken in the order they come in the overall R&D rankings, for each of the three main world regions (EU, US and Japan). Table 5.8 shows key R&D indicators for the different groups.

The top 50 EU and top 50 US *Scoreboard* companies invested practically the same total amount in R&D in 2004, and 50 % more than the amount invested by the top 50 Japanese firms. However, the US firms in the bottom-ranking groups invest much more in R&D than their EU and Japanese counterparts - for example, the total R&D investment by US companies ranked between 351 and 398 is equal to the total R&D investment of EU firms ranked between positions 201 and 250.

Table 5.8

Distribution of total R&D investment and R&D indicators by groups of 50 companies in the three main world regions

	Total group R&D investment in 2004 (€ m)	Group share in top 398 R&D (%)	Group share in top 198 R&D (%)	R&D AGR in 2004 (%)	R&D CAGR over 2001-2004 (%)
EU					
Top50	75719	*76.1*	*80.4*	1.0	0.9
50-100	10623	*10.7*	*11.3*	0.0	-2.9
101-150	4824	*4.8*	*5.1*	-1.9	-2.2
151-200	2988	*3.0*	*3.2*	-3.9	-6.6
201-250	1931	*1.9*		5.0	4.9
251-300	1419	*1.4*		-3.6	3.1
301-350	1084	*1.1*		2.8	-0.4
351-400	882	*0.9*		8.7	2.1
US					
Top50	78997	*67.3*	*74.1*	6.0	4.7
50-100	14048	*12.0*	*13.2*	8.3	5.8
101-150	8282	*7.1*	*7.8*	10.0	4.1
151-200	5239	*4.5*	*4.9*	8.2	6.1
201-250	3726	*3.2*		7.5	-1.3
251-300	2863	*2.4*		12.3	7.5
301-350	2334	*2.0*		5.0	3.7
351-398	1875	*1.6*		2.4	-1.2
Japan					
Top50	53492		*78.4*	3.6	3.2
50-100	8395		*12.3*	2.0	2.3
101-150	4072		*6.0*	2.8	1.1
151-198	2304		*3.4*	7.6	3.2

Note: There are 398 US and 198 Japanese companies in the *Scoreboard*, which is the reason for computing shares of groups in total R&D of top 398 or top 198 companies for all world regions when comparing between them. AGR – annual growth rate; CAGR – compound AGR.

Comparing next the percentage distribution by groups of 50 for the top 198s for EU, US and Japan (Table 5.8, column 4), it is largely the same for the three, with a slightly higher EU concentration in the top 50 group than Japan, which in turn is slightly higher than the US.

However, when moving to column 3 to compare the EU and US distribution for the top 398s, we can see that the difference in the top 50 proportions increases, with systematically higher proportions of R&D accounted for by all the lower ranking groups of 50 US firms compared to equivalent EU groups.

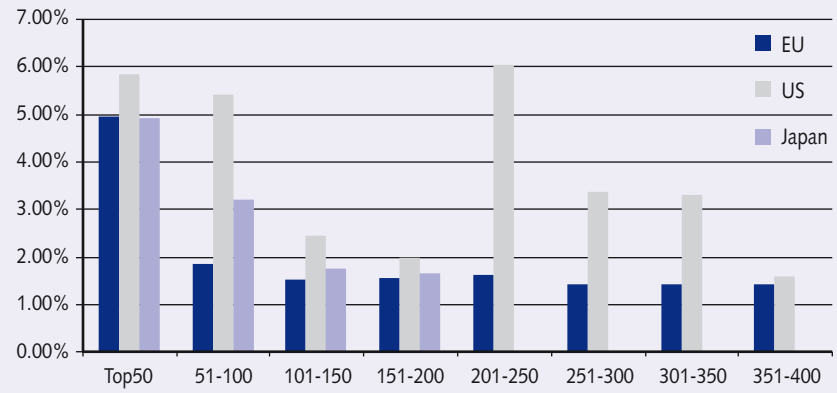
The average annual R&D investment growth rates (2001-2004) for EU companies lie in the range from -3 % to 3 % for all groups of 50 companies except two. The 151 - 200 group shows negative growth rates for 2004 and on average in the last three years (more than 6 % decrease per year), which may indicate the presence of several companies that will slide down the future

Scoreboard rankings. In contrast, there is high growth among companies in the 201 - 250 group. In the case of US companies, R&D growth is apparent among companies right across all groups.

The pattern for Japanese companies is mixed, with higher growth rates for the top 50 and in last (151 – 198) group. If these trends continue, there will be changes in the years ahead, with companies that have just entered the *Scoreboard* climbing further and middle-ranked companies sliding towards the bottom of the list.

Figure 5.4

Average R&D/sales ratio per groups of 50 *Scoreboard* companies in the main world regions, in 2004



The top 50 EU and top 50 US *Scoreboard* companies made practically the same total R&D investment in 2004. However, the US firms in the bottom-ranked groups appear more much more active in R&D than their EU and Japanese equivalents as shown by their higher average levels of R&D investment and R&D/sales ratios.

Figure 5.4 shows the average R&D/sales ratios for the same groups of companies in Table 5.8 above. There is a striking difference again to be observed in the case of the US groups. Firstly, the average R&D/sales ratios for all US groups are considerably bigger than those for EU or Japanese groups. Secondly, there is a notable break in the general pattern of decreasing R&D/sales with the R&D-size of the company[45] for US groups in the form of a sudden increase in the average R&D/sales ratio for US Groups 201-250, 251-300 and 301-350. The value of 6 % for the 201-250 Group is, in fact, the highest for the whole distribution. This indicates the presence of many companies from R&D-intensive sectors and explains the (structurally-driven) difference in R&D/sales ratio between the EU and the US *Scoreboard* companies.

45 The evidence for the existence of this pattern was offered in the 2004 *EU Industrial R&D Investment Scoreboard*, see http://eu-iriscoreboard.jrc.es

EU Countries

Chapter 6

This chapter compares the R&D investment of the EU *Scoreboard* companies by EU Member State. It discusses the relative weight of groups of companies from different Member States in the overall R&D investment of the EU *Scoreboard* companies. It also analyses the top R&D investors in each Member State.

Key findings

- *Scoreboard* companies from just three countries (Germany, France and UK) together represent around three quarters of both total R&D investment and sales and almost one third of the total number of EU companies in the *Scoreboard*.
- French, Danish and Italian companies increased their shares of total R&D investment, while Swedish companies decreased theirs, both last year and on average over the period from 2001 to 2004.
- There have been no significant changes in the average R&D/sales ratios for *Scoreboard* companies by major EU countries over the period from 2001 to 2004.
- Almost all countries show at least one pronounced area of specialisation in terms of industrial R&D investment when compared to the average for EU *Scoreboard* companies.
- Seven companies from four new Member States - Czech Republic (1), Slovenia (2), Poland (2) and Hungary (2) – are included in the 2005 *Scoreboard*. The average R&D/sales ratio is much lower for the new Member States' companies, at 1.3 %. However, the R&D investment growth rate was higher in the last three years for the *Scoreboard* companies in new Member States than in the EU-15.

6.1 Shares of Industrial R&D Investment

The average company R&D investment differs considerably from country to country[46] due to the different national specialisations and different sizes of companies. The average for UK companies (€ 81 million per company) is one of the lowest while for German companies it is the highest (€ 280 million per company), followed by French companies (€ 239 million per company). German *Scoreboard* companies invest much more than UK and French *Scoreboard* companies, however UK-based companies account for a higher proportion of sales in the total *Scoreboard* figure than French companies and almost as big a proportion of sales as the German ones. This implies a lower average R&D/sales ratio for the group of UK *Scoreboard* companies.

The EU 700 *Scoreboard* companies come from 19 different Member States[47].

***Scoreboard* companies from just three countries (Germany, France and UK) together represent around three quarters of both total R&D and sales and almost one third of the total number of EU companies in the *Scoreboard*.**

46 The overall average for the EU 700 is € 146 million per company.

47 This means that companies with registered offices in the remainder of the EU Member States either do not disclose the information on their R&D investments, had R&D investments of less than € 4.3 million in 2004, or that they are the affiliates or subsidiaries of ultimate parent companies located elsewhere.

Table 6.1 lists the proportion of the total EU 700 *Scoreboard* R&D investment accounted for by each group of Member State firms. It also gives their proportions of the total aggregate net sales and of the total number of companies.

Table 6.1

Proportions of R&D and sales in total by EU Member State and number of companies, in 2004

EU Member State	Proportion of R&D in total (%)	Proportion of Sales in total (%)	Number of companies in *Scoreboard* 2005
Germany	37.03	29.31	135
France	18.94	21.04	81
UK	16.72	24.87	211
Subtotal DE+FR+UK	*72.69*	*75.22*	*427*
The Netherlands	7.00	3.69	33
Sweden	5.97	3.98	60
Finland	4.75	3.33	43
Italy	4.30	5.82	25
Denmark	1.77	1.30	31
Belgium	1.42	1.44	26
Spain	0.93	2.57	13
Austria	0.37	0.97	21
Luxembourg	0.35	0.97	4
Ireland	0.28	0.22	7
Hungary	0.06	0.03	2
Slovenia	0.04	0.04	2
Greece	0.03	0.03	2
Poland	0.02	0.13	2
Czech Republic	0.01	0.09	1
Portugal	0.01	0.17	1
TOTAL EU	100	100	700

The following observations can be made:

- German, French and UK companies dominate the *Scoreboard*. German companies' proportion of total EU R&D investment is higher than that of the French and UK companies put together. The 427 *Scoreboard* companies (61 %) from these three countries account for 73 % of the total R&D investment and 75 % of the 700 EU companies' total net sales.

- Dutch, Swedish, Finnish and Italian companies account for a significant proportion of the total EU *Scoreboard* R&D investment, with percentages ranging between 7.0 % and 4.3 %.

- The UK has the largest number of companies in the top 700. Germany and France have fewer companies than the UK, but German and French companies account for a larger proportion of the total R&D investment (more than twice that of the UK in the case of Germany). This situation is more or less the same as it was in last year's *Scoreboard*.

- Increasing the number of companies listed in the *Scoreboard* from 500 to 700 EU-based companies has brought into the ranking companies from three more EU Member States (Poland, the Czech Republic and Portugal).

Increasing the number of companies listed in the *Scoreboard* from 500 to 700 has brought into the ranking companies from three more EU Member States (Poland, the Czech Republic and Portugal). Seven companies from new Member States are included in the 2005 *Scoreboard*.

- Seven companies from four new Member States (NMS) – Czech Republic (1), Slovenia (2), Poland (2) and Hungary (2) – are included in the 2005 *Scoreboard*. These firms account for proportions of only 0.14 % of total R&D investment and 0.29 % of total net sales of the EU *Scoreboard* companies. This means that, at 1.3 %, the average R&D/sales ratio is much lower for the NMS companies than for the companies in EU-15. However, their proportion in total operating profits of EU *Scoreboard* companies was 0.62 % in 2004, which means their average profitability was well above that of the 700 group as a whole. Furthermore, the growth rate of R&D investment was higher in the last three years for the EU *Scoreboard* companies in the new Member States than in the EU-15.

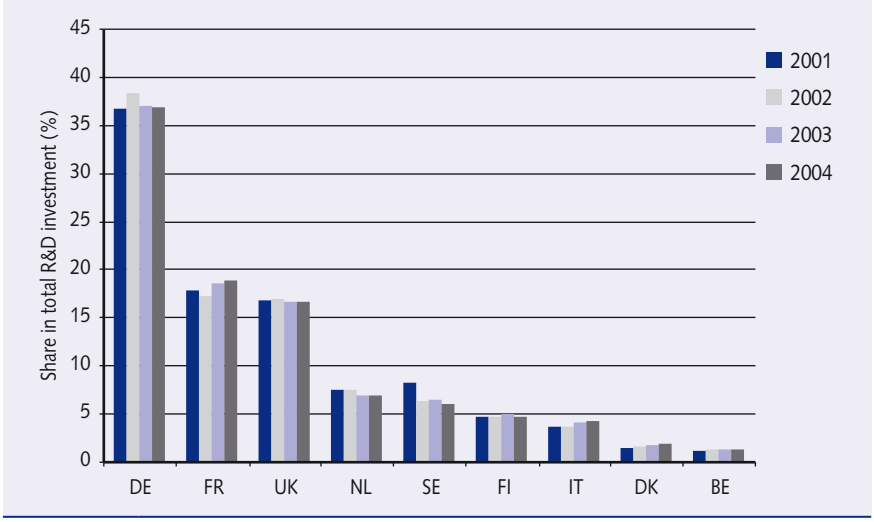
6.2 Growth of Industrial R&D Investment

The year-on-year variation (2001-2004) of the proportions accounted for by some Member State groups of companies in the overall R&D investment of the EU *Scoreboard* companies is shown in Figure 6.1.

French, Danish and Italian companies increased their shares of total R&D investment, while Swedish companies decreased theirs, both last year and on average over 2001 to 2004.

Figure 6.1

Shares of groups of companies in total R&D investment of the EU *Scoreboard* companies by country, 2001-2004 (%)



It can be seen that French, Danish and Italian companies increased their shares in total EU R&D investment, while Swedish companies decreased their.

There are no significant differences between the proportions deriving from the data for the 500 companies in last year's *Scoreboard* and the 700 EU firms in this year's edition.

There have been no significant changes in the average R&D/sales ratios for *Scoreboard* companies by major EU countries during over the period from 2001 to 2004.

It is expected that with the increase in the total number of companies selected for the analysis in the R&D *Scoreboard*, the share of smaller country groups taken together would increase slightly, as more and more countries are represented in the sample.

However, in some cases, there is an important difference between the shares if the calculation is based on data for the two years taken from two *different* samples, i.e. 500 companies in the 2004 *Scoreboard* and 700 companies in the 2005 *Scoreboard*. For example, the increase in share of French-based companies in total R&D investment of the EU *Scoreboard* companies from

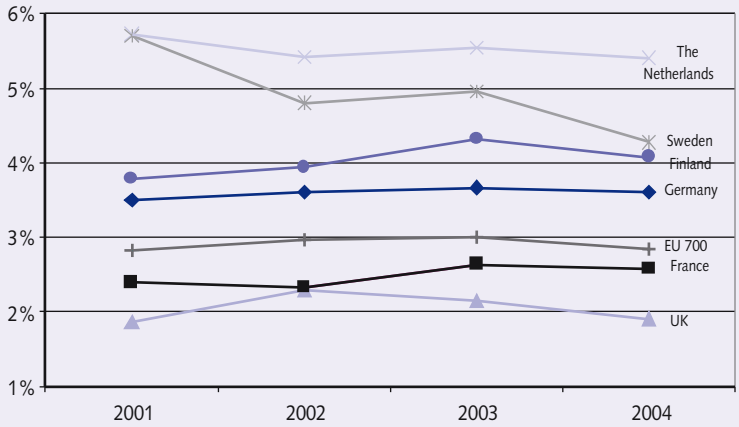
2001 to 2002 was more than 3 %, and 1 % from 2002 to 2003. In fact, in the additional 200 companies added to this year's *Scoreboard* (i.e. in the ranking band 500-700), France has 11 companies compared to 28 in the 100-300 band. This distribution of companies in the *Scoreboard* reflects the high presence of French companies among the very large R&D-investing firms, but also indicates a shortage of middle-sized companies in the sample (due to either a real absence of such firms and/or to lower disclosure rates of R&D investment by middle-sized French firms). The French case is particularly striking if it is compared to Belgium (11 companies in the ranking band 500-700 and 5 in the ranking band 100-300), Sweden (17 companies in the ranking band 500-700 and 18 in the ranking band 100-300), or the UK (75 in the ranking band 500-700 and 49 companies in the ranking band 100-300).

6.3. Change in R&D/Sales Ratios

Figure 6.2 shows how the average R&D/sales ratio of the EU *Scoreboard* companies grouped by six Member States progressed from 2001 to 2004. The figure also shows the average R&D/sales ratio for all the EU companies as a whole.

Figure 6.2

Trends in R&D/sales ratio for EU *Scoreboard* companies over the period 2001-2004, by Member State



Companies from France and the UK – major players in world markets - show overall R&D/sales ratios below the EU average, with UK companies showing a marked downward trend since 2002[48].

Companies from only two countries out of this group of six have average R&D to net sales ratios comparable to or above those characterising US *Scoreboard* companies (4.5 %): Sweden (4.3 %) and the Netherlands (above

48 As with all the conclusions of this analysis, this finding is valid only for the available sample of companies included in the *2005 EU Industrial R&D Investment Scoreboard*, although it may also characterise larger groups of EU companies.

5.4 %).[49] Swedish companies show a marked downward trend in R&D/sales ratio, mainly due to the drop in R&D investment by Eriksson.

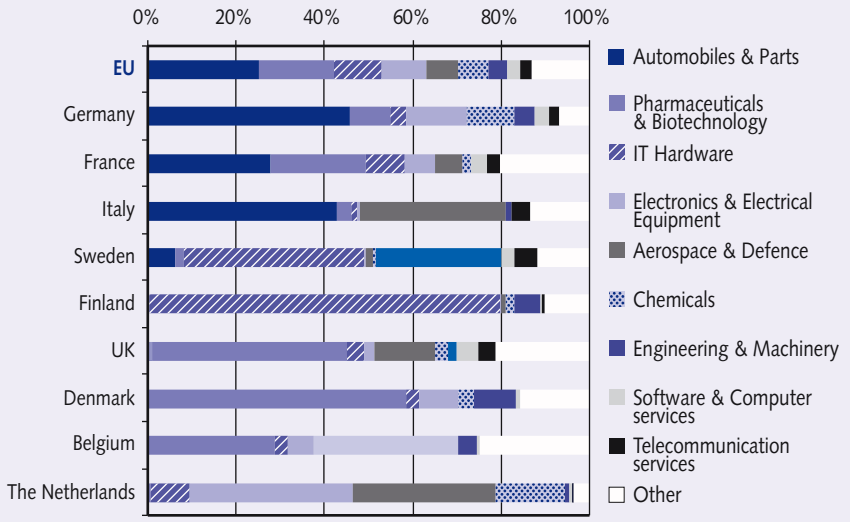
There has been little change in the aggregate R&D/sales ratios of the German group of *Scoreboard* companies over the period 2001-2004.

6.4 Sector Specialisation

This section analyses sector specialisation by taking the companies in the most strongly represented Member States and grouping them into the main sectors of activity (Figure 6.3).

Figure 6.3

The proportion (%) of total R&D investment of the EU *Scoreboard* companies accounted for by major sector groups, by country of registration, in 2004.



Almost all countries show at least one pronounced area of specialisation in terms of industrial R&D investment when compared to the average for EU *Scoreboard* companies.

Similarly to last year, many groups of EU *Scoreboard* companies by Member State show at least one pronounced area of R&D investment specialisation[50] when compared to the overall EU distribution. The group of German companies shows a high degree of specialisation in automobiles & parts, which is the EU's most important sector in terms of R&D investment volumes. Almost 80 % of the Finnish group's R&D investment is concentrated in IT

49 The overall picture may improve slightly for the UK and worsen for the Netherlands if we change the assignment of location of headquarter for joint companies such as Shell, a case in which the location of the main headquarters is ambiguous. Companies with high net sales figures operating in low R&D intensive sectors (such as oil & gas or telecommunication services, for example) may change the average share of net sales their R&D investment represents quite significantly.

50 For the purposes of the *Scoreboard*, a country is considered to have a pronounced specialisation in a sector when that sector's share of total R&D investment by the group of companies based in the country concerned is much higher than the corresponding share calculated for the overall EU sample of 700 companies.

hardware (specifically in telecommunications hardware, where Nokia alone has an annual worldwide R&D investment comparable to the country's total domestic business R&D). The Swedish group shows strong R&D and specialisation in IT hardware and its traditional engineering & machinery sector. The Dutch group is an interesting case, with three clear areas of specialisation: aerospace, chemicals and electronics & electrical equipment. The UK group shows a specialisation in the pharmaceuticals & biotechnology sector, but is also well above the EU average in aerospace & defence. The Italian group also shows a clear pattern of specialisation in automobiles & parts and in aerospace & defence, while Belgian and Danish companies are strong in chemicals and pharmaceuticals, respectively.

No particular sector specialisation emerges in the case of the French group. The breakdown by sectors of R&D investments made in 2004 by French *Scoreboard* companies is close to the average pattern for the EU as a whole. However, in most of the nine sectors shown in Figure 6.3, French companies are the second biggest group of players in R&D investment among the EU 700 companies.

6.5 Addendum to the EU700 *Scoreboard* List of Companies

The *Scoreboard* also includes a list of each Member State's top 10 companies ranked by R&D investment volume in 2004. The top ten companies are listed regardless of whether or not they have reached the minimum entry threshold for inclusion on the *Scoreboard*'s EU 700 list (set this year at € 4.73 million). Compared to similar tables in last year's *Scoreboard*, the number of companies listed increased, especially in the case of the New Member States.

Table 6.2 shows the volumes of R&D and net sales in 2004 as well as their growth rates and the average R&D/sales ratio for these top 10 companies in each Member State. In the case of a few Member States it was not possible to obtain a complete list of 10 companies[51].

Table 6.2 reveals that top R&D investing companies have a high overall average R&D/sales ratio, but clear differences exist between Member States.

The average growth rate for such a small group of companies is always likely to be influenced by the performance of individual companies and therefore subject to large variations. This explains the broad range of values in growth rate columns of Table 6.2.

51 Either due to the smaller size of R&D investment or because information on R&D figures was not easy to access.

Table 6.2

Total R&D investment and net sales in top 10 companies by Member States

	R&D Investment		R&D/sales ratio	Sales	
	2004	change 04/03	2004	2004	change 04/03
	€ m	%	%	€ m	%
Austria (10)	284	5.2	1.0	29,391	18.4
Belgium (10)	1,299	12.7	4.6	28,245	11.6
Cyprus (2)	0.1	..	0.1	85	10.1
Czech Republic (4)	20	0.5	0.2	8,577	21.7
Denmark (10)	1,323	1.3	9.0	14,690	4.4
Estonia (3)	3.5	35.2	0.6	581	14.7
Finland (10)	4,389	-5.1	5.9	74,346	-0.5
France (10)	13,343	2.3	3.8	347,357	8.8
Germany (10)	27,649	1.8	5.8	480,692	4.7
Greece (10)	52	-28.9	0.7	7,915	2.8
Hungary (5)	68	6.0	4.9	1,394	3.5
Ireland (10)	296	-13.4	2.1	13,834	11.5
Italy (10)	4,159	7.9	2.6	159,732	4.6
Latvia (3)	0.4	..	0.1	374	..
Lithuania (1)	0.4	0.0	0.2	271	0.0
Luxembourg (6)	364	3.5	1.0	36,413	16.0
Malta (7)	1.6	-20.7	0.7	236	1.1
Poland (4)	23	-8.5	0.3	6,561	7.5
Portugal (10)	20	3.8	0.0	25,629	10.0
Slovakia (2)	1.2	-22.6	0.4	319	17.9
Slovenia (2)	40	30.0	2.9	1,376	12.3
Spain (10)	927	-6.8	1.1	86,942	9.6
Sweden (10)	4,991	-9.8	5.6	89,607	8.4
The Netherlands (10)	6,737	0.6	7.3	92,665	5.8
UK (10)	11,479	2.8	2.0	585,577	16.6
TOTAL (179) €/ weighted average %	77,535	1.0	3.7	2,092,809	9.4

Note: The number of companies for which information was available is shown in brackets after the name of each Member State. The data include also companies with an R&D investment below the € 4.73 million R&D investment threshold for inclusion in the Scoreboard's EU 700 list.

Annex II.1.4 in Volume II - Company Data - provides the list of companies by EU Member State from which data were computed to build the above Table 6.2. The list in Annex II.1.4 also includes some foreign subsidiaries in eight EU countries, which represent the result of pilot work undertaken for the first time this year.

We acknowledge that the information on foreign subsidiaries is most probably incomplete, mainly due to the fact that R&D investment is not easy to access or not completely disclosed in publicly available financial reports of such foreign company subsidiaries.

Chapter 7

Financial Indicators for Scoreboard Companies

In addition to R&D investment-related variables, the *Scoreboard* reports a wide variety of financial data and other indicators for each company, such as operating profit, net sales, market capitalisation, market spread, capital expenditures, but also number of employees – see, for more detail, Volume II - Company Data –. Taking such indicators as a reflection of the average business performance of *Scoreboard* companies, this chapter presents and compares them by world main region and by sector. As the timing of business cycles may vary across main world economies, the information provided covers the latest four years' performance of these companies.

Key findings

- The profitability gap between EU and non-EU *Scoreboard* companies shrank in 2004, although on average EU companies continue to show a lower operating profit/sales ratio. Since 2002, all the *Scoreboard* companies have enjoyed a strong recovery in profitability.
- The average market capitalisation/sales ratio for EU *Scoreboard* companies rose markedly by 20 % in 2004.
- Capital expenditure by non-EU *Scoreboard* companies increased at the same rate as their net sales in 2004. For EU companies the capital expenditure growth rate was slightly lower than that of net sales.
- The financial performance of US companies is on average better than that of EU or Japanese companies.
- Most sectors with a high market capitalisation have a high average R&D/sales ratio. Examples include pharmaceuticals & biotechnology, software & computer services, health and IT hardware.

7.1. Financial Indicators for *Scoreboard* Companies by Main World Region

Table 7.1 shows R&D investment and a number of financial indicators for the EU and non-EU *Scoreboard* companies of similar R&D size, in 2004.

Table 7.1

Overall financial indicators of *Scoreboard* companies in 2004

Factor	Non-EU 700	EU-242
R&D Investment (€ bn)	212.8	95.9
Net Sales (€ bn)	5122.2	2947.3
Employees (*millions*)	17.9	10.3
Change in Number of Employees over previous year	1.3 %	-1.4 %
Operating Profit / Net Sales Ratio	10.2 %	8.7 %
- difference as compared to previous year	1.5 %	2.3 %
Capital Expenditure / Net Sales Ratio	6.0 %	6.1 %
- difference as compared to previous year	0.0 %	-0.6 %
Market Capitalisation / Net Sales	131.7 %	102.3 %
- difference as compared to previous year	-1.0 %	21.6 %

Note: The annual growth rates and the ratios are adjusted according to the available sample of companies in each year. If no data are available for a given company in a particular year, making it impossible to calculate a growth rate or ratio, that company is excluded from the aggregate growth rate calculation.

- Average operating profit/net sales ratio (profitability) is lower among EU[52] companies, at 85 % of the ratio for non-EU companies. However, the gap in profitability between the two groups of companies shrank in 2004 as EU companies raised their average profitability by 2.3 % on the previous year compared to an increase of just 1.5 % in the case of non-EU companies.

Since 2002, all the *Scoreboard* companies have enjoyed a strong recovery in profits. However, in the case of EU companies this has been accompanied by a cut in the workforce.

- The market capitalisation ratio of EU companies[53] on major stock exchanges boomed (a rise of more than 20 %) and remained almost stagnant for non-EU companies in 2004. This means that the overall figures for market capitalisation moved in the same direction and at the same rate as the overall net sales for the non-EU *Scoreboard* companies, while it increased at a much faster rate for the EU companies. The effect of exchange rates on these figures is significant, as market capitalisation is usually reported in the dollar (US) equivalent (for EU companies, the dollar (US) value of shares further appreciated in 2004).

The average market capitalisation/sales ratio for EU *Scoreboard* companies rose by 20 % in 2004.

- The improvement in financial performance of the EU 242 *Scoreboard* companies was accompanied by a decline of 1.4% in the number of employees.

A more disaggregated picture is offered in Table 7.2, which compares the EU with the non-EU *Scoreboard* companies aggregated by main world regions (EU, US, Japan and Rest of the World).

Table 7.2

Comparison of financial and employment indicators of *Scoreboard* companies, by main world region, in 2004

Factor	EU	US	Japan	Rest of the World
Number of companies	242	398	198	104
R&D Investment / Net Sales ratio	3.3 %	4.5 %	4.0 %	3.4 %
Capital Expenditure / Net Sales	6.1 %	4.3 %	6.2 %	10.6 %
Market Capitalisation / Net Sales	102.3 %	171.5 %	70.5 %	152.3 %
Operating Profit / Net Sales	8.7 %	11.3 %	6.3 %	15.1 %

The key points from Table 7.2 are:

US companies continued to lead the *Scoreboard* in 2004 in terms of their net sales growth rate and profitability. In general, US companies' financial indicators were better than those of their EU and Japanese counterparts.

- On aggregate, US companies continued to lead the *Scoreboard* in 2004 in terms of their net sales growth rate (US 14.8 %, EU 7.2 % and Japan 3.4 %) and profitability, compared to EU and Japanese companies. However, they have the lowest average capital expenditure/net sales ratio, as they are the only group of *Scoreboard* companies for which the total capital expenditure is smaller than the total R&D investment (€ 117.3 bn R&D investment compared to € 111.9 bn capital expenditure for US *Scoreboard* companies in 2004). This strong preference for R&D is a result of most of the US companies being concentrated in R&D intensive sectors such as software & computer services, pharmaceuticals or IT hardware (see Chapter 4, section 4.4 for details).

- The profitability and the market capitalisation/sales ratio of the EU companies were above those of the Japanese companies.

52 When making comparisons, the top 242 EU group is generally referred to as it includes companies of similar R&D size as the top 700 non-EU group of companies.
53 As per previous footnote.

- For Swiss and US companies the market capitalisation to net sales ratio was higher than 1.5, as compared to an average of 1.2 for all non-EU *Scoreboard* companies over the same period.

7.2. Financial Indicators for *Scoreboard* Companies by Sector Groups

7.2.1 Average profit rates by sector

The profitability of *Scoreboard* companies improved significantly in 2004. This finding remains valid when splitting the sample of companies by sector as well as by location of registered office.

Average profitability (ratio of overall operating profit to overall net sales for all companies in a given sector) was positive for companies in all sectors in the case of the non-EU 700 companies and negative in only 4 cases for EU companies (internet, biotechnology, banks and diversified industrials)[54]. Using the data for the top 942 *Scoreboard* companies, table 7.3 shows the operating profit as a percentage of net sales (profitability), the operating profit plus R&D expenditure as a percentage of net sales and the change in average sector profitability from 2003 to 2004 for the top 16 sectors (by total R&D investment).

Table 7.3

Profitability indicators for top 942 *Scoreboard* companies by sector, in 2004

Sector of activity	Profitability	(R&D + Profit) / Sales	Change in profitability 2004/2003
	%	%	%
Pharmaceuticals & Biotechnology	19.9	35.3	3
Software & Computer services	18.7	29.4	4
Health	15.9	22.7	0
Personal care & Household	17.1	20.0	1
Diversified industrials	15.2	17.6	1
IT Hardware	8.0	16.6	5
Oil & gas	13.5	13.8	1
Electronics & Electrical equipment	6.4	11.9	2
Food producers	10.0	11.8	-1
Telecommunication services	10.2	11.7	0
Electricity	10.3	11.4	0
Chemicals	7.2	11.0	4
Aerospace & Defence	5.6	10.6	1
Media & Entertainment	7.4	10.1	1
Automobiles & Parts	5.3	9.6	1
Engineering & Machinery	6.9	9.4	3

A further split by sub-sector groups reveals some difference in average sub-sector profitability between companies in software and internet on the one

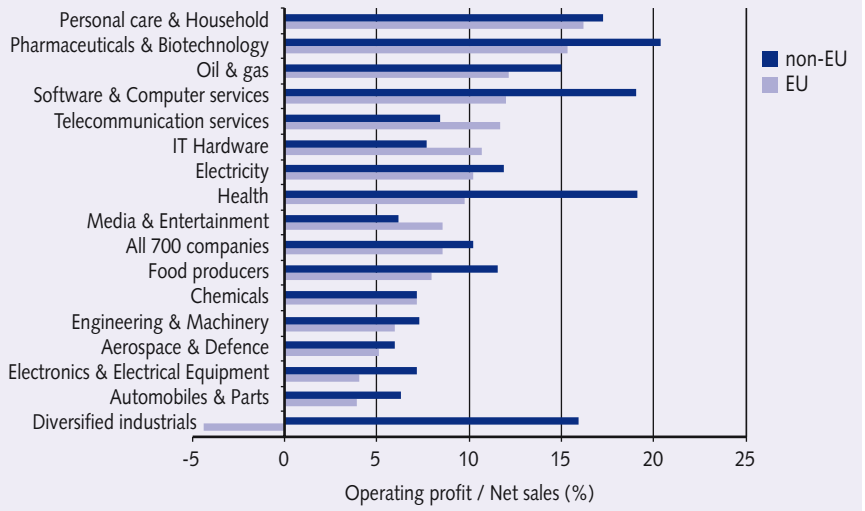
54 See Volume II, Tables II.1.3 and II.1.7.

hand (these two sub-groups being at the top of the profitability ranking, with 25 % profitability) and those in computer services on the other hand (still highly profitable, at 12 %). The same applies to the engineering & machinery sub-groups, where companies in the 'engineering-fabricators' sector had an average profitability of 13 % in 2004 compared to 5.7 % for the main group of companies in engineering-general sub-sector. Striking differences are found though in the case of companies in IT hardware: semiconductors companies show as a group very high R&D/sales and profit/sales ratios (14-15 % each), while companies producing computer hardware – as a group - exhibit low profitability (4.2 % in 2004), putting them – as a group – at the bottom of the ranking.

Figure 7.1 presents – for the same 16 sectors as above – the comparative situation of EU and non-EU companies (average sector profitability) in 2004.

Figure 7.1

Profitability for EU 700 and non-EU 700 *Scoreboard* companies by sector, in 2004



In 2004, non-EU firms registered higher profitability than their EU counterparts in 12 out of the 16 sectors. Sector average profitability for EU companies was higher only in telecommunication services, IT hardware and media & entertainment.

The top 10 *Scoreboard* companies by profitability in 2004, for each of the two 700 groups, are presented in Table 7.4. This only takes account of companies with net sales above € 200 million in 2004, in order to be consistent with previous rankings and to keep the analysis within a comparable sample of firms.

Although the profits of almost all the EU companies rose in 2004, their profitability remains below that of non-EU companies of similar size.

The main conclusions that can be drawn from table 7.4 are that 19 of the 20 companies (all except Sage (UK)) increased their profitability yet further in 2004, and that the highest profit/sales ratios for EU companies are lower than those for non-EU (mostly US) companies of a similar size.

Table 7.4

Top 10 EU and top 10 non-EU *Scoreboard* companies, ordered by their profit rate in the 2004 financial year

Name of Company	Rank in 2005 *Scoreboard*	Sector	Country	Profit/sales in 2003	Profit/sales in 2004
EU 700 companies				%	%
Danske Bank	241	Banks	Denmark	47	**50**
BG	526	Oil & gas	UK	34	**36**
Urenco	358	Support services	UK	28	**35**
Northumbrian Water	590	Utilities - other	UK	32	**35**
Raisio	421	Food producers	Finland	-2	**32**
Deutsche Borse	200	Other financials	Germany	30	**31**
GlaxoSmithKline	4	Pharmaceuticals (Pharma & Bio)	UK	30	**30**
Dassault Systemes	69	Software (Soft & Comp services)	France	28	**29**
Galen (now Warner Chilcott)	323	Pharmaceuticals (Pharma & Bio)	UK	21	**29**
Sage	114	Software (Soft & Comp services)	UK	28	**27**
Non-EU 700 companies					
McAfee	268	Software (Soft & Comp services)	US	7	**62**
Linear Technology	403	Semiconductors*	US	49	**54**
Gilead Sciences	232	Pharmaceuticals (Pharma & Bio)	US	-18	**48**
Maxim Integrated Products	165	Semiconductors*	US	39	**42**
Qualcomm	80	Telecommunications equipment*	US	30	**42**
Intergraph	551	Software (Soft & Comp services)	US	4	**42**
Takeda Pharmaceutical	48	Pharmaceuticals (Pharma & Bio)	Japan	37	**40**
eBay	179	General retailers	US	29	**40**
Qlogic	431	Semiconductors*	US	38	**39**
PetroChina	139	Oil & gas	China	33	**39**

Note: In the sector column, the names in brackets are sector names according to the FTSE 2-digit classification following the name based on a FTSE 3-digit classification; * - sub-sectors aggregated in the IT hardware sector (name according to FTSE 2-digit classification).

As already mentioned in Chapter 4, company profitability seems to be an important driver of investment in R&D as well as in fixed assets, and thus constitutes a constraint on investment decisions. In this sense, profitability trends are potentially an important signal for company R&D investment decisions. Table 7.5 shows these trends for the top 942 *Scoreboard* companies by main world region over the period from 2001 to 2004.

The conclusions that can be drawn from table 7.5 are:

- Worldwide, companies have registered a solid recovery since the drop in profitability seen in 2001-2002;
- Profitability is highest among *Scoreboard* companies in the Rest of the World category. This is the result of the different sector mixes that characterise the group of companies in each region (e.g. high proportion of pharmaceuticals with generally strong profitability, in the case of Swiss companies included in the Rest of the World group);

- The increase in the profit/sales ratio was higher for US companies and lower for Japanese companies compared to EU ones during the last four years.

Table 7.5

Profitability by main world region, for the top 942 *Scoreboard* companies, 2001-2004 (%)

REGIONS	2001	2002	2003	2004
EU-242	3.2	2.0	6.4	8.7
US-398	2.8	2.2	9.5	11.1
Japan-198	3.5	4.1	5.5	6.3
RoW-104	9.3	12.8	13.7	15.3
EU 700	3.0	1.7	6.2	8.6
Non-EU 700	4.0	4.5	8.7	10.2
Top 942	3.6	3.4	7.7	9.6

7.2.2. Market capitalisation by sector

The market capitalisation of a listed company represents the valuation placed on it by financial markets. One of the measures financial markets use as a means of distinguishing between sectors and assessing companies within a sector is the ratio of market capitalisation to value added (MC/VA). However, as value added data are only available for EU companies[55], the ratio of market capitalisation to net sales (MC/sales) is used instead in this *Scoreboard* analysis. The MC/sales ratio for the top sector groups is summarised in Table 7.6 together with the corresponding annual growth rates of average sector market capitalisation. The sector groups are shown in descending order of MC/sales ratio.

Table 7.6

Market capitalisation to net sales ratio for top 942 *Scoreboard* companies by sector, in 2004

Sector	MC/sales in 2004	Change in MC 2004/2003 (%)
Software & Computer services	3.69	6
Pharmaceuticals & Biotechnology	3.65	11
Health	3.12	13
Personal care & Household	2.35	6
Diversified industrials	1.77	4
IT Hardware	1.73	11
Telecommunication services	1.48	20
Food producers	1.34	15
Media & Entertainment	1.21	16
Oil & Gas	1.15	41
Chemicals	0.92	27
Aerospace & Defence	0.89	19
Electronics & Electrical equipment	0.86	22
Engineering & Machinery	0.75	25
Electricity	0.52	29
Automobiles & Parts	0.36	11

55 US and Japanese companies follow US GAAP accounting standard, which does not require companies to disclose sufficient information to allow value added to be calculated.

The main message is that, despite the fact that the group of companies in engineering-related sectors (aerospace & defence, automobiles & parts, chemicals, electronics & electrical equipment, engineering & machinery, electricity) continues to have average MC/sales ratios[56] below 1.0 (EU and non-EU) the growth rate of market capitalisation for this group was significantly higher in 2004 than the average growth rate for companies in sectors with high MC/sales. These latter sectors generally also have high average R&D/sales ratios and a relatively greater need to finance their R&D (as it is the case with pharmaceuticals & biotechnology, software & computer services, health and IT hardware).

The growth rate of market capitalisation of companies in the engineering-related sectors was significantly higher in 2004 than the average growth rate for companies in sectors with high MC/sales ratios.

Table 7.1

Top 10 EU and top 10 non-EU *Scoreboard* companies, ordered by their market capitalisation/sales ratio, in 2004

Name Company	Rank in 2005 *Scoreboard*	Sector	Country	MC/sales in 2004	Net Sales in 2004
EU 700 companies					(€ bn)
SAP	24	Software (Soft & Comp services)	Germany	**6.0**	7.5
Rio Tinto	382	Mining	UK	**5.3**	8.3
Deutsche Borse	200	Other financials	Germany	**5.1**	1.6
BG	526	Oil & gas	UK	**4.4**	5.8
Shire Pharmaceuticals	88	Pharmaceuticals (Pharma & Bio)	UK	**4.2**	1.1
Danske Bank	241	Banks	Denmark	**4.1**	3.6
Smith & Nephew	126	Health	UK	**3.9**	1.8
Sanofi-Aventis	5	Pharmaceuticals (Pharma & Bio)	France	**3.9**	25.4
GlaxoSmithKline	4	Pharmaceuticals (Pharma & Bio)	UK	**3.8**	28.8
AstraZeneca	9	Pharmaceuticals (Pharma & Bio)	UK	**3.7**	15.8
Non-EU 700 companies					
Google	125	Internet (Soft & Comp services)	US	**25.2**	2.3
eBay	179	General retailers	US	**20.9**	2.0
Altria	72	Tobacco	US	**19.1**	5.3
Yahoo!	128	Internet (Soft & Comp services)	US	**13.6**	2.6
Qualcomm	80	Telecom. equipment*	US	**13.6**	3.6
Symantec	151	Software (Soft & Comp services)	US	**10.1**	1.9
Maxim Integrated Products	165	Semiconductors*	US	**9.7**	1.1
Amgen	32	Biotechnology (Pharma & Bio)	US	**9.4**	7.8
ZTE	195	Telecom. equipment*	China	**8.4**	1.9
Genzyme	130	Biotechnology (Pharma & Bio)	US	**8.2**	1.6

Note: In the sector column, the names in brackets show the name according to the FTSE 2-digit classification following the name based on a FTSE 3-digit classification; * - sub-sectors aggregated in the IT hardware sector (FTSE 2-digit).

56 In several cases, the number of top 942 *Scoreboard* companies is too small to be significant, thus forcing the analysis to concentrate from the very beginning on the top 16 R&D-intensive sectors. Even so, there are some sectors in which there are only 10-12 companies taken into account in the calculation of the average MC/sales for one sector (or even less in the case of the annual growth rate). The calculations are subject to a bigger size-effect when the same type of indicators are calculated for EU versus non-EU sector groups of *Scoreboard* companies (e.g., in health sector, only five EU companies with R&D investment over € 100m report market capitalisation figures for 2004 and 11 worldwide - among firms listed in the top 942).

Within the IT hardware sector, semiconductor companies show an average MC/sales ratio of 3.3 and telecommunication equipment a ratio of 2.6, while computer hardware companies behave more like the engineering-related group (referred above), with a MC/sales ratio lower than 1. Software firms tend to have MC/sales ratios four to five times higher than those in computer services, while internet companies are the top performers, as can be seen in Table 7.7, which lists the top 10 EU and top 10 non-EU *Scoreboard* companies by MC/sales ratio (considering those with more than € 1 billion net sales[57]).

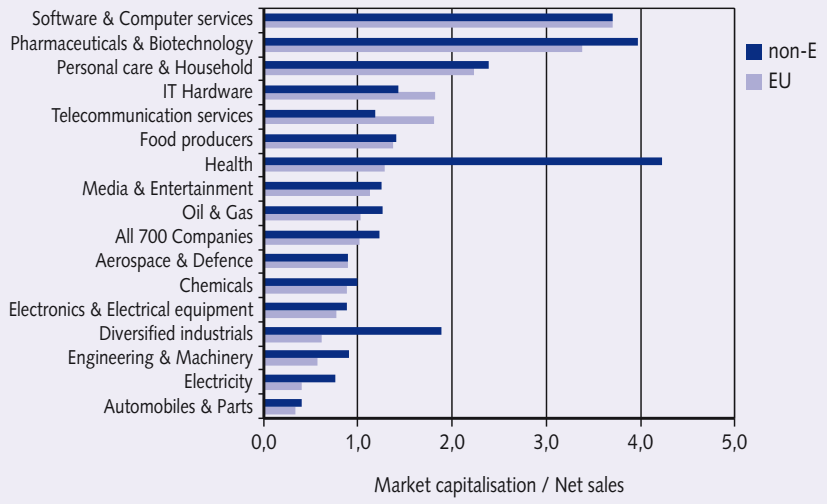
For these companies, there is a large gap in market capitalisation to sales ratios between EU and non-EU (mainly US) companies. The tenth ranked non-EU company has a higher MC/sales ratio than the top EU company (SAP). However the total net sales of the 10 EU companies in Table 7.7 are much higher than those of the non-EU companies. It is worth noting that the sectors with high MC/sales ratio companies are also R&D-intensive sectors.

There is a large gap in market capitalisation to sales ratios between EU and non-EU (mainly US) companies. The tenth ranked non-EU company has a higher MC/sales ratio than the top EU company.

Figure 7.2 shows the average market capitalisation to net sales ratio for the main 16 sector of *Scoreboard* companies, calculated separately for the top 700 non-EU and top 242 EU companies.

Figure 7.2

Market capitalisation/sales rates for the top 942 *Scoreboard* EU and non-EU companies by sector, in 2004



Most of the sectors with a high market capitalisation have a high average R&D/sales ratio. Examples include pharmaceuticals & biotechnology, software & computer services, health and IT hardware.

The figure shows that in almost all sectors the top 242 EU companies have average MC/sales ratios similar to (or slightly lower than) the top 700 non-EU companies. However, non-EU companies show much higher MC/sales ratios in the case of pharmaceuticals & biotechnology, diversified industrials and, most of all, in health, while EU companies have higher MC/sales ratios values in the case of IT hardware and telecommunication services.

57 We have used a threshold criterion of € 1 billion net sales in selecting the companies for the MC/sales ratio analysis, due to the fact that – for a company willing to do so - listing on a major stock exchange will require anyway a strong financial position and a significant market share.

In last year's *Scoreboard*, it was noted that sector averages can sometimes be deceptive since one or two companies can often dominate the sector's aggregate market capitalisation. There are small changes[58] compared to last year's results, one interesting finding being that the concentration by company of market capitalisation for EU *Scoreboard* companies (except for the personal care products sector) has further increased while it decreased for non-EU companies in the top 4 sectors, widening the difference between these two groups, as is shown in table 7.8:

Table 7.8

Concentration of market capitalisation for the top *Scoreboard* companies in selected sectors, 2004 compared to 2003

		Share of sector market capitalisation for largest companies (%) †				
Sector	**EU company**	**2004**	**2003**	**Non-EU company**	**2004**	**2003**
IT Hardware	Nokia	43	35	Intel	12	14
Personal care products	L'Oreal	53	55	Proctor & Gamble	48	50
Software & computer services	SAP	85	71	Microsoft	33	43
Pharmaceuticals & biotechnology	GlaxoSmith Kline	34	32	Pfizer	14	19

†- only those *Scoreboard* companies with R&D investment over € 55m in 2004 and for which there is available information on market capitalisation are included.

This second edition of the *Scoreboard* provides further insight into the industrial R&D investments compared to last year. It is already a powerful means for comparison of companies' performance in this field. To make it even more valuable, it is envisaged that next year the *Scoreboard* will increase the number of companies in both EU and 'the rest of the world' groups from the present 700 to 1,000.

58 In comparable terms, i.e. for samples of top 500 companies, like the one available in the 2004 *Scoreboard*.

Annex 1

Table A1.1

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
			Top 700 Companies	**102 238**	**0.7**	**3 579 466**	**2.9**	**8.6**	**7.5**	**3 462 021**
			number of companies for calculation	*700*	*686*	*700*	*689*	*696*	*688*	*587*
1	DaimlerChrysler	Automobiles & parts (31)	Germany	5 658	1.6	142 059	4.0	2.4	14.9	46 204
2	Siemens	Electronic & Electrical (25)	Germany	5 063	-8.1	75 167	6.7	4.0	12.1	59 127
3	Volkswagen	Automobiles & parts (31)	Germany	4 164	0.6	88 963	4.7	2.0	13.0	22 658
4	GlaxoSmithKline	Pharma & biotech (48)	UK	4 010	1.7	28 757	13.9	30.3	40.2	108 038
5	Sanofi-Aventis	Pharma & biotech (48)	France	3 961	-2.6	25 418	15.6	11.6	41.1	98 605
6	Nokia	IT hardware (93)	Finland	3 834	-3.6	29 267	13.1	14.7	71.6	58 171
7	Robert Bosch	Automobiles & parts (31)	Germany	2 898	9.4	40 007	7.2	6.0	12.1	..
8	BMW	Automobiles & parts (31)	Germany	2 818	10.1	44 335	6.4	8.4	27.2	24 455
9	AstraZeneca	Pharma & biotech (48)	UK	2 798	10.2	15 763	17.7	22.3	43.6	59 035
10	Philips Electronics	Electronic & Electrical (25)	The Netherlands	2 534	-3.2	30 319	8.4	7.7	17.8	28 322
11	Ericsson	IT hardware (93)	Sweden	2 436	-24.9	14 611	16.7	21.8	47.1	43 334
12	Bayer	Chemicals (11)	Germany	2 404	-0.4	29 758	8.1	5.4	21.1	21 669
13	EADS	Aerospace & defence (21)	The Netherlands	2 295	4.7	31 761	7.2	7.0	20.7	22 087
14	Peugeot (PSA)	Automobiles & parts (31)	France	2 118	1.0	56 797	3.7	4.2	10.2	12 715
15	Renault	Automobiles & parts (31)	France	1 961	12.9	40 715	4.8	11.3	15.0	21 570
16	Istituto Finanziario Industriale	Automobiles & parts (31)	Italy	1 827	3.6	51 878	3.5	-2.3	10.2	976
17	BAE Systems	Aerospace & defence (21)	UK	1 568	1.0	12 847	12.2	-0.6	22.6	15 191
18	Alcatel	IT hardware (93)	France	1 557	-2.3	12 265	12.7	1.5	27.9	12 849
19	Finmeccanica	Aerospace & defence (21)	Italy	1 454	18.5	7 529	19.3	-0.8	31.3	6 266
20	Boehringer Ingelheim	Pharma & biotech (48)	Germany	1 232	4.8	8 157	15.1	16.8	34.9	..
21	Infineon Technologies	IT hardware (93)	Germany	1 219	12.6	7 195	16.9	1.1	35.7	5 808
22	BASF	Chemicals (11)	Germany	1 173	6.2	37 537	3.1	11.8	14.3	33 240
23	Unilever	Food producers (43)	UK	1 040	-2.3	40 169	2.6	8.6	4.6	54 212
24	SAP	Software & computer services (97)	Germany	1 020	2.4	7 514	13.6	26.6	32.7	45 426
25	Volvo	Engineering & machinery (26)	Sweden	991	14.0	23 294	4.3	6.7	12.7	13 812
26	Schering	Pharma & biotech (48)	Germany	933	-1.5	4 907	19.0	14.6	35.7	10 296
27	Deutsche Telekom	Telecommunication services (67)	Germany	900	0.0	57 880	1.6	14.9	3.6	73 547
28	AKZO Nobel	Chemicals (11)	The Netherlands	826	-7.4	12 688	6.5	6.3	13.0	12 124
29	Snecma	Aerospace & defence (21)	France	754	20.8	6 812	11.1	6.2	21.3	5 351
30	Michelin	Automobiles & parts (31)	France	674	-5.2	15 689	4.3	6.7	5.3	7 435
31	Total	Oil & gas (7)	France	635	-4.8	122 700	0.5	14.9	5.7	132 130
32	Merck	Pharma & biotech (48)	Germany	599	-0.9	5 859	10.2	10.9	20.7	3 712
33	Novo Nordisk	Pharma & biotech (48)	Denmark	585	3.8	3 903	15.0	23.6	30.0	11 908
34	Valeo	Automobiles & parts (31)	France	584	3.5	9 439	6.2	2.4	10.5	2 685
35	France Telecom	Telecommunication services (67)	France	564	18.0	47 157	1.2	16.4	2.8	62 272
36	Schneider	Electronic & Electrical (25)	France	535	8.3	10 365	5.2	9.6	6.3	14 646
37	Continental	Automobiles & parts (31)	Germany	530	6.4	12 597	4.2	8.8	7.2	9 569
38	ZF	Automobiles & parts (31)	Germany	520	-0.7	9 899	5.3	3.8	9.5	..
39	L'Oreal	Personal care & household (47)	France	507	5.6	14 534	3.5	15.4	9.7	41 897
40	Telefonica	Telecommunication services (67)	Spain	461	4.8	30 322	1.5	18.0	2.9	67 911
41	ALTANA	Pharma & biotech (48)	Germany	445	8.1	2 963	15.0	20.6	41.6	6 405
42	Thales	Aerospace & defence (21)	France	436	14.5	10 288	4.2	3.9	7.9	6 057
43	Solvay	Chemicals (11)	Belgium	427	1.7	7 877	5.4	9.8	14.6	7 612
44	Electricite de France	Electricity (72)	France	425	11.5	46 928	0.9	7.1	2.7	..
45	Shell (now Royal Dutch Shell)	Oil & gas (7)	UK	407	-5.3	195 104	0.2	12.3	3.6	183 576
46	AREVA	Electricity (72)	France	402	41.1	11 109	3.6	5.4	5.7	700
47	MAN	Engineering & machinery (26)	Germany	400	-1.7	14 947	2.7	4.0	6.4	5 869
48	Rolls-Royce	Aerospace & defence (21)	UK	398	0.4	8 389	4.7	5.8	11.3	8 591
49	UCB	Pharma & biotech (48)	Belgium	376	39.3	3 068	12.3	13.8	31.3	6 589

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
50	BT	Telecommunication services (67)	UK	363	-23.1	26 305	1.4	16.7	3.6	26 253
51	ALSTOM	Electronic & Electrical (25)	France	336	-29.0	13 662	2.5	-2.4	4.8	4 393
52	ASML	IT hardware (93)	The Netherlands	331	15.4	2 465	13.4	15.4	65.7	6 761
53	BP	Oil & gas (7)	UK	323	25.8	208 141	0.2	8.3	3.1	192 751
54	Lagardere	Media & entertainment (54)	France	321	-2.7	13 389	2.4	5.1	6.8	8 362
55	Vodafone	Telecommunication services (67)	UK	309	28.1	48 213	0.6	-12.7	5.4	133 326
56	TeliaSonera	Telecommunication services (67)	Sweden	308	9.4	9 071	3.4	22.2	12.1	16 934
57	Saint-Gobain	Construction & building (13)	France	304	-0.7	32 025	0.9	7.0	1.7	17 154
58	Deutsche Post	Support services (58)	Germany	290	85.9	43 168	0.7	6.8	0.8	23 063
59	DSM	Chemicals (11)	The Netherlands	286	6.7	7 752	3.7	4.2	11.7	6 255
60	Thomson	Electronic & Electrical (25)	France	277	-6.1	7 994	3.5	-4.8	5.6	5 114
61	Henkel	Personal care & household (47)	Germany	272	5.8	10 592	2.6	19.5	5.4	10 826
62	Autoliv	Automobiles & parts (31)	Sweden	271	20.6	4 520	6.0	8.5	7.9	3 053
63	Marconi	IT hardware (93)	UK	263	-5.6	1 889	13.9	-7.4	..	852
64	Amersham *(now GE Healthcare)*	Health (44)	UK	257	-1.2	2 218	11.6	13.1	24.9	..
65	ENI	Oil & gas (7)	Italy	257	8.0	58 382	0.4	20.4	3.6	96 868
66	Scania	Engineering & machinery (26)	Sweden	255	7.0	6 382	4.0	10.9	8.8	6 306
67	Heidelberger Druckmaschinen	Engineering & machinery (26)	Germany	244	-33.3	3 360	7.3	4.3	12.5	2 690
68	Electrolux	Household goods & textiles (34)	Sweden	227	23.2	13 357	1.7	3.9	3.1	5 295
69	Dassault Systemes	Software & computer services (97)	France	222	2.9	797	27.8	28.9	49.8	4 554
70	Carl Zeiss	Health (44)	Germany	209	10.0	2 135	9.8	5.7	15.4	..
71	ICI	Chemicals (11)	UK	208	-5.8	7 911	2.6	7.9	6.1	4 948
72	Oce	IT hardware (93)	The Netherlands	207	-0.8	2 652	7.8	4.2	9.5	1 068
73	Pirelli	Diversified industrials (24)	Italy	198	-2.9	7 114	2.8	5.6	5.9	4 420
74	Schwarz Pharma	Pharma & biotech (48)	Germany	198	37.2	947	20.9	2.2	51.8	2 206
75	Vivendi Universal	Media & entertainment (54)	France	196	15.3	21 428	0.9	14.1	5.0	27 676
76	Behr	Automobiles & parts (31)	Germany	195	6.0	3 050	6.4	4.0	11.5	..
77	Smiths	Aerospace & defence (21)	UK	193	5.5	3 861	5.0	10.7	7.2	7 111
78	Agfa-Gevaert	Health (44)	Belgium	191	-18.0	3 762	5.1	12.5	11.8	2 926
79	ThyssenKrupp	Engineering & machinery (26)	Germany	191	4.4	39 342	0.5	4.6	1.0	8 119
80	Linde	Chemicals (11)	Germany	188	5.0	9 421	2.0	6.9	4.1	9 851
81	Sandvik	Engineering & machinery (26)	Sweden	185	-0.3	6 046	3.1	13.1	4.9	7 986
82	Reuters	Media & entertainment (54)	UK	181	-25.1	4 075	4.4	7.3	11.3	7 287
83	Invensys	Electronic & Electrical (25)	UK	175	-24.8	4 129	4.2	-1.6	4.8	1 105
84	Lundbeck	Pharma & biotech (48)	Denmark	173	-29.8	1 308	13.2	26.0	33.5	4 352
85	Hella	Automobiles & parts (31)	Germany	172	2.3	3 141	5.5	3.1	7.4	..
86	Rhodia	Chemicals (11)	France	171	-15.8	5 281	3.2	-11.4	8.3	1 092
87	Diehl Stiftung	Diversified industrials (24)	Germany	162	-3.2	1 595	10.2	3.8	15.2	..
88	Shire Pharmaceuticals	Pharma & biotech (48)	UK	159	-12.3	1 066	14.9	8.7	84.0	4 455
89	Amadeus Global Travel	Leisure & hotels (53)	Spain	153	5.7	2 057	7.4	16.3	26.6	4 354
90	Rheinmetall	Automobiles & parts (31)	Germany	152	-19.6	3 413	4.5	5.7	8.0	2 400
91	Wacker-Chemie	Chemicals (11)	Germany	152	-0.1	2 543	6.0	5.4	9.9	..
92	JM Voith	Diversified industrials (24)	Germany	149	10.4	3 262	4.6	5.7	..	..
93	Freudenberg	Diversified industrials (24)	Germany	148	6.2	4 418	3.4	6.8	4.6	..
94	Pierre Fabre	Pharma & biotech (48)	France	145	7.1	1 426	10.2	4.0	15.8	..
95	Atlas Copco	Engineering & machinery (26)	Sweden	141	9.4	5 387	2.6	13.6	5.3	7 985
96	Telecom Italia	Telecommunication services (67)	Italy	139	0.0	31 237	0.4	21.0	1.6	37 213
97	Ipsen	Pharma & biotech (48)	Luxembourg	136	4.1	737	18.5	21.2	36.2	..
98	Elan	Pharma & biotech (48)	Ireland	136	-27.3	341	39.9	-84.4	74.3	2 526
99	Arcelor	Steel & other metals (18)	Luxembourg	135	-4.9	30 176	0.4	12.0	1.4	11 580
100	Fresenius	Health (44)	Germany	133	9.9	7 271	1.8	11.6	2.0	3 382

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
101	Danone	Food producers (43)	France	131	0.8	13 700	1.0	7.5	1.5	22 394
102	Misys	Software & computer services (97)	UK	128	2.6	1 255	10.2	4.3	19.7	1 654
103	RWE	Utilities - other (77)	Germany	128	-70.6	40 996	0.3	12.3	1.2	30 918
104	BioMerieux	Health (44)	France	127	-3.3	931	13.6	13.8	23.4	1 607
105	GKN	Automobiles & parts (31)	UK	126	9.9	4 921	2.6	-0.3	3.4	3 043
106	Knorr-Bremse	Engineering & machinery (26)	Germany	124	3.3	2 423	5.1	9.1	11.3	..
107	Schott	Chemicals (11)	Germany	120	6.2	2 023	5.9	4.6	6.4	..
108	SNPE	Chemicals (11)	France	114	-0.9	793	14.4	-8.3	22.4	..
109	Kerry	Food producers (43)	Ireland	111	25.5	4 129	2.7	5.7	5.1	3 901
110	Business Objects	Software & computer services (97)	France	111	57.8	681	16.3	9.2	28.9	2 315
111	Infogrames Entertainment	Software & computer services (97)	France	111	19.6	701	15.8	-1.4	73.1	273
112	Novozymes	Pharma & biotech (48)	Denmark	109	8.0	810	13.4	17.8	27.7	..
113	Essilor International	Health (44)	France	107	3.1	2 260	4.7	15.0	4.5	6 130
114	Sage	Software & computer services (97)	UK	105	28.3	971	10.8	26.9	13.8	4 281
115	Merial	Pharma & biotech (48)	UK	104	6.0	1 375	7.6	13.1	16.7	..
116	Dragerwerk	Health (44)	Germany	104	7.3	1 520	6.8	6.6	10.6	310
117	L'Air Liquide	Chemicals (11)	France	103	9.5	9 376	1.1	13.5	2.9	16 004
118	Metso	Engineering & machinery (26)	Finland	103	-18.3	3 976	2.6	2.9	4.2	2 720
119	Beiersdorf	Personal care & household (47)	Germany	101	1.0	4 546	2.2	11.1	6.1	7 989
120	Trumpf	Diversified industrials (24)	Germany	98	10.4	1 221	8.0	8.3	16.7	..
121	Veolia Environnement	Utilities - other (77)	France	95	3.0	28 603	0.3	-2.8	0.5	13 193
122	Spirent	IT hardware (93)	UK	95	2.0	671	14.2	7.2	21.0	736
123	BAT	Tobacco (49)	UK	95	-8.2	15 204	0.6	18.0	1.6	32 964
124	GUS	General retailers (52)	UK	95	3.1	10 999	0.9	9.6	1.3	13 112
125	B Braun Melsungen	Health (44)	Germany	94	-10.7	2 793	3.4	7.3	3.2	..
126	Smith & Nephew	Health (44)	UK	94	-0.6	1 764	5.3	14.1	11.9	6 964
127	Amdocs	Software & computer services (97)	UK	93	6.0	1 305	7.1	16.8	8.8	4 448
128	Gaz De France	Oil & gas (7)	France	90	1.1	18 129	0.5	8.9	2.4	28 040
129	SAAB	Aerospace & defence (21)	Sweden	89	-0.1	1 976	4.5	8.9	7.4	1 319
130	Bouygues	Construction & building (13)	France	89	4.7	23 402	0.4	5.9	0.7	12 299
131	Umicore	Steel & other metals (18)	Belgium	89	111.9	7 115	1.3	3.9	7.7	1 866
132	Corus	Steel & other metals (18)	UK	89	1.6	13 181	0.7	6.5	1.8	3 030
133	Cadbury Schweppes	Food producers (43)	UK	89	18.9	9 517	0.9	12.4	1.5	15 771
134	SKF	Engineering & machinery (26)	Sweden	88	6.1	4 963	1.8	9.4	2.3	4 312
135	Adidas-Salomon	Household goods & textiles (34)	Germany	88	2.3	6 478	1.4	8.9	5.4	7 540
136	Suez	Utilities - other (77)	France	85	7.6	40 739	0.2	7.9	0.5	25 182
137	ASM International	IT hardware (93)	The Netherlands	85	7.4	754	11.3	11.7	10.4	599
138	Reckitt Benckiser	Personal care & household (47)	UK	85	5.3	5 468	1.5	19.6	4.3	17 706
139	British Nuclear Fuels *(now Brit Nuc Group Sellafield)*	Electricity (72)	UK	83	-11.9	3 280	2.5	-12.3	3.6	..
140	Stora Enso	Forestry & paper (15)	Finland	82	-7.5	12 396	0.7	4.9	1.9	9 069
141	Industria de Turbo Propulsores	Aerospace & defence (21)	Spain	82	-24.3	379	21.6	9.9	36.4	..
142	Avecia	Chemicals (11)	UK	82	-1.9	685	11.9	-16.4	26.3	..
143	UBIsoft Entertainment	Software & computer services (97)	France	80	9.5	508	15.8	1.0	34.1	774
144	Grundfos	Engineering & machinery (26)	Denmark	77	23.2	1 634	4.7	10.6	6.1	..
145	Danfoss	Engineering & machinery (26)	Denmark	76	-2.1	2 197	3.5	6.1	4.4	..
146	Johnson Matthey	Chemicals (11)	UK	76	-1.1	6 552	1.2	3.5	10.1	3 472
147	Danisco	Food producers (43)	Denmark	75	10.1	2 398	3.1	10.8	8.1	2 429
148	Italtel	IT hardware (93)	Italy	75	-7.7	542	13.8	-1.6	30.0	..
149	Wincor Nixdorf	Software & computer services (97)	Germany	73	10.3	1 576	4.6	5.4	13.1	1 237
150	Svenska Cellulosa	Forestry & paper (15)	Sweden	73	4.1	9 960	0.7	6.3	1.5	6 026

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
151	Claas	Engineering & machinery (26)	Germany	73	8.0	1 928	3.8	3.1	8.9	..
152	Tomkins	Engineering & machinery (26)	UK	72	-12.5	4 210	1.7	8.3	2.0	3 068
153	Gemplus International	Electronic & Electrical (25)	Luxembourg	72	0.3	865	8.3	2.4	13.2	1 195
154	Stork	Engineering & machinery (26)	The Netherlands	71	-4.1	1 824	3.9	5.2	5.6	1 316
155	ARM	IT hardware (93)	UK	71	4.1	216	32.8	23.0	91.5	2 356
156	EPCOS	Electronic & Electrical (25)	Germany	71	1.9	1 362	5.2	4.4	4.5	931
157	Orion	Health (44)	Finland	71	-17.9	1 944	3.6	6.6	15.3	1 602
158	Deutz	Engineering & machinery (26)	Germany	70	26.6	1 242	5.6	1.2	12.6	558
159	Barco	Electronic & Electrical (25)	Belgium	69	-1.0	672	10.3	8.7	15.7	764
160	Cobham	Aerospace & defence (21)	UK	69	20.5	1 388	5.0	13.7	7.0	2 178
161	Trelleborg	Automobiles & parts (31)	Sweden	68	27.0	2 537	2.7	4.0	3.1	1 119
162	Gambro	Health (44)	Sweden	68	-4.2	2 947	2.3	-1.8	3.2	3 722
163	Kone	Engineering & machinery (26)	Finland	67	-23.9	4 450	1.5	9.6	2.2	3 010
164	Cognis Deutschland	Chemicals (11)	Germany	66	1.5	3 073	2.1	3.4	8.2	..
165	Eberspaecher	Automobiles & parts (31)	Germany	66	7.0	1 468	4.5	1.8	12.8	..
166	Giesecke & Devrient	Support services (58)	Germany	63	-15.1	1 157	5.4	5.7	8.5	..
167	Cambridge Antibody	Pharma & biotech (48)	UK	62	-1.9	22	283.3	-265.0	220.2	511
168	Chiesi Farmaceutici	Pharma & biotech (48)	Italy	62	-4.7	474	13.1	9.8	24.8	..
169	Bang & Olufsen	Electronic & Electrical (25)	Denmark	61	28.2	486	12.6	9.3	22.6	622
170	Chr Hansen	Pharma & biotech (48)	Denmark	61	-9.6	601	10.1	7.2	16.7	1 070
171	Voest-Alpine	Steel & other metals (18)	Austria	60	16.3	5 779	1.0	8.9	2.5	2 540
172	Wartsila	Engineering & machinery (26)	Finland	59	-15.4	2 478	2.4	4.8	4.8	2 250
173	IWKA	Engineering & machinery (26)	Germany	59	-0.7	2 169	2.7	3.7	4.5	501
174	BOC	Chemicals (11)	UK	59	4.3	5 488	1.1	13.9	1.3	7 479
175	Vattenfall	Electricity (72)	Sweden	59	10.7	12 551	0.5	17.3	1.8	8 800
176	MG Technologies	Engineering & machinery (26)	Germany	59	-37.4	4 059	1.4	4.3	2.2	1 948
177	Koenig & Bauer	Engineering & machinery (26)	Germany	58	0.9	1 423	4.1	1.4	7.9	285
178	LogicaCMG	Software & computer services (97)	UK	58	-28.5	2 359	2.5	4.1	3.0	1 908
179	Repsol YPF	Oil & gas (7)	Spain	57	-57.5	40 585	0.1	9.2	1.8	29 484
180	Salzgitter	Steel & other metals (18)	Germany	57	-0.9	5 942	1.0	6.8	3.2	1 871
181	VA Technologie	Engineering & machinery (26)	Austria	56	-2.5	4 073	1.4	-1.8	3.4	997
182	Assa Abloy	Support services (58)	Sweden	55	11.9	2 826	2.0	10.9	1.9	3 601
183	Eidos	Software & computer services (97)	UK	55	20.3	189	29.3	-2.5	79.5	..
184	FastWeb	Telecommunication services (67)	Italy	55	43.6	720	7.7	-16.8	26.1	2 741
185	E ON	Utilities - other (77)	Germany	55	-20.3	44 745	0.1	13.2	0.8	54 599
186	Draka	Electronic & Electrical (25)	The Netherlands	54	24.2	1 743	3.1	-0.3	6.4	367
187	Symbian	Software & computer services (97)	UK	54	15.9	64	84.7	-65.7	73.8	..
188	Lafarge	Construction & building (13)	France	54	-3.6	14 436	0.4	12.9	0.7	13 686
189	Sorin	Health (44)	Italy	54	-11.3	719	7.5	-3.5	11.3	868
190	Bull	IT hardware (93)	France	54	-10.0	1 139	4.7	2.1	7.2	648
191	Bekaert	Engineering & machinery (26)	Belgium	54	49.8	2 173	2.5	10.6	4.4	1 463
192	HVB	Banks (81)	Germany	53	-41.8	9 219	0.6	-20.2	0.9	16 895
193	Intentia International	Software & computer services (97)	Sweden	51	1.2	330	15.6	-9.3	19.5	288
194	Nyco	Pharma & biotech (48)	Denmark	51	55.8	645	8.0	3.1	17.0	..
195	Genmab	Pharma & biotech (48)	Denmark	50	7.9	1	5 019.0	-10 766.4	243.6	403
196	Gamesa	Engineering & machinery (26)	Spain	50	22.4	1 736	2.9	16.0	6.9	2 851
197	Spectris	Electronic & Electrical (25)	UK	49	2.3	868	5.7	8.6	8.4	1 001
198	Software	Software & computer services (97)	Germany	49	-16.0	411	11.9	20.4	19.5	1 081
199	Axalto	Electronic & Electrical (25)	The Netherlands	48	-1.6	707	6.8	9.4	10.0	1 074
200	Deutsche Borse	Other financials (87)	Germany	47	-14.0	1 591	3.0	31.1	15.3	8 190

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
201	Wavecom	IT hardware (93)	France	47	-24.2	152	31.0	-53.4	102.8	161
202	UPM-Kymmene	Forestry & paper (15)	Finland	47	-2.1	9 820	0.5	6.0	1.3	8 388
203	Nexans	Electronic & Electrical (25)	France	47	0.0	4 900	1.0	2.2	2.7	835
204	Arla Foods	Food producers (43)	Denmark	46	-9.4	6 400	0.7	3.1	2.2	..
205	GN Store Nord	IT hardware (93)	Denmark	46	16.2	746	6.2	9.5	10.0	1 874
206	Kemira	Chemicals (11)	Finland	46	-4.6	2 533	1.8	5.1	4.7	1 435
207	Alfa Laval	Engineering & machinery (26)	Sweden	45	9.7	1 659	2.7	8.1	4.8	1 440
208	Leoni	Electronic & Electrical (25)	Germany	44	21.0	1 247	3.5	5.0	1.7	643
209	HeidelbergCement	Construction & building (13)	Germany	44	2.3	6 929	0.6	1.6	1.0	6 553
210	Getinge	Health (44)	Sweden	44	53.8	1 206	3.6	13.8	6.5	1 928
211	William Demant	Health (44)	Denmark	44	9.9	578	7.5	23.3	9.7	2 373
212	Gedeon Richter	Pharma & biotech (48)	Hungary	43	12.3	606	7.1	25.1	..	2 148
213	Telekom Austria	Telecommunication services (67)	Austria	42	-0.9	4 056	1.0	11.5	3.1	7 654
214	Groupe SEB	Household goods & textiles (34)	France	42	3.9	2 339	1.8	7.4	2.9	1 495
215	TTP Communications	IT hardware (93)	UK	42	31.3	88	47.4	-1.7	74.4	114
216	Borealis	Chemicals (11)	Denmark	41	-4.7	4 628	0.9	7.1	8.3	..
217	Outokumpu	Steel & other metals (18)	Finland	41	-14.6	7 136	0.6	7.6	2.1	2 235
218	Christian Dior	Household goods & textiles (34)	France	41	0.0	13 201	0.3	15.6	0.7	12 021
219	NKT	Electronic & Electrical (25)	Denmark	41	49.9	1 038	3.9	0.9	6.9	729
220	Acambis	Pharma & biotech (48)	UK	41	45.2	121	33.7	25.8	141.2	397
221	Burelle	Automobiles & parts (31)	France	41	-0.8	2 038	2.0	2.8	4.8	204
222	CSM	Food producers (43)	The Netherlands	40	0.0	3 475	1.2	6.4	2.9	2 070
223	SkyePharma	Pharma & biotech (48)	UK	40	11.6	88	44.9	-33.3	90.2	520
224	Filtronic	IT hardware (93)	UK	39	-1.5	335	11.8	1.2	11.7	281
225	Patria	Aerospace & defence (21)	Finland	39	46.5	346	11.4	8.7	19.8	..
226	Meggitt	Aerospace & defence (21)	UK	39	38.4	677	5.8	14.2	8.8	1 896
227	Aegis	Media & entertainment (54)	UK	39	7.0	1 055	3.7	9.6	3.8	1 894
228	Vestas Wind Systems	Electronic & Electrical (25)	Denmark	39	39.6	2 561	1.5	-0.4	..	2 662
229	IMMSI	Automobiles & parts (31)	Italy	39	2.1	1 137	3.4	4.3	5.9	484
230	Gildemeister	Engineering & machinery (26)	Germany	38	-8.1	1 052	3.6	4.0	7.5	268
231	Jungheinrich	Engineering & machinery (26)	Germany	38	15.1	1 531	2.5	4.8	4.2	312
232	IMI	Engineering & machinery (26)	UK	38	-5.0	2 276	1.7	6.8	2.2	2 239
233	Euronext	Other financials (87)	The Netherlands	38	75.2	887	4.2	25.9	15.0	3 307
234	Recordati	Pharma & biotech (48)	Italy	37	13.9	488	7.6	17.5	20.8	1 268
235	Novar	Construction & building (13)	UK	37	-12.4	2 089	1.8	2.9	2.8	..
236	Metsaliitto	Forestry & paper (15)	Finland	37	2.8	8 554	0.4	0.1	1.3	..
237	PUMA	Household goods & textiles (34)	Germany	37	23.4	1 530	2.4	23.9	10.6	3 613
238	Pilkington	Construction & building (13)	UK	37	-10.3	3 382	1.1	9.2	1.5	2 342
239	Zeltia	Pharma & biotech (48)	Spain	37	-28.3	79	46.5	-7.3	69.0	1 195
240	Haldex	Automobiles & parts (31)	Sweden	37	11.8	748	4.9	4.6	8.5	299
241	Danske Bank	Banks (81)	Denmark	37	..	3 623	1.0	50.0	2.3	14 801
242	Krka	Pharma & biotech (48)	Slovenia	35	14.3	473	7.4	15.4	7.5	1 109
243	Vilmorin Clause	Food producers (43)	France	35	18.0	492	7.1	9.5	11.5	507
244	IBS	Software & computer services (97)	Sweden	35	8.3	262	13.2	1.6	18.1	162
245	Cookson	Engineering & machinery (26)	UK	34	-24.8	2 335	1.5	2.8	2.1	914
246	RAG	Diversified industrials (24)	Germany	34	-23.1	15 796	0.2	-21.0	0.4	..
247	Ingenico	Electronic & Electrical (25)	France	34	-0.2	427	8.0	0.9	23.8	314
248	Neopost	Electronic & Electrical (25)	France	34	3.7	756	4.5	22.7	7.3	2 436
249	Phoenix Venture	Automobiles & parts (31)	UK	34	-73.6	2 361	1.4	-5.1	5.2	..
250	Auna	Telecommunication services (67)	Spain	34	58.7	4 217	0.8	7.2	7.3	..

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
251	Compagnie Generale de Geophysique	Oil & gas (7)	France	34	24.5	693	4.8	4.4	9.1	973
252	lastminute com	General retailers (52)	UK	33	7.6	621	5.4	-16.9	15.0	..
253	Technip	Oil & gas (7)	France	33	-0.3	5 141	0.6	2.4	1.7	4 516
254	Anglo American	Mining (4)	UK	33	15.4	18 341	0.2	17.7	0.2	39 633
255	Numico	Food producers (43)	The Netherlands	33	3.1	1 722	1.9	18.5	3.0	6 186
256	Micronic Laser Systems	IT hardware (93)	Sweden	33	-1.3	93	35.0	15.2	90.7	324
257	Duerr	Engineering & machinery (26)	Germany	33	-1.7	2 136	1.5	1.6	2.5	217
258	JCB Service	Engineering & machinery (26)	UK	32	31.4	1 274	2.5	1.5	7.5	..
259	Boots	General retailers (52)	UK	32	6.1	7 725	0.4	9.2	0.5	6 239
260	Biovitrum	Pharma & biotech (48)	Sweden	32	-10.8	71	45.0	-12.5	55.1	..
261	Jenoptik	Engineering & machinery (26)	Germany	32	1.3	2 523	1.3	1.1	3.2	413
262	Amer (now Amer Sports)	Household goods & textiles (34)	Finland	31	2.0	1 059	3.0	9.6	7.5	1 118
263	Sopra	Software & computer services (97)	France	31	6.5	629	5.0	6.2	4.2	551
264	Beru	Automobiles & parts (31)	Germany	31	5.9	386	8.1	13.3	11.7	700
265	Zambon	Pharma & biotech (48)	Italy	31	-3.4	433	7.2	6.3	13.2	..
266	Sud-Chemie	Chemicals (11)	Germany	31	6.2	862	3.6	5.7	6.1	526
267	TUI	Leisure & hotels (53)	Germany	31	47.4	18 046	0.2	4.6	0.5	4 199
268	Tioxide	Chemicals (11)	UK	31	4.3	2 921	1.0	1.1	5.1	..
269	Pace Micro Technology	Household goods & textiles (34)	UK	30	-21.2	339	8.9	1.7	50.4	243
270	Sartorius	Pharma & biotech (48)	Germany	30	8.1	468	6.3	6.5	8.0	410
271	Intracom	IT hardware (93)	Greece	29	-46.1	620	4.7	9.4	..	604
272	Dialog Semiconductor	IT hardware (93)	UK	29	-5.0	116	25.1	-5.7	103.5	110
273	Kontron	IT hardware (93)	Germany	28	8.1	262	10.9	6.7	15.8	389
274	Industrial and Financial Systems	Software & computer services (97)	Sweden	28	-4.8	241	11.8	-9.6	10.7	180
275	Tessenderlo	Chemicals (11)	Belgium	28	2.9	2 078	1.4	3.6	3.4	807
276	Innogenetics	Pharma & biotech (48)	Belgium	28	10.4	71	39.5	-20.8	47.6	284
277	GPC Biotech	Pharma & biotech (48)	Germany	28	86.4	13	212.4	-335.6	161.5	318
278	Ahlstrom	Chemicals (11)	Finland	28	-16.1	1 568	1.8	2.8	4.5	..
279	Sudzucker	Food producers (43)	Germany	28	6.2	4 827	0.6	11.0	1.6	3 252
280	Coloplast	Health (44)	Denmark	27	-1.4	816	3.3	16.3	4.5	1 989
281	Phoenix	Automobiles & parts (31)	Germany	27	-37.7	1 023	2.7	5.1	3.1	380
282	Imagination Technologies	IT hardware (93)	UK	27	19.5	43	63.2	-25.0	89.7	168
283	Vernalis	Pharma & biotech (48)	UK	27	-38.6	21	129.2	-202.8	207.1	191
284	Eramet	Steel & other metals (18)	France	27	22.7	1 990	1.4	-3.3	2.0	2 246
285	Delft Instruments	Engineering & machinery (26)	The Netherlands	27	60.0	279	9.6	8.7	22.4	..
286	Tate & Lyle	Food producers (43)	UK	27	11.8	4 239	0.6	6.9	4.0	3 196
287	BBC	Media & entertainment (54)	UK	27	-10.0	5 417	0.5	-5.5	1.0	..
288	Active Biotech	Pharma & biotech (48)	Sweden	26	-15.7	8	331.1	-291.2	175.4	182
289	Campina	Food producers (43)	The Netherlands	26	-1.5	3 559	0.7	0.4	3.7	..
290	LK	Mining (4)	Sweden	26	102.6	995	2.6	21.8	7.5	..
291	Flamel Technologies	Pharma & biotech (48)	France	26	74.8	41	63.4	15.9	116.1	266
292	Fortum	Oil & gas (7)	Finland	26	-25.7	11 665	0.2	16.1	2.0	13 685
293	ISOFT	Software & computer services (97)	UK	26	44.1	370	7.0	18.5	10.1	1 388
294	Henlys	Engineering & machinery (26)	UK	26	12.5	443	5.8	-7.8	9.0	..
295	Qiagen	Pharma & biotech (48)	The Netherlands	25	15.5	280	9.0	21.8	19.0	1 362
296	Nutreco	Food producers (43)	The Netherlands	25	4.1	3 858	0.7	3.1	2.0	1 269
297	Elekta	Health (44)	Sweden	25	19.6	321	7.8	10.9	22.0	1 054
298	Societe BIC	Household goods & textiles (34)	France	25	-17.9	1 386	1.8	11.5	2.9	2 497
299	MGI Coutier	Automobiles & parts (31)	France	25	6.7	461	5.3	5.2	5.6	91
300	KSB	Engineering & machinery (26)	Germany	25	2.1	1 267	1.9	2.0	2.0	257

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
301	Dunlop Standard Aerospace	Aerospace & defence (21)	UK	24	20.2	645	3.8	12.8	6.2	..
302	Renishaw	Electronic & Electrical (25)	UK	24	10.5	218	11.1	18.7	13.0	852
303	KPN	Telecommunication services (67)	The Netherlands	24	4.3	11 731	0.2	20.4	0.8	17 143
304	Guerbet	Pharma & biotech (48)	France	24	0.0	248	9.7	12.4	21.1	251
305	De La Rue	Support services (58)	UK	24	-21.1	909	2.6	5.9	3.6	953
306	Unit 4 Agresso	Software & computer services (97)	The Netherlands	24	8.9	276	8.6	7.2	14.1	327
307	Nolato	Chemicals (11)	Sweden	24	-13.4	266	8.9	8.1	8.7	137
308	Singulus Technologies	Engineering & machinery (26)	Germany	24	44.6	440	5.4	16.6	33.3	384
309	Stada Arzneimittel	Pharma & biotech (48)	Germany	23	12.2	814	2.9	10.3	9.0	1 564
310	La Poste	Support services (58)	France	23	76.9	18 677	0.1	3.3	0.1	..
311	ACTIELEC Technologies	Electronic & Electrical (25)	France	23	-24.5	228	10.0	2.9	12.2	101
312	IMERYS	Construction & building (13)	France	23	23.4	2 873	0.8	12.3	1.6	3 945
313	Bollore Investissement	Transport (59)	France	22	16.1	5 608	0.4	1.1	0.7	2 160
314	Vaisala	Electronic & Electrical (25)	Finland	22	5.7	181	12.3	13.2	20.4	309
315	ElringKlinger	Automobiles & parts (31)	Germany	22	12.7	454	4.9	15.6	7.1	622
316	ELMOS Semiconductor	IT hardware (93)	Germany	22	-8.0	143	15.4	20.0	23.7	255
317	Ultra Electronics	Aerospace & defence (21)	UK	22	22.2	452	4.8	11.5	8.2	805
318	Rockwool International	Construction & building (13)	Denmark	22	1.4	1 229	1.8	7.3	2.9	504
319	Fuchs Petrolub	Chemicals (11)	Germany	21	-5.3	1 096	2.0	7.6	5.1	716
320	Auriga Industries	Chemicals (11)	Denmark	21	-7.6	714	3.0	12.8	7.1	43
321	Andritz	Engineering & machinery (26)	Austria	21	-17.1	1 481	1.4	4.8	4.0	1 009
322	BTG	Support services (58)	UK	21	-21.8	54	39.1	-99.5	144.5	384
323	Galen (now Warner Chilcott)	Pharma & biotech (48)	UK	21	7.4	318	6.6	28.5	20.2	..
324	Systems Union	Software & computer services (97)	UK	21	36.3	147	14.3	4.7	16.8	202
325	Dyson Technology *(now Dyson James)*	Household goods & textiles (34)	UK	21	25.3	391	5.3	14.1	14.7	..
326	Abengoa	Diversified industrials (24)	Spain	21	3.9	1 687	1.2	5.8	2.2	1 040
327	Seco Tools	Engineering & machinery (26)	Sweden	21	-8.3	480	4.3	18.7	5.4	71
328	RM	Software & computer services (97)	UK	21	24.0	372	5.5	2.2	11.0	219
329	AMS *(now BAE Systems Integrated System)*	Aerospace & defence (21)	UK	20	54.3	671	3.1	5.2	5.0	..
330	Clarins	Personal care & household (47)	France	20	1.8	939	2.2	13.0	3.7	1 823
331	Q-Med	Pharma & biotech (48)	Sweden	20	19.6	91	22.2	-3.8	40.8	85
332	Dynea International	Chemicals (11)	Finland	20	1.0	1 065	1.9	3.4	6.4	..
333	Enodis	Engineering & machinery (26)	UK	20	8.3	927	2.2	6.4	3.3	722
334	Xenova	Pharma & biotech (48)	UK	20	-5.3	6	336.2	-324.8	216.9	25
335	CSR	IT hardware (93)	UK	20	64.5	186	10.8	23.3	80.9	873
336	Compagnie Industriali Riunite	Diversified industrials (24)	Italy	20	11.1	3 061	0.7	12.8	1.9	1 937
337	Enel	Electricity (72)	Italy	20	-52.4	34 329	0.1	13.1	0.3	42 674
338	Recticel	Chemicals (11)	Belgium	20	9.2	1 276	1.6	2.6	1.8	215
339	Pohjolan Voima	Electricity (72)	Finland	20	59.7	667	3.0	-0.3	22.7	..
340	Same Deutz-Fahr	Engineering & machinery (26)	Italy	20	..	905	2.2	3.6	7.8	..
341	British Energy	Electricity (72)	UK	20	-6.7	2 141	0.9	23.9	3.8	3 704
342	Egis Pharmaceuticals	Pharma & biotech (48)	Hungary	20	-1.7	354	5.6	8.1	..	497
343	GW Pharmaceuticals	Pharma & biotech (48)	UK	20	9.9	0	..	..	153.8	113
344	Telelogic	Software & computer services (97)	Sweden	20	-16.8	115	17.0	15.8	29.0	473
345	FAES Farma	Pharma & biotech (48)	Spain	20	..	163	12.0	12.3	26.1	902
346	RHI	Construction & building (13)	Austria	20	21.9	1 297	1.5	10.4	2.5	602
347	Finland Post	Support services (58)	Finland	20	-12.9	1 235	1.6	6.8	0.8	..
348	FLS Industries *(now FLSmidth)*	Engineering & machinery (26)	Denmark	19	29.4	1 979	1.0	0.3	3.4	770
349	Thrane & Thrane	Electronic & Electrical (25)	Denmark	19	85.2	123	15.7	11.5	29.8	141
350	Tenaris	Oil & gas (7)	Luxembourg	19	331.0	3 043	0.6	24.3	1.2	1 652

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
351	SGL Carbon	Electronic & Electrical (25)	Germany	19	-8.1	926	2.1	4.8	3.7	680
352	Biacore International	Health (44)	Sweden	19	40.4	55	34.9	-1.1	56.1	1 427
353	Hexagon	Engineering & machinery (26)	Sweden	19	22.8	914	2.1	7.2	3.2	853
354	Boliden	Mining (4)	Sweden	19	89.9	1 985	0.9	9.4	4.2	1 054
355	WEB DE	Software & computer services (97)	Germany	19	36.3	43	43.5	-15.1	41.0	371
356	OMV	Oil & gas (7)	Austria	19	-17.7	9 880	0.2	9.0	3.0	12 225
357	Urenco	Support services (58)	UK	19	-9.6	707	2.6	35.4	9.8	..
358	Biotest	Pharma & biotech (48)	Germany	19	0.9	218	8.5	8.4	18.1	114
359	Oxford Instruments	Electronic & Electrical (25)	UK	19	4.8	257	7.2	0.2	11.7	148
360	Oberthur Card Systems	Electronic & Electrical (25)	France	18	4.6	451	4.1	7.4	6.2	544
361	Rexam	Support services (58)	UK	18	-18.8	4 352	0.4	9.0	0.8	4 060
362	Beta Systems Software	Software & computer services (97)	Germany	18	60.7	101	18.2	3.9	21.2	50
363	Transgene	Pharma & biotech (48)	France	18	2.7	3	608.0	-862.4	108.6	105
364	ML Laboratories *(now Innovata)*	Pharma & biotech (48)	UK	18	18.2	11	165.7	-152.4	158.5	179
365	YIT	Support services (58)	Finland	18	12.5	3 033	0.6	4.4	0.8	1 882
366	Huhtamaki	Support services (58)	Finland	18	27.9	2 092	0.9	4.8	1.1	1 389
367	Cardo	Engineering & machinery (26)	Sweden	18	20.1	851	2.1	4.1	3.0	555
368	London Bridge Software	Software & computer services (97)	UK	18	-6.9	82	21.7	0.6	24.1	..
369	Aixtron	IT hardware (93)	Germany	18	23.8	140	12.6	5.8	42.3	245
370	Ardana Bioscience *(now Ardana)*	Pharma & biotech (48)	UK	18	..	0	..	-17 352.4	878.5	89
371	Psion	IT hardware (93)	UK	18	-1.7	191	9.2	-14.1	17.5	376
372	Funkwerk	Support services (58)	Germany	17	43.3	249	7.0	9.1	14.3	271
373	JoWooD Productions Software	Software & computer services (97)	Austria	17	91.8	17	101.3	-95.1	93.6	22
374	Heraeus	Steel & other metals (18)	Germany	17	-61.0	8 338	0.2	2.0	1.8	..
375	IMA Industria Macchine Automatiche	Engineering & machinery (26)	Italy	17	-5.9	363	4.7	8.8	6.9	391
376	ESI	Software & computer services (97)	France	17	34.7	58	29.5	-3.3	34.8	96
377	Lenzing	Chemicals (11)	Austria	17	11.4	871	2.0	12.3	3.6	692
378	Rautaruukki	Steel & other metals (18)	Finland	17	0.0	3 569	0.5	13.1	1.4	2 215
379	Hunter Douglas	Household goods & textiles (34)	The Netherlands	17	0.0	1 720	1.0	10.5	1.1	1 772
380	Elisa	Telecommunication services (67)	Finland	17	-29.2	1 356	1.3	14.7	3.0	1 952
381	Melexis	IT hardware (93)	Belgium	17	42.6	153	11.1	18.9	26.4	465
382	Rio Tinto	Mining (4)	UK	17	0.0	8 346	0.2	25.6	0.5	44 607
383	Anoto	IT hardware (93)	Sweden	17	-12.6	16	105.4	-75.6	127.7	175
384	BBA	Transport (59)	UK	17	26.6	1 942	0.9	6.8	1.3	2 120
385	Ilog	Software & computer services (97)	France	17	20.7	76	22.1	1.5	26.5	222
386	Torex Retail	Software & computer services (97)	UK	17	..	105	16.0	13.2	16.8	415
387	Telekomunikacja Polska	Telecommunication services (67)	Poland	17	15.3	4 560	0.4	18.6	0.5	6 971
388	Halma	Engineering & machinery (26)	UK	17	4.7	423	3.9	15.0	5.5	766
389	Morgan Crucible	Engineering & machinery (26)	UK	17	-25.5	1 124	1.5	-1.5	1.3	848
390	Bavarian Nordic	Pharma & biotech (48)	Denmark	16	92.6	22	74.9	-52.2	140.8	429
391	Spector Photo	Media & entertainment (54)	Belgium	16	-7.5	358	4.6	0.7	9.6	42
392	Aliaxis	Construction & building (13)	Belgium	16	2.0	1 680	1.0	9.5	1.4	..
393	WET Automotive Systems	Automobiles & parts (31)	Germany	16	25.1	177	9.2	16.0	5.1	168
394	NSB	Software & computer services (97)	UK	16	-21.6	64	25.5	-19.6	22.0	151
395	Intec Telecom Systems	Software & computer services (97)	UK	16	14.1	97	16.7	-1.9	23.6	267
396	Astex Technology *(now Astex Therapeutics)*	Pharma & biotech (48)	UK	16	31.2	4	401.8	-365.2	156.0	..
397	Bohler-Uddeholm	Steel & other metals (18)	Austria	16	4.2	1 934	0.8	9.7	1.4	1 573
398	Uponor	Engineering & machinery (26)	Finland	16	0.0	1 073	1.5	8.8	3.4	1 306
399	Crucell	Pharma & biotech (48)	The Netherlands	16	-20.3	18	88.8	-150.0	76.1	680
400	James Hardie Industries	Construction & building (13)	The Netherlands	16	-4.4	891	1.8	16.1	5.1	2 400

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
401	AVEVA	Software & computer services (97)	UK	16	63.6	81	19.6	10.0	33.4	256
402	Simcorp	Software & computer services (97)	Denmark	16	24.3	82	19.3	20.2	30.4	359
403	Intercell	Pharma & biotech (48)	Austria	16	17.9	3	524.0	-601.5	112.3	255
404	Wagon	Automobiles & parts (31)	UK	16	-22.9	688	2.3	2.8	2.9	162
405	Diageo	Beverages (41)	UK	16	-26.7	12 559	0.1	25.4	0.7	32 545
406	Gerling-Konzern Versicherungs	Insurance (83)	Germany	16	14.0	4 172	0.4	7.6	2.0	810
407	TT electronics	Electronic & Electrical (25)	UK	15	25.6	844	1.8	4.9	1.8	335
408	Cez	Electricity (72)	Czech Republic	15	..	3 300	0.5	22.8	0.8	10 160
409	Lectra	Software & computer services (97)	France	15	4.9	208	7.2	3.5	10.0	174
410	Dynaction	Chemicals (11)	France	15	0.0	259	5.8	4.3	8.3	60
411	Yule Catto	Chemicals (11)	UK	15	-6.3	776	1.9	5.2	4.5	494
412	Aviagen	Food producers (43)	UK	15	-29.5	199	7.4	23.1	9.8	..
413	Carlsberg	Beverages (41)	Denmark	15	142.1	4 838	0.3	4.6	0.6	3 184
414	Gewiss	Electronic & Electrical (25)	Italy	15	4.9	312	4.7	19.0	8.7	600
415	Medigene	Pharma & biotech (48)	Germany	14	-28.8	13	110.9	-110.3	123.2	133
416	AEA Technology	Support services (58)	UK	14	6.3	334	4.3	-5.2	5.4	153
417	Wanderer-Werke	Engineering & machinery (26)	Germany	14	125.0	410	3.5	8.1	4.4	106
418	Anite	Software & computer services (97)	UK	14	-13.9	268	5.4	0.3	8.4	326
419	Option	IT hardware (93)	Belgium	14	59.7	103	13.9	18.0	73.2	390
420	Brembo	Automobiles & parts (31)	Italy	14	24.5	678	2.1	8.1	3.6	429
421	Raisio	Food producers (43)	Finland	14	-32.7	627	2.3	32.4	7.1	405
422	Axis-Shield	Pharma & biotech (48)	UK	14	-22.2	74	19.1	-4.3	32.2	226
423	Augusta Technologie	IT hardware (93)	Germany	14	9.8	234	6.0	-2.8	14.8	45
424	Randox Laboratories	Pharma & biotech (48)	UK	14	2.0	44	32.0	-11.6	27.6	..
425	Axis	IT hardware (93)	Sweden	14	2.3	77	18.3	7.1	41.0	241
426	Muhlbauer	Engineering & machinery (26)	Germany	14	23.0	128	10.9	18.7	10.5	273
427	InBev	Beverages (41)	Belgium	14	0.0	8 568	0.2	9.7	0.2	19 252
428	BHP Billiton	Mining (4)	UK	14	-52.5	16 838	0.1	23.3	0.4	29 929
429	Bioinvent	Pharma & biotech (48)	Sweden	14	-3.8	7	199.4	-166.8	138.2	41
430	ProStrakan	Pharma & biotech (48)	UK	14	92.8	30	46.5	-84.8	88.4	..
431	Steag Hamatech	Engineering & machinery (26)	Germany	14	62.4	149	9.3	0.6	47.4	54
432	Vossloh	Engineering & machinery (26)	Germany	14	87.8	922	1.5	10.8	3.0	649
433	Hoganas	Mining (4)	Sweden	14	-8.8	461	3.0	14.7	..	648
434	SCI Entertainment	Software & computer services (97)	UK	14	19.6	44	31.4	14.6	99.4	394
435	Sanitec	Construction & building (13)	Finland	14	-13.8	899	1.5	-3.6	2.0	..
436	Evotec OAI	Pharma & biotech (48)	Germany	14	-10.9	73	18.9	-126.3	21.6	174
437	Omega Pharma	Pharma & biotech (48)	Belgium	14	102.8	833	1.7	5.4	5.1	1 279
438	Microscience	Pharma & biotech (48)	UK	14	-6.3	0	..	-26 250.8	193.7	..
439	Autonomy	Software & computer services (97)	UK	14	16.7	50	27.1	0.1	61.9	524
440	Domino Printing Sciences	Electronic & Electrical (25)	UK	13	12.4	252	5.4	13.7	7.5	396
441	SAES Getters	Electronic & Electrical (25)	Italy	13	5.0	142	9.5	18.8	14.2	257
442	Gamma	Household goods & textiles (34)	The Netherlands	13	-16.4	861	1.6	5.4	1.4	274
443	OMX	Other financials (87)	Sweden	13	-45.7	322	4.1	18.8	8.8	1 111
444	Union Electrica Fenosa	Electricity (72)	Spain	13	-28.1	5 717	0.2	12.7	0.6	7 468
445	Radiall	IT hardware (93)	France	13	4.8	163	8.0	1.8	7.8	125
446	Latecoere	Aerospace & defence (21)	France	13	225.0	260	5.0	4.5	6.0	297
447	Oxford Biomedica	Pharma & biotech (48)	UK	13	-14.7	1	1 298.0	-2 423.7	209.4	192
448	Ark Therapeutics	Pharma & biotech (48)	UK	13	70.4	0	..	-10 420.2	150.2	178
449	Channel Four Television	Media & entertainment (54)	UK	13	21.3	1 188	1.1	7.3	14.5	..
450	K+S	Chemicals (11)	Germany	13	-2.4	2 582	0.5	6.4	1.2	2 230

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
451	Lucite International	Chemicals (11)	UK	13	0.0	999	1.3	9.5	6.1	..
452	National Grid Transco	Utilities - other (77)	UK	13	-10.0	12 036	0.1	21.6	0.5	19 580
453	Arakis	Pharma & biotech (48)	UK	13	..	0	..	..	353.1	..
454	EYBL International	Automobiles & parts (31)	Austria	13	53.3	342	3.7	3.3	3.5	..
455	IONA Technologies	Software & computer services (97)	Ireland	13	-37.0	50	25.3	0.3	36.6	84
456	Genus	Support services (58)	UK	13	11.4	259	4.9	4.9	9.5	181
457	Bacou-Dalloz	Household goods & textiles (34)	France	13	3.3	706	1.8	1.6	2.1	569
458	Swedish Match	Tobacco (49)	Sweden	13	13.0	1 440	0.9	25.9	0.8	3 189
459	CODASciSys	Software & computer services (97)	UK	12	-1.2	96	13.0	5.3	14.7	144
460	ADVA	IT hardware (93)	Germany	12	0.8	102	12.2	7.2	27.6	232
461	Morphosys	Pharma & biotech (48)	Germany	12	37.7	22	56.3	0.6	105.9	209
462	Vectura	Pharma & biotech (48)	UK	12	23.8	4	308.3	-311.7	122.1	119
463	Exact	Software & computer services (97)	The Netherlands	12	-22.9	212	5.8	20.2	5.7	569
464	Tarkett	Household goods & textiles (34)	Germany	12	12.8	1 437	0.9	6.2	1.8	718
465	BWT	Engineering & machinery (26)	Austria	12	23.5	488	2.5	4.8	4.5	584
466	Stallergenes	Pharma & biotech (48)	France	12	43.3	95	12.9	16.6	24.0	341
467	SSL International	Personal care & household (47)	UK	12	-24.5	648	1.9	1.0	2.4	784
468	BE Semiconductor Industries	IT hardware (93)	The Netherlands	12	-8.8	126	9.6	-7.7	15.5	131
469	Gameloft	Software & computer services (97)	France	12	208.7	23	52.3	11.3	16.7	356
470	Elektrobit	Engineering & machinery (26)	Finland	12	22.3	203	5.9	16.4	8.7	324
471	Cerep	Pharma & biotech (48)	France	12	1.0	51	23.4	0.3	25.6	113
472	Empire Interactive	Software & computer services (97)	UK	12	-12.7	42	28.3	1.6	98.3	8
473	Teleca	Software & computer services (97)	Sweden	12	104.0	302	3.9	0.3	4.2	214
474	XRT	Software & computer services (97)	France	12	2.4	40	29.4	5.8	29.8	48
475	FKI	Engineering & machinery (26)	UK	12	-25.9	1 823	0.6	5.1	0.9	852
476	Wolfson Microelectronics	IT hardware (93)	UK	12	69.7	88	13.3	14.0	62.0	275
477	Royal Cosun	Food producers (43)	The Netherlands	12	26.1	1 317	0.9	8.8	2.9	..
478	Voca	Banks (81)	UK	12	-66.8	110	10.5	1.6	29.5	..
479	ARC International	IT hardware (93)	UK	12	-34.0	17	68.2	-79.7	78.8	75
480	Pharmagene	Pharma & biotech (48)	UK	12	4.1	6	193.0	-195.9	152.4	17
481	Raymarine	Electronic & Electrical (25)	UK	12	-5.1	150	7.7	3.4	20.3	247
482	Tecnomen	IT hardware (93)	Finland	12	22.3	51	22.5	3.1	32.4	48
483	Head	Household goods & textiles (34)	The Netherlands	11	13.9	351	3.2	1.9	..	93
484	Soitec	IT hardware (93)	France	11	0.8	139	8.2	-0.7	20.9	622
485	Balfour Beatty	Construction & building (13)	UK	11	-20.0	4 942	0.2	3.6	0.4	2 311
486	Miba	Automobiles & parts (31)	Austria	11	8.7	328	3.4	9.0	4.4	36
487	Wittington Investments	Food producers (43)	UK	11	33.3	7 394	0.2	7.8	0.3	..
488	O2	Telecommunication services (67)	UK	11	-20.0	9 440	0.1	4.8	0.8	18 377
489	Zentiva	Pharma & biotech (48)	The Netherlands	11	0.3	276	4.1	23.6	3.9	1 045
490	DICOM	Software & computer services (97)	UK	11	9.0	221	5.1	6.3	13.3	295
491	Vitec	Engineering & machinery (26)	UK	11	-10.2	262	4.3	7.0	7.2	216
492	Gunnebo	Support services (58)	Sweden	11	0.0	811	1.4	3.6	1.4	323
493	Eureko	Life assurance (84)	The Netherlands	11	400.0	6 534	0.2	10.0	0.8	..
494	Skanditek	Electronic & Electrical (25)	Sweden	11	1.3	68	16.1	4.6	32.6	149
495	F-Secure	Software & computer services (97)	Finland	11	24.5	47	23.2	13.2	37.4	258
496	Laird	Electronic & Electrical (25)	UK	11	28.3	661	1.6	8.8	2.1	740
497	Villeroy & Boch	Household goods & textiles (34)	Germany	11	-13.3	960	1.1	3.5	1.0	182
498	PSI	Software & computer services (97)	Germany	11	20.5	115	9.4	-7.9	9.8	55
499	Northgate Information Solutions	Software & computer services (97)	UK	11	10.8	193	5.6	-6.4	5.7	595
500	Arup	Engineering & machinery (26)	UK	11	-18.2	578	1.8	2.4	1.7	..

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
501	Portugal Telecom	Telecommunication services (67)	Portugal	11	-25.9	6 023	0.2	16.5	0.4	9 332
502	First Technology	Electronic & Electrical (25)	UK	11	-6.3	168	6.3	12.7	5.9	333
503	Staffware (now TIBCO BPM)	Software & computer services (97)	UK	11	5.7	60	17.6	6.5	30.3	..
504	Eniro	Media & entertainment (54)	Sweden	11	-5.0	544	1.9	18.5	2.2	1 319
505	Valio	Food producers (43)	Finland	11	2.9	1 582	0.7	4.3	2.4	..
506	Linedata Services	Software & computer services (97)	France	11	32.9	113	9.3	11.6	15.0	208
507	Royalblue	Software & computer services (97)	UK	10	8.6	84	12.5	13.6	21.6	315
508	NicOx	Pharma & biotech (48)	France	10	-31.4	2	522.0	-762.0	186.4	140
509	Datalogic	Support services (58)	Italy	10	8.9	146	7.1	11.5	11.9	291
510	Rational	Engineering & machinery (26)	Germany	10	-8.5	222	4.7	24.1	14.0	1 014
511	SUSS MicroTec	IT hardware (93)	Germany	10	-1.2	116	8.9	-8.2	..	79
512	Teligent	Software & computer services (97)	Sweden	10	66.7	40	25.8	-6.1	35.6	57
513	Croda International	Chemicals (11)	UK	10	7.3	416	2.5	16.0	6.5	744
514	Gyrus	Health (44)	UK	10	12.3	123	8.3	6.4	16.6	643
515	Pfeiffer Vacuum Technology	Engineering & machinery (26)	Germany	10	14.8	156	6.6	11.6	13.7	367
516	Plasmon	IT hardware (93)	UK	10	-14.0	63	16.3	-18.3	23.8	138
517	LISI	Aerospace & defence (21)	France	10	-10.5	541	1.9	8.2	2.0	586
518	Sygen International	Food producers (43)	UK	10	-6.5	183	5.6	4.9	8.1	178
519	NPM/CNP	Other financials (87)	Belgium	10	22.4	9 229	0.1	7.9	0.7	4 128
520	Palfinger	Engineering & machinery (26)	Austria	10	34.7	404	2.5	10.3	3.9	573
521	Vacon	Electronic & Electrical (25)	Finland	10	12.2	129	7.8	11.5	22.0	242
522	Edison	Utilities - other (77)	Italy	10	-23.1	5 696	0.2	9.9	2.6	7 675
523	Danieli	Engineering & machinery (26)	Italy	10	-16.7	1 008	1.0	7.1	2.9	371
524	Photo-Me	Media & entertainment (54)	UK	10	-7.5	333	3.0	14.6	6.0	633
525	PPL Therapeutics	Pharma & biotech (48)	UK	10	-27.7	0	..	-39 024.6	78.8	..
526	BG	Oil & gas (7)	UK	10	-12.5	5 766	0.2	36.5	2.0	25 621
527	Zetex	IT hardware (93)	UK	10	-20.1	102	9.7	6.3	13.1	137
528	Avon Rubber	Automobiles & parts (31)	UK	10	26.5	338	2.9	4.3	2.3	85
529	Biotage	Pharma & biotech (48)	Sweden	10	-3.5	41	23.8	-27.8	39.6	74
530	Isra Vision Systems	Engineering & machinery (26)	Germany	10	41.8	40	24.3	14.0	39.9	31
531	Roxboro	Electronic & Electrical (25)	UK	10	-14.8	168	5.8	7.7	6.7	167
532	Sydsvenska Kemi	Chemicals (11)	Sweden	10	-1.1	723	1.3	7.4	4.6	..
533	Observer	Support services (58)	Sweden	10	10.6	179	5.4	2.0	3.9	224
534	Charter	Engineering & machinery (26)	UK	10	-52.1	1 229	0.8	4.0	1.1	725
535	Nokian Tyres	Automobiles & parts (31)	Finland	10	15.7	602	1.6	18.3	3.4	2 049
536	Carraro	Automobiles & parts (31)	Italy	10	15.1	514	1.9	5.0	4.4	183
537	Ion Beam Applications	Health (44)	Belgium	9	-48.5	175	5.4	5.9	11.7	161
538	Kyro	Engineering & machinery (26)	Finland	9	-4.1	232	4.1	7.7	8.0	353
539	Karo Bio	Pharma & biotech (48)	Sweden	9	3.3	4	233.8	-293.2	110.0	37
540	MBDA	Aerospace & defence (21)	UK	9	-3.3	921	1.0	-0.2	2.9	..
541	Tekla	Software & computer services (97)	Finland	9	-25.6	38	24.1	-5.6	24.8	70
542	VOGT Electronic	Electronic & Electrical (25)	Germany	9	-7.1	306	3.0	-0.2	2.5	14
543	JCB Compact Products	Engineering & machinery (26)	UK	9	28.6	159	5.7	-1.4	17.3	..
544	Phytopharm	Pharma & biotech (48)	UK	9	-12.1	2	448.5	-652.1	224.3	58
545	Baltimore Technologies *(now Baltimore)*	Other financials (87)	UK	9	-43.2	26	34.3	-98.2	40.0	..
546	ICOS Vision Systems	IT hardware (93)	Belgium	9	36.6	89	10.0	30.6	33.9	261
547	Thomas Cook	Leisure & hotels (53)	Germany	9	76.1	7 479	0.1	-1.4	0.4	..
548	Alizyme	Pharma & biotech (48)	UK	9	-45.0	2	443.0	-352.0	553.8	233
549	Baxi	General retailers (52)	UK	9	-15.1	636	1.4	11.0	1.6	..
550	Compagnie de Fives-Lille	Diversified industrials (24)	France	9	9.0	877	1.0	3.9	2.2	..

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
551	Radstone Technology	IT hardware (93)	UK	9	35.1	70	12.3	16.4	20.1	126
552	Chemring	Aerospace & defence (21)	UK	9	27.2	177	4.8	13.7	5.2	226
553	KCI Konecranes	Engineering & machinery (26)	Finland	9	7.6	728	1.2	5.0	1.9	545
554	Marlborough Stirling	Software & computer services (97)	UK	8	29.7	133	6.3	-14.0	5.5	..
555	Karstadt Quelle	General retailers (52)	Germany	8	-60.6	13 447	0.1	-10.3	0.1	2 521
556	WEDECO	Engineering & machinery (26)	Germany	8	-3.3	126	6.6	-7.0	11.3	220
557	Biotie Therapies	Pharma & biotech (48)	Finland	8	-21.6	4	206.8	-181.1	176.0	40
558	P&I Personal & Informatik	Software & computer services (97)	Germany	8	-5.5	40	20.7	10.7	34.6	94
559	Delcam	Software & computer services (97)	UK	8	12.1	30	27.3	5.8	23.8	25
560	Franz Haniel & Cie	Pharma & biotech (48)	Germany	8	300.0	24 317	0.0	4.1	0.2	..
561	Servier	Pharma & biotech (48)	UK	8	1.7	10	79.9	5.4	121.1	..
562	Glunz & Jensen	IT hardware (93)	Denmark	8	-7.2	83	9.6	2.9	21.4	22
563	Pharmexa	Pharma & biotech (48)	Denmark	8	-35.7	3	264.7	-289.6	132.3	96
564	IDS Scheer	Software & computer services (97)	Germany	8	4.4	280	2.8	11.5	4.0	553
565	Weir	Engineering & machinery (26)	UK	8	11.3	1 044	0.7	7.2	1.0	1 055
566	Basler	Electronic & Electrical (25)	Germany	8	50.5	52	14.8	11.2	25.0	52
567	Huntleigh Technology	Health (44)	UK	8	2.5	281	2.7	13.9	3.0	268
568	JC Decaux	Media & entertainment (54)	France	8	-7.2	1 631	0.5	12.3	1.1	4 376
569	E2V (now e2v Technologies)	Electronic & Electrical (25)	UK	8	25.4	138	5.5	10.1	5.9	170
570	Robotic Technology Systems	Support services (58)	UK	8	13.2	69	11.0	-9.9	24.7	42
571	Mensch und Maschine Software	Software & computer services (97)	Germany	8	-6.4	135	5.6	-2.3	21.4	69
572	Napp Pharmaceutical	Pharma & biotech (48)	UK	8	-61.4	147	5.2	11.6	11.5	..
573	Biolipox	Pharma & biotech (48)	Sweden	8	25.1	0	..	..	229.7	..
574	Mariella Burani Fashion	Household goods & textiles (34)	Italy	8	56.7	412	1.8	7.2	3.5	308
575	Biocompatibles International	Health (44)	UK	8	17.0	4	188.0	-293.6	104.4	133
576	Energie Baden	Electricity (72)	Germany	8	-29.9	9 844	0.1	11.3	..	4 978
577	BPB	Construction & building (13)	UK	7	-1.8	3 272	0.2	13.5	0.6	5 167
578	Ubizen	Software & computer services (97)	Belgium	7	-25.1	43	17.4	-17.9	25.0	85
579	GfK	Support services (58)	Germany	7	-12.9	672	1.1	14.2	1.4	969
580	Walter	Engineering & machinery (26)	Germany	7	-28.0	261	2.8	15.4	3.9	388
581	Chloride	Electronic & Electrical (25)	UK	7	1.0	233	3.1	3.0	5.1	283
582	NXT	Electronic & Electrical (25)	UK	7	-19.6	9	80.1	-161.5	49.0	90
583	Torotrak	Automobiles & parts (31)	UK	7	-11.4	1	720.0	-1 191.5	75.0	95
584	Nedap	Electronic & Electrical (25)	The Netherlands	7	-21.7	124	5.8	14.6	12.0	189
585	Constantia-ISO	Construction & building (13)	Austria	7	-7.5	594	1.2	1.3	1.8	..
586	Spirax-Sarco Engineering	Engineering & machinery (26)	UK	7	3.5	460	1.6	15.7	1.7	821
587	SurfControl	Software & computer services (97)	UK	7	28.5	64	11.1	14.0	15.3	198
588	Macro 4	Software & computer services (97)	UK	7	-13.9	44	16.2	4.3	27.1	89
589	Telindus	IT hardware (93)	Belgium	7	36.2	532	1.3	-1.2	3.2	375
590	Northumbrian Water	Utilities - other (77)	UK	7	1.6	817	0.9	35.0	1.9	1 684
591	Games Workshop	Household goods & textiles (34)	UK	7	-24.8	193	3.7	10.2	2.2	182
592	Atria	Food producers (43)	Finland	7	4.5	834	0.8	4.7	..	190
593	Orc Software	Software & computer services (97)	Sweden	7	-16.9	27	25.9	12.4	44.5	83
594	NIBE Industrier	Household goods & textiles (34)	Sweden	7	27.3	350	2.0	12.1	1.8	417
595	Epigenomics	Pharma & biotech (48)	Germany	7	-26.9	8	86.8	-135.1	47.9	134
596	Prima Industrie	Engineering & machinery (26)	Italy	7	16.4	100	6.9	4.9	14.8	49
597	Teleste	IT hardware (93)	Finland	7	19.0	66	10.5	8.0	14.0	115
598	Net Insight	IT hardware (93)	Sweden	7	40.3	4	172.3	-208.9	106.0	86
599	Sodra	Forestry & paper (15)	Sweden	7	0.0	1 511	0.5	6.5	1.9	..
600	PiroNet NDH	Software & computer services (97)	Germany	7	192.7	35	19.6	9.7	21.4	63

Table A1.1 *(cont.)*

Listing of the EU-700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
601	Techem	Support services (58)	Germany	7	94.3	432	1.6	19.8	3.2	913
602	Proha	Software & computer services (97)	Finland	7	-13.9	66	10.3	-10.5	12.0	27
603	Grupo Empresarial ENCE	Forestry & paper (15)	Spain	7	112.9	470	1.4	2.8	4.7	588
604	Trintech	Software & computer services (97)	Ireland	7	10.8	41	16.5	2.7	21.4	42
605	DSV	Transport (59)	Denmark	7	31.5	2 432	0.3	3.9	0.7	1 722
606	Leifheit	Household goods & textiles (34)	Germany	7	-1.0	317	2.1	-4.1	3.2	113
607	Newport Networks	IT hardware (93)	UK	7	51.1	0	..	-2 365.3	102.3	78
608	CAF	Engineering & machinery (26)	Spain	7	..	578	1.1	3.1	1.7	298
609	Global Graphics	Software & computer services (97)	France	7	5.1	19	34.5	3.1	66.8	111
610	Provimi	Food producers (43)	France	7	-56.7	1 580	0.4	4.5	0.8	498
611	Body Shop International	General retailers (52)	UK	7	-13.2	592	1.1	8.9	1.0	705
612	Punch International	Electronic & Electrical (25)	Belgium	6	..	215	3.0	5.4	1.9	144
613	Oriflame Cosmetics	Personal care & household (47)	Belgium	6	2.9	671	1.0	15.6	1.4	1 086
614	Protherics	Pharma & biotech (48)	UK	6	23.6	27	23.7	-12.5	30.2	182
615	Lorantis	Pharma & biotech (48)	UK	6	17.2	0	..	..	130.6	..
616	HK Ruokatalo	Food producers (43)	Finland	6	4.3	680	0.9	4.6	1.3	269
617	Wavelight Laser Technologie	Health (44)	Germany	6	50.6	62	10.2	8.8	29.5	135
618	Sanochemia Pharmazeutika	Pharma & biotech (48)	Austria	6	52.0	26	24.3	-7.0	42.3	86
619	Rosenbauer International	Engineering & machinery (26)	Austria	6	0.0	299	2.1	6.7	4.6	102
620	Clearswift Systems	Software & computer services (97)	UK	6	-2.3	33	19.1	-53.7	29.5	..
621	Constantia Packaging	Support services (58)	Austria	6	31.7	945	0.7	7.6	1.2	542
622	Ricardo	Support services (58)	UK	6	-13.6	207	3.0	-1.3	3.6	188
623	ATB-Austria Antriebstechnik	Electronic & Electrical (25)	Austria	6	23.8	181	3.5	3.5	3.5	157
624	Greencore	Food producers (43)	Ireland	6	-15.7	1 446	0.4	5.8	0.6	677
625	Acerinox	Steel & other metals (18)	Spain	6	244.4	4 041	0.2	12.7	1.0	3 912
626	Otto	General retailers (52)	Germany	6	4.6	14 424	0.0	3.1	0.1	..
627	AIT (now Portrait Software)	Software & computer services (97)	UK	6	-31.2	28	22.0	11.8	38.7	18
628	Waterford Wedgwood	Household goods & textiles (34)	Ireland	6	-34.4	832	0.7	-2.2	0.7	252
629	EVS Broadcast Equipment	Electronic & Electrical (25)	Belgium	6	3.4	50	12.2	53.4	42.7	357
630	SolarWorld	Engineering & machinery (26)	Germany	6	22.0	200	3.1	16.5	10.7	1 131
631	Infovista	Software & computer services (97)	France	6	-2.9	29	21.0	-22.6	32.0	92
632	Senior	Engineering & machinery (26)	UK	6	13.0	460	1.3	3.6	1.2	223
633	Deceuninck	Construction & building (13)	Belgium	6	-4.6	582	1.0	3.9	2.0	567
634	Wienerberger	Construction & building (13)	Austria	6	-8.2	1 759	0.3	14.3	0.5	2 758
635	Larox	Support services (58)	Finland	6	..	97	6.2	5.2	13.8	36
636	Lufthansa	Transport (59)	Germany	6	-25.0	16 965	0.0	2.8	0.1	5 106
637	SoftM Software und Beratung	Software & computer services (97)	Germany	6	-6.3	88	6.8	1.3	12.6	21
638	Microgen	Software & computer services (97)	UK	6	76.9	60	10.0	0.4	12.0	113
639	TELES AG Informationstechnologien	Software & computer services (97)	Germany	6	33.3	79	7.6	5.4	11.9	172
640	Serco	Support services (58)	UK	6	..	1 951	0.3	4.3	0.2	1 658
641	AudioDev	IT hardware (93)	Sweden	6	15.6	30	19.5	13.3	47.5	50
642	GFT Technologies	Software & computer services (97)	Germany	6	25.8	126	4.6	-1.2	6.1	51
643	Group 4 Securicor	Support services (58)	UK	6	1 278.6	4 483	0.1	-0.9	0.0	2 766
644	Nordex	Engineering & machinery (26)	Germany	6	16.7	222	2.6	-12.9	7.9	97
645	MWG-Biotech	Pharma & biotech (48)	Germany	6	170.3	33	17.4	-112.3	17.6	11
646	MTL Instruments	Electronic & Electrical (25)	UK	6	9.4	90	6.4	7.6	7.5	99
647	Devro	Food producers (43)	UK	6	-0.7	210	2.7	14.4	2.7	283
648	Progress-Werk Oberkirch	Automobiles & parts (31)	Germany	6	-18.7	201	2.8	7.3	5.8	67
649	PZ Cussons	Personal care & household (47)	UK	6	7.4	690	0.8	9.9	0.5	781
650	LDV	Engineering & machinery (26)	UK	6	152.0	199	2.8	-8.8	6.1	..

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ Employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
651	Sveaskog	Forestry & paper (15)	Sweden	6	50.3	923	0.6	14.1	3.2	..
652	Efore	Electronic & Electrical (25)	Finland	6	48.7	73	7.7	11.6	11.0	77
653	IPTE	Engineering & machinery (26)	Belgium	6	-5.5	129	4.4	-1.4	4.3	26
654	Luxfer	Engineering & machinery (26)	UK	6	-2.4	321	1.8	5.2	2.8	..
655	GFI Informatique	Software & computer services (97)	France	6	24.5	518	1.1	-3.0	0.9	235
656	Dyson	Chemicals (11)	UK	6	7.5	83	6.7	-0.6	6.2	184
657	Schouw	Diversified industrials (24)	Denmark	6	-41.0	454	1.2	5.2	2.1	327
658	Pharming	Pharma & biotech (48)	The Netherlands	6	4.7	1	553.0	-2 076.3	141.8	284
659	Netia	Telecommunication services (67)	Poland	6	-26.2	220	2.5	10.4	..	1 301
660	LION Bioscience	Pharma & biotech (48)	Germany	5	-56.2	10	54.8	-144.2	64.5	9
661	Innovation	Software & computer services (97)	UK	5	-40.5	82	6.7	-14.8	5.6	185
662	ALTEC	Software & computer services (97)	Greece	5	58.1	289	1.9	0.0	5.8	36
663	Surteco	Household goods & textiles (34)	Germany	5	2.5	380	1.4	11.7	2.7	282
664	Aga Foodservice	Engineering & machinery (26)	UK	5	15.2	614	0.9	6.6	1.0	547
665	Karolin Machine Tool	Engineering & machinery (26)	Sweden	5	14.1	160	3.3	5.3	7.2	81
666	NeuroSearch	Pharma & biotech (48)	Denmark	5	..	16	33.4	-57.3	30.6	160
667	Thomas Swan	Chemicals (11)	UK	5	-11.1	40	13.3	-0.5	19.9	..
668	Pankl Racing Systems	Automobiles & parts (31)	Austria	5	-2.6	76	6.9	3.5	8.6	84
669	Severn Trent	Utilities - other (77)	UK	5	15.7	2 940	0.2	18.6	0.3	4 701
670	Xaar	Electronic & Electrical (25)	UK	5	-20.1	50	10.4	16.4	22.2	242
671	Infor Business Solutions	Software & computer services (97)	Germany	5	-57.8	57	9.1	-16.3	11.4	76
672	Posten	Support services (58)	Sweden	5	-81.9	2 828	0.2	3.1	0.1	..
673	Elexis	Electronic & Electrical (25)	Germany	5	-1.9	125	4.2	6.6	7.2	126
674	MessageLabs	Software & computer services (97)	UK	5	69.5	81	6.4	-8.2	9.3	..
675	IHC Caland *(now SBM Offshore)*	Oil & gas (7)	The Netherlands	5	-16.7	970	0.5	9.3	1.3	1 950
676	Superscape	Software & computer services (97)	UK	5	18.9	6	85.8	-143.8	76.9	69
677	Linn Products	Household goods & textiles (34)	UK	5	33.2	50	10.3	1.0	13.9	..
678	Norbrook Laboratories	Pharma & biotech (48)	UK	5	3.6	97	5.3	6.7	7.0	..
679	Stonesoft	Software & computer services (97)	Finland	5	-22.2	22	23.1	-46.6	19.7	34
680	Virbac	Pharma & biotech (48)	France	5	..	355	1.4	6.0	2.3	289
681	Umbro	Household goods & textiles (34)	UK	5	31.0	198	2.6	12.8	25.6	281
682	CML Microsystems	IT hardware (93)	UK	5	26.9	33	15.3	-0.8	22.7	78
683	Bespak	Health (44)	UK	5	-44.0	117	4.3	10.4	7.5	205
684	Norddeutsche Affinerie	Steel & other metals (18)	Germany	5	-16.7	2 481	0.2	2.3	1.6	610
685	Gorenje	Household goods & textiles (34)	Slovenia	5	7 042.9	903	0.6	3.2	0.5	320
686	Fiskars	Household goods & textiles (34)	Finland	5	25.0	597	0.8	10.1	1.3	863
687	Kaessbohrer Gelaendefahrzeug	Engineering & machinery (26)	Germany	5	-2.0	154	3.2	11.1	11.7	98
688	Kingspan	Construction & building (13)	Ireland	5	0.2	958	0.5	9.9	1.5	1 795
689	CeNeS Pharmaceuticals	Pharma & biotech (48)	UK	5	18.3	0	..	-10 610.5	350.7	47
690	Proteome Sciences	Pharma & biotech (48)	UK	5	-2.2	0	..	-7 958.3	116.9	161
691	Victrex	Chemicals (11)	UK	5	33.5	122	4.0	32.7	19.1	578
692	HITT	Electronic & Electrical (25)	The Netherlands	5	31.4	17	28.8	-0.3	31.8	29 808
693	Stralfors	Media & entertainment (54)	Sweden	5	..	339	1.4	2.7	2.8	127
694	Artwork Systems	Software & computer services (97)	Belgium	5	11.0	47	10.3	36.0	21.3	172
695	OFCOM	Media & entertainment (54)	UK	5	-0.4	205	2.4	18.8	6.3	..
696	British Vita	Chemicals (11)	UK	5	-5.7	1 355	0.4	4.8	0.6	..
697	Alphameric	Software & computer services (97)	UK	5	-17.8	99	4.8	-5.7	6.1	157
698	Sondagsavisen	Media & entertainment (54)	Denmark	5	39.2	165	2.9	3.5	4.9	127
699	TTP	Software & computer services (97)	UK	5	-17.7	32	14.8	-3.9	16.9	..
700	Intrum Justitia	Other financials (87)	Sweden	5	-23.5	315	1.5	11.5	1.6	437

Table A1.2

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
			Top 700 Companies	**212 785**	**6.9**	**5 121 736**	**4.2**	**8.6**	**11.3**	**6 855 871**
			number of companies for calculation	*700*	*693*	*700*	*699*	*699*	*662*	*686*
1	Pfizer	Pharma & biotech (48)	USA	5 653	7.8	38 637	14.6	26.8	49.2	141 853
2	Ford Motor	Automobiles & parts (31)	USA	5 444	-1.3	126 287	4.3	6.2	16.8	13 584
3	Toyota Motor	Automobiles & parts (31)	Japan	5 422	10.7	133 197	4.1	9.8	20.4	106 171
4	General Motors	Automobiles & parts (31)	USA	4 782	14.0	142 373	3.4	6.4	14.8	14 524
5	Microsoft	Software & computer services (97)	USA	4 550	-20.5	29 273	15.5	38.1	74.6	215 020
6	Matsushita Electric	Electronic & electrical (25)	Japan	4 419	6.3	62 562	7.1	2.8	13.2	31 262
7	IBM	Software & computer services (97)	USA	4 167	11.8	70 844	5.9	13.3	12.7	96 496
8	Johnson & Johnson	Pharma & biotech (48)	USA	3 828	11.1	34 835	11.0	27.1	34.8	139 050
9	Sony	Electronic & electrical (25)	Japan	3 604	-2.4	47 940	7.5	2.8	23.8	24 975
10	Intel	IT hardware (93)	USA	3 515	9.6	25 168	14.0	29.7	41.4	117 943
11	Samsung Electronics	Electronic & electrical (25)	South Korea	3 484	37.0	58 251	6.0	14.7	..	68 619
12	Honda Motor	Automobiles & parts (31)	Japan	3 358	4.2	62 106	5.4	8.7	24.4	35 907
13	Roche	Pharma & biotech (48)	Switzerland	3 295	6.9	20 233	16.3	24.0	50.9	92 766
14	Novartis	Pharma & biotech (48)	Switzerland	3 095	12.0	20 782	14.9	23.7	38.0	100 808
15	Merck	Pharma & biotech (48)	USA	2 950	26.2	16 876	17.5	33.9	46.8	49 348
16	Hitachi	IT hardware (93)	Japan	2 790	4.5	64 813	4.3	2.6	8.0	15 627
17	Hewlett-Packard	IT hardware (93)	USA	2 579	-4.0	58 787	4.4	5.2	17.1	51 028
18	Nissan Motor	Automobiles & parts (31)	Japan	2 544	18.0	53 340	4.8	9.9	20.6	35 606
19	Toshiba	IT hardware (93)	Japan	2 418	1.6	40 060	6.0	2.2	15.0	9 446
20	Cisco Systems	IT hardware (93)	USA	2 348	1.8	16 219	14.5	28.2	69.1	83 643
21	NTT	Telecommunication services (67)	Japan	2 284	-10.4	77 584	2.9	11.5	11.3	96 526
22	General Electric	Diversified industrials (24)	USA	2 274	16.4	112 096	2.0	21.0	7.4	269 147
23	Motorola	IT hardware (93)	USA	2 251	-18.9	23 045	9.8	10.2	33.1	38 681
24	Eli Lilly	Pharma & biotech (48)	USA	1 980	14.5	10 195	19.4	21.6	44.5	43 985
25	NEC	IT hardware (93)	Japan	1 977	7.3	34 859	5.7	2.7	13.4	7 706
26	Canon	Electronic & electrical (25)	Japan	1 977	6.2	24 899	7.9	15.8	18.3	32 628
27	Bristol-Myers Squibb	Pharma & biotech (48)	USA	1 839	9.7	14 258	12.9	22.3	42.8	35 701
28	Wyeth	Pharma & biotech (48)	USA	1 810	17.5	12 771	14.2	0.4	65.6	44 876
29	Fujitsu	IT hardware (93)	Japan	1 802	-12.2	34 225	5.3	0.8	11.5	8 966
30	Delphi	Automobiles & parts (31)	USA	1 545	5.0	21 058	7.3	-1.5	8.3	2 239
31	Denso	Automobiles & parts (31)	Japan	1 543	17.5	18 398	8.4	7.1	16.2	17 126
32	Amgen	Pharma & biotech (48)	USA	1 492	22.5	7 762	19.2	31.7	103.6	72 973
33	Texas Instruments	IT hardware (93)	USA	1 455	13.2	9 255	15.7	18.3	41.0	37 961
34	Nortel Networks	IT hardware (93)	Canada	1 441	-0.1	6 035	23.9	-2.0	42.2	10 500
35	Sun Microsystems	IT hardware (93)	USA	1 417	4.8	8 229	17.2	3.1	43.5	9 597
36	Boeing	Aerospace & defence (21)	USA	1 382	13.8	38 593	3.6	4.3	8.7	29 354
37	Hyundai Motor	Automobiles & parts (31)	South Korea	1 379	102.2	37 739	3.7	5.0	..	13 837
38	Procter & Gamble	Personal care & household (47)	USA	1 326	8.2	37 821	3.5	19.4	12.1	98 277
39	Abbott Laboratories	Health (44)	USA	1 248	-2.1	14 479	8.6	22.2	20.6	53 224
40	Fuji Photo Film	Media & entertainment (54)	Japan	1 244	8.9	18 383	6.8	6.5	17.0	12 543
41	Schering-Plough	Pharma & biotech (48)	USA	1 182	9.4	6 086	19.4	-0.9	38.8	23 636
42	Oracle	Software & computer services (97)	USA	1 097	16.7	8 681	12.6	33.9	22.0	50 323
43	LG Electronics	Electronic & electrical (25)	South Korea	1 097	40.8	30 737	3.6	7.4	..	7 104
44	STMicroelectronics	IT hardware (93)	Switzerland	1 065	24.6	6 442	16.5	7.7	21.5	11 259
45	Sharp	Electronic & electrical (25)	Japan	997	-8.8	16 207	6.1	4.6	21.6	12 522
46	El du Pont de Nemours	Chemicals (11)	USA	981	-1.2	20 114	4.9	7.2	16.3	30 584
47	Lucent Technologies	IT hardware (93)	USA	934	-14.7	6 655	14.0	15.1	29.4	9 647
48	Takeda Chemical *(now Takeda Pharmaceutical)*	Pharma & biotech (48)	Japan	931	4.4	7 800	11.9	39.9	63.8	34 095
49	United Technologies	Diversified industrials (24)	USA	924	22.3	27 549	3.4	11.9	4.4	38 925

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
50	Nestle	Food producers (43)	Switzerland	914	17.3	56 138	1.6	11.6	3.7	84 909
51	Mitsubishi Electric	IT hardware (93)	Japan	900	-22.5	23 763	3.8	2.7	9.1	8 189
52	Sanyo Electric	Electronic & electrical (25)	Japan	899	3.6	18 007	5.0	2.5	10.9	3 482
53	Ricoh	Electronic & electrical (25)	Japan	793	19.4	13 025	6.1	7.7	10.6	8 388
54	Dow Chemical	Chemicals (11)	USA	752	4.2	29 547	2.5	10.8	17.4	34 873
55	EMC	IT hardware (93)	USA	746	21.9	6 055	12.3	12.6	32.9	23 641
56	Applied Materials	IT hardware (93)	USA	730	7.7	5 895	12.4	22.0	59.9	21 069
57	Mitsubishi Heavy	Engineering & machinery (26)	Japan	715	-9.1	17 041	4.2	3.1	11.9	6 728
58	Freescale Semiconductor	IT hardware (93)	USA	710	..	4 205	16.9	4.7	32.0	11 972
59	Lockheed Martin	Aerospace & defence (21)	USA	708	6.5	26 137	2.7	5.7	5.4	20 605
60	Medtronic	Health (44)	USA	700	11.7	7 397	9.5	24.8	21.2	49 024
61	Advanced Micro Devices	IT hardware (93)	USA	688	9.7	3 680	18.7	3.8	43.2	6 067
62	Agilent Technologies	Electronic & electrical (25)	USA	686	-11.2	5 283	13.0	6.3	24.5	9 442
63	Caterpillar	Engineering & machinery (26)	USA	683	38.7	22 256	3.1	10.7	9.3	27 904
64	Honeywell	Aerospace & defence (21)	USA	675	22.1	18 835	3.6	8.5	6.2	24 436
65	Visteon	Automobiles & parts (31)	USA	659	-0.8	13 726	4.8	-2.2	9.4	947
66	Aisin Seiki	Automobiles & parts (31)	Japan	640	11.2	11 525	5.6	4.8	13.4	5 421
67	Mitsubishi Chemical	Chemicals (11)	Japan	636	-2.8	13 824	4.6	3.9	19.0	4 957
68	Mazda Motor	Automobiles & parts (31)	Japan	630	0.0	20 937	3.0	2.5	17.7	3 567
69	Eastman Kodak	Media & entertainment (54)	USA	628	9.3	9 945	6.3	0.3	11.5	5 462
70	Sankyo	Pharma & biotech (48)	Japan	623	0.1	4 282	14.5	13.1	54.1	3 480
71	Syngenta	Chemicals (11)	Switzerland	595	11.3	5 348	11.1	6.7	30.5	8 720
72	Altria	Tobacco (49)	USA	595	6.2	65 927	0.9	16.9	3.8	102 058
73	Tyco International	Diversified industrials (24)	Bermuda	577	16.9	29 541	2.0	12.5	2.2	42 585
74	Xerox	IT hardware (93)	USA	559	-12.4	11 567	4.8	5.9	9.6	9 770
75	Computer Associates	Software & computer services (97)	USA	559	7.6	2 597	21.5	3.3	36.5	11 615
76	3M	Diversified industrials (24)	USA	558	1.3	14 722	3.8	22.9	8.3	40 730
77	Micron Technology	IT hardware (93)	USA	555	15.0	3 240	17.1	6.1	31.0	5 036
78	Suzuki Motor	Automobiles & parts (31)	Japan	544	25.4	15 788	3.4	3.4	14.1	6 795
79	Sumitomo Chemical	Chemicals (11)	Japan	540	3.3	8 317	6.5	5.7	28.4	6 758
80	Qualcomm	IT hardware (93)	USA	530	37.6	3 590	14.8	41.9	69.7	48 929
81	Fujisawa Pharmaceutical	Pharma & biotech (48)	Japan	529	18.0	2 839	18.6	16.7	..	..
82	Bridgestone	Automobiles & parts (31)	Japan	523	2.7	17 351	3.0	7.7	4.6	12 139
83	Asea Brown Boveri	Electronic & electrical (25)	Switzerland	508	12.6	15 245	3.3	3.0	5.0	11 002
84	Yamanouchi Pharma *(now Astellas Pharma)*	Pharma & biotech (48)	Japan	503	4.8	3 670	13.7	19.3	55.5	14 597
85	Biogen Idec	Pharma & biotech (48)	USA	498	190.2	1 627	30.6	1.2	116.8	10 350
86	Eisai	Pharma & biotech (48)	Japan	495	15.6	3 591	13.8	16.7	64.3	7 885
87	Mitsubishi Motors	Automobiles & parts (31)	Japan	495	-11.7	18 089	2.7	-3.7	11.3	3 968
88	Exxon Mobil	Oil & gas (7)	USA	478	5.0	194 221	0.2	15.7	4.5	283 199
89	Electronic Arts	Software & computer services (97)	USA	466	23.9	2 302	20.2	20.9	76.3	13 372
90	Serono	Pharma & biotech (48)	Switzerland	451	25.7	1 808	24.9	21.3	91.9	5 847
91	Yamaha Motor	Automobiles & parts (31)	Japan	451	12.1	7 325	6.2	7.7	13.4	4 115
92	Deere	Engineering & machinery (26)	USA	450	5.9	13 002	3.5	8.5	9.7	12 989
93	ADP	Support services (58)	USA	428	16.4	5 705	7.5	18.5	10.2	19 107
94	Daiichi Pharmaceutical	Pharma & biotech (48)	Japan	424	10.6	2 317	18.3	14.4	..	4 972
95	Boston Scientific	Health (44)	USA	419	25.9	4 138	10.1	27.7	23.9	17 083
96	Fuji Heavy Industries	Automobiles & parts (31)	Japan	413	-4.3	10 335	4.0	3.4	15.1	2 502
97	Broadcom	IT hardware (93)	USA	407	-15.3	1 766	23.1	11.6	120.8	8 680
98	Pioneer	Electronic & electrical (25)	Japan	401	8.6	5 267	7.6	-0.2	10.2	2 134
99	Sumitomo Electric	Electronic & electrical (25)	Japan	397	13.6	11 074	3.6	4.1	4.5	6 534
100	Baxter International	Health (44)	USA	380	-6.5	6 996	5.4	5.6	7.9	18 452

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
101	Guidant	Health (44)	USA	380	-0.5	2 770	13.7	21.8	31.6	17 332
102	Johnson Controls	Automobiles & parts (31)	USA	379	6.4	19 536	1.9	4.9	3.1	8 243
103	Analog Devices	IT hardware (93)	USA	377	13.7	1 938	19.4	26.5	42.3	10 140
104	Monsanto	Chemicals (11)	USA	376	-3.0	4 015	9.4	8.6	29.8	12 882
105	Northrop Grumman	Aerospace & defence (21)	USA	371	26.0	21 963	1.7	6.7	3.0	14 444
106	Agere Systems	IT hardware (93)	USA	365	6.2	1 407	25.9	-6.0	55.3	1 508
107	Mitsubishi Pharma	Pharma & biotech (48)	Japan	363	4.7	1 690	21.5	8.8	59.3	3 247
108	Raytheon	Aerospace & defence (21)	USA	361	0.8	14 895	2.4	4.5	4.6	13 199
109	Apple Computer	IT hardware (93)	USA	360	3.8	6 091	5.9	3.9	30.8	28 160
110	Emerson Electric	Electronic & electrical (25)	USA	358	-5.4	11 488	3.1	13.0	3.3	20 977
111	Konica Minolta	Media & entertainment (54)	Japan	353	62.0	6 178	5.7	5.0	10.2	3 902
112	Asahi Kasei	Chemicals (11)	Japan	348	-1.8	9 000	3.9	3.9	13.9	5 057
113	Schlumberger	Oil & gas (7)	USA	344	-16.0	8 446	4.1	16.8	6.6	37 232
114	Dell	IT hardware (93)	USA	341	40.3	36 201	0.9	8.6	6.2	65 264
115	Kyocera	IT hardware (93)	Japan	335	-1.4	8 191	4.1	9.9	5.8	10 173
116	Omron	Electronic & electrical (25)	Japan	334	15.6	4 199	8.0	8.5	13.7	4 040
117	Komatsu	Engineering & machinery (26)	Japan	334	9.0	10 302	3.2	7.6	10.1	8 208
118	Tokyo Electron	IT hardware (93)	Japan	317	-11.9	3 803	8.3	3.5	35.7	7 652
119	LSI Logic	IT hardware (93)	USA	310	-2.6	1 251	24.8	-25.7	70.3	2 602
120	Alps Electric	Electronic & electrical (25)	Japan	305	12.4	4 621	6.6	5.3	9.3	2 078
121	Chiron	Pharma & biotech (48)	USA	304	5.6	1 268	24.0	4.1	56.3	5 074
122	Japan Tobacco	Tobacco (49)	Japan	303	-5.1	33 208	0.9	-0.1	7.7	10 274
123	LG Philips LCD	Electronic & electrical (25)	South Korea	296	49.2	5 916	5.0	21.2	22.5	13 176
124	Seiko Epson	Electronic & electrical (25)	Japan	295	-3.9	10 147	2.9	5.2	3.5	..
125	Google	Software & computer services (97)	USA	291	72.1	2 346	12.4	19.9	96.2	59 218
126	Taiwan Semiconductor Manufacturing	IT hardware (93)	Taiwan	291	-1.5	6 081	4.8	34.9	15.6	30 607
127	Kao	Personal care & household (47)	Japan	286	3.3	6 726	4.2	13.0	14.9	9 647
128	Yahoo!	Software & computer services (97)	USA	285	87.1	2 630	10.8	34.1	37.5	35 856
129	Hynix Semiconductor	IT hardware (93)	South Korea	281	13.0	4 168	6.7	24.6	..	7 185
130	Genzyme	Pharma & biotech (48)	USA	279	20.0	1 619	17.2	10.7	39.9	13 292
131	Goodyear	Automobiles & parts (31)	USA	278	7.9	13 515	2.1	4.2	3.3	2 287
132	Olympus	Electronic & electrical (25)	Japan	278	11.3	4 549	6.1	9.8	9.6	4 004
133	Applera	Pharma & biotech (48)	USA	277	16.6	1 343	20.7	6.4	51.8	3 021
134	Cadence Design Systems	Software & computer services (97)	USA	274	9.6	881	31.1	7.7	56.0	3 194
135	Telstra	Telecommunication services (67)	Australia	266	-22.7	12 273	2.2	29.8	6.9	16 195
136	Tokyo Electric Power	Electricity (72)	Japan	265	-8.4	34 850	0.8	8.8	5.1	24 117
137	JFE	Steel & other metals (18)	Japan	262	10.3	17 761	1.5	8.6	5.0	12 105
138	Corning	IT hardware (93)	USA	261	3.2	2 835	9.2	-25.0	10.6	20 946
139	PetroChina	Oil & gas (7)	China	261	21.8	34 546	0.8	38.9	0.6	119 046
140	National Semiconductor	IT hardware (93)	USA	260	-19.0	1 459	17.8	16.2	26.8	6 000
141	Veritas Software	Software & computer services (97)	USA	258	15.4	1 502	17.2	27.5	34.0	..
142	Toray Industries	Chemicals (11)	Japan	257	0.2	7 815	3.3	4.7	7.8	4 818
143	Korea Electric Power	Electricity (72)	South Korea	256	21.7	17 025	1.5	18.7	7.9	16 926
144	Avaya	IT hardware (93)	USA	256	-4.1	2 994	8.6	8.1	17.2	3 404
145	Intuit	Software & computer services (97)	USA	255	35.6	1 374	18.6	22.5	38.1	6 242
146	Allergan	Pharma & biotech (48)	USA	254	13.7	1 505	16.9	26.2	50.5	9 100
147	Teva Pharmaceutical Industries	Pharma & biotech (48)	Israel	249	58.5	3 531	7.1	12.0	18.0	14 514
148	TDK	Electronic & electrical (25)	Japan	248	8.3	4 731	5.2	8.9	6.7	7 164
149	Nvidia	IT hardware (93)	USA	247	24.1	1 479	16.7	5.7	117.3	3 723
150	Murata Manufacturing	IT hardware (93)	Japan	245	8.7	2 974	8.2	18.2	9.3	8 304

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
151	Symantec	Software & computer services (97)	USA	244	31.7	1 900	12.9	31.7	37.6	19 176
152	General Dynamics	Aerospace & defence (21)	USA	242	16.7	14 110	1.7	10.2	3.4	16 950
153	MedImmune	Pharma & biotech (48)	USA	241	109.4	840	28.7	-5.8	132.1	5 038
154	NCR	IT hardware (93)	USA	241	7.9	4 403	5.5	4.1	8.4	4 894
155	Amazon com	General retailers (52)	USA	241	13.8	5 092	4.7	6.3	26.7	13 395
156	Maxtor	IT hardware (93)	USA	238	-8.7	2 793	8.5	-4.1	17.4	961
157	Mitsui Chemicals	Chemicals (11)	Japan	236	-11.4	7 823	3.0	3.1	19.1	3 667
158	Teijin	Chemicals (11)	Japan	236	9.9	6 279	3.8	5.3	11.5	3 590
159	Whirlpool	Household goods & textiles (34)	USA	232	-3.1	9 726	2.4	5.6	3.4	4 148
160	Asahi Glass	Construction & building (13)	Japan	232	-11.5	10 595	2.2	8.4	4.1	8 386
161	Lexmark	IT hardware (93)	USA	230	17.7	3 909	5.9	13.8	17.2	5 361
162	Adobe Systems	Software & computer services (97)	USA	229	12.4	1 226	18.7	35.5	72.9	9 707
163	Xilinx	IT hardware (93)	USA	226	24.2	1 157	19.6	23.5	74.2	6 942
164	Textron	Diversified industrials (24)	USA	226	20.4	7 535	3.0	7.5	5.1	7 274
165	Maxim Integrated Products	IT hardware (93)	USA	225	12.5	1 059	21.3	42.1	29.7	10 299
166	Rohm	IT hardware (93)	Japan	225	-1.4	2 553	8.8	29.3	12.1	7 945
167	PPG Industries	Chemicals (11)	USA	223	4.5	6 999	3.2	12.0	7.0	8 201
168	Ono Pharmaceutical	Pharma & biotech (48)	Japan	222	1.6	1 001	22.2	38.0	83.9	4 375
169	Siebel Systems	Software & computer services (97)	USA	220	-3.2	986	22.3	10.2	43.7	3 170
170	Nikon	IT hardware (93)	Japan	217	9.7	3 636	6.0	-0.9	15.9	3 306
171	Unisys	Software & computer services (97)	USA	217	5.1	4 282	5.1	-0.1	5.9	1 606
172	Danaher	Engineering & machinery (26)	USA	216	42.0	5 069	4.3	16.0	6.2	12 785
173	Forest Laboratories	Pharma & biotech (48)	USA	216	19.1	2 246	9.6	37.4	42.1	10 025
174	Shionogi	Pharma & biotech (48)	Japan	214	-4.7	1 439	14.9	2.6	38.3	3 345
175	Toyota Industries	Automobiles & parts (31)	Japan	212	-0.5	8 360	2.5	4.4	7.7	7 001
176	Synopsys	Software & computer services (97)	USA	212	-0.2	803	26.4	8.0	48.4	1 827
177	Kyowa Hakko Kogyo	Pharma & biotech (48)	Japan	210	-5.6	2 505	8.4	0.9	33.3	2 280
178	BMC Software	Software & computer services (97)	USA	209	-51.5	1 076	19.4	1.6	30.3	3 282
179	eBay	General retailers (52)	USA	207	61.3	1 955	10.6	39.9	25.6	40 799
180	St Jude Medical	Health (44)	USA	207	16.9	1 688	12.3	23.2	26.3	12 157
181	Kla-Tencor	IT hardware (93)	USA	207	4.6	1 101	18.8	19.5	39.7	6 994
182	Kimberly-Clark	Personal care & household (47)	USA	206	-0.3	11 097	1.9	16.8	3.4	22 115
183	Fuji Electric	Electronic & electrical (25)	Japan	205	6.7	6 147	3.3	1.0	8.3	2 000
184	Kirin Brewery	Beverages (41)	Japan	203	6.4	8 788	2.3	9.1	9.1	7 073
185	Ajinomoto	Food producers (43)	Japan	202	6.2	7 464	2.7	4.8	8.1	4 927
186	Cephalon	Pharma & biotech (48)	USA	202	60.9	747	27.0	0.8	92.8	1 691
187	Shin-Etsu Chemical	Chemicals (11)	Japan	201	6.1	6 946	2.9	15.7	11.1	12 564
188	Accenture	Support services (58)	Bermuda	200	8.6	11 119	1.8	11.7	2.0	10 508
189	Tanabe Seiyaku	Pharma & biotech (48)	Japan	200	12.9	1 235	16.2	14.9	44.2	1 961
190	ATI Technologies	IT hardware (93)	Canada	199	26.7	1 469	13.5	12.5	73.5	2 190
191	Dana	Automobiles & parts (31)	USA	198	6.7	6 679	3.0	1.5	4.3	1 671
192	POSCO	Steel & other metals (18)	South Korea	197	8.4	17 038	1.2	22.5	..	14 022
193	Millennium Pharmaceuticals	Pharma & biotech (48)	USA	196	-15.9	330	59.4	-57.3	132.7	2 289
194	Marvell Technology	IT hardware (93)	Bermuda	196	22.9	901	21.7	13.2	102.0	9 210
195	ZTE	IT hardware (93)	China	195	43.0	1 886	10.4	7.9	7.7	15 927
196	Rohm & Haas	Chemicals (11)	USA	195	11.3	5 371	3.6	11.6	11.7	7 618
197	SK Telecom	Telecommunication services (67)	South Korea	194	15.9	7 513	2.6	22.0	26.4	11 406
198	Yokogawa Electric	Electronic & electrical (25)	Japan	194	7.0	2 670	7.3	0.7	10.6	2 294
199	Teradyne	IT hardware (93)	USA	193	2.9	1 318	14.6	10.5	31.1	2 168
200	Cypress Semiconductor	IT hardware (93)	USA	193	4.1	698	27.6	0.0	42.8	1 470

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
201	Eaton	Electronic & electrical (25)	USA	192	17.0	7 223	2.7	8.8	3.5	7 326
202	SEGA	Software & computer services (97)	Japan	192	-3.5	1 373	14.0	5.5	54.6	..
203	Dai Nippon Printing	Media & entertainment (54)	Japan	187	8.1	9 722	1.9	7.1	5.4	8 673
204	SunGard Data Systems	Software & computer services (97)	USA	187	22.3	2 547	7.3	22.6	14.4	..
205	Ciba Specialty Chemicals	Chemicals (11)	Switzerland	186	2.5	4 546	4.1	7.8	9.6	3 296
206	Novellus Systems	IT hardware (93)	USA	186	10.8	999	18.6	15.8	52.9	2 751
207	Tellabs	IT hardware (93)	USA	184	-12.5	906	20.3	-3.0	44.6	3 067
208	Halliburton	Oil & gas (7)	USA	184	5.0	15 056	1.2	-3.4	1.9	21 997
209	Calsonic Kansei	Automobiles & parts (31)	Japan	184	14.2	4 446	4.1	2.7	11.8	1 185
210	Goodrich	Aerospace & defence (21)	USA	183	11.5	3 476	5.3	7.5	12.5	4 401
211	Petroleo Brasiliero	Oil & gas (7)	Brazil	183	23.4	27 554	0.7	26.1	3.5	45 339
212	Atmel	IT hardware (93)	USA	182	-0.1	1 214	15.0	2.8	20.7	768
213	ChevronTexaco *(now Chevron)*	Oil & gas (7)	USA	178	1.7	110 994	0.2	13.8	3.8	95 489
214	Cummins	Engineering & machinery (26)	USA	177	20.5	6 208	2.9	6.6	6.3	2 968
215	Clariant	Chemicals (11)	Switzerland	177	-11.0	5 519	3.2	5.5	7.2	2 559
216	Comverse Technology	IT hardware (93)	USA	177	7.4	706	25.1	4.7	35.1	3 803
217	Conexant Systems	IT hardware (93)	USA	177	50.6	664	26.6	-30.8	73.6	599
218	Autodesk	Software & computer services (97)	USA	176	14.4	908	19.4	19.3	50.7	6 178
219	Alcan	Steel & other metals (18)	Canada	176	70.7	18 308	1.0	4.0	2.1	9 903
220	Juniper Networks	IT hardware (93)	USA	175	35.4	983	17.8	14.7	59.5	9 728
221	Taisho Pharmaceutical	Pharma & biotech (48)	Japan	174	-18.1	2 057	8.4	22.8	31.7	4 561
222	Becton Dickinson	Health (44)	USA	173	0.2	3 631	4.8	13.4	6.9	9 987
223	Daikin Industries	Electronic & electrical (25)	Japan	171	-0.4	4 493	3.8	7.5	10.0	4 924
224	United Microelectronics	IT hardware (93)	Taiwan	171	25.7	2 999	5.7	14.7	16.1	10 301
225	DST Systems	Software & computer services (97)	USA	171	26.2	1 787	9.5	15.5	15.5	3 090
226	McKesson	Food & drug retailers (63)	USA	170	0.5	59 236	0.3	-0.2	6.8	10 655
227	Sekisui Chemical	Construction & building (13)	Japan	170	1.3	5 851	2.9	3.2	10.0	2 438
228	Cerner	Software & computer services (97)	USA	170	28.1	682	24.9	12.3	31.7	2 161
229	Colgate-Palmolive	Personal care & household (47)	USA	169	11.9	7 787	2.2	19.8	4.7	20 178
230	Kansai Electric Power	Electricity (72)	Japan	167	-14.8	18 238	0.9	10.7	4.9	14 997
231	UTStarcom	IT hardware (93)	USA	165	40.7	1 989	8.3	2.4	20.1	713
232	Gilead Sciences	Pharma & biotech (48)	USA	165	35.6	975	16.9	47.7	99.4	14 226
233	Hon Hai Precision Industry	Electronic & electrical (25)	Taiwan	164	47.4	12 574	1.3	6.1	..	12 960
234	Toyoda Gosei	Automobiles & parts (31)	Japan	163	..	2 850	5.7	6.2	10.5	1 666
235	Yamaha	Household goods & textiles (34)	Japan	162	0.3	3 874	4.2	9.4	8.6	2 549
236	IHI	Engineering & machinery (26)	Japan	161	1.8	7 520	2.1	-3.7	7.1	1 552
237	Rockwell Collins	Aerospace & defence (21)	USA	160	0.9	2 156	7.4	14.9	10.2	6 372
238	Harman International Industries	Electronic & electrical (25)	USA	160	51.6	1 995	8.0	9.0	15.1	4 096
239	Human Genome Sciences	Pharma & biotech (48)	USA	159	17.7	3	5 290.3	-6 404.3	188.9	1 288
240	OKI Electric	IT hardware (93)	Japan	158	36.4	4 944	3.2	3.5	7.7	1 452
241	Kubota	Engineering & machinery (26)	Japan	158	-5.6	7 059	2.2	9.0	6.9	6 162
242	Advantest	IT hardware (93)	Japan	155	-8.4	1 251	12.4	16.7	43.8	5 916
243	Stryker	Health (44)	USA	155	17.1	3 136	5.0	17.0	9.8	15 588
244	Gillette	Personal care & household (47)	USA	154	3.5	7 708	2.0	23.1	5.4	38 112
245	Brother Industries	Electronic & electrical (25)	Japan	154	1.7	3 051	5.0	9.0	8.8	1 672
246	Toppan Printing	Media & entertainment (54)	Japan	153	5.2	9 315	1.6	4.6	4.8	5 129
247	Navistar International	Engineering & machinery (26)	USA	152	-4.2	6 966	2.2	4.6	10.3	1 735
248	Ciena	IT hardware (93)	USA	151	-3.4	220	68.7	-259.9	91.5	891
249	Mentor Graphics	Software & computer services (97)	USA	149	9.5	523	28.5	5.6	38.6	467
250	Western Digital	IT hardware (93)	USA	148	49.2	2 242	6.6	5.1	8.5	2 287

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
251	Beckman Coulter	Health (44)	USA	147	2.9	1 772	8.3	13.9	20.2	2 463
252	Novell	Software & computer services (97)	USA	146	8.1	858	17.0	4.3	23.6	1 665
253	Lear	Automobiles & parts (31)	USA	145	15.5	12 478	1.2	4.3	1.3	1 980
254	Storage Technology	IT hardware (93)	USA	145	-3.7	1 636	8.8	10.0	20.4	2 902
255	Japan Radio	Electronic & electrical (25)	Japan	144	-1.3	2 000	7.2	2.4	16.4	402
256	Namco	Software & computer services (97)	Japan	142	35.7	1 239	11.5	8.0	..	1 212
257	Dover	Diversified industrials (24)	USA	139	18.7	4 038	3.4	11.2	4.9	6 153
258	Furukawa Electric	Electronic & electrical (25)	Japan	137	-23.4	5 312	2.6	-18.0	5.3	2 095
259	Harley-Davidson	Automobiles & parts (31)	USA	137	11.3	3 914	3.5	25.5	15.4	10 519
260	China Petroleum & Chemical	Oil & gas (7)	China	135	-28.1	53 643	0.3	10.9	0.3	30 378
261	Givaudan	Personal care & household (47)	Switzerland	135	-4.2	1 734	7.8	18.1	22.8	3 583
262	AlCoA	Steel & other metals (18)	USA	134	-6.2	17 273	0.8	9.5	1.1	19 076
263	Altera	IT hardware (93)	USA	133	1.1	748	17.8	31.0	61.4	6 017
264	Bandai	Household goods & textiles (34)	Japan	132	23.9	1 890	7.0	10.0	45.1	1 644
265	Baker Hughes	Oil & gas (7)	USA	130	2.0	4 491	2.9	14.1	4.8	14 675
266	International Flavors & Fragrances	Personal care & household (47)	USA	129	10.0	1 496	8.6	15.0	24.7	2 566
267	TRW Automotive	Automobiles & parts (31)	USA	128	5.8	8 837	1.4	3.4	2.1	2 127
268	McAfee	Software & computer services (97)	USA	127	-6.4	670	19.0	61.8	43.1	3 534
269	Compuware	Software & computer services (97)	USA	127	-1.3	906	14.0	8.6	16.1	2 370
270	Chubu Electric Power	Electricity (72)	Japan	126	-4.3	15 085	0.8	13.0	7.3	13 359
271	Showa Denko	Chemicals (11)	Japan	126	3.5	5 318	2.4	4.0	11.3	2 394
272	Network Appliance	IT hardware (93)	USA	126	29.7	1 176	10.7	15.8	33.1	6 269
273	Mattel	Household goods & textiles (34)	USA	126	2.2	3 754	3.4	14.8	5.0	5 290
274	Lam Research	IT hardware (93)	USA	125	6.2	689	18.2	11.3	57.0	2 927
275	Statoil	Oil & gas (7)	Norway	125	2.3	36 898	0.3	21.4	5.2	38 424
276	Barr Pharmaceuticals	Pharma & biotech (48)	USA	124	85.3	963	12.9	14.6	82.9	3 604
277	Eastman Chemical	Chemicals (11)	USA	124	-10.6	4 841	2.6	2.7	10.3	3 225
278	AT&T	Telecommunication services (67)	USA	123	-39.7	22 467	0.5	-33.6	2.6	11 718
279	Scientific-Atlanta	Media & entertainment (54)	USA	123	6.4	1 257	9.8	17.1	16.3	4 047
280	Zimmer	Health (44)	USA	123	57.6	2 193	5.6	25.6	18.6	14 611
281	LG Chem	Chemicals (11)	South Korea	122	119.5	6 266	2.0	11.7	..	2 049
282	Vale Do Rio Doce	Mining (4)	Brazil	122	76.7	7 630	1.6	27.6	3.4	28 241
283	Kobe Steel	Steel & other metals (18)	Japan	122	-4.9	8 753	1.4	4.7	4.6	4 876
284	Shiseido	Personal care & household (47)	Japan	120	-4.7	4 594	2.6	-0.3	5.0	4 533
285	Meiji Seika Kaisha	Food producers (43)	Japan	120	-5.9	2 648	4.5	1.3	..	1 471
286	Bausch & Lomb	Health (44)	USA	120	8.4	1 642	7.3	12.5	9.6	3 216
287	Casio Computer	IT hardware (93)	Japan	119	17.1	4 014	3.0	6.4	9.8	2 857
288	Pitney Bowes	Electronic & electrical (25)	USA	119	9.9	3 647	3.3	17.5	3.4	7 521
289	Sepracor	Pharma & biotech (48)	USA	118	-27.4	280	42.0	-71.8	69.2	4 211
290	Unaxis	Diversified industrials (24)	Switzerland	117	16.9	1 197	9.7	-17.8	17.5	1 527
291	AU Optronics	Electronic & electrical (25)	Taiwan	116	48.0	3 903	3.0	17.0	5.8	7 002
292	General Mills	Food producers (43)	USA	116	6.0	8 144	1.4	18.9	4.2	12 845
293	Hasbro	Household goods & textiles (34)	USA	116	9.8	2 205	5.2	9.7	19.3	2 752
294	RF Micro Devices	IT hardware (93)	USA	115	22.1	467	24.6	-9.9	44.8	801
295	Sybase	Software & computer services (97)	USA	115	7.9	580	19.8	11.5	32.2	1 411
296	ArvinMeritor	Automobiles & parts (31)	USA	115	-6.6	5 910	1.9	1.2	3.7	1 037
297	ITT Industries	Engineering & machinery (26)	USA	115	28.5	4 976	2.3	9.0	2.6	7 367
298	Dainippon Pharmaceutical	Pharma & biotech (48)	Japan	114	4.7	1 227	9.3	6.5	46.8	1 410
299	East Japan Railway	Transport (59)	Japan	114	3.4	18 253	0.6	14.7	1.5	15 685
300	Nintendo	Software & computer services (97)	Japan	114	8.4	3 693	3.1	21.7	38.1	11 215

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
301	Nitto Denko	Chemicals (11)	Japan	114	14.2	3 250	3.5	12.3	8.6	7 269
302	Kaneka	Chemicals (11)	Japan	113	8.9	3 145	3.6	9.0	17.0	3 021
303	Sumitomo Rubber Industries	Automobiles & parts (31)	Japan	113	11.9	3 379	3.3	8.6	..	2 042
304	Skyworks Solutions	IT hardware (93)	USA	112	0.6	577	19.5	5.7	26.7	778
305	Nissan Diesel Motor	Automobiles & parts (31)	Japan	111	13.0	3 252	3.4	-9.2	..	756
306	Winbond Electronic	IT hardware (93)	Taiwan	111	-1.8	734	15.1	8.6	28.3	1 177
307	Brocade Communications	IT hardware (93)	USA	110	3.0	439	25.1	-4.5	106.0	816
308	Ingersoll-Rand	Engineering & machinery (26)	USA	110	-26.8	6 911	1.6	16.2	3.1	9 995
309	Kellogg	Food producers (43)	USA	110	17.5	7 073	1.5	17.4	4.4	13 770
310	JSR	Chemicals (11)	Japan	108	7.7	1 975	5.5	11.1	25.2	3 823
311	BEA Systems	Software & computer services (97)	USA	108	4.0	795	13.6	18.3	32.2	2 668
312	Dainippon Ink & Chemicals	Chemicals (11)	Japan	108	16.1	6 999	1.5	4.3	4.1	1 810
313	Kawasaki Heavy Industries	Engineering & machinery (26)	Japan	106	-4.9	8 330	1.3	1.3	3.6	2 258
314	Terumo	Health (44)	Japan	106	29.1	1 545	6.8	16.3	11.6	4 559
315	Proton Holdings Berhad	Automobiles & parts (31)	Malaysia	105	31.5	1 253	8.4	7.5	11.7	980
316	Benq	IT hardware (93)	Taiwan	105	30.4	4 057	2.6	4.2	7.3	1 995
317	Ivax	Pharma & biotech (48)	USA	104	30.7	1 352	7.7	14.7	10.3	5 114
318	SMC	Engineering & machinery (26)	Japan	104	10.1	1 775	5.9	22.2	9.3	6 273
319	Tostem Inax (now JS)	Construction & building (13)	Japan	104	6.8	6 946	1.5	5.7	3.6	4 052
320	Celgene	Pharma & biotech (48)	USA	104	31.0	278	37.3	11.3	135.3	5 798
321	American Standard Companies	Engineering & machinery (26)	USA	103	9.4	6 996	1.5	4.9	1.7	6 974
322	Fanuc	Electronic & electrical (25)	Japan	103	11.5	1 901	5.4	34.0	..	12 818
323	Swatch	Household goods & textiles (34)	Switzerland	102	-3.7	2 576	4.0	16.4	4.9	6 822
324	Exelixis	Pharma & biotech (48)	USA	101	7.9	39	259.8	-255.6	196.0	453
325	Federal-Mogul	Automobiles & parts (31)	USA	101	11.4	4 542	2.2	-1.5	2.3	32
326	Nanya Technology	IT hardware (93)	Taiwan	100	23.8	942	10.6	21.2	31.8	2 098
327	NGK Spark Plug	Automobiles & parts (31)	Japan	100	2.1	1 643	6.1	8.7	10.7	2 303
328	Yokohama Rubber	Automobiles & parts (31)	Japan	99	10.4	2 884	3.4	4.6	7.5	1 084
329	Thermo Electron	Electronic & electrical (25)	USA	99	-8.0	1 623	6.1	11.2	10.0	3 462
330	Time Warner	Media & entertainment (54)	USA	99	-3.6	30 966	0.3	15.6	1.2	61 822
331	Dade Behring	Pharma & biotech (48)	USA	99	14.0	1 148	8.6	11.8	16.4	2 412
332	Kuraray	Chemicals (11)	Japan	98	9.3	2 385	4.1	5.7	14.5	2 481
333	Nektar Therapeutics	Pharma & biotech (48)	USA	98	1.5	84	117.0	-64.4	148.4	783
334	Sumitomo Metal	Steel & other metals (18)	Japan	98	0.3	8 048	1.2	6.6	..	7 035
335	NTN	Engineering & machinery (26)	Japan	97	10.5	2 566	3.8	5.8	8.2	2 043
336	Brunswick	Household goods & textiles (34)	USA	97	10.9	3 847	2.5	8.1	3.8	3 228
337	Tektronix	IT hardware (93)	USA	96	28.9	677	14.2	16.2	25.0	1 461
338	KDDI	Telecommunication services (67)	Japan	96	27.6	20 434	0.5	10.4	7.3	17 114
339	Pliva	Pharma & biotech (48)	Croatia	95	19.7	831	11.5	13.5	14.3	..
340	International Game Technology	Leisure & hotels (53)	USA	95	36.2	1 828	5.2	36.5	19.4	6 811
341	NPS Pharmaceuticals	Pharma & biotech (48)	USA	95	19.1	10	948.1	-1 157.9	266.3	291
342	Watson Pharmaceuticals	Pharma & biotech (48)	USA	94	29.1	1 207	7.8	15.2	24.5	2 666
343	Air Products and Chemicals	Chemicals (11)	USA	93	4.6	5 453	1.7	13.0	4.7	9 982
344	ConocoPhillips	Oil & gas (7)	USA	93	-7.4	99 377	0.1	11.0	2.6	68 225
345	Norsk Hydro	Oil & gas (7)	Norway	92	-10.6	18 880	0.5	21.4	2.5	19 752
346	Symbol Technologies	Electronic & electrical (25)	USA	92	15.0	1 274	7.2	8.1	17.1	1 594
347	SanDisk	IT hardware (93)	USA	92	48.4	1 307	7.0	23.4	105.0	4 870
348	Bombardier	Aerospace & defence (21)	Canada	91	-21.3	9 726	0.9	0.5	1.5	3 576
349	Illinois Tool Works	Engineering & machinery (26)	USA	91	15.6	8 631	1.1	17.5	1.9	18 207
350	BorgWarner	Automobiles & parts (31)	USA	91	4.2	2 594	3.5	9.7	6.2	2 422

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
351	NGK Insulators	Diversified industrials (24)	Japan	91	-3.1	1 804	5.0	6.9	10.4	2 705
352	Hilti	Construction & building (13)	Liechtenstein	90	1.7	2 134	4.2	8.9	6.0	..
353	Protein Design Labs	Pharma & biotech (48)	USA	90	48.1	71	127.0	-60.8	136.6	2 050
354	Applied Micro Circuits	IT hardware (93)	USA	90	-4.7	187	48.0	-56.4	119.0	607
355	Medarex	Pharma & biotech (48)	USA	90	27.8	9	997.3	-1 449.3	206.3	821
356	Rockwell Automation	Electronic & electrical (25)	USA	90	-6.4	3 245	2.8	12.7	4.3	6 994
357	Celanese	Chemicals (11)	USA	89	13.1	5 101	1.8	2.7	9.8	2 953
358	Osaka Gas	Utilities - other (77)	Japan	89	-9.8	6 830	1.3	8.9	5.8	5 299
359	Sammy	Leisure & hotels (53)	Japan	89	53.2	1 804	4.9	27.3	46.1	..
360	PMC-Sierra	IT hardware (93)	USA	89	0.9	219	40.5	12.7	93.2	1 154
361	Actelion	Pharma & biotech (48)	Switzerland	88	72.2	305	28.9	20.2	103.7	1 831
362	Hospira	Pharma & biotech (48)	USA	88	..	1 946	4.5	16.2	6.3	4 525
363	Amylin Pharmaceuticals	Pharma & biotech (48)	USA	88	87.5	25	351.8	-444.3	146.6	1 529
364	Rieter	Engineering & machinery (26)	Switzerland	88	5.1	2 053	4.3	6.6	6.5	1 029
365	Molex	Electronic & electrical (25)	USA	88	1.7	1 653	5.3	9.6	4.1	3 579
366	Black & Decker	Household goods & textiles (34)	USA	87	18.1	3 972	2.2	11.7	3.3	5 176
367	Chartered Semiconductor	IT hardware (93)	Singapore	87	-5.0	686	12.7	3.1	..	1 347
368	UBE Industries	Chemicals (11)	Japan	87	6.1	3 672	2.4	-1.2	7.6	1 684
369	Oji Paper	Forestry & paper (15)	Japan	86	-6.2	8 475	1.0	4.5	4.4	4 045
370	Glory	Engineering & machinery (26)	Japan	85	17.3	1 269	6.7	16.7	16.9	931
371	Santen Pharmaceutical	Pharma & biotech (48)	Japan	85	-6.8	645	13.2	14.7	36.4	1 539
372	Funai Electric	Electronic & electrical (25)	Japan	84	26.8	2 456	3.4	10.5	21.5	2 575
373	Adaptec	IT hardware (93)	USA	84	10.7	349	24.0	-20.0	54.9	271
374	Hyundai Heavy Industries	Engineering & machinery (26)	South Korea	83	15.9	8 460	1.0	1.0	3.2	3 534
375	Micronas Semiconductor	IT hardware (93)	Switzerland	83	30.7	623	13.3	18.1	43.2	1 006
376	Intersil	IT hardware (93)	USA	83	23.1	394	21.0	3.1	55.8	2 143
377	CR Bard	Health (44)	USA	82	27.7	1 218	6.7	22.2	9.5	5 073
378	Harris	IT hardware (93)	USA	82	11.8	1 853	4.4	7.6	7.5	3 597
379	Electronics For Imaging	IT hardware (93)	USA	82	14.9	290	28.2	3.6	57.4	825
380	Kos Pharmaceuticals	Pharma & biotech (48)	USA	82	112.7	366	22.3	23.5	77.6	2 465
381	Toto	Construction & building (13)	Japan	82	0.6	3 360	2.4	5.7	4.7	2 114
382	OSI Pharmaceuticals	Pharma & biotech (48)	USA	81	18.6	31	262.0	-589.2	179.7	1 482
383	Andrew	IT hardware (93)	USA	81	31.0	1 353	6.0	3.9	10.3	1 324
384	Mitsubishi Materials	Steel & other metals (18)	Japan	81	-3.2	6 808	1.2	2.2	3.9	2 429
385	Synthes	Health (44)	Switzerland	81	70.1	1 309	6.2	28.8	14.6	10 506
386	Tokyo Gas	Utilities - other (77)	Japan	80	-4.7	8 270	1.0	7.5	5.1	7 736
387	Silicon Graphics	IT hardware (93)	USA	80	-36.4	619	12.9	-7.0	30.1	162
388	Dainippon Screen Mfg	Engineering & machinery (26)	Japan	80	3.4	1 378	5.8	1.8	17.9	1 297
389	Vitesse Semiconductor	IT hardware (93)	USA	80	-1.5	161	49.6	-14.0	102.6	340
390	Bio-Rad Laboratories	Health (44)	USA	80	14.9	802	9.9	11.0	15.3	1 089
391	Lubrizol	Chemicals (11)	USA	80	15.3	2 324	3.4	6.7	10.2	2 128
392	Daicel Chemical Industries	Chemicals (11)	Japan	80	-5.6	2 023	3.9	4.9	14.2	1 551
393	Mitsubishi Rayon	Chemicals (11)	Japan	80	2.7	2 223	3.6	6.7	9.3	1 841
394	Parametric Technology	Software & computer services (97)	USA	80	-18.5	486	16.3	5.1	26.1	1 266
395	Fujikura	Electronic & electrical (25)	Japan	79	-3.0	2 379	3.3	-2.7	2.9	1 636
396	Ebara	Engineering & machinery (26)	Japan	79	-22.3	3 646	2.2	0.5	5.2	968
397	Abgenix	Pharma & biotech (48)	USA	79	29.3	13	605.5	-1 044.8	150.5	681
398	Vertex Pharmaceuticals	Pharma & biotech (48)	USA	79	-23.5	76	103.4	-154.1	106.7	1 192
399	Kajima	Construction & building (13)	Japan	78	-4.6	11 644	0.7	0.2	7.9	3 103
400	Newell Rubbermaid	Household goods & textiles (34)	USA	78	-14.8	4 965	1.6	1.5	2.5	5 033

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
401	Cognos	Software & computer services (97)	Canada	78	16.2	607	12.8	19.2	23.6	2 397
402	Asustek Computer	IT hardware (93)	Taiwan	77	44.3	5 805	1.3	6.2	..	5 848
403	Linear Technology	IT hardware (93)	USA	77	14.5	594	13.0	54.1	25.2	8 489
404	Kyushu Electric Power	Electricity (72)	Japan	77	-2.5	9 992	0.8	13.6	4.0	7 657
405	CV Therapeutics	Pharma & biotech (48)	USA	77	49.6	15	509.7	-728.6	288.5	853
406	Integrated Device Technology	IT hardware (93)	USA	76	5.3	287	26.6	0.3	25.8	857
407	AGCO	Engineering & machinery (26)	USA	76	45.2	3 880	2.0	6.1	5.3	1 393
408	Paccar	Engineering & machinery (26)	USA	76	27.3	8 384	0.9	14.4	3.7	8 974
409	Mitsubishi Gas Chemical	Chemicals (11)	Japan	76	-8.9	2 446	3.1	5.5	16.6	2 078
410	Saurer	Engineering & machinery (26)	Switzerland	75	0.7	1 614	4.7	4.9	8.5	802
411	Delta Electronics	Electronic & electrical (25)	Taiwan	75	2.6	1 311	5.7	10.2	1.9	2 415
412	Research In Motion	IT hardware (93)	Canada	74	61.5	994	7.5	2.5	20.9	9 686
413	Cell Therapeutics	Pharma & biotech (48)	USA	74	13.0	22	338.2	-813.8	185.1	127
414	Tosoh	Chemicals (11)	Japan	74	-1.0	3 478	2.1	4.3	8.0	1 849
415	Chunghwa Picture Tubes	Electronic & electrical (25)	Taiwan	74	5.3	2 719	2.7	10.2	3.5	2 319
416	Schindler	Engineering & machinery (26)	Switzerland	74	-18.0	5 351	1.4	6.3	1.9	3 857
417	Georg Fischer	Engineering & machinery (26)	Switzerland	74	1.8	2 290	3.2	4.6	6.0	877
418	Engelhard	Chemicals (11)	USA	74	7.3	3 065	2.4	7.5	11.3	2 537
419	Gazprom	Utilities - other (77)	Russia	73	31.4	26 825	0.3	30.7	0.2	60 537
420	JDS Uniphase	IT hardware (93)	USA	73	-35.3	468	15.6	-30.7	12.1	1 652
421	KT	Telecommunication services (67)	South Korea	73	-64.1	12 130	0.6	12.5	1.7	8 271
422	Sumitomo Bakelite	Chemicals (11)	Japan	73	-0.9	1 222	6.0	7.0	..	1 151
423	Macromedia	Software & computer services (97)	USA	72	7.9	321	22.6	13.0	50.1	2 095
424	Maytag	Household goods & textiles (34)	USA	72	-8.2	3 474	2.1	0.7	4.3	1 117
425	Tekelec	IT hardware (93)	USA	72	33.9	292	24.7	4.6	48.1	927
426	Quantum	IT hardware (93)	USA	71	-6.6	584	12.2	-1.2	28.5	382
427	Anritsu	IT hardware (93)	Japan	71	-25.2	563	12.6	3.6	19.9	520
428	Hyperion Solutions	Software & computer services (97)	USA	71	30.5	458	15.5	11.0	28.6	1 303
429	Hoya	Electronic & electrical (25)	Japan	71	43.9	1 949	3.6	21.9	3.9	11 052
430	Kissei Pharmaceutical	Pharma & biotech (48)	Japan	71	-24.8	418	16.9	16.4	42.1	809
431	Qlogic	IT hardware (93)	USA	71	9.2	421	16.8	39.3	83.3	2 248
432	Endress & Hauser	Electronic & electrical (25)	Switzerland	70	15.2	785	8.9	8.5	11.2	..
433	Sanken Electric	Electronic & electrical (25)	Japan	70	12.6	1 057	6.6	7.3	7.1	1 065
434	3Com	IT hardware (93)	USA	70	-15.8	514	13.6	-50.2	36.4	970
435	SEI Investments	Support services (58)	USA	70	67.8	509	13.7	36.9	34.4	2 787
436	Avid Technology	IT hardware (93)	USA	70	11.0	434	16.1	11.5	34.7	1 043
437	Leica Geosystems	Electronic & electrical (25)	Switzerland	70	-0.6	500	13.9	9.3	29.1	710
438	Parker Hannifin	Engineering & machinery (26)	USA	70	1.6	5 229	1.3	7.9	1.4	5 833
439	Nippon Oil	Oil & gas (7)	Japan	70	-3.5	30 728	0.2	-3.1	4.8	8 536
440	ON Semiconductor	IT hardware (93)	USA	70	10.4	932	7.5	11.8	6.7	1 002
441	Minebea	Electronic & electrical (25)	Japan	69	-1.0	1 928	3.6	6.2	1.6	1 243
442	SIG	Support services (58)	Switzerland	69	-9.2	1 694	4.1	-7.0	10.3	1 131
443	FMC	Chemicals (11)	USA	69	6.9	1 509	4.6	9.6	13.5	2 031
444	Ranbaxy Laboratories	Pharma & biotech (48)	India	69	67.6	936	7.3	15.4	7.4	3 377
445	Openwave Systems	Software & computer services (97)	USA	69	-19.0	214	32.1	-7.1	54.2	845
446	Toyo Tire	Automobiles & parts (31)	Japan	69	4.8	1 839	3.7	2.5	11.0	645
447	Tohoku Electric Power	Electricity (72)	Japan	69	-10.9	11 220	0.6	9.8	3.7	7 766
448	Microchip Technology	IT hardware (93)	USA	69	9.0	623	11.0	30.7	17.4	4 736
449	Campbell Soup	Food producers (43)	USA	68	5.7	5 230	1.3	15.5	2.9	9 223
450	Reynolds and Reynolds	Software & computer services (97)	USA	68	5.4	723	9.5	15.4	15.6	1 326

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
451	Compal Electronics	Electronic & electrical (25)	Taiwan	68	12.0	5 335	1.3	4.1	3.4	2 818
452	Quanta Computer	Electronic & electrical (25)	Taiwan	68	15.8	7 662	0.9	3.7	..	4 526
453	Valeant Pharmaceuticals	Pharma & biotech (48)	USA	68	104.2	502	13.6	-3.6	15.8	1 338
454	Citizen Watch	Household goods & textiles (34)	Japan	68	12.6	2 698	2.5	9.9	3.8	1 958
455	International Rectifier	IT hardware (93)	USA	68	16.8	780	8.7	11.3	11.7	2 048
456	Taisei	Construction & building (13)	Japan	68	-4.8	11 477	0.6	-0.7	..	2 881
457	Cell Genesys	Pharma & biotech (48)	USA	68	8.0	8	847.0	-754.4	179.7	195
458	Polycom	IT hardware (93)	USA	68	26.8	397	17.1	7.8	47.1	1 140
459	Nippon Shokubai	Chemicals (11)	Japan	68	2.1	1 219	5.6	8.0	25.5	1 348
460	Ballard Power Systems	Automobiles & parts (31)	Canada	68	-11.7	60	112.5	-222.6	..	449
461	McData	IT hardware (93)	USA	67	3.0	294	22.9	-6.5	66.8	544
462	Lattice Semiconductor	IT hardware (93)	USA	67	4.4	166	40.3	-24.8	66.4	369
463	National Instruments	Software & computer services (97)	USA	66	11.5	378	17.5	11.8	19.1	1 606
464	Yue Yuen Industrial	Household goods & textiles (34)	Hong Kong	66	6.1	2 001	3.3	10.6	0.3	3 727
465	Incyte	Pharma & biotech (48)	USA	65	-24.1	10	649.4	-1 065.3	349.1	444
466	Toyobo	Household goods & textiles (34)	Japan	65	3.2	2 679	2.4	1.3	..	1 244
467	Mylan Laboratories	Pharma & biotech (48)	USA	65	-12.8	922	7.0	24.9	21.6	2 877
468	Pentax	Media & entertainment (54)	Japan	64	12.5	966	6.7	4.2	12.5	358
469	PerkinElmer	IT hardware (93)	USA	64	4.7	1 241	5.2	10.4	6.4	1 950
470	Chi Mei Optoelectronic	Electronic & electrical (25)	Taiwan	64	35.2	2 820	2.3	15.1	5.2	5 121
471	Edwards Lifesciences	Health (44)	USA	64	19.5	685	9.3	4.7	12.3	1 938
472	China Motor	Automobiles & parts (31)	Taiwan	64	15.5	1 661	3.8	..	..	999
473	Activision	Software & computer services (97)	USA	64	-11.6	1 034	6.2	13.1	36.8	2 941
474	Akebono Brake Industry	Automobiles & parts (31)	Japan	64	1.9	1 015	6.3	6.3	13.8	502
475	Citrix Systems	Software & computer services (97)	USA	64	34.0	545	11.7	21.8	23.9	2 941
476	Isis Pharmaceuticals	Pharma & biotech (48)	USA	63	27.2	31	203.8	-288.4	208.5	237
477	Chugoku Electric Power	Electricity (72)	Japan	63	1.8	6 943	0.9	11.0	4.4	5 432
478	American Power Conversion	Electronic & electrical (25)	USA	63	26.6	1 251	5.0	12.6	9.8	3 812
479	Hamamatsu Photonics	Electronic & electrical (25)	Japan	63	0.4	506	12.4	11.8	20.1	1 074
480	Tokuyama	IT hardware (93)	Japan	63	12.5	1 575	4.0	6.2	13.8	1 608
481	Nidec	IT hardware (93)	Japan	63	28.2	1 992	3.2	8.1	0.9	6 137
482	Take-Two Interactive Software	Software & computer services (97)	USA	63	239.1	830	7.5	8.4	43.7	1 310
483	NSK	Engineering & machinery (26)	Japan	63	5.0	3 749	1.7	4.5	3.2	2 132
484	Nissan Chemical Industries	Chemicals (11)	Japan	62	15.8	1 119	5.6	9.1	..	1 664
485	Creo	IT hardware (93)	Canada	62	6.9	468	13.3	1.9	15.7	..
486	Transkaryotic Therapies	Pharma & biotech (48)	USA	62	13.6	57	108.6	-96.2	154.8	..
487	Clorox	Personal care & household (47)	USA	62	10.5	3 181	1.9	19.9	7.2	6 492
488	Weatherford International	Oil & gas (7)	USA	62	0.8	2 304	2.7	13.2	3.3	6 735
489	Nippon Kayaku	Chemicals (11)	Japan	61	0.0	919	6.7	7.1	15.6	977
490	Mettler-Toledo International	Engineering & machinery (26)	Switzerland	61	6.7	1 033	5.9	11.9	7.0	1 562
491	Huntsman	Chemicals (11)	USA	61	26.5	8 450	0.7	2.3	5.4	3 560
492	Zeon	Chemicals (11)	Japan	61	19.2	1 531	4.0	3.1	21.5	1 524
493	Denki Kagaku Kogyo	Chemicals (11)	Japan	61	-2.5	1 803	3.4	6.0	..	1 352
494	Theravance	Pharma & biotech (48)	USA	61	31.2	7	869.0	-1 190.1	247.3	799
495	Avery Dennison	Chemicals (11)	USA	61	10.0	3 929	1.5	8.1	2.8	4 551
496	Fairchild Semiconductor	IT hardware (93)	USA	60	9.6	1 179	5.1	7.9	6.7	1 442
497	Advanced Semiconductor Engineering	IT hardware (93)	Taiwan	60	9.8	1 897	3.2	5.5	1.7	2 285
498	Alpharma	Pharma & biotech (48)	USA	60	28.8	985	6.1	-14.2	14.3	606
499	InterMune	Pharma & biotech (48)	USA	60	-32.2	111	53.9	-33.4	183.5	361
500	Asahi Breweries	Beverages (41)	Japan	60	12.2	6 394	0.9	10.2	3.8	4 341

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
501	Federated Department Stores	General retailers (52)	USA	60	35.0	11 499	0.5	9.0	0.5	9 394
502	Nippon Shinyaku	Pharma & biotech (48)	Japan	59	4.8	369	16.1	6.5	..	420
503	Credence Systems	IT hardware (93)	USA	59	9.5	324	18.3	-13.8	31.4	653
504	Mindspeed Technologies	IT hardware (93)	USA	59	..	88	66.5	-77.5	92.5	113
505	Macronix International	IT hardware (93)	Taiwan	59	-6.9	533	11.0	2.6	15.6	546
506	Zoran	IT hardware (93)	USA	58	96.0	279	20.9	-12.4	62.5	459
507	Yamatake	Electronic & electrical (25)	Japan	58	-8.8	1 220	4.8	3.8	8.7	967
508	Quest Software	Software & computer services (97)	USA	58	16.1	287	20.1	8.5	25.5	965
509	Toyo Ink Manufacturing	Chemicals (11)	Japan	58	0.5	1 554	3.7	3.7	9.5	817
510	FileNET	Software & computer services (97)	USA	58	1.6	292	19.7	7.1	35.8	874
511	Chunghwa Telecom	Telecommunication services (67)	Taiwan	58	-4.1	4 299	1.3	33.5	2.0	13 236
512	Silicon Image	IT hardware (93)	USA	57	79.8	127	45.2	0.0	170.4	542
513	Trimble Navigation	Electronic & electrical (25)	USA	57	14.6	492	11.6	11.8	26.4	1 431
514	Convergys	Support services (58)	USA	57	-17.8	1 830	3.1	7.4	0.9	1 454
515	AMIS	IT hardware (93)	USA	57	9.9	381	14.9	16.6	22.1	717
516	Praxair	Chemicals (11)	USA	57	2.7	4 851	1.2	16.9	2.1	12 222
517	Showa	Automobiles & parts (31)	Japan	56	11.2	1 576	3.6	6.5	7.4	800
518	ECI Telecom	IT hardware (93)	Israel	56	-8.9	365	15.3	1.1	21.2	669
519	Valspar	Chemicals (11)	USA	56	8.9	1 796	3.1	11.1	7.4	1 838
520	JohnsonDiversey	Chemicals (11)	USA	55	0.2	2 332	2.4	4.8	4.6	..
521	Nippon Sheet Glass	Construction & building (13)	Japan	55	-13.6	1 932	2.9	4.1	4.9	1 371
522	Shimizu	Construction & building (13)	Japan	55	3.0	10 196	0.5	3.2	..	3 076
523	Silicon Laboratories	IT hardware (93)	USA	55	55.1	336	16.4	23.9	93.7	1 123
524	Affymetrix	Pharma & biotech (48)	USA	55	12.5	255	21.4	17.3	60.1	2 157
525	Energizer	Electronic & electrical (25)	USA	54	43.7	2 069	2.6	13.8	4.2	3 254
526	MeadWestvaco	Support services (58)	USA	54	4.2	6 053	0.9	-4.5	1.9	3 904
527	Logitech International	IT hardware (93)	Switzerland	54	20.6	1 091	5.0	11.6	7.9	2 760
528	Yaskawa Electric	IT hardware (93)	Japan	54	9.0	1 889	2.9	4.1	7.1	1 214
529	Enterasys Networks	IT hardware (93)	USA	54	-12.3	263	20.6	-24.4	47.2	175
530	Mercury Interactive	Software & computer services (97)	USA	54	31.9	504	10.8	13.0	20.4	2 441
531	Emulex	IT hardware (93)	USA	54	19.5	268	20.1	-136.8	103.2	1 178
532	Sealed Air	Support services (58)	USA	54	6.1	2 794	1.9	12.6	3.1	3 250
533	Invitrogen	Health (44)	USA	54	33.9	753	7.1	13.2	14.2	3 347
534	Thq	Software & computer services (97)	USA	54	98.0	557	9.6	9.8	41.3	1 072
535	Meiji Dairies	Food producers (43)	Japan	53	7.4	5 183	1.0	2.3	7.1	1 231
536	Nippon Paint	Chemicals (11)	Japan	53	9.4	1 426	3.7	5.9	12.4	736
537	Varian Medical Systems	Health (44)	USA	53	21.8	909	5.8	20.7	16.2	3 810
538	ICOS	Pharma & biotech (48)	USA	53	-16.3	55	96.0	-265.1	78.3	1 133
539	L-3 Communications	IT hardware (93)	USA	52	34.9	5 074	1.0	10.9	1.2	6 681
540	Fair Isaac	Software & computer services (97)	USA	52	5.2	520	10.1	24.9	17.1	1 873
541	I2 Technologies	Software & computer services (97)	USA	52	-12.5	286	18.2	3.3	25.4	344
542	Cooper Industries	Electronic & electrical (25)	USA	52	11.4	3 283	1.6	11.1	1.9	4 397
543	Sasol	Oil & gas (7)	South Africa	52	-41.0	7 855	0.7	15.4	1.7	17 142
544	Shimadzu	Engineering & machinery (26)	Japan	52	9.6	1 565	3.3	5.8	6.5	1 286
545	Amada	Engineering & machinery (26)	Japan	51	12.9	1 182	4.4	2.7	10.7	2 219
546	Telenor	Telecommunication services (67)	Norway	51	-8.3	7 380	0.7	11.3	2.4	11 020
547	Creative Technology	IT hardware (93)	Singapore	51	18.3	600	8.5	5.4	..	453
548	Nippon Unipac *(now Nippon Paper)*	Forestry & paper (15)	Japan	51	5.9	8 563	0.6	4.2	3.7	2 961
549	palmOne	IT hardware (93)	USA	51	-37.3	699	7.3	-1.7	73.0	1 131
550	Taiwan Power	Electricity (72)	Taiwan	51	6.6	7 788	0.7	13.3	2.3	..

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
551	Intergraph	Software & computer services (97)	USA	51	0.1	405	12.5	41.7	14.5	845
552	Cae	Electronic & electrical (25)	Canada	51	3.8	606	8.4	-40.3	10.2	1 246
553	Fortune Brands	Diversified industrials (24)	USA	51	18.2	5 386	0.9	16.0	1.6	9 867
554	American Axle & Manufacturing	Automobiles & parts (31)	USA	51	13.0	2 648	1.9	7.3	4.6	1 037
555	Borland Software	Software & computer services (97)	USA	50	6.0	228	22.0	6.0	36.8	343
556	NetIQ	Software & computer services (97)	USA	50	-4.3	192	26.1	-73.6	37.9	430
557	International Paper	Forestry & paper (15)	USA	50	-6.9	18 796	0.3	3.8	0.6	11 299
558	King Pharmaceuticals	Pharma & biotech (48)	USA	50	54.1	960	5.2	-17.2	18.1	2 437
559	Varian Semiconductor Equipment	IT hardware (93)	USA	50	11.9	390	12.8	16.1	34.5	1 176
560	LTX	IT hardware (93)	USA	50	2.4	188	26.5	2.1	78.4	257
561	Nihon Unisys	Software & computer services (97)	Japan	50	4.6	2 222	2.2	-1.4	5.7	775
562	ADTRAN	IT hardware (93)	USA	50	15.9	334	14.8	22.7	31.1	1 418
563	Verisign	Software & computer services (97)	USA	50	20.7	858	5.8	11.0	15.5	4 561
564	Smith International	Oil & gas (7)	USA	49	20.9	3 251	1.5	9.9	3.7	5 337
565	Estee Lauder	Personal care & household (47)	USA	49	10.5	4 260	1.2	10.5	2.2	3 699
566	Brooks Automation	IT hardware (93)	USA	49	-7.9	397	12.4	5.6	26.0	500
567	Elbit Systems	Aerospace & defence (21)	Israel	49	21.7	692	7.1	7.9	8.5	696
568	Cirrus Logic	IT hardware (93)	USA	49	-12.3	143	34.4	-19.6	81.5	458
569	IDX Systems	Software & computer services (97)	USA	49	20.4	383	12.8	8.4	20.4	720
570	Aspen Technology	Software & computer services (97)	USA	49	-8.7	240	20.4	-3.5	31.5	172
571	CuraGen	Pharma & biotech (48)	USA	49	15.2	5	977.0	-1 474.4	107.6	180
572	Meidensha	Diversified industrials (24)	Japan	49	-3.1	1 304	3.7	2.6	6.7	456
573	CheckFree	Software & computer services (97)	USA	49	16.3	446	10.9	3.2	16.3	2 584
574	Tokyo Ohka Kogyo	Chemicals (11)	Japan	48	11.9	597	8.1	10.5	33.0	783
575	Newmarket	Chemicals (11)	USA	48	14.8	658	7.3	7.0	42.4	202
576	Waters	Health (44)	USA	48	7.1	813	5.9	25.7	11.4	3 767
577	Zarlink Semiconductor	IT hardware (93)	Canada	48	-13.2	158	30.4	-17.3	49.9	125
578	Alkermes	Pharma & biotech (48)	USA	48	-20.2	56	85.5	-91.3	90.7	1 045
579	Eclipsys	Software & computer services (97)	USA	48	-15.0	227	21.1	-11.1	24.1	594
580	Biomet	Health (44)	USA	48	17.3	1 188	4.0	30.9	9.0	6 990
581	Lawson Software	Software & computer services (97)	USA	48	9.8	267	17.9	3.3	30.2	419
582	Avon Products	Personal care & household (47)	USA	47	28.6	5 700	0.8	15.4	1.0	11 191
583	Arris	IT hardware (93)	USA	47	0.8	361	12.9	-4.3	64.0	781
584	Axcelis Technologies	IT hardware (93)	USA	47	-0.1	374	12.4	15.7	29.2	459
585	Yakult Honsha	Food producers (43)	Japan	46	11.3	1 715	2.7	10.1	3.2	2 616
586	MGI PHARMA	Pharma & biotech (48)	USA	46	24.9	144	32.0	-43.3	163.4	1 376
587	Millipore	Pharma & biotech (48)	USA	46	7.0	650	7.1	15.6	10.2	2 312
588	Coherent	IT hardware (93)	USA	46	23.1	364	12.6	5.7	20.7	717
589	Lonza	Chemicals (11)	Switzerland	46	-13.4	1 412	3.3	9.7	..	2 125
590	Finisar	IT hardware (93)	USA	46	3.2	137	33.4	-47.3	16.2	212
591	Unova	Diversified industrials (24)	USA	46	9.5	597	7.7	-4.5	10.3	1 240
592	Kaken Pharmaceutical	Pharma & biotech (48)	Japan	46	11.7	522	8.7	7.6	..	508
593	RSA Security	Software & computer services (97)	USA	46	15.4	226	20.1	15.3	39.8	665
594	Garmin	IT hardware (93)	Cayman Islands	45	40.9	561	8.1	35.5	18.2	4 461
595	Ecolab	Chemicals (11)	USA	45	15.6	3 079	1.5	12.8	2.1	6 315
596	Sumitomo Heavy Industries	Engineering & machinery (26)	Japan	45	8.0	3 466	1.3	4.5	4.0	2 496
597	Tibco Software	Software & computer services (97)	USA	45	-5.4	285	15.8	17.6	33.1	1 126
598	Disco	Engineering & machinery (26)	Japan	45	135.8	433	10.4	15.1	26.8	990
599	Leapfrog Enterprises	IT hardware (93)	USA	45	5.9	471	9.5	-2.2	48.7	326
600	Georgia-Pacific	Forestry & paper (15)	USA	45	-4.7	14 461	0.3	7.8	0.8	6 289

Table A1.2 *(cont.)*

Listing of the non-EU 700 group of companies on the 2005 *Scoreboard* ranked by their R&D investment in financial year 2004

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
601	GTECH	IT hardware (93)	USA	45	6.4	925	4.9	24.8	8.5	2 504
602	Snap-On	Engineering & machinery (26)	USA	45	1.7	1 714	2.6	6.2	3.9	1 522
603	Triquint Semiconductor	IT hardware (93)	USA	45	-6.5	255	17.5	-7.8	21.6	369
604	Wind River Systems	Software & computer services (97)	USA	45	7.1	173	25.8	4.3	40.2	988
605	Polaris Industries	Automobiles & parts (31)	USA	45	17.3	1 305	3.4	9.8	12.4	1 691
606	Nabi Biopharmaceuticals	Pharma & biotech (48)	USA	45	109.0	132	33.8	-21.9	61.4	620
607	Progress Software	Software & computer services (97)	USA	45	19.8	267	16.7	12.8	28.8	864
608	Basilea Pharmaceuticals	Pharma & biotech (48)	Switzerland	45	37.8	0	..	-26 338.2	..	426
609	Diebold	IT hardware (93)	USA	44	-0.7	1 752	2.5	11.6	3.1	2 510
610	Shimano	Household goods & textiles (34)	Japan	44	-0.9	1 215	3.6	16.8	6.2	2 510
611	Eyetech Pharmaceuticals	Pharma & biotech (48)	USA	44	-16.7	36	120.8	-211.1	135.1	426
612	ADC Telecommunications	IT hardware (93)	USA	44	-45.6	577	7.5	1.5	5.8	2 041
613	CSG Systems International	Support services (58)	USA	43	-6.2	390	11.1	15.9	17.0	691
614	West Japan Railway	Transport (59)	Japan	43	-1.0	8 729	0.5	11.0	..	5 016
615	Taiheiyo Cement	Diversified industrials (24)	Japan	43	-19.4	6 315	0.7	4.1	2.4	2 246
616	Mitsui	Construction & building (13)	Japan	43	76.3	21 398	0.2	2.9	1.1	12 261
617	Analogic	Electronic & electrical (25)	USA	43	0.0	262	16.5	1.9	25.4	498
618	USEC	Mining (4)	USA	43	30.6	1 043	4.1	5.2	15.0	964
619	Cymer	IT hardware (93)	USA	43	0.4	308	14.0	14.8	55.8	858
620	Veeco Instruments	Electronic & electrical (25)	USA	43	19.4	287	15.0	-3.0	34.0	420
621	AvtoVAZ	Automobiles & parts (31)	Russia	43	13.2	3 471	1.2	4.2	..	583
622	ImClone Systems	Pharma & biotech (48)	USA	43	-34.5	286	15.0	32.2	49.4	1 955
623	Kansai Paint	Chemicals (11)	Japan	43	2.7	1 334	3.2	7.8	7.3	1 342
624	Extreme Networks	IT hardware (93)	USA	43	0.2	259	16.5	0.0	51.4	385
625	SPX	Electronic & electrical (25)	USA	43	-39.5	3 217	1.3	2.4	1.8	2 412
626	Swisscom	Telecommunication services (67)	Switzerland	43	-27.5	6 507	0.7	27.3	2.7	15 366
627	Novelis	Steel & other metals (18)	Canada	43	-6.4	5 705	0.7	3.5	3.2	1 251
628	Ishihara Sangyo Kaisha	Chemicals (11)	Japan	43	4.7	673	6.3	6.6	24.0	575
629	NACCO Industries	Diversified industrials (24)	USA	43	3.4	2 047	2.1	3.6	3.7	551
630	Shikoku Electric Power	Electricity (72)	Japan	43	-5.3	4 034	1.1	10.7	5.1	3 890
631	Mitsui Mining & Smelting	Steel & other metals (18)	Japan	42	98.7	3 146	1.3	9.6	4.4	2 174
632	Pall	Engineering & machinery (26)	USA	42	9.7	1 303	3.2	12.3	4.1	2 710
633	MKS Instruments	IT hardware (93)	USA	42	19.6	408	10.3	11.8	18.1	710
634	Imation	IT hardware (93)	USA	42	-0.2	897	4.7	4.0	16.4	1 052
635	Encysive Pharmaceuticals	Pharma & biotech (48)	USA	42	120.1	10	416.7	-396.7	356.2	508
636	Bookham Technology *(now Bookham)*	IT hardware (93)	USA	42	-17.5	124	33.6	-231.2	22.2	109
637	Redback Networks	IT hardware (93)	USA	42	-14.5	85	49.0	-48.4	93.2	372
638	Sekisui House	Construction & building (13)	Japan	42	10.1	9 852	0.4	0.6	2.1	5 554
639	Nalco	Chemicals (11)	USA	42	..	2 232	1.9	4.6	4.0	1 919
640	Cardinal Health	Food & drug retailers (63)	USA	42	-0.7	47 861	0.1	3.5	0.8	18 675
641	NOF	Chemicals (11)	Japan	41	0.9	987	4.2	4.5	25.4	575
642	Hillenbrand Industries	Health (44)	USA	41	0.0	1 346	3.1	12.6	4.0	2 295
643	Cubist Pharmaceuticals	Pharma & biotech (48)	USA	41	3.6	50	82.3	-95.0	137.2	671
644	FEI	IT hardware (93)	USA	41	20.6	343	12.0	6.3	24.3	518
645	Daiwa House Industry	Construction & building (13)	Japan	41	1.0	8 793	0.5	5.8	2.3	4 936
646	Alexion Pharmaceuticals	Pharma & biotech (48)	USA	41	-21.3	3	1 354.3	-1 528.5	199.2	558
647	BE Aerospace	Aerospace & defence (21)	USA	41	23.3	540	7.5	8.8	11.6	711
648	Kureha Chemical Industry	Chemicals (11)	Japan	41	-10.4	969	4.2	5.2	10.5	599
649	Weyerhaeuser	Forestry & paper (15)	USA	41	7.8	16 675	0.2	10.4	0.8	12 025
650	Reebok International	Household goods & textiles (34)	USA	40	7.9	2 785	1.4	7.6	4.4	2 475

Rank	Company	FTSE Sector (code)	Country	R&D Investment		Net Sales	R&D/Net Sales ratio	Operating Profit	R&D/ employees	Market Capitalisation
				2004	change 04/03	2004	2004	2004	2004	2004
				€m	%	€m	%	% of Net sales	€k	€k
651	Nissin Kogyo	Automobiles & parts (31)	Japan	40	21.1	897	4.4	10.0	..	597
652	WebMD	Health (44)	USA	40	26.0	854	4.7	3.9	6.7	2 652
653	Sysmex	Pharma & biotech (48)	Japan	40	11.7	474	8.4	9.4	13.7	1 155
654	Ariba	Software & computer services (97)	USA	40	0.5	181	22.0	-11.7	23.6	293
655	Tokyo Seimitsu	IT hardware (93)	Japan	40	68.0	447	8.9	-9.6	36.1	1 235
656	Varco International *(now National Oilwell Varco)*	Oil & gas (7)	USA	40	-12.5	1 154	3.4	11.7	3.7	7 663
657	Centillium Communications	IT hardware (93)	USA	40	16.4	52	76.0	-61.8	116.3	81
658	Central Glass	Construction & building (13)	Japan	39	-2.5	1 306	3.0	11.7	..	998
659	Cabot	Chemicals (11)	USA	39	-17.2	1 423	2.7	10.3	9.1	1 552
660	Tsumura	Pharma & biotech (48)	Japan	39	2.1	590	6.6	12.8	..	1 029
661	JDA Software	Software & computer services (97)	USA	39	8.8	160	24.3	-0.2	33.6	296
662	Kongsberg Gruppen	Aerospace & defence (21)	Norway	39	5.0	782	4.9	2.4	9.4	367
663	Realnetworks	Software & computer services (97)	USA	38	9.1	196	19.5	-10.1	46.8	656
664	Sauer-Danfoss	Engineering & machinery (26)	USA	38	19.5	1 033	3.7	6.4	4.6	703
665	Vignette	Software & computer services (97)	USA	38	26.4	114	33.4	-166.7	52.2	327
666	Computer Network Technology	IT hardware (93)	USA	38	20.9	269	14.1	-28.7	37.6	..
667	Advanced Energy Industries	IT hardware (93)	USA	38	-0.2	291	13.0	-0.1	23.0	260
668	Informatica	Software & computer services (97)	USA	38	8.6	162	23.3	-49.0	45.1	714
669	Interdigital Communications	IT hardware (93)	USA	38	11.5	76	49.6	-6.1	115.9	727
670	WR Grace	Chemicals (11)	USA	38	-1.7	1 663	2.3	-11.5	5.8	450
671	Vishay Intertechnology	Electronic & electrical (25)	USA	38	12.4	1 776	2.1	3.6	1.5	1 730
672	Micro-Star International	IT hardware (93)	Taiwan	38	20.5	1 594	2.4	0.2	..	433
673	Endo Pharmaceuticals	Pharma & biotech (48)	USA	37	-0.9	453	8.2	37.8	67.7	2 715
674	Xoma	Pharma & biotech (48)	Bermuda	37	-2.9	3	1 239.7	-2 134.3	169.1	102
675	FMC Technologies	Oil & gas (7)	USA	37	11.3	2 036	1.8	6.0	4.1	2 031
676	Toyama Chemical	Pharma & biotech (48)	Japan	37	1.5	121	30.6	-30.4	40.7	544
677	Timken	Engineering & machinery (26)	USA	37	-5.5	3 321	1.1	5.5	1.4	1 913
678	Horiba	Electronic & electrical (25)	Japan	37	26.8	611	6.0	6.4	9.7	709
679	Biovail	Pharma & biotech (48)	Canada	37	-30.8	652	5.6	23.5	16.1	2 131
680	Aeroflex	IT hardware (93)	USA	37	60.7	305	12.1	6.7	15.3	500
681	Biomarin Pharmaceutical	Pharma & biotech (48)	USA	37	16.5	14	261.6	-962.2	102.0	436
682	S1	Software & computer services (97)	USA	37	10.1	177	20.7	2.6	22.0	231
683	Crompton	Chemicals (11)	USA	37	-3.7	1 876	1.9	0.5	7.6	3 112
684	Medicines	Pharma & biotech (48)	USA	36	37.2	106	34.2	10.8	164.8	797
685	Nippon Soda	Chemicals (11)	Japan	36	..	971	3.7	1.9	13.9	323
686	Ichikoh Industries	Automobiles & parts (31)	Japan	36	-3.8	852	4.2	-0.2	9.8	196
687	Toagosei	Chemicals (11)	Japan	36	-4.3	1 036	3.5	7.3	13.9	1 007
688	Koor Industries	IT hardware (93)	Israel	36	-4.2	1 572	2.3	12.4	5.5	631
689	Geac Computer	Software & computer services (97)	Canada	36	-37.6	273	13.2	15.9	15.7	637
690	Directv	Media & entertainment (54)	USA	36	..	8 358	0.4	-22.4	3.1	16 520
691	Lenovo	IT hardware (93)	Hong Kong	36	-24.1	2 135	1.7	3.8	3.7	2 509
692	Varian	Electronic & electrical (25)	USA	36	6.7	674	5.3	9.9	8.1	860
693	Sycamore Networks	IT hardware (93)	USA	36	-12.6	33	108.0	-136.5	101.0	715
694	NOVA Chemicals	Chemicals (11)	Canada	35	6.6	3 877	0.9	7.5	8.6	2 160
695	Orbotech	Electronic & electrical (25)	Israel	35	21.6	232	15.2	9.8	23.2	582
696	Reynolds American	Tobacco (49)	USA	35	-11.1	4 736	0.7	14.5	3.8	8 951
697	Yulon Motor	Automobiles & parts (31)	Taiwan	35	-8.3	1 194	3.0	14.3	..	1 187
698	Fiserv	Support services (58)	USA	35	-8.8	2 744	1.3	17.7	1.6	6 447
699	York International	Engineering & machinery (26)	USA	35	12.8	3 318	1.1	3.0	1.5	1 303
700	Bucher Industries	Engineering & machinery (26)	Switzerland	35	7.1	1 062	3.3	5.6	6.0	517

Annex 2

Note on the effect of exchange rates changes on Scoreboard data

Chapter 2 of this Volume (Box 2.1) provided some explanations of the potential effects of exchange rate changes on the financial results of companies with worldwide operations as they are shown in the *Scoreboard*. These are taken further here using a case study as an illustrative example:

ST Microelectronics (STM) is a company registered in Switzerland which reports its financial accounts in US dollars and does most of its R&D in the euro zone.

According to the company's 2004 annual report, its R&D expenditure was $ 1,022 million (US) in 2002, growing by 21.1 % to $ 1,238 million (US) in 2003 and by 23.7 % to $ 1,532 million (US) in 2004. Converting US dollars to euro, using the same exchange rate for all the three years, the R&D expenditure data that appear in the *Scoreboard* for STM are € 752 million in 2002, € 911 million in 2003 and € 1,127 million in 2004 , and so correspond to the same nominal growth rates as reported in STM's original annual report.

However, the company states in its annual report that approximately 87% of research and development expenses in 2004 were incurred in Europe, primarily in France and Italy. It also states that the Consolidated Financial Statements for 2004 include income and expense items translated at the average rate for the period. The average euro/dollar rates were € 1.00 to $ 1.236 (US) in 2004 and € 1.00 to $ 1.125 (US) in 2003. Assuming that the proportions of R&D spent in the euro area were the same in 2002 and 2003 as in 2004, then 87 % of the $1,532 million (US) in 2004 and of the $1,238 million (US) in 2003 gives –after conversion at the rates used by STM– € 1,078 million and € 957 million, respectively. On this basis, the effective nominal growth rate of R&D expenditure was 12.6 % in 2004, much less than the figure shown in the *Scoreboard* of 23.7 %. It goes without saying that the dimension of this exchange rate effect can only be calculated for companies which make the geographic distribution of their R&D spending and the exchange rates used public in the annual report. Unfortunately, this is only the case for less than 5 % of the companies.

The result is that, in the case of firms which report in a currency other than euro and spend a large proportion of their R&D in the EU, the growth rates of R&D investment in the *Scoreboard* are significantly inflated in years when the euro appreciates against the reporting currency. On the other hand, the growth rates of firms reporting in euro with a large share of R&D spent in regions with other currencies (for example, Daimler-Chrysler or GlaxoSmithKline) are deflated. The opposite effect takes place in case of a depreciation of the euro. This exchange rate effect applies to all financial figures, such as net sales, operating profit, capital expenditure or market capitalisation, and the ratios between two different financial items (such as R&D/sales ratio or profitability), if the geographical distribution of the two items is different. For example, if the euro appreciates against the US dollar, a company that reports in euro and spends all its R&D investment domestically but makes half of its net sales in the US will see the growth rate of R&D investment unaffected, while the net sales growth will be deflated by half of its volume. Consequently, the *Scoreboard* will report an artificially inflated growth rate for the R&D/sales ratio in that period. As it is already reported in Box 2.1 in Chapter 2 of this volume, under the assumption that the EU *Scoreboard* companies spend 20 % of their R&D investment in the US, the growth rate of EU companies R&D over the past year

– adjusted for the effect of exchange rate variations – would have been 2.2 % in 2004 instead of the nominally reported 0.7 %.

However, this exchange rate effect becomes noticeable only when there has been a considerable appreciation or depreciation of the euro with respect to the reporting currency, combined with a large share of the company's activity outside the area of the reporting currency. In these cases, the interpretation of the figures in the *Scoreboard* should take the effect of exchange rate fluctuations into account.

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