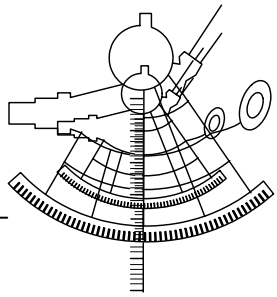
2003 European innovation scoreboard: technical paper No 1 indicators and definitions

European Trend Chart on Innovation



2003 European Innovation Scoreboard: Technical Paper No 1 Indicators and Definitions

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European Commission
Enterprise Directorate-General

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The European Trend Chart on Innovation

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States. The 'First Action Plan for Innovation in Europe', launched by the European Commission in 1996, provided for the first time a common analytical and political framework for innovation policy in Europe.

Building upon the Action Plan, the *Trend Chart on Innovation in Europe* is a practical tool for innovation policy makers and scheme managers in Europe. Run by the European Commission (Innovation Directorate of DG Enterprise), it pursues the collection, regular updating and analysis of information on innovation policies at national and Community level, with a focus on innovation finance; setting up and developing innovative businesses; the protection of intellectual property rights; and the transfer of technology between research and industry.

The Trend Chart serves the "open policy co-ordination approach" laid down by the Lisbon Council in March 2000. It delivers summarised and concise information and statistics on innovation policies, performances and trends in the European Union. It is also a European forum for benchmarking and the exchange of good practices in the area of innovation policy.

The Trend Chart products

The Trend Chart on Innovation has been running since January 2000. It tracks innovation policy developments in all EU Member States, plus Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Iceland, Israel, Latvia, Lithuania, Norway, Poland, Romania, Slovak Republic, Slovenia and Switzerland. The Trend Chart website (www.cordis.lu/trendchart) provides access to the following services and publications:

- the European Innovation Scoreboard and other statistical reports;
- regular country reports for all countries covered;
- a database of policy measures across Europe;
- a "who is who?" of agencies and government departments involved in innovation;
- regular trend reports covering each of the four main themes;
- benchmarking reports from the Trend Chart workshops;
- a news service and thematic papers;
- the annual reports of the Trend Chart.

The present report was prepared by **Hugo Hollanders** of **MERIT** (www.merit.unimaas.nl). The information contained in this report has not been validated in detail by either the Member States or the European Commission.

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European Innovation Scoreboard

The European Innovation Scoreboard (EIS) was developed at the request of the Lisbon European Council in 2000[1]. It focuses on high-tech innovation and provides indicators for tracking the EU's progress towards the Lisbon goal of becoming the most competitive and dynamic knowledge-based economy in the world within the next decade.

The 2003 EIS contains 19 main indicators, selected to summarize the main drivers and outputs of innovation. These indicators are divided into four groups: Human resources for innovation (5 indicators); the Creation of new knowledge (4 indicators); the Transmission and application of knowledge (3 indicators); and Innovation finance, output and markets (7 indicators).

The EIS complements the *Enterprise Policy Scoreboard*[2] and other benchmarking exercises of the European Commission. It mainly uses Eurostat data. Six indicators are drawn from the European Commission's Structural indicators. Eight indicators are also used by DG Research under the "Investing in Research" Action Plan for Europe[3].

All indicators have been updated based on data availability as of September 23, 2003. The 2003 EIS offers a number of improvements compared to the 2002 EIS. Most importantly, it will uses new and more detailed data from the 3rd Community Innovation Survey (CIS-3). It provides a substantially improved coverage of innovation in services. A supplementary technical report, the *Sectoral Innovation Scoreboard* (SIS), replicates the EIS, where possible, for four manufacturing classes: high medium-high, medium-low, and low technology. The background national context that influences innovation performances across the 15 EU member states is described in a second supplementary report on *National Innovation Systems* (NIS).

The EIS is complemented by six technical papers:

- Technical Paper No 1: Indicators and definitions
  Full definitions and graphs for all indicators.
- Technical Paper No 2: Analysis of national performances
  Detailed EIS results for current and trend data, innovation leaders, relative strengths and weaknesses per country, and country pages with both current and trend graphs.
- Technical Paper No 3: Regional innovation performances
  Detailed results for current data, innovation leaders, a revealed regional summary innovation index, and cluster analysis for 173 regions in 13 Member States using 13 regional innovation indicators.
- Technical Paper No 4: Sectoral Innovation Scoreboards
  Replicates the EIS for four classes of manufacturing sectors.
- Technical Paper No 5: National Innovation System Indicators
  Includes nine structural and 14 socio-cultural-institutional indicators that shape the background conditions for innovative activity in each EU Member State.
- Technical Paper No 6: Methodology report
  Describes the methodology underlying the EIS, including different methods for calculating a Summary Innovation Index.

All technical papers are available from the Trend Chart website (www.cordis.lu/trendchart).

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[1] A first provisional EIS was published in September 2000: COM(2000) 567. The first full version of the EIS was published in October 2001: SEC(2001) 1414. The second full version was published in December 2002: SEC(2002) 1349.
[2] SEC(2002) 1213.
[3] SEC(2003) 489.

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Introduction

This Technical Paper No 1: Indicators and Definitions complements the 2003 EIS. It presents the full definitions of all indicators, years used, a brief interpretation justifying why the indicator has been selected, and indicator graphs showing the EIS 2003 figures for all countries. The data sources are also indicated with each graph (mostly EUROSTAT).

The EIS indicators are divided into four categories, containing 17 main indicators and 3 additional indicators for the Candidate countries, all selected to summarize the main drivers and outputs of innovations:

- Human resources for innovation, comprising 5 main indicators:
  1.1 S&E graduates (‰ of 20-29 years age class)
  1.2 Population with tertiary education (% of 25-64 years age class)
  1.3 Participation in life-long learning (% of 25-64 years age class)
  1.4 Employment in medium-high and high-tech manufacturing (% of total workforce)
  1.5 Employment in high-tech services (% of total workforce)

- The creation of new knowledge, comprising 4 main indicators of which two are divided into EPO and USPTO patents:
  2.1 Public R&D expenditures (GERD - BERD) (% of GDP)
  2.2 Business expenditures on R&D (BERD) (% of GDP)
  2.3.1 EPO high-tech patent applications (per million population)
  2.3.2 USPTO high-tech patent applications (per million population)
  2.4.1 EPO patent applications (per million population)
  2.4.2 USPTO patents granted (per million population)

- The transmission and application of knowledge, comprising 3 main indicators which are divided between manufacturing and services:
  3.1.1 SMEs innovating in-house in manufacturing (% of manufacturing SMEs)
  3.1.2 SMEs innovating in-house in services (% of services SMEs)
  3.2.1 SMEs involved in innovation co-operation in manufacturing (% of manufacturing SMEs)
  3.2.2 SMEs involved in innovation co-operation in services (% of services SMEs)
  3.3.1 Innovation expenditures in manufacturing (% of turnover in manufacturing)
  3.3.2 Innovation expenditures in services (% of turnover in services)

- Innovation finance, outputs and markets, comprising 7 main indicators of which three are divided between manufacturing and services:
  4.1 Share of high-tech venture capital investment
  4.2 Share of early-stage venture capital in GDP
  4.3.1.1 Sales of ‘new to market’ products in manufacturing (% of turnover in manufacturing)
  4.3.1.2 Sales of ‘new to market’ products in services (% of turnover in services)
  4.3.2.1 Sales of ‘new to the firm but not new to the market’ products in manufacturing (% of turnover in manufacturing)
  4.3.2.2 Sales of ‘new to the firm but not new to the market’ products in services (% of turnover in services)
  4.4 Internet access/use
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  4.6 Share of manufacturing value-added in high-tech sectors
  4.7.1 Volatility rates of SMEs in manufacturing (% of manufacturing SMEs)
  4.7.2 Volatility rates of SMEs in services (% of services SMEs)

For each indicator the following pages will provide the full definition, a brief interpretation and indicator graphs showing the EIS 2003 current and trend performance of all countries.

1 Human Resources

1.1 S&E graduates (‰ of 20 - 29 years age class)

Definition

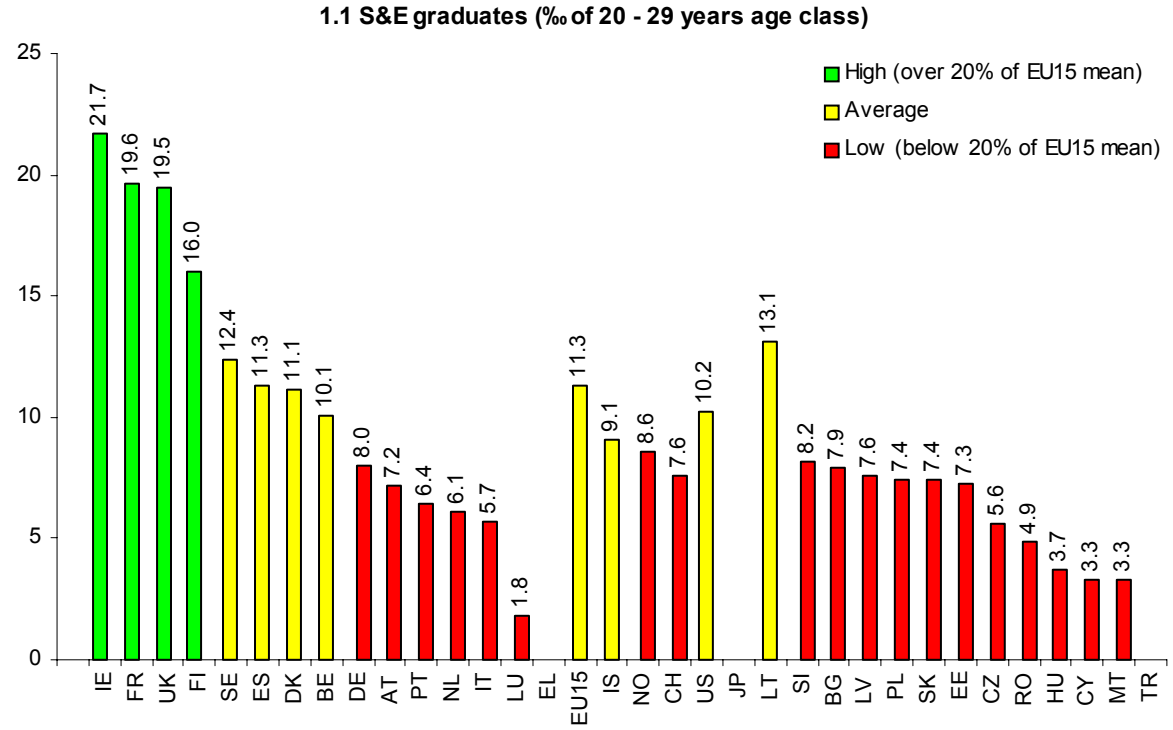
Numerator: S&E (science and engineering) graduates are defined as all post-secondary education graduates (ISCED classes 5a and above) in life sciences (ISC42), physical sciences (ISC44), mathematics and statistics (ISC46), computing (ISC48), engineering and engineering trades (ISC52), manufacturing and processing (ISC54) and architecture and building (ISC58).

Denominator: The reference population is all age classes between 20 and 29 years inclusive.

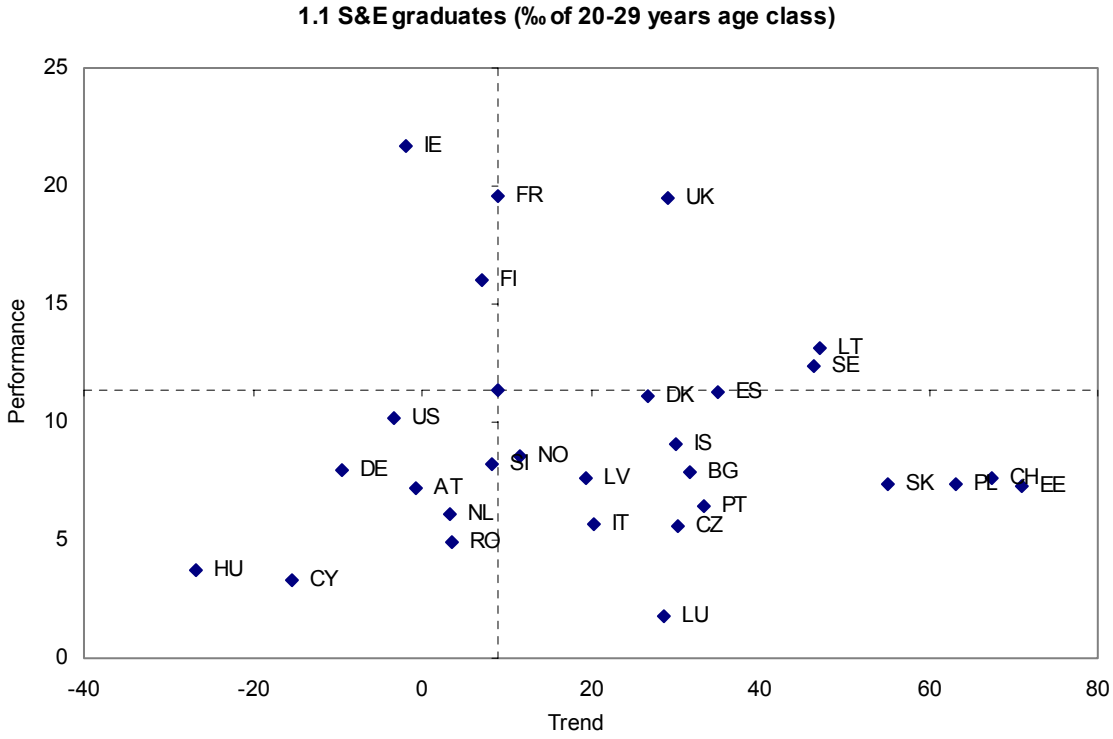
Source: EUROSTAT: *Structural indicator II.4.1 (Total tertiary graduates in science and technology per 1000 of population aged 20-29)*.
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_sh_sm.htm

Interpretation

The indicator is a measure of the supply of new graduates with training in Science & Engineering (S&E). Due to problems of comparability for educational qualifications across countries, this indicator uses broad educational categories. This means that it covers everything from graduates of one-year diploma programmes to PhDs. A broad coverage can also be an advantage, since graduates of one-year programmes are of value to incremental innovation in manufacturing production and in the service sector.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I. Malta (MT – performance: 3.3; trend: 153.8) not shown.

1.2 Population with tertiary education (% of 25 - 64 years age class)

Definition

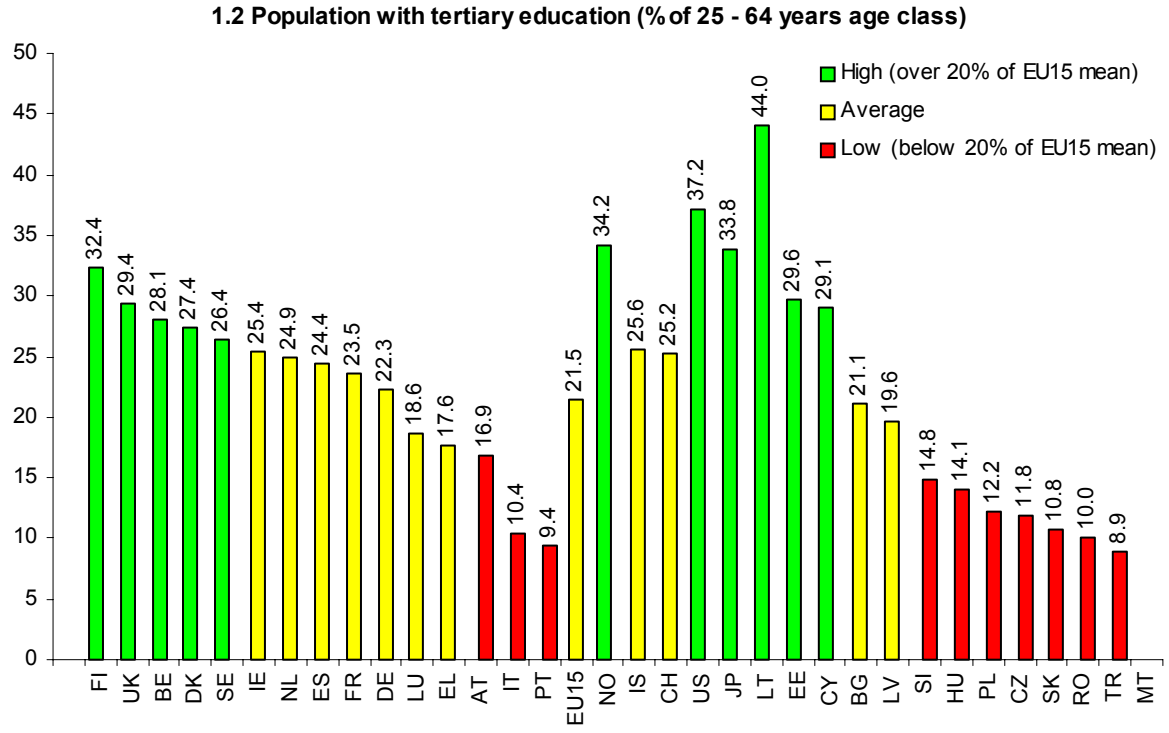
Numerator: Number of persons in age class with some form of post-secondary education (ISCED 5 and 6).

Denominator: The reference population is all age classes between 25 and 64 years inclusive.

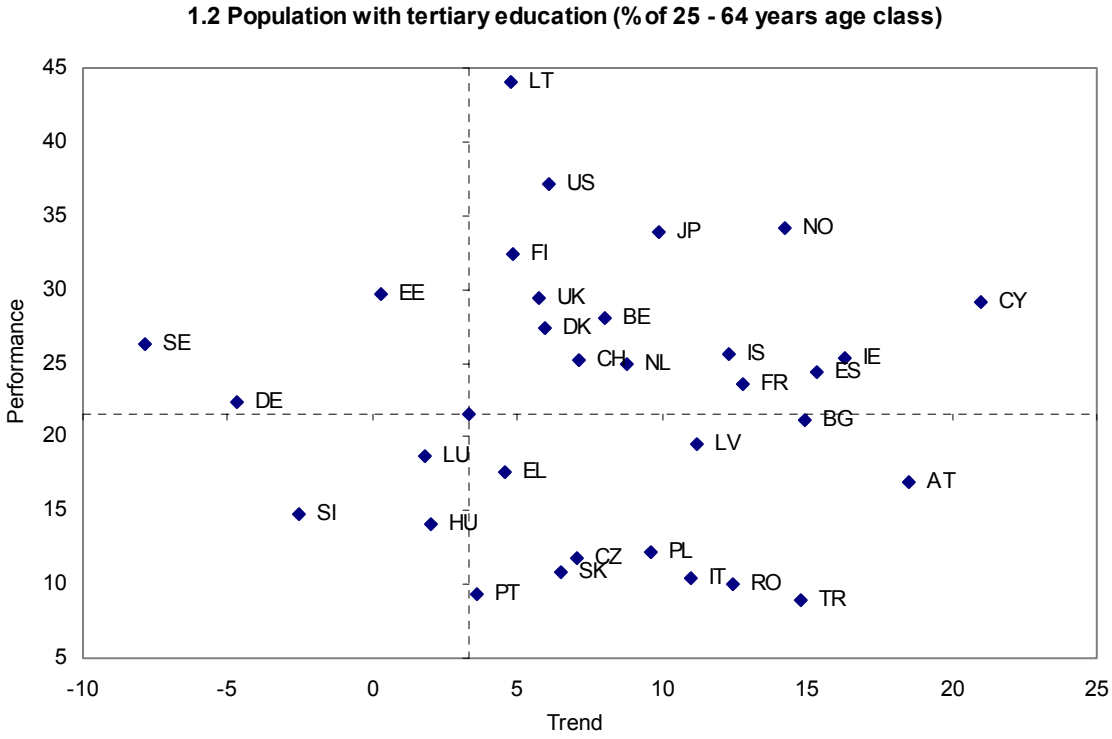
Source: EUROSTAT: Labour Force Survey.

Interpretation

This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields because the adoption of innovations in many areas, particularly in the service sectors, depends on a wide range of skills. Furthermore, it includes the entire working age population, because future economic growth could require drawing on the non-active fraction of the population. International comparisons of educational levels however are notoriously difficult due to large discrepancies in educational systems, access, and the level of attainment that is required to receive a tertiary degree. Therefore, differences among countries should be interpreted cautiously.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

1.3 Participation in life-long learning (% of 25 - 64 years age class)

Definition

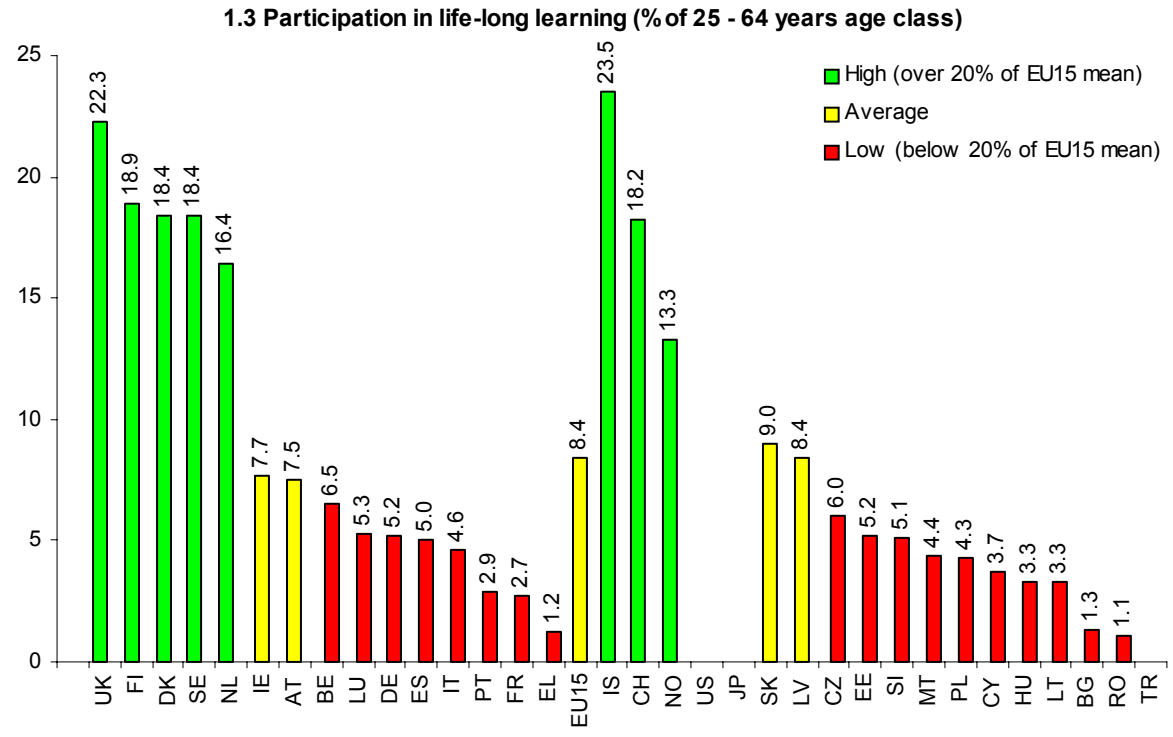
Numerator: Life-long learning is defined as participation in any type of education or training course during the four weeks prior to the survey. Education includes both courses of relevance to the respondent's employment and general interest courses, such as in languages or arts. It includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, and evening classes.

Denominator: The reference population is all age classes between 25 and 64 years inclusive.

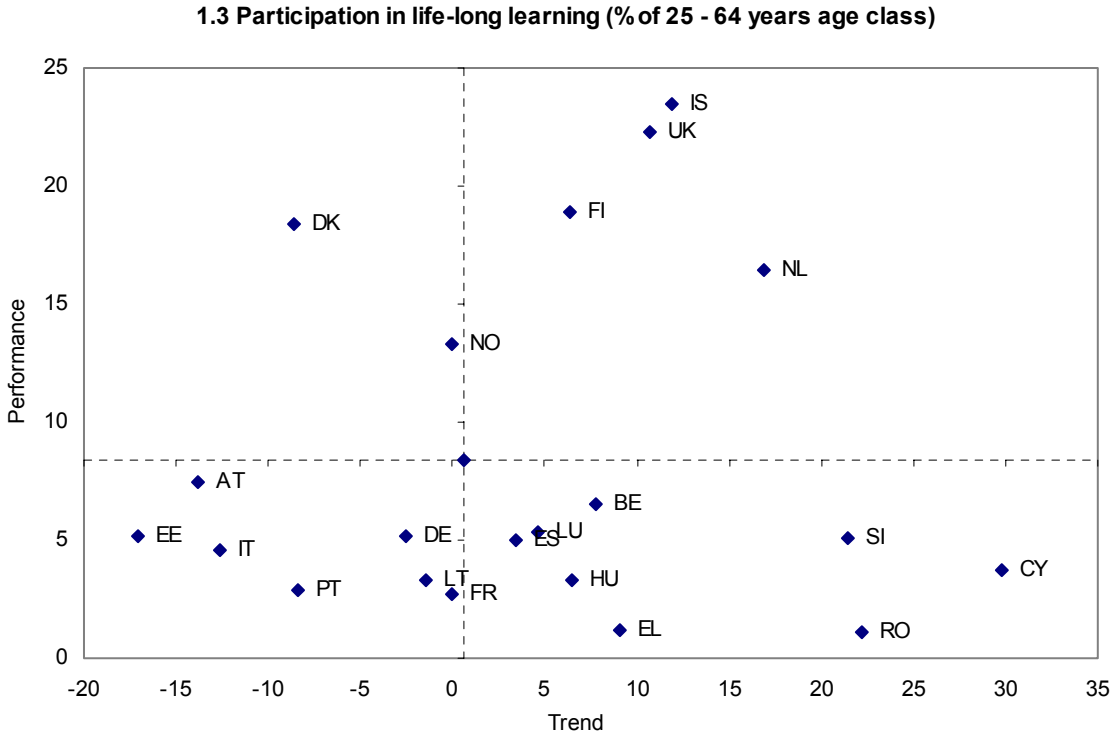
Source: EUROSTAT: *Structural indicator I.5.1.*
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/emploi_ll_sm.htm

Interpretation

A central characteristic of a knowledge economy is continual technical development and innovation. Under these conditions, individuals need to continually learn new ideas and skills - or to participate in life-long learning. All types of learning are valuable, since it prepares people for "learning to learn". The ability to learn can then be applied to new tasks with social or economic benefits. The limitation of the indicator to a brief window of four weeks could reduce comparability between countries due to differences in adult education systems. Little is known at this time about such differences, but differences in the timing of national holidays, preferred times for adult education courses, the average length of adult courses, and other unknown factors could influence the results and reduce comparability. Technical Paper No 5 of the 2002 EIS further elaborates on the issue of "Lifelong Learning for Innovation".



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

1.4 Employment in medium-high and high-tech manufacturing (% of total workforce)

Definition

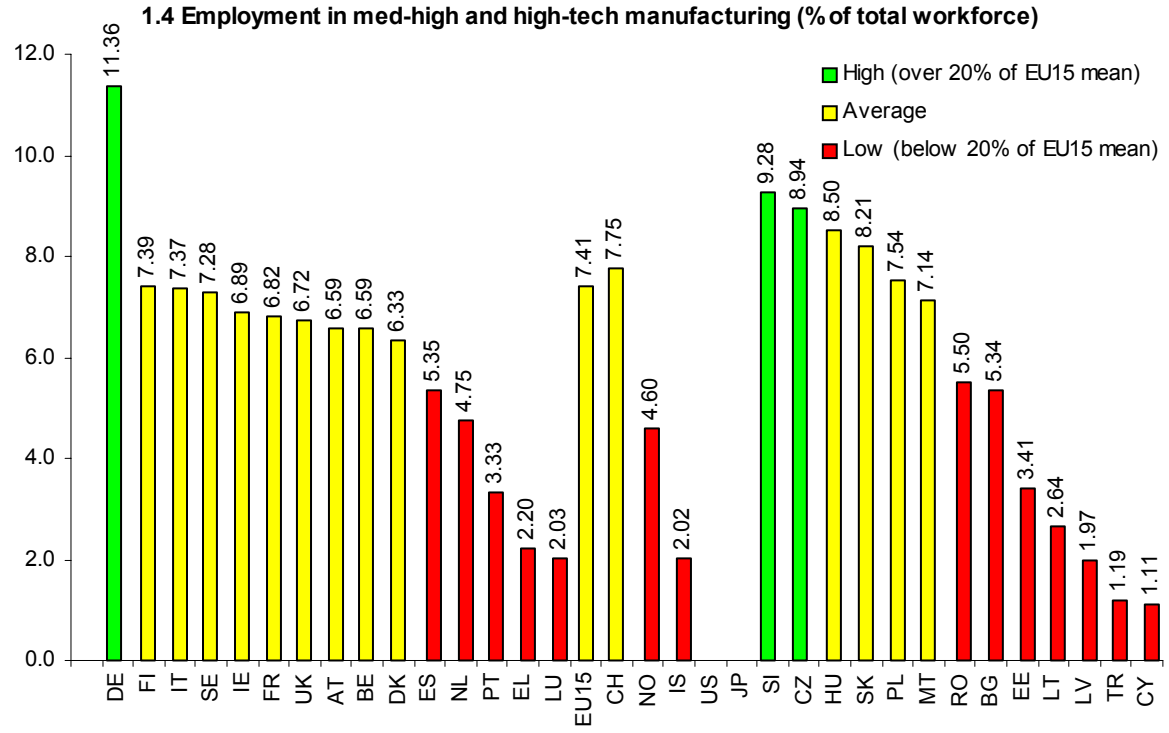
Numerator: Number of employed persons in the medium-high and high-technology manufacturing sectors. These include chemicals (NACE 24), machinery (NACE 29), office equipment (NACE 30), electrical equipment (NACE 31), telecommunications and related equipment (NACE 32), precision instruments (NACE 33), automobiles (NACE 34), and aerospace and other transport (NACE 35).

Denominator: The total workforce includes all manufacturing and service sectors.

Source: EUROSTAT: Labour Force Survey.

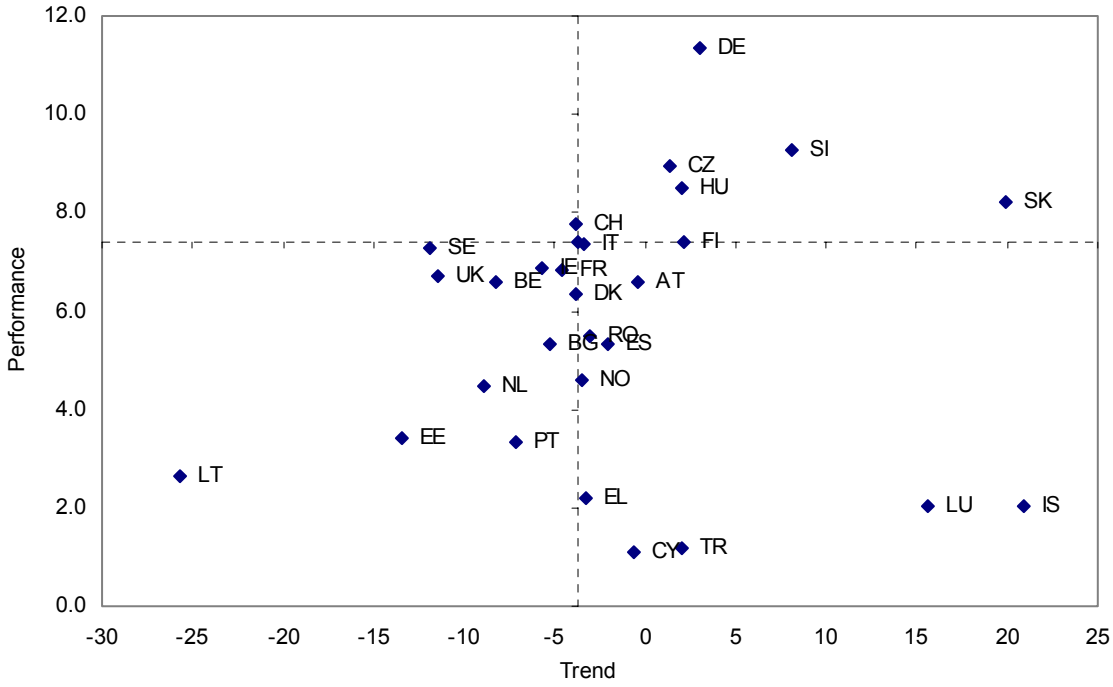
Interpretation

The percentage of employment in medium-high and high technology manufacturing sectors is an indicator of the share of the manufacturing economy that is based on continual innovation through creative, inventive activity. The use of total employment gives a better indicator than using the share of manufacturing employment alone, since the latter will be affected by the hollowing out of manufacturing in some countries.



Years used: see Annex Tables D and E.

1.4 Employment in med-high and high-tech manufacturing (% of total workforce)



Trend base years: see Annex Tables H and I. Latvia (LV – performance: 1.97; trend: 154.8) not shown.

1.5 Employment in high-tech services (% of total workforce)

Definition

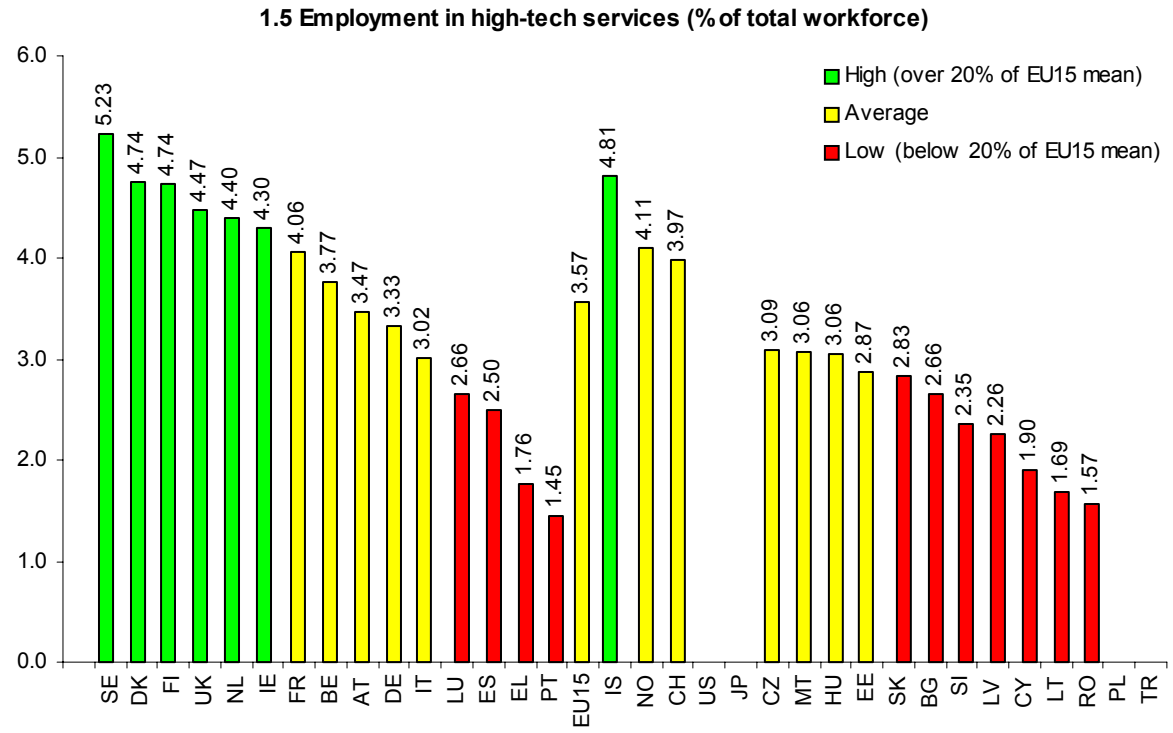
Numerator: Number of employed persons in the high-technology services sectors. These include post and telecommunications (NACE 64), information technology including software development (NACE 72), and R&D services (NACE 73).

Denominator: The total workforce includes all manufacturing and service sectors.

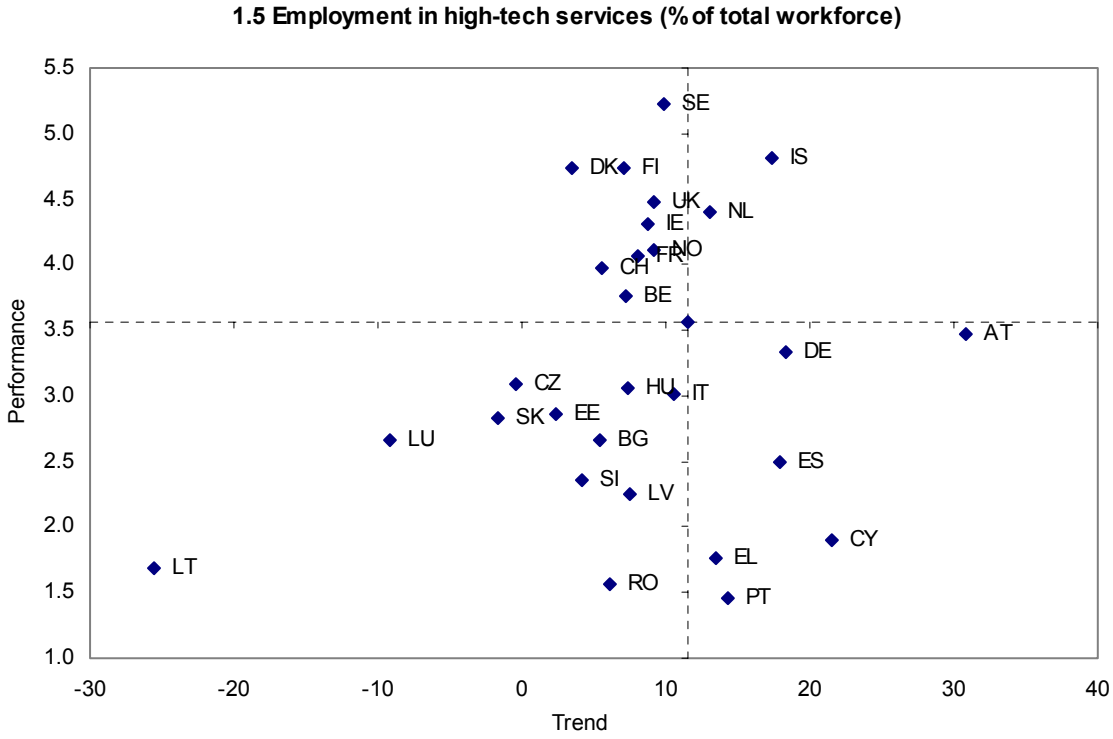
Source: EUROSTAT: Labour Force Survey.

Interpretation

The high technology services both provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, particularly those based on ICT.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

2 Knowledge creation

2.1 Public R&D expenditures (GERD - BERD) (% GDP)

Definition

Numerator: Difference between GERD (Gross domestic expenditure on R&D) and BERD (Business enterprise expenditure on R&D). Both GERD and BERD according to Frascati-manual definitions, in national currency and current prices. This definition is a proxy of public R&D expenditures as it also includes the R&D expenditures from the Private Non Profit (PNP) sector.

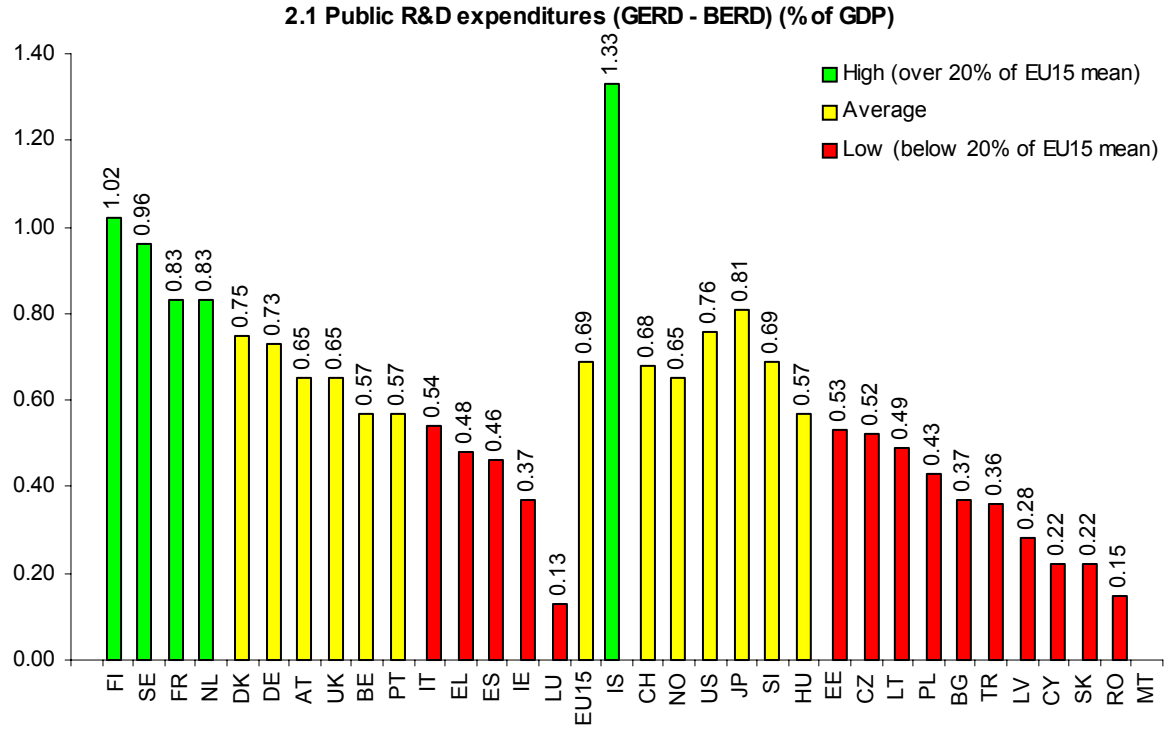
Denominator: Gross domestic product as defined in the European System of Accounts (ESA 1995), in national currency and current prices.

Source: EUROSTAT: R&D Statistics. OECD: Main Science and Technology Indicators.

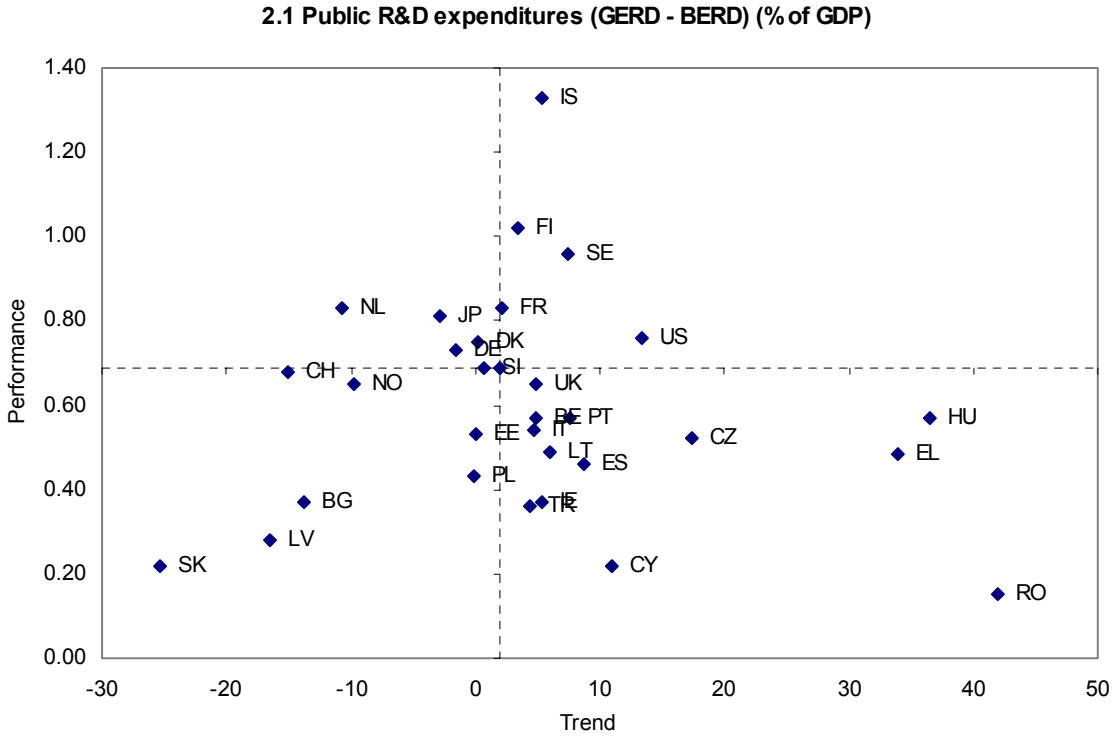
Note: This indicator is identical to the difference between indicators 1 and 3 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

Interpretation

In addition to the production of basic and applied knowledge in universities and higher-education institutions, publicly funded research offers several other outputs of direct importance to private innovation: trained research staff and new instrumentation and prototypes.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

2.2 Business expenditures on R&D (BERD) (% GDP)

Definition

Numerator: All R&D expenditures of the business sector (manufacturing and services), according to Frascati-manual definitions, in national currency and current prices.

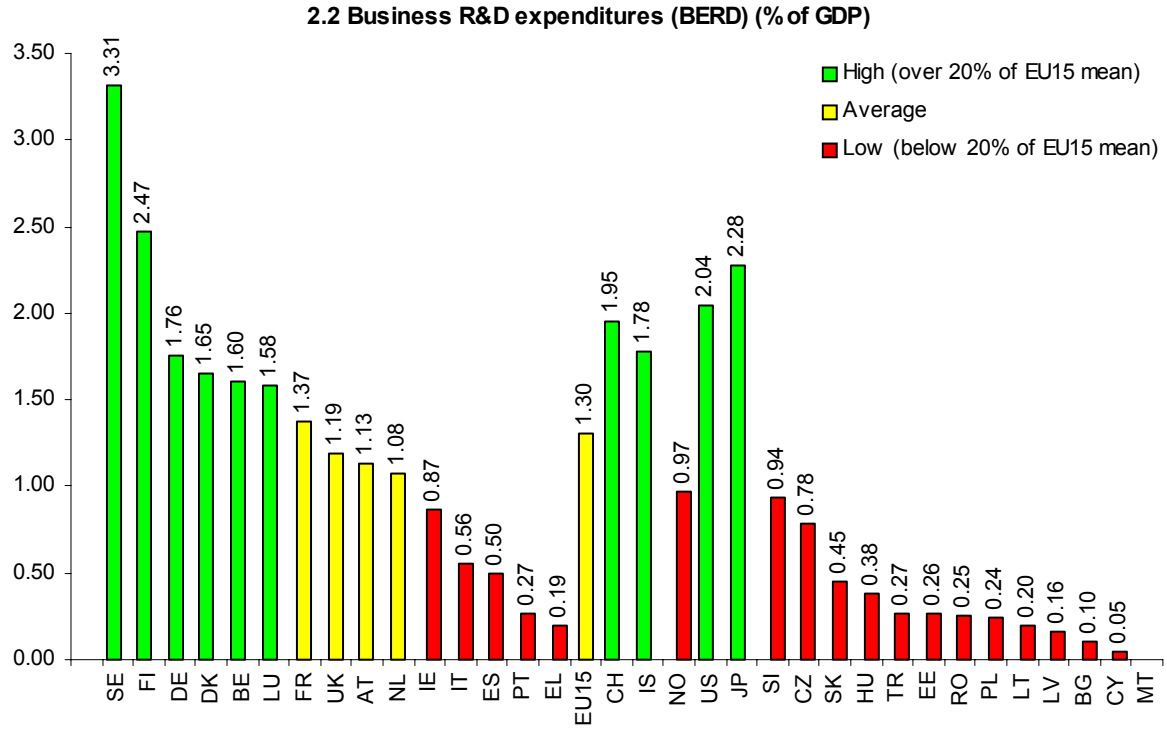
Denominator: Gross domestic product as defined in the European System of Accounts (ESA 1995), in national currency and current prices.

Source: EUROSTAT: R&D Statistics. OECD: Main Science and Technology Indicators.

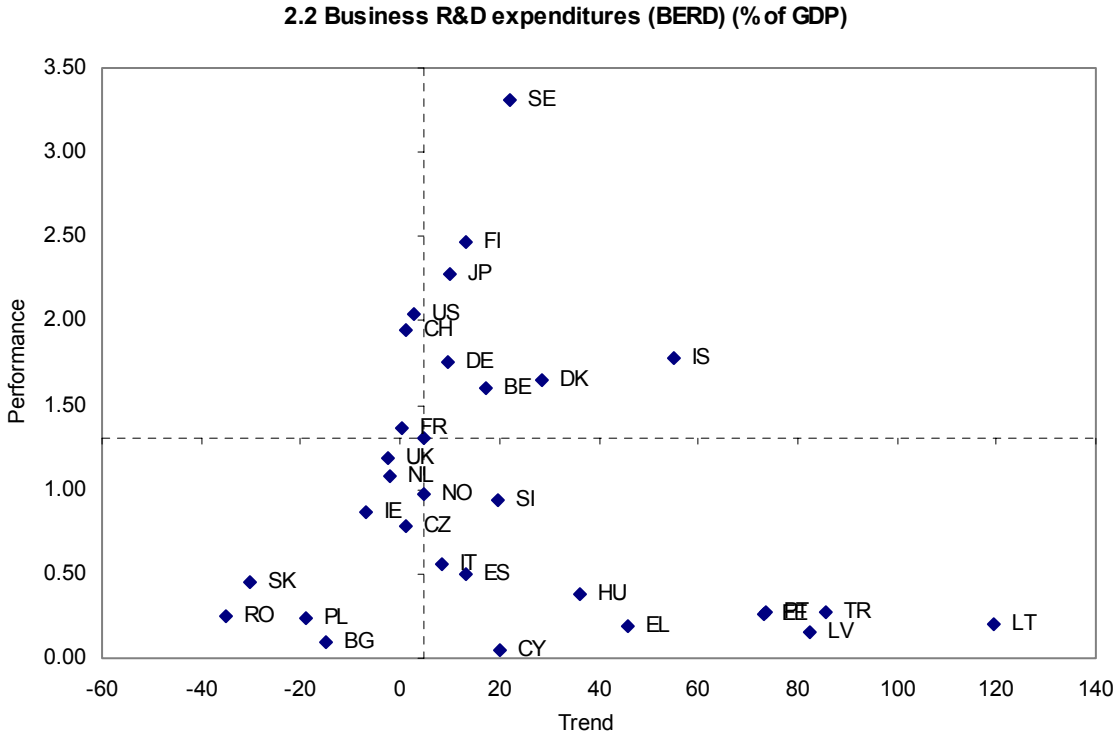
Note: This indicator is identical to indicator 3 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

Interpretation

The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sectors (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.



Source: EUROSTAT, R&D statistics; OECD. Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

2.3.1 EPO high-tech patent applications (per million population)

Definition

Numerator: Number of patents applied for at the European Patent Office (EPO), by date of filing. The national (and regional) distribution of the patent applications is assigned according to the address of the inventor. The high technology patent classes include (see Annex A for a full list of IPC subclasses): 1) Computer and Automated Business Equipment: B41J, G06, G11C; 2) Micro-organism, genetic engineering: C12M, C12N, C12P, C12Q; 3) Aviation: B64; 4) Communications: H04; 5) Semiconductors: H01L; 6) Laser: H01S.

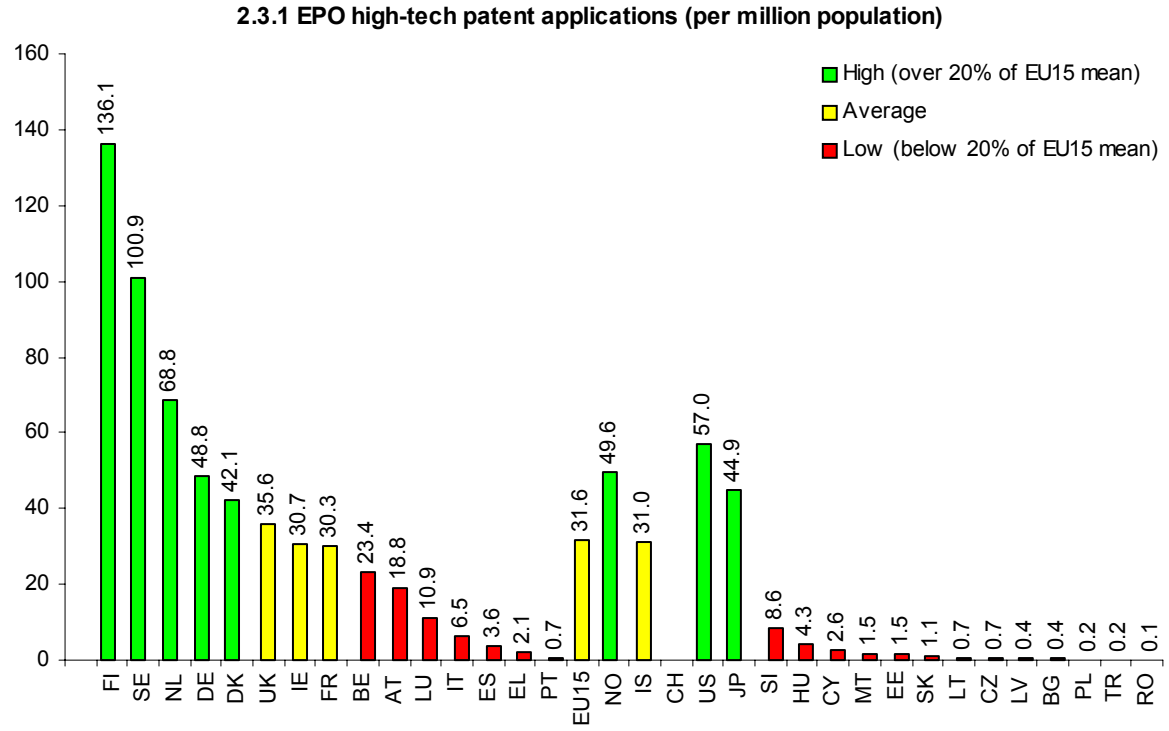
Denominator: Total population as defined in the European System of Accounts (ESA 1995).

Source: EUROSTAT.

Note: This indicator is identical to indicator 13 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

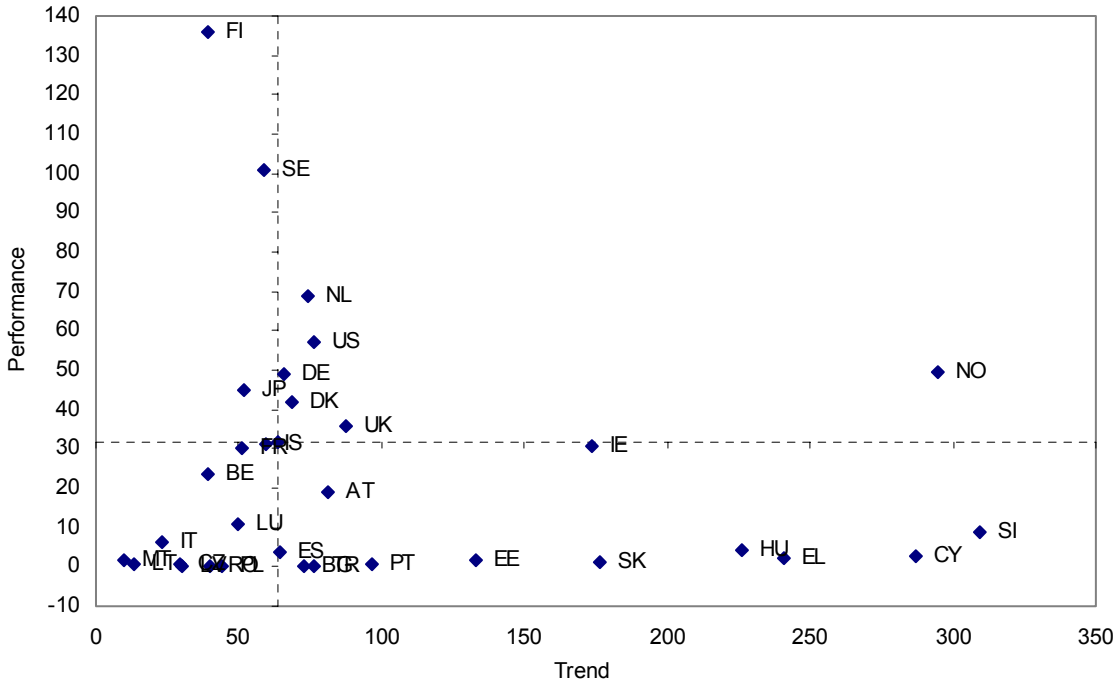
Interpretation

This indicator complements indicator 2.2 on business R&D in that patenting captures new knowledge created anywhere within a firm and not just within a formal R&D laboratory. The indicator also measures specialisation of knowledge creation in fast-growing technologies. For some countries the absolute numbers of high-tech patent applications are so small, that the relative level of performance is both close to zero and highly unstable over time. For these countries overall patent performance (cf. indicator 2.4.1) might be a better proxy for relative performance.



Years used: see Annex Tables D and E.

2.3.1 EPO high-tech patent applications (per million population)



Trend base years: see Annex Tables H and I.

2.3.2 USPTO high-tech patent applications (per million population)

Definition

Numerator: Number of patents applied for at the US Patent and Trademark Office (USPTO), by date of filing. The high technology patent classes include (see Annex A for a full list of IPC subclasses): 1) Computer and Automated Business Equipment: B41J, G06, G11C; 2) Micro-organism, genetic engineering: C12M, C12N, C12P, C12Q; 3) Aviation: B64; 4) Communications: H04; 5) Semiconductors: H01L; 6) Laser: H01S.

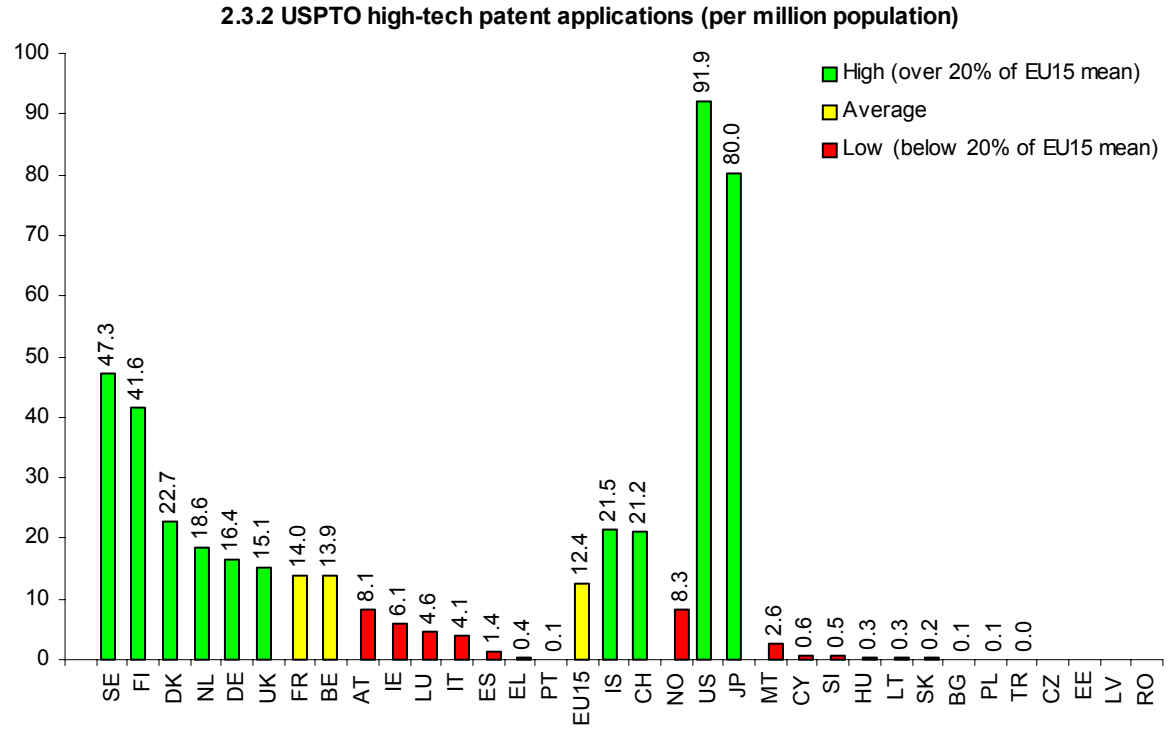
Denominator: Total population as defined in the European System of Accounts (ESA 1995).

Source: USPTO. USPTO patent data are, according to US patent law, for patents granted. High-tech patent data are, by exception, for patent *applications,* following the objectives of the Trilateral Corporation (established in 1983 by the European Patent Office (EPO), the Japanese Patent Office (JPO) and the U.S. Patent and Trademark Office (USPTO)).

Note: This indicator is identical to indicator 13 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

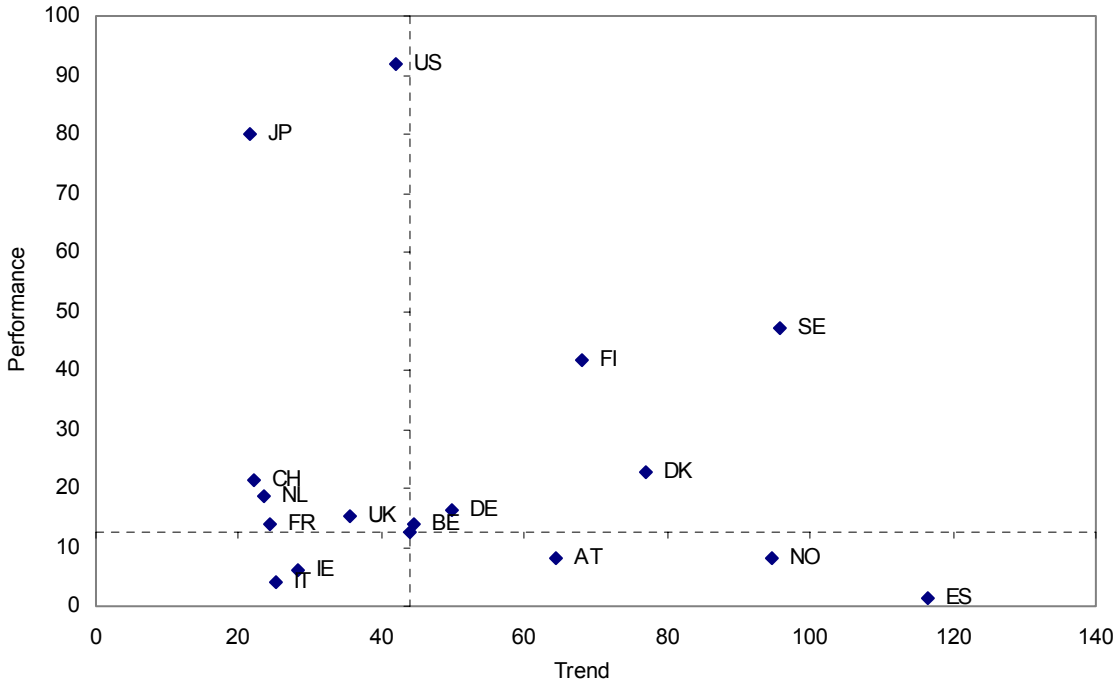
Interpretation

Indicator 2.3.1 on EPO patent applications favours European versus American and Japanese firms. This indicator provides the equivalent for American firms and measures US patenting activity by European inventors. For some countries the absolute numbers of high-tech patent applications are so small, that the relative level of performance is both close to zero and highly unstable over time. For these countries overall patent performance (cf. indicator 2.4.2) might be a better proxy for relative performance.



Years used: see Annex Tables D and E.

2.3.2 USPTO high-tech patent applications (per million population)



Trend base years: see Annex Tables H and I.

2.4.1 EPO patent applications (per million population)

Definition

Numerator: Number of patents applied for at the European Patent Office (EPO), by date of filing. The national distribution of the patent applications is assigned according to the address of the inventor.

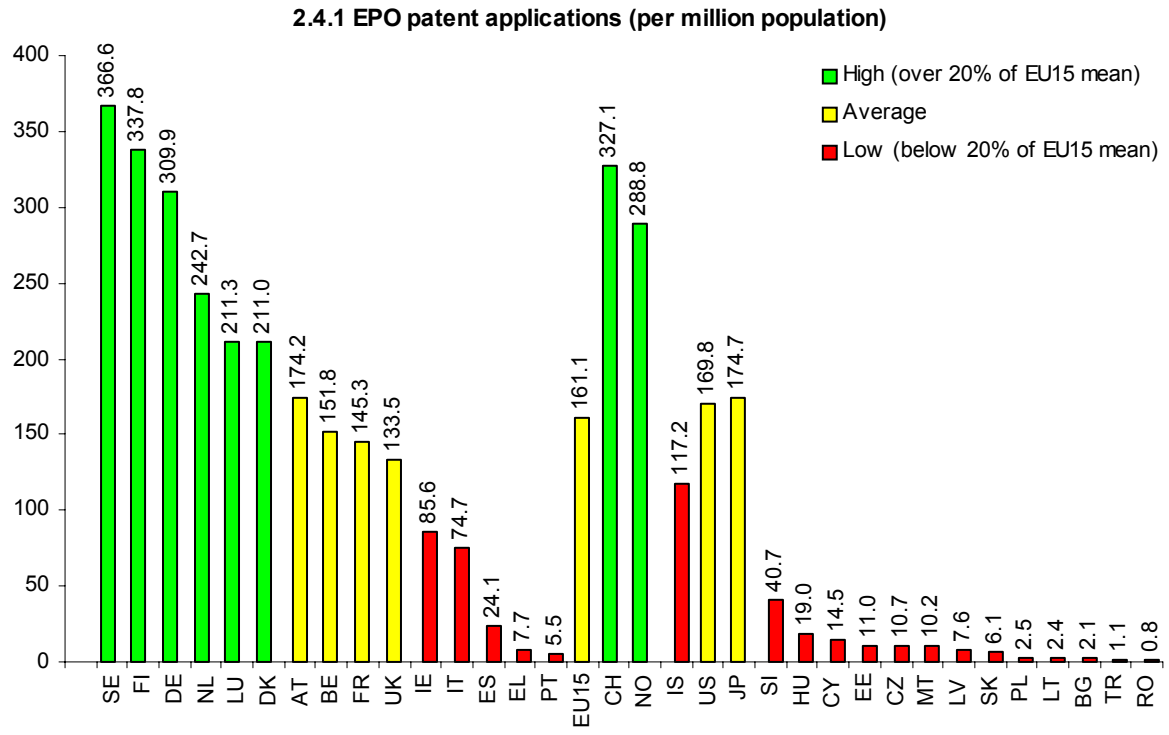
Denominator: Total population as defined in the European System of Accounts (ESA 1995).

Source: EUROSTAT: *Structural indicator II.5.1*.
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_pat_sm.htm

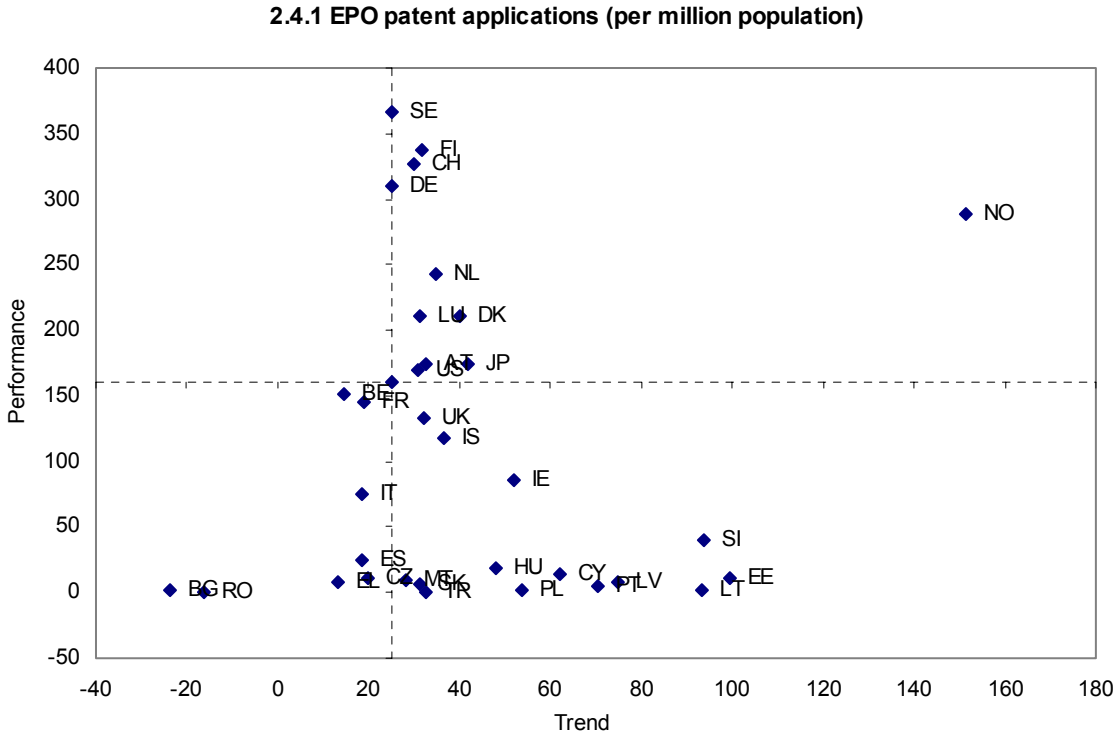
Note: This indicator is identical to indicator 12 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

Interpretation

This indicator covers all patent applications at the EPO and complements indicator 2.3.1 on high-tech patenting.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

2.4.2 USPTO patents granted (per million population)

Definition

Numerator: Number of patents granted by the US Patent and Trademark Office (USPTO), by date of publication. Patents are allocated to the country of the inventor, using fractional counting in the case of multiple inventor countries.

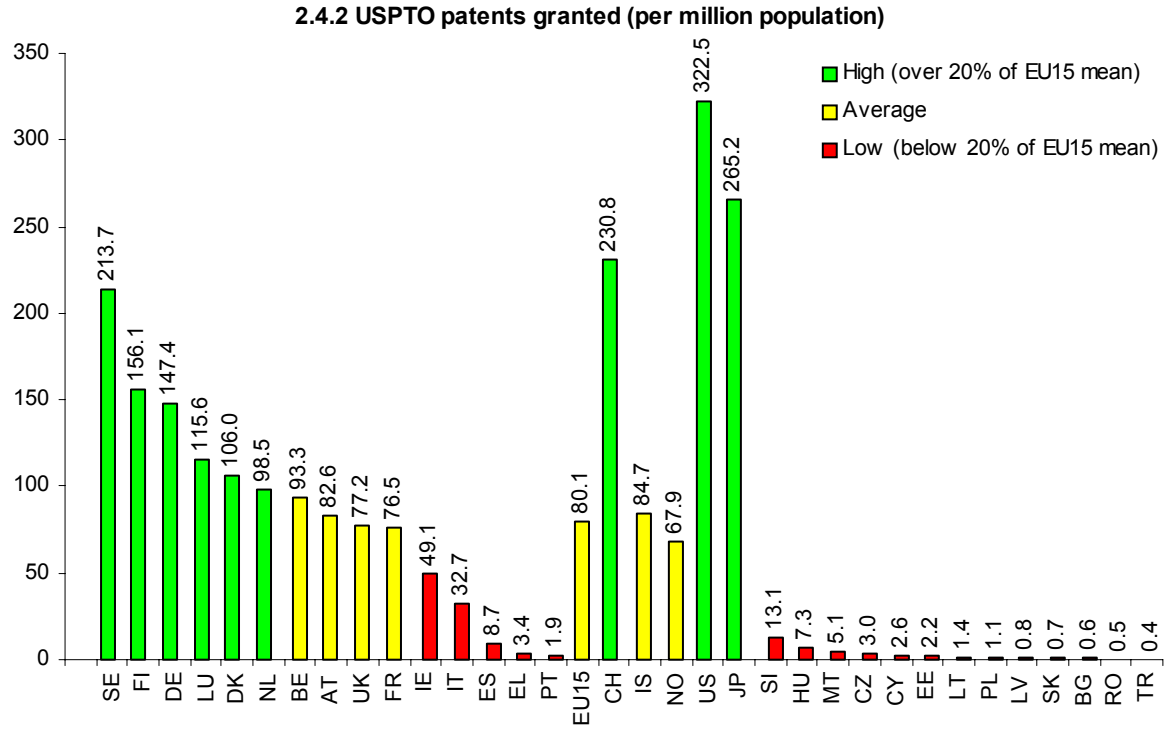
Denominator: Total population as defined in the European System of Accounts (ESA 1995).

Source: EUROSTAT: *Structural indicator II.5.2*.
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_pat_uspto_sm.htm

Note: This indicator is identical to indicator 12 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489).

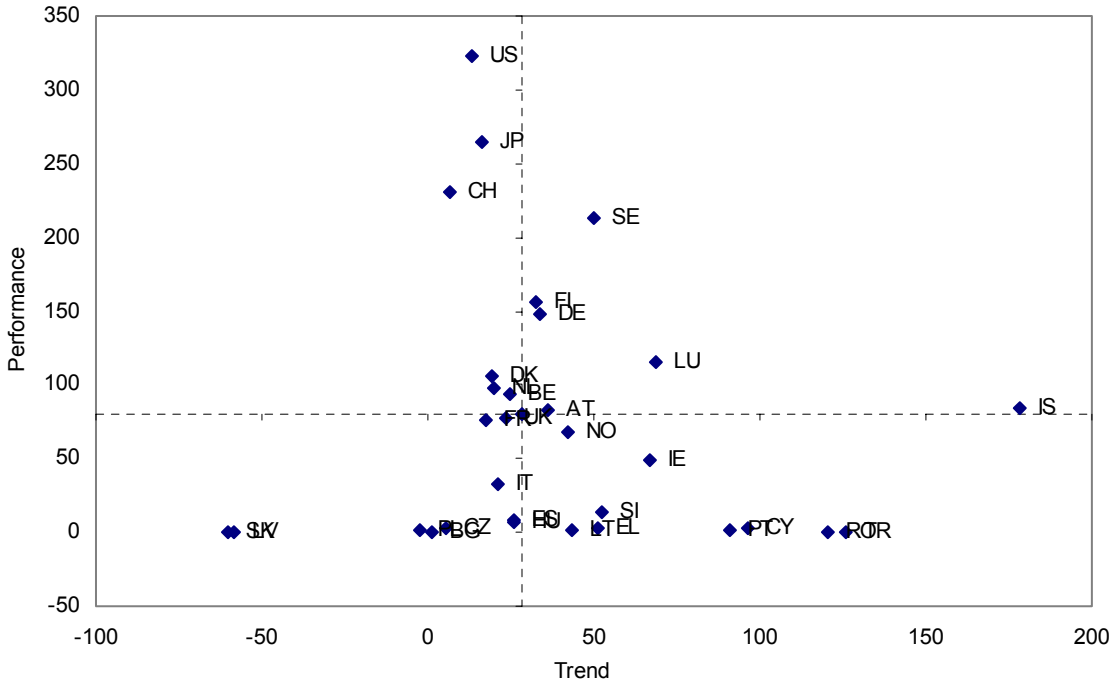
Interpretation

This indicator covers all patents granted by the USPTO and complements indicator 2.3.2 on high-tech patenting.



Years used: see Annex Tables D and E.

2.4.2 USPTO patents granted (per million population)



Trend base years: see Annex Tables H and I. Estonia (EE – performance: 2.2; trend: 534.4) and Malta (MT – performance: 5.1; trend: 284.8) and not shown.

3 Transmission and application of knowledge

3.1 SMEs innovating in-house (% of manufacturing SMEs and % of services SMEs)

Definition

Numerator: Sum of all manufacturing/services SMEs with in-house innovation activities. Innovative firms are defined as those who introduced new products or processes either 1) in-house or 2) in combination with other firms.

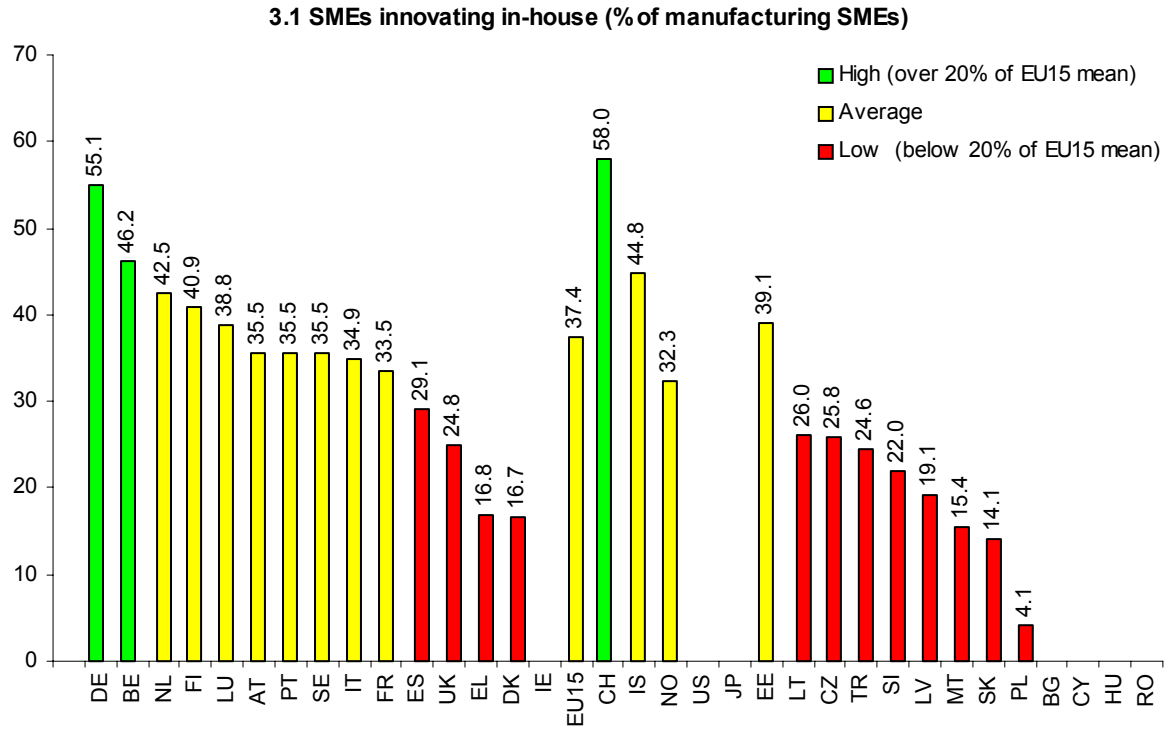
Denominator: Total number of manufacturing/services SMEs. Manufacturing refers to section D of NACE, services to sections G+I+J+K of NACE.

Source: EUROSTAT: 3rd Community Innovation Survey (CIS-3). National sources.

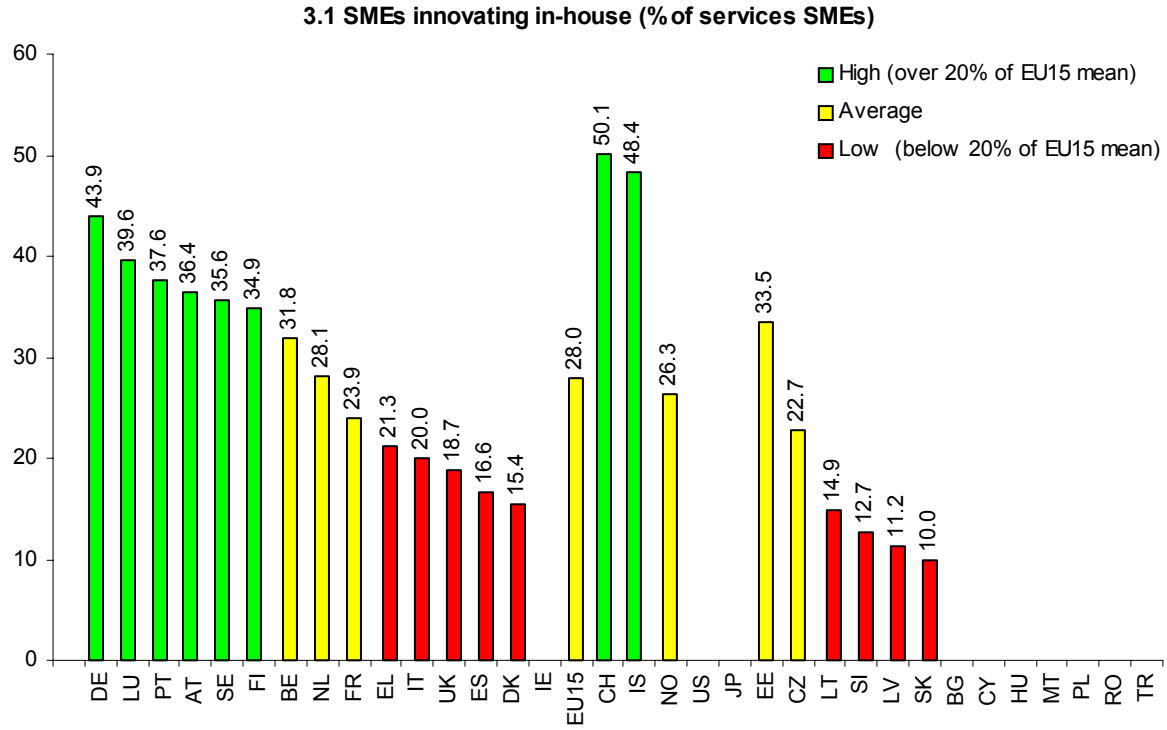
Note: This indicator does not include new products or processes developed by other firms. SMEs include all enterprises with 10-249 employees. **As CIS-2 covered enterprises with 20-249 employees only, a direct comparison with the results in older Scoreboard publications is not possible (cf. 1st and 3rd graph below)**.

Interpretation

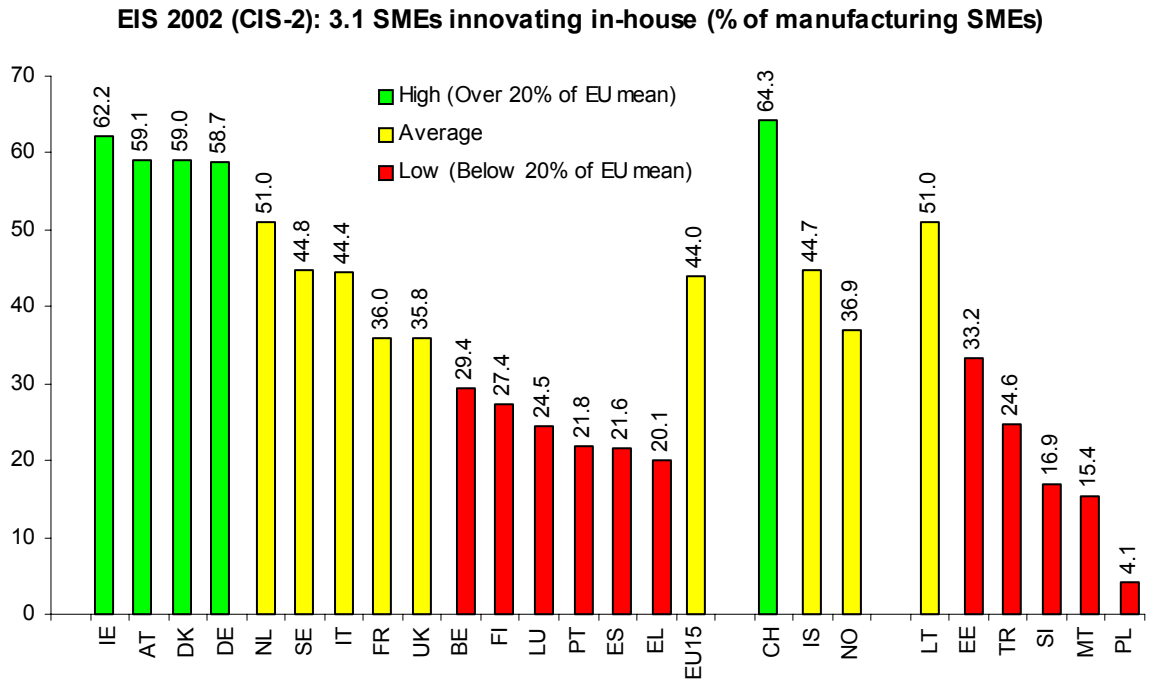
This indicator measures the degree to which manufacturing/services SMEs, that have introduced any new or significantly improved products or production processes during the period 1998-2000, have innovated in-house. The indicator is limited to SMEs because almost all large firms innovate and because countries with an industrial structure weighted to larger firms would tend to do better.



Years used: see Annex Tables D and E.



Years used: see Annex Tables D and E.



3.2 SMEs involved in innovation co-operation (% of manufacturing SMEs and % of services SMEs)

Definition

Numerator: Sum of all manufacturing/services SMEs with innovation co-operation activities. Firms with co-operation activities are those that had any co-operation agreements on innovation activities with other enterprises or institutions in the three years before the survey.

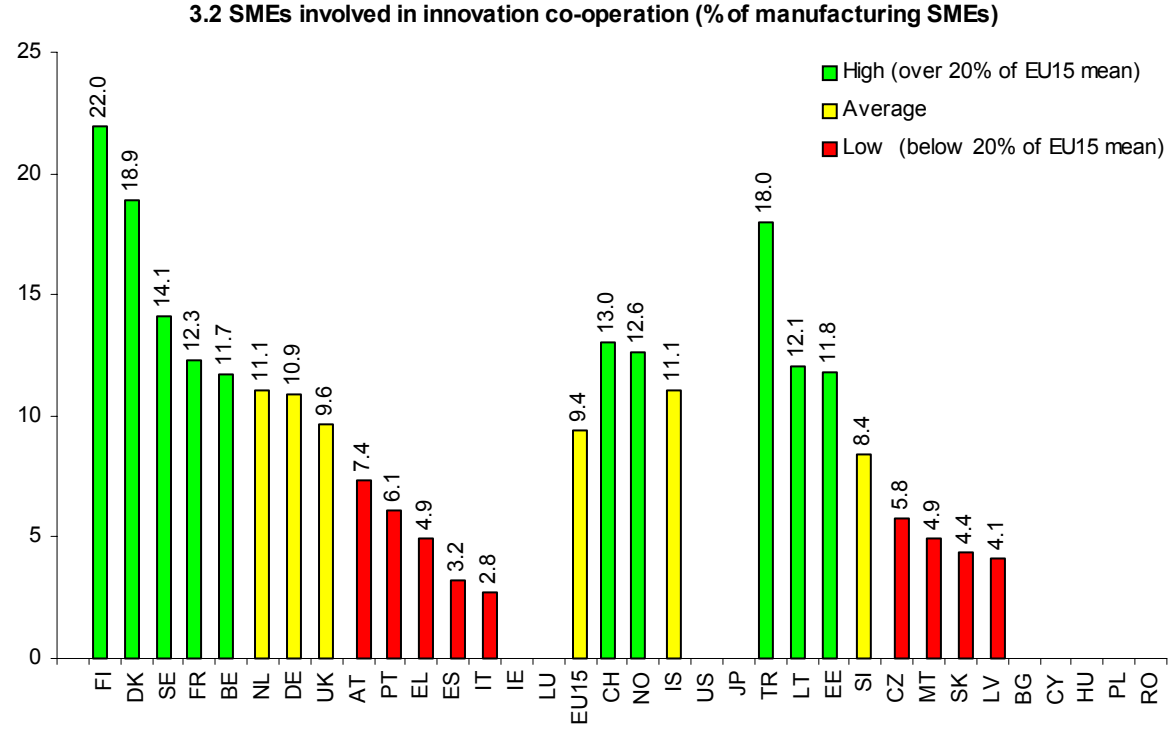
Denominator: Total number of manufacturing/services SMEs. Manufacturing refers to section D of NACE, services to sections G+I+J+K of NACE.

Source: EUROSTAT: 3rd Community Innovation Survey (CIS-3). National sources.

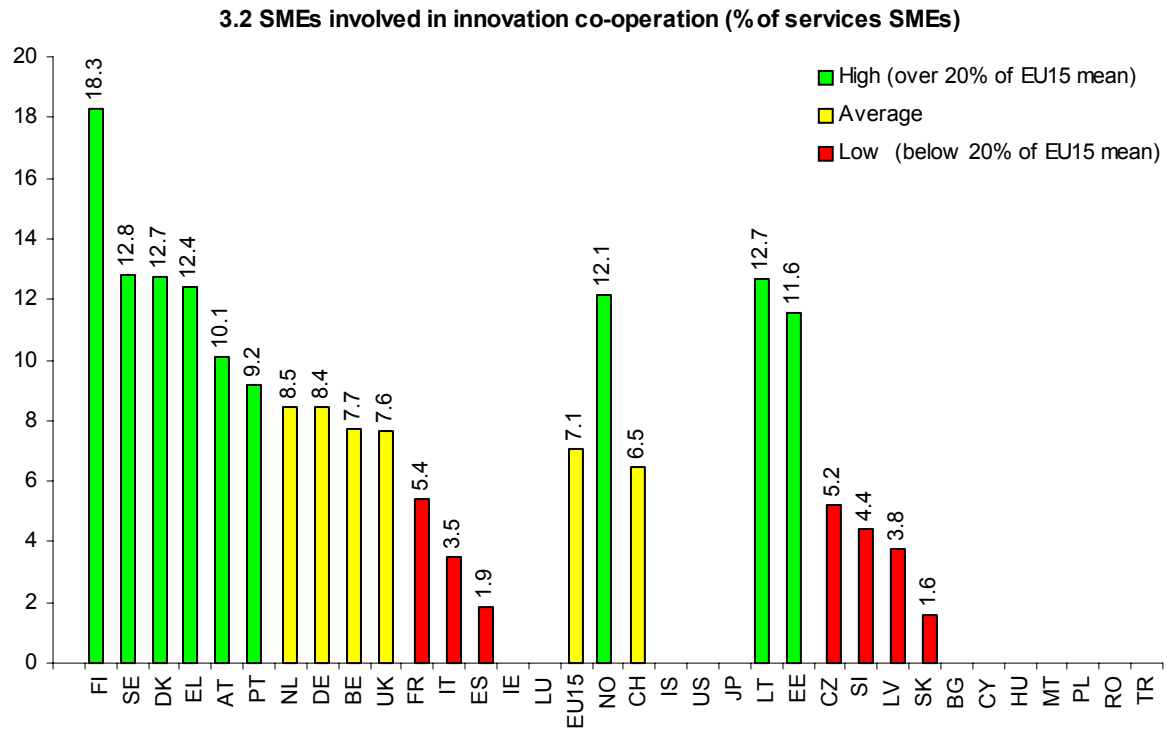
Note: SMEs include all enterprises with 10-249 employees. **As CIS-2 covered enterprises with 20-249 employees only, a direct comparison with the results in older Scoreboard publications is not possible (cf. 1st and 3rd graph below)**.

Interpretation

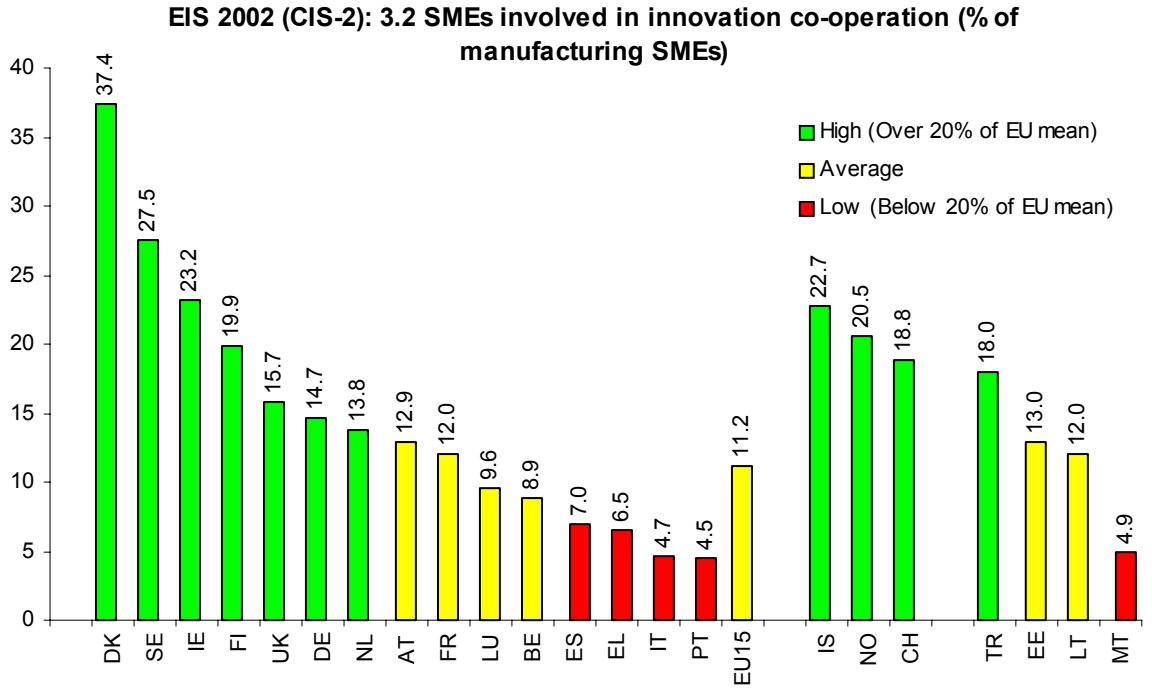
This indicator measures the degree to, which manufacturing SMEs are involved in innovation co-operation. Complex innovations, particularly in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate on the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms and between firms and other firms. The indicator is limited to SMEs because almost all large firms are involved in innovation co-operation. This indicator also captures technology-based small manufacturing firms, since most are involved in co-operative projects. However, the indicator will miss high-technology firms with no product sales, such as many biotechnology firms, because these firms are assigned to the service sector.



Years used: see Annex Tables D and E.



Years used: see Annex Tables D and E.



3.3 Innovation expenditures (% of all turnover in manufacturing/services)

Definition

Numerator: Sum of total innovation expenditure for all manufacturing/services enterprises. Innovation expenditures includes the full range of innovation activities: in-house R&D, extramural R&D, machinery and equipment linked to product and process innovation, spending to acquire patents and licenses, industrial design, training, and the marketing of innovations.

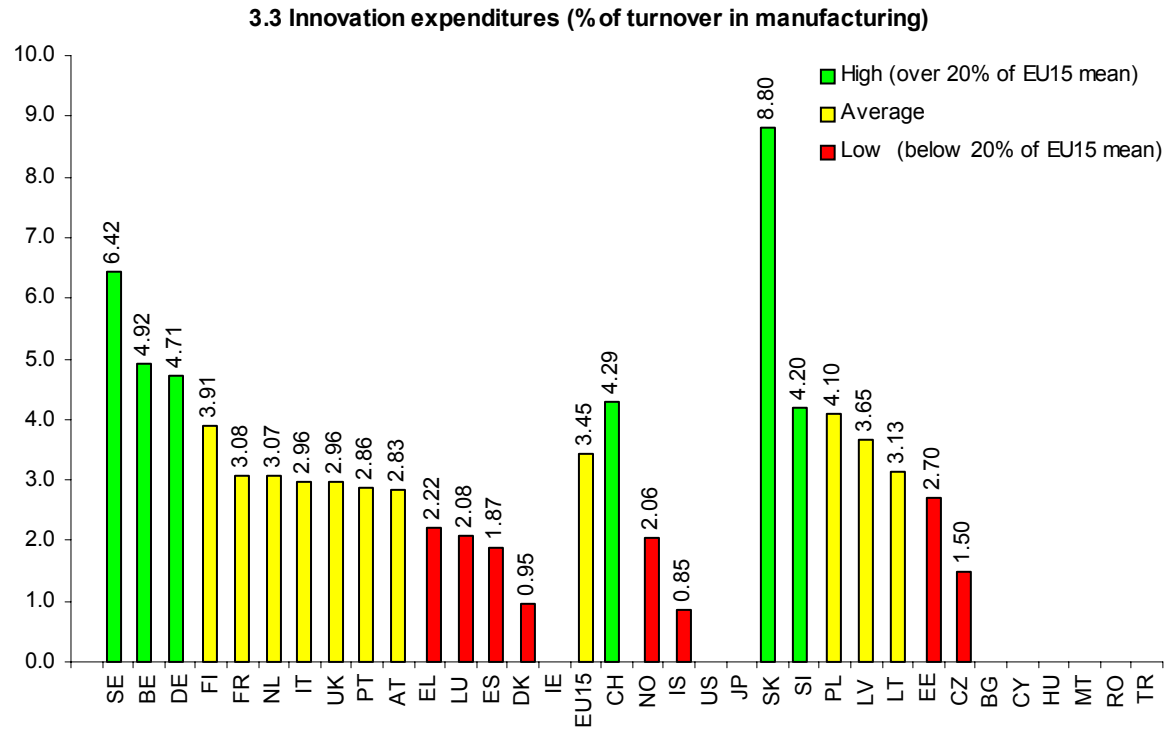
Denominator: Total turnover for manufacturing/services. This includes firms that do not innovate, whose innovation expenditures are zero by definition. Manufacturing refers to section D of NACE, services to sections G+I+J+K of NACE.

Source: EUROSTAT: 3rd Community Innovation Survey (CIS-3). National sources.

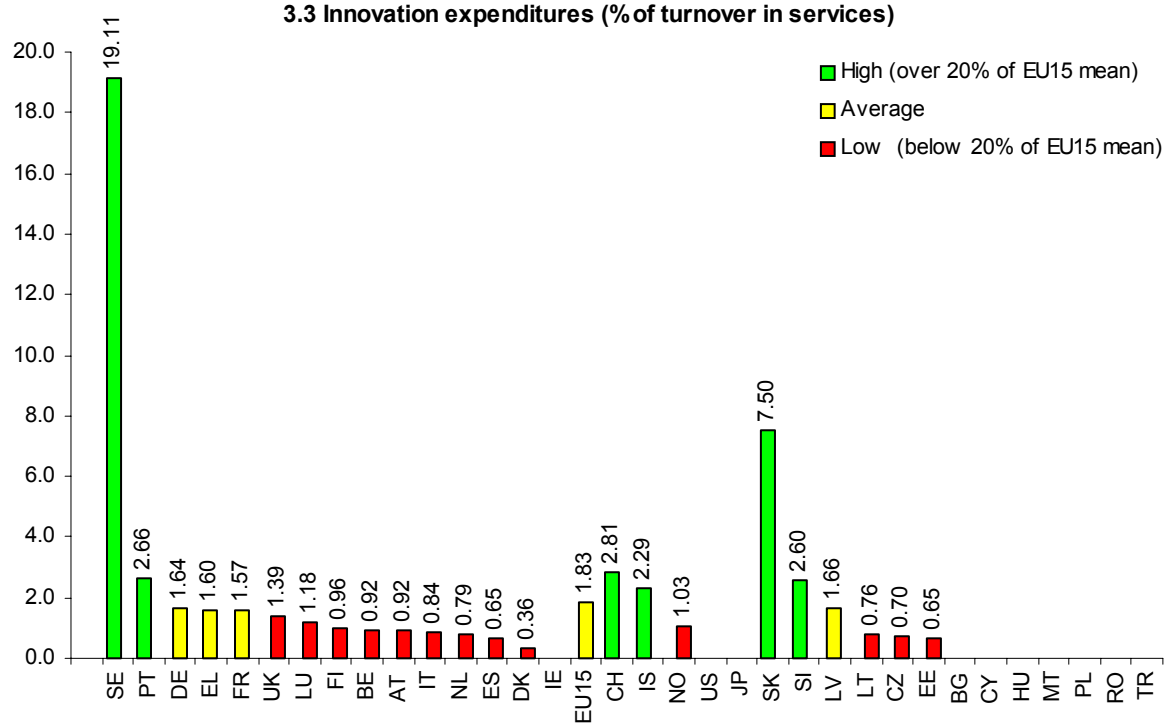
Note: All enterprises with 10 or more employees are included. **As CIS-2 covered enterprises with 20 or more employees only, a direct comparison with the results in older Scoreboard publications is not possible (cf. 1st and 3rd graph below)**.

Interpretation

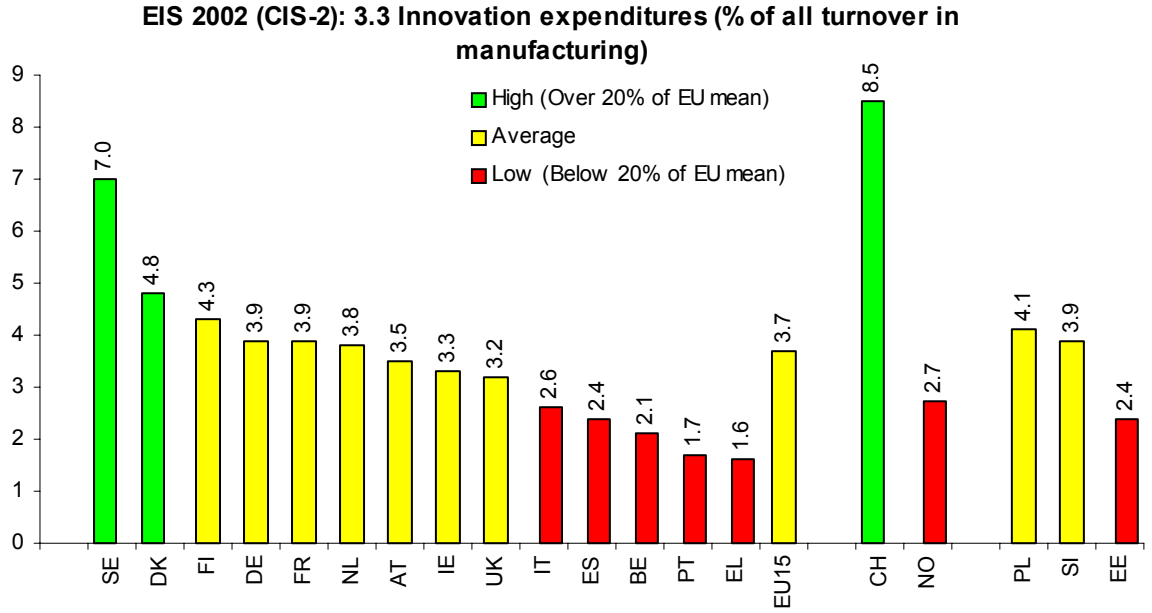
This indicator measures the total innovation expenditure as a percentage of total turnover. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas. Overall, the indicator measures total expenditures on many different activities of relevance to innovation. The indicator partly overlaps with indicator 2.2 on R&D expenditures. A better version would exclude R&D, but concerns over data reliability have prevented this option.



Years used: see Annex Tables D and E.



Years used: see Annex Tables D and E.



4 Innovation finance, output and markets

4.1 Share of high-tech venture capital investment

Definition

Numerator: High-tech venture capital includes the following sectors: computer related fields, electronics, biotechnology, medical/health, industrial automation, financial services.

Denominator: Venture capital is defined as the sum of early stage capital (seed and start-up) plus expansion capital.

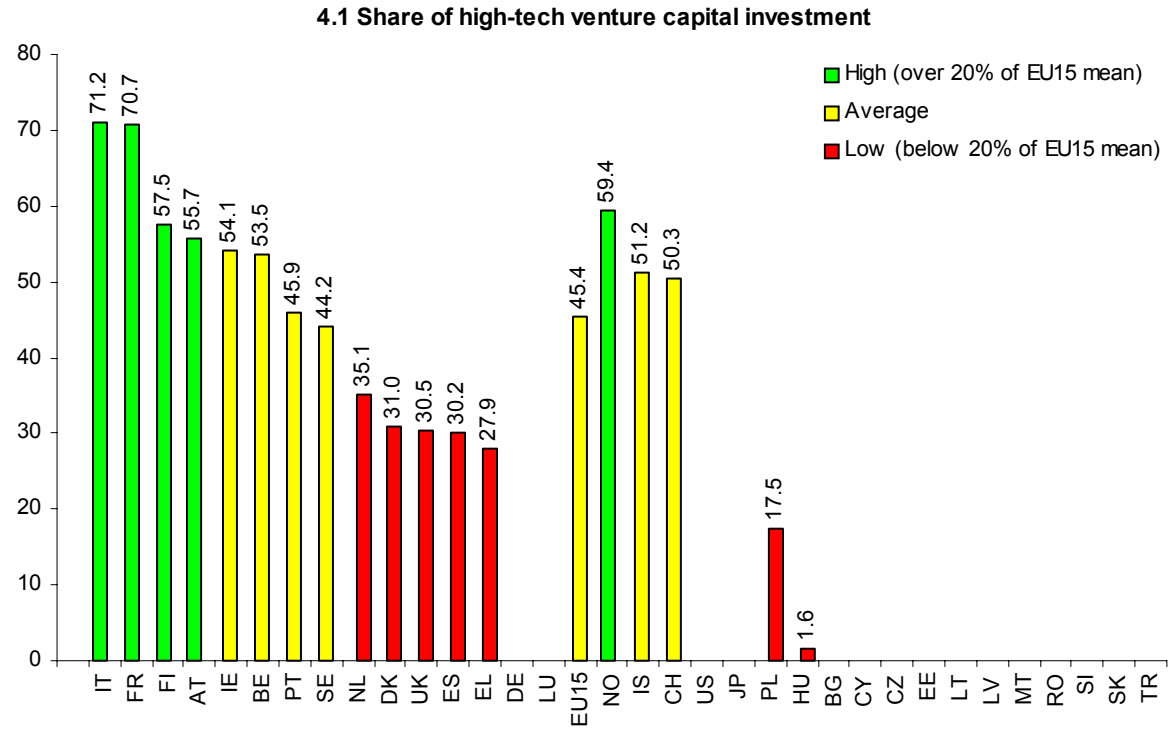
In order to reduce volatility, this indicator is based on a two-year average of the figures for 2000 and 2001.

Source: EVCA's (European Private Equity & Venture Capital Association) "Mid-Year Survey of Pan-European Private Equity & Venture Activity".

Note: This indicator is similar to indicator 15 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489), which uses the same data but without calculating a two-year average.

Interpretation

One of the main barriers to innovation is the ability of new technology-based firms to raise adequate funding. This indicator measures the relative supply of private venture capital to these firms. The total supply of capital will be higher because of bank and private-placement financing. The main disadvantage is that there are many alternative methods of financing new technology-based start-up firms that are not covered by this indicator. Firms can also go abroad to raise venture capital. An additional concern is the lack of information on the accuracy of the venture capital data.



Years used: see Annex Tables D and E.

4.2 Share of early stage venture capital in GDP

Definition

Numerator: Venture capital investment is defined as private equity raised for investment in companies. Management buyouts, management buyins, and venture purchase of quoted shares are excluded. Early-stage capital includes seed and start-up capital. *Seed* is defined as financing provided to research, assess and develop an initial concept before a business has reached the start-up phase. *Start-up* is defined as financing provided for product development and initial marketing, manufacturing, and sales. Companies may be in the process of being set up or may have been in business for a short time, but have not yet sold their product commercially.

Denominator: Gross domestic product as defined in the European System of Accounts (ESA 1995), in national currency and current prices.

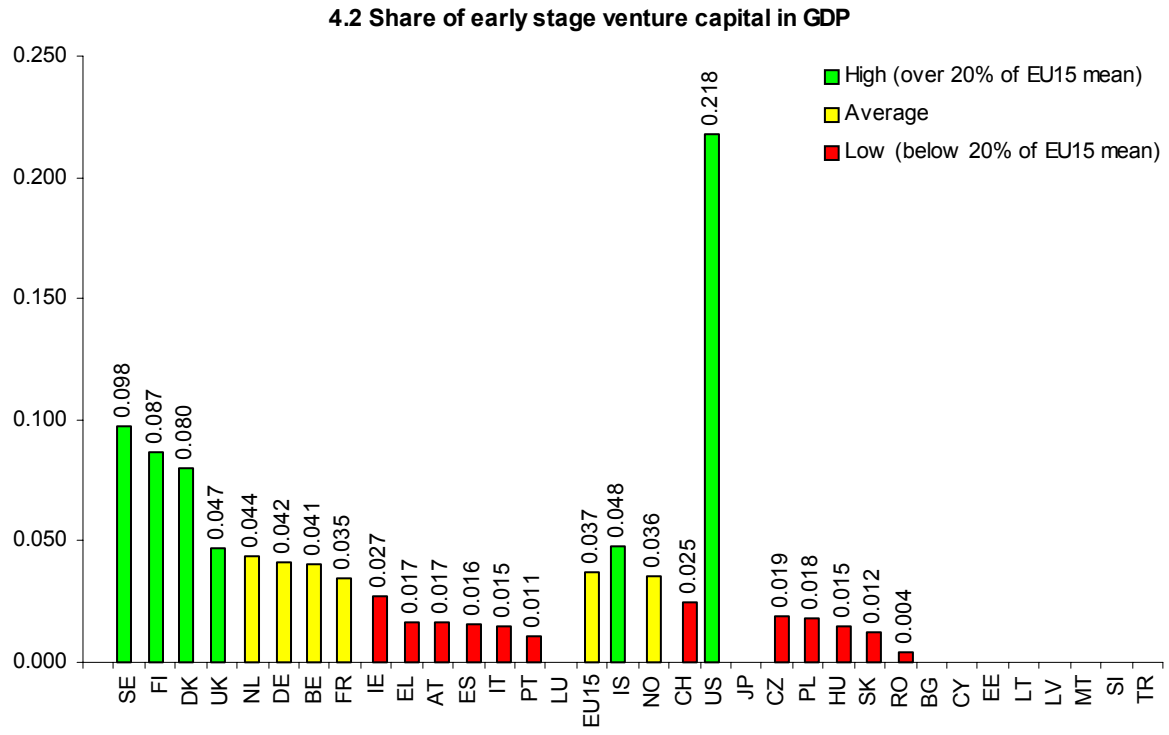
In order to reduce volatility, this indicator is based on a two-year average of the figures for 2000 and 2001.

Source: EUROSTAT: *Structural indicator II.6.1*.
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_vc_sm.htm

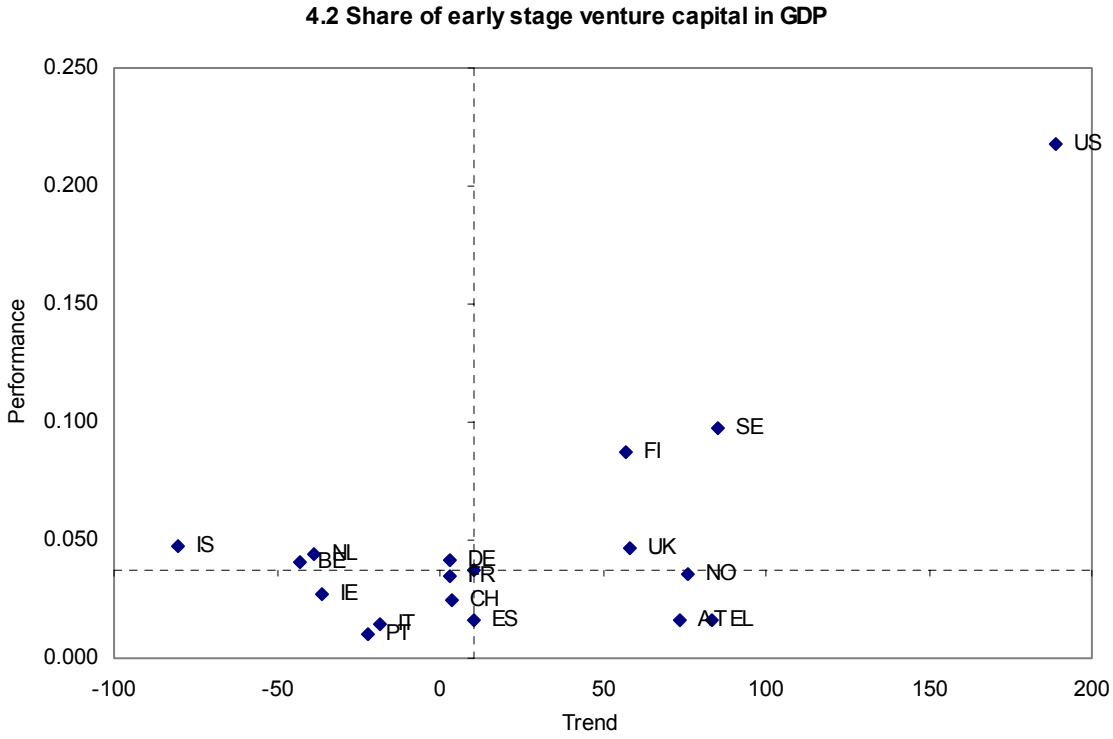
Note: This indicator is similar to indicator 14 in "Investing in Research: an Action Plan for Europe" (SEC(2003): 489), which uses the same data but without calculating a two-year average.

Interpretation

The amount of early-stage venture capital is a proxy for the relative dynamism of new business creation.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I. Denmark (DK – performance: 0.080; trend: 531.6) not shown.

4.3.1 Sales of 'new to market' products (% of turnover in manufacturing and % of turnover in services)

Definition

Numerator: Sum of total turnover of new or significantly improved products for all manufacturing/services enterprises.

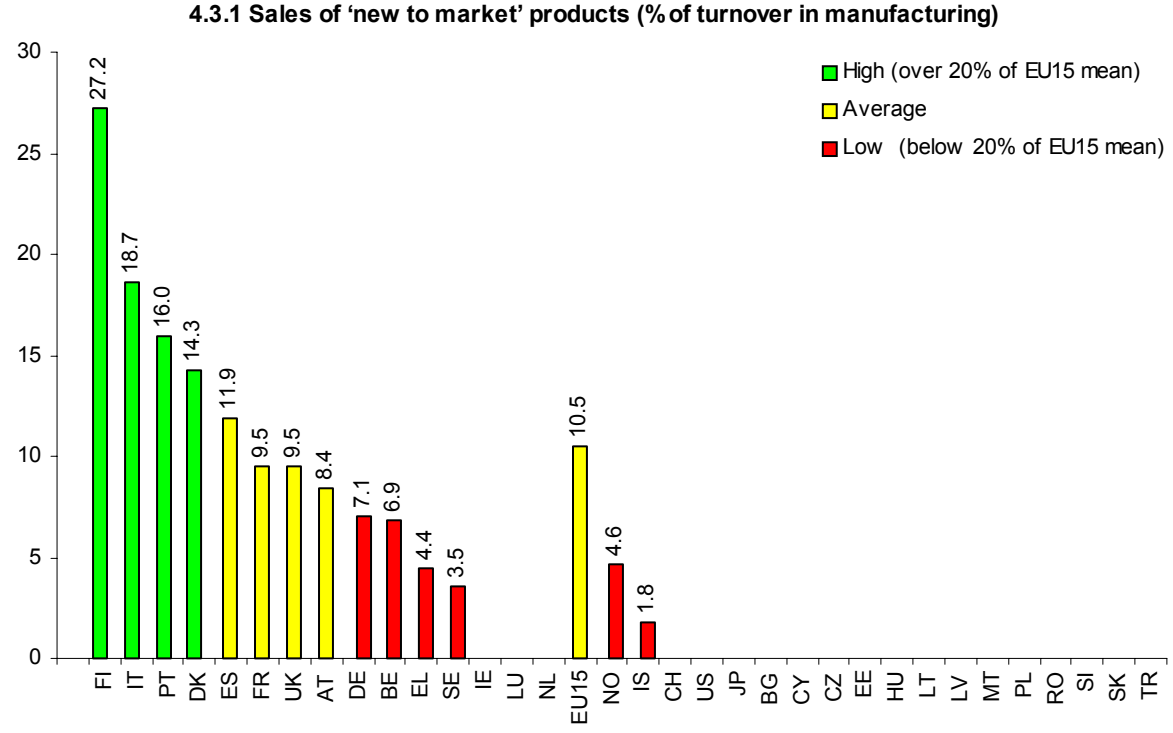
Denominator: Total turnover for manufacturing/services. Manufacturing refers to section D of NACE, services to sections G+I+J+K of NACE.

Source: EUROSTAT: 3rd Community Innovation Survey (CIS-3). National sources.

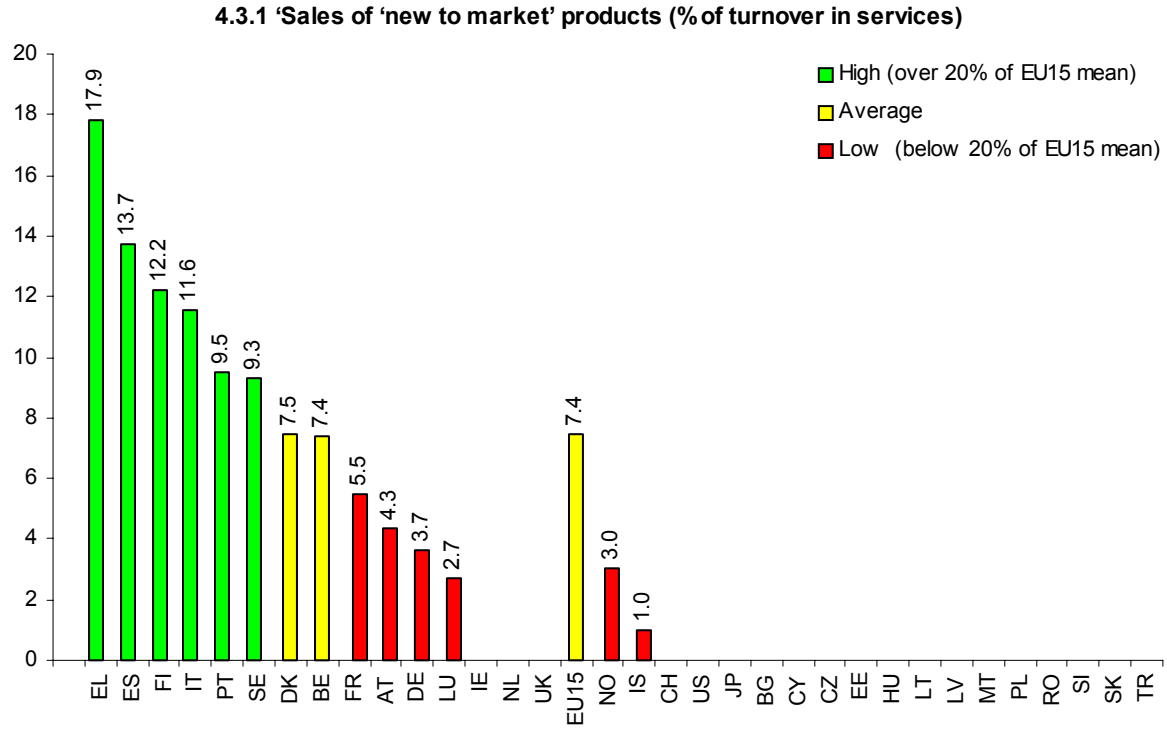
Note: All enterprises with 10 or more employees are included. **As CIS-2 covered enterprises with 20 or more employees only, a direct comparison with the results in older Scoreboard publications is not possible (cf. 1st and 3rd graph below)**.

Interpretation

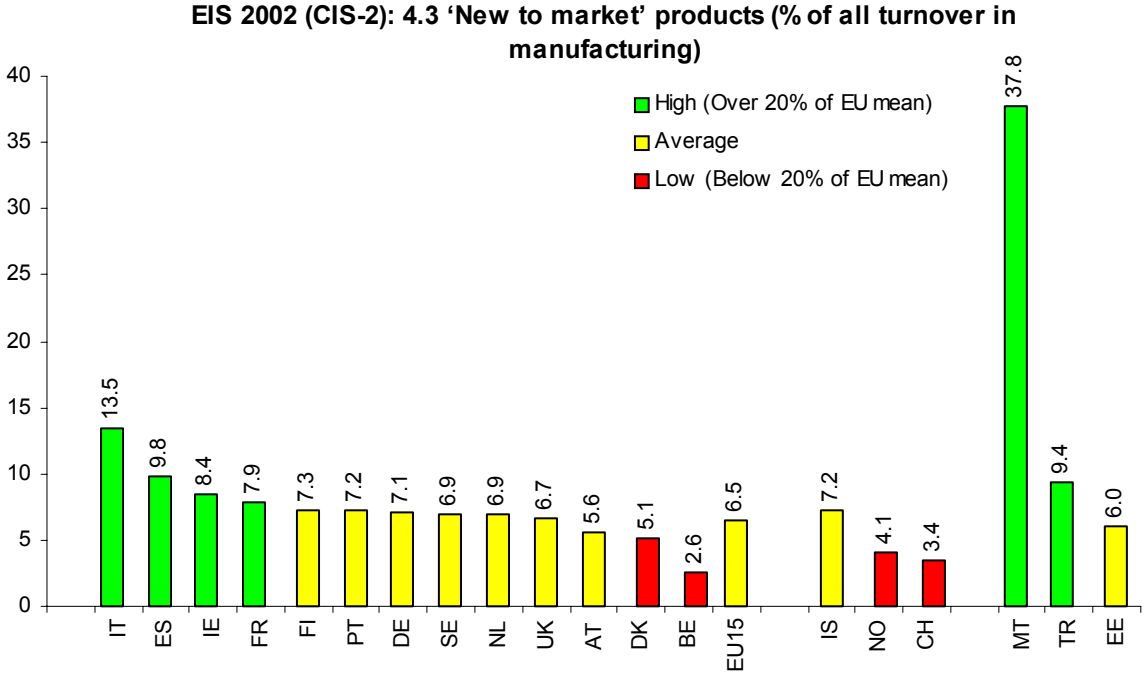
This indicator measures the turnover of new or significantly improved products, which are also new to the market, as a percentage of total turnover. The product must be new to the firm, which in many cases will also include innovations that are world-firsts. The main disadvantage is that there is some ambiguity in what constitutes a 'new to market' innovation. Smaller firms or firms from less developed countries could be more likely to include innovations that have already been introduced onto the market elsewhere.



Years used: see Annex Tables D and E.



Years used: see Annex Tables D and E.



4.3.2 Sales of 'new to the firm but not new to the market' products (% of turnover in manufacturing and % of turnover in services)

Definition

Numerator: Sum of total turnover of new or significantly improved products to the firm but not to the market for all manufacturing/services enterprises.

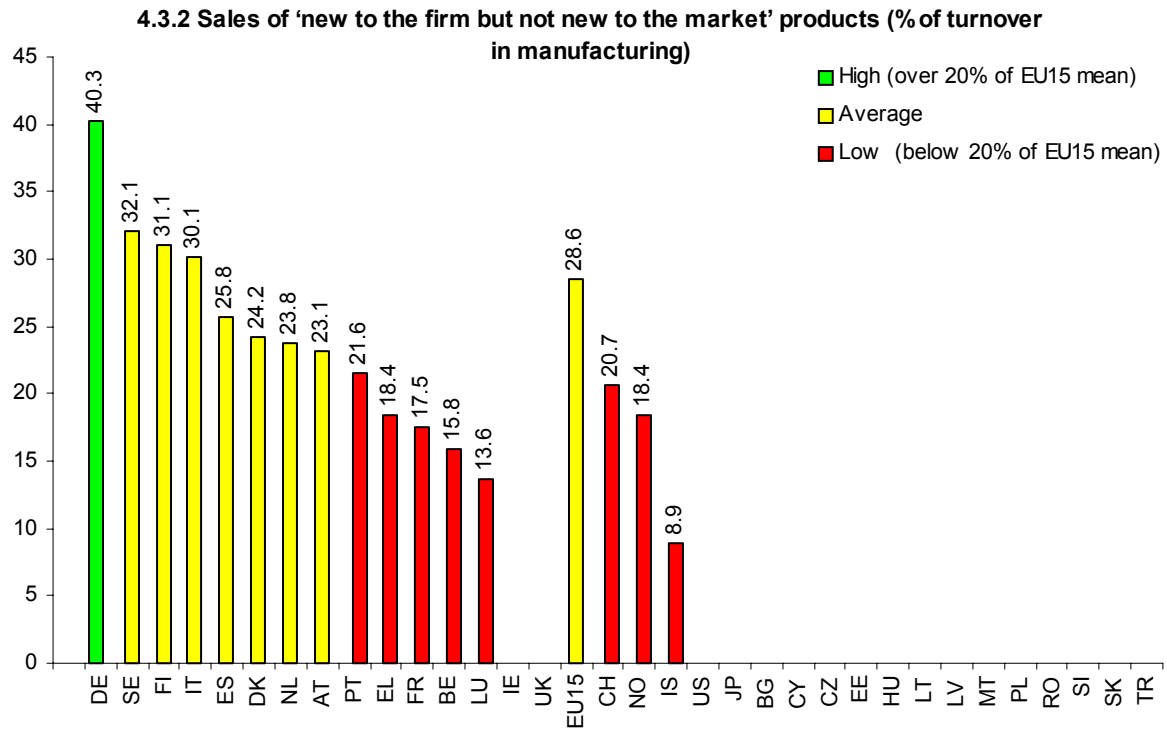
Denominator: Total turnover for manufacturing/services. Manufacturing refers to section D of NACE, services to sections G+I+J+K of NACE.

Source: EUROSTAT: 3rd Community Innovation Survey (CIS-3). National sources.

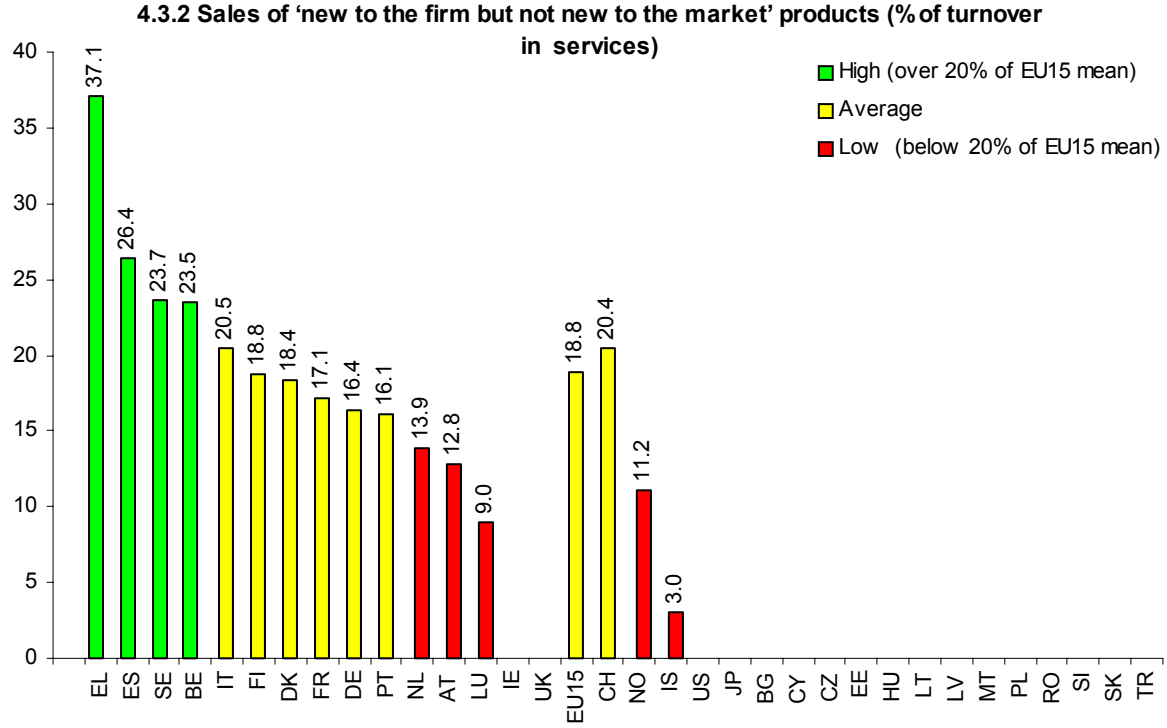
Note: All enterprises with 10 or more employees are included.

Interpretation

CIS-2 results have shown that, in manufacturing, 31% of turnover is from products "new or improved for the firm", while only 7% is from products that were "new or improved to the market" (EUROSTAT, Community Innovation Survey 1997/1998: Innovating Enterprises. Statistics in Focus, Theme 9 - 2/1999). The difference of 24% shows the importance of innovation as diffusion versus innovation as creation.



Years used: see Annex Tables D and E.



Years used: see Annex Tables D and E.

4.4 Internet access/use

Definition

This is a composite indicator using the average of the re-scaled values for the following two indicators:

- *Home internet access (% of all households)*

Numerator: Number of households who have internet access at home. All forms of use are included. Population considered is equal to or over 15 years old.

Denominator: The number of households.

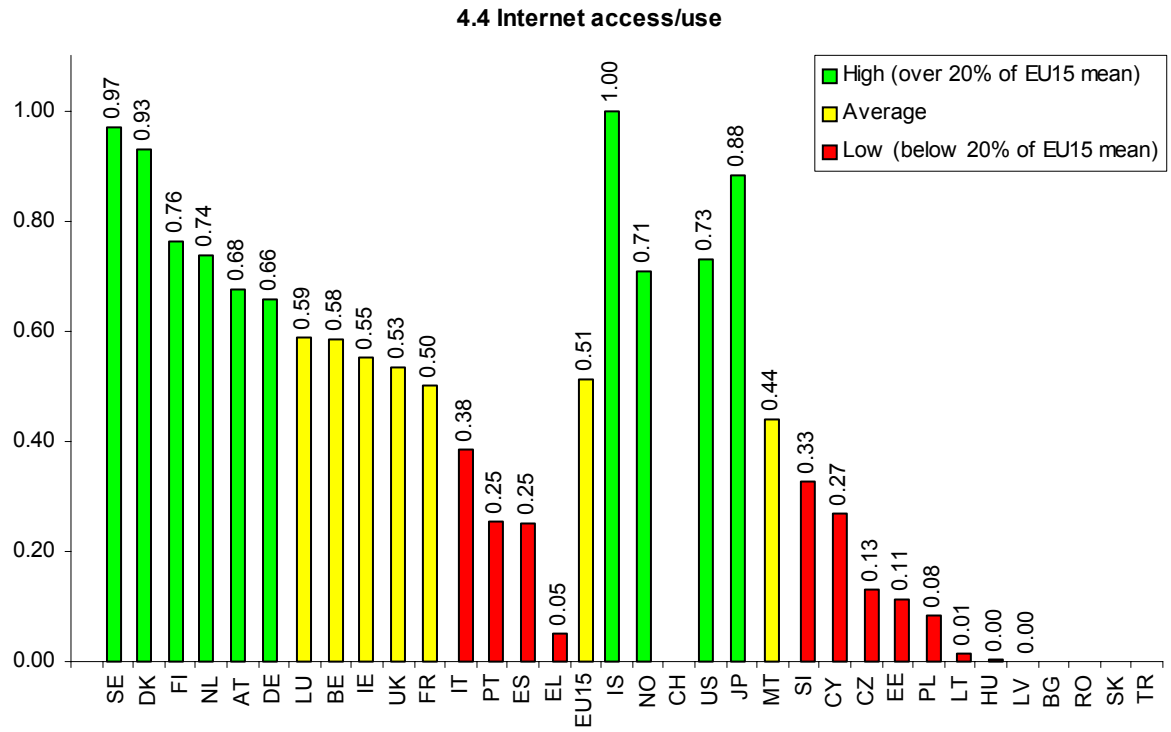
Source: EUROSTAT: *Structural indicator II.3.1*.
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_ia_sm.htm

- *Share of SMEs with own web site*

Numerator: Number of SMEs with own web site.

Denominator: Number of manufacturing/services SMEs.

Source: EUROSTAT.



Years used: see Annex Tables D and E.

4.5 ICT expenditures (% of GDP)

Definition

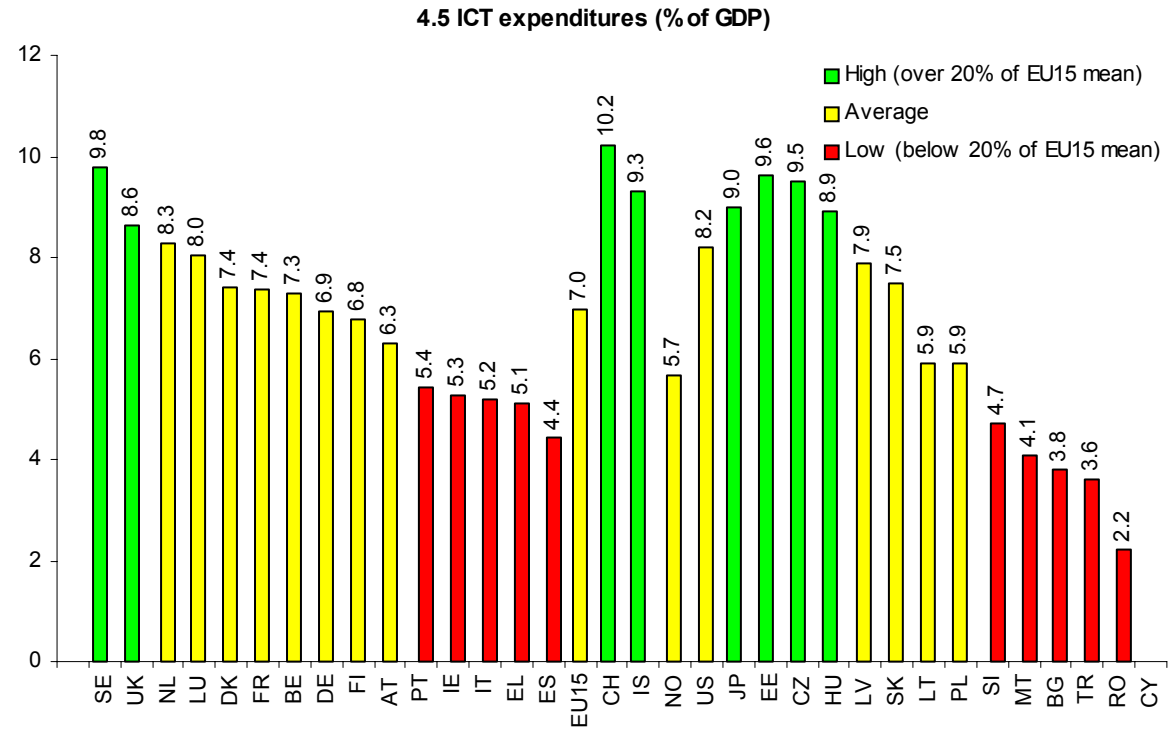
Numerator: Total expenditures on information and communication technology (ICT). ICT includes office machines, data processing equipment, data communication equipment, and telecommunications equipment, plus related software and telecom services.

Denominator: Gross domestic product as defined in the European System of Accounts (ESA 1995), in national currency and current prices.

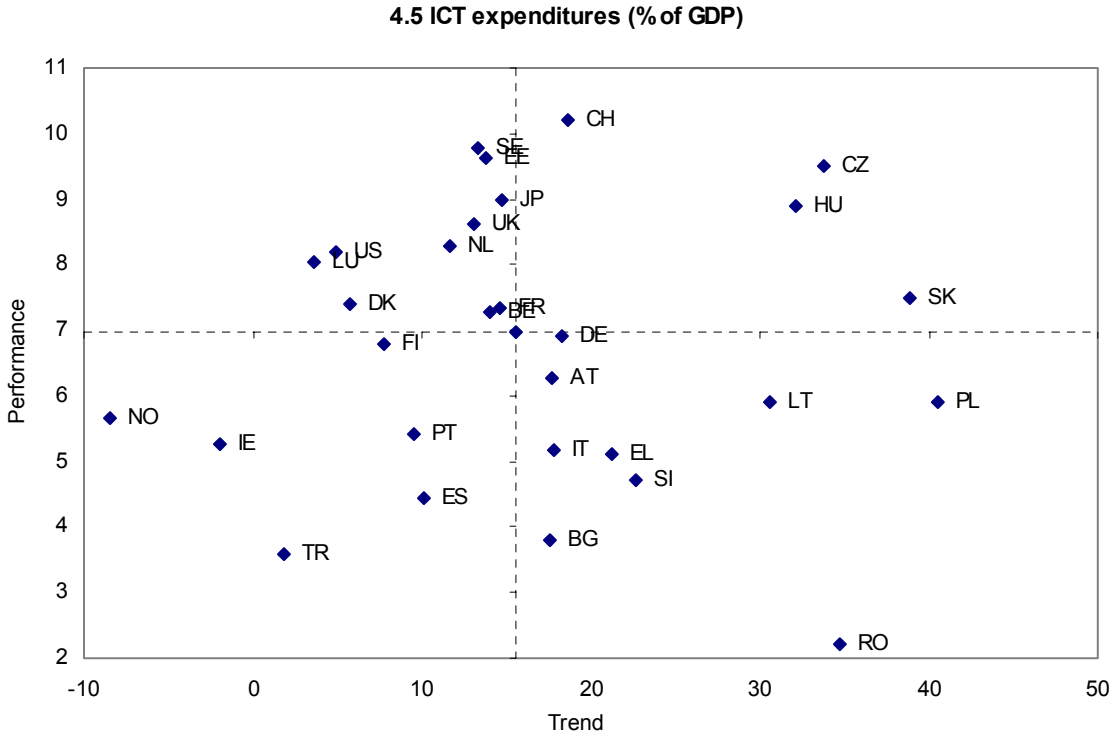
Source: EUROSTAT: *Structural indicators II.7.1 and II.7.2*. WITSA/IDC (Digital Planet).
http://europa.eu.int/newcronos/suite/info/notmeth/en/theme1/strind/innore_ict_sm.htm

Interpretation

ICT is a fundamental feature of knowledge based economies and the driver of current and future productivity improvements. An indicator for ICT investment is crucial for capturing innovation in knowledge-based economies, particularly due to the diffusion of new IT equipment, services, and software. One disadvantage of this indicator is that it is ultimately obtained from private sources (IDC), with a lack of good information on the reliability of the data. Another disadvantage is that some expenditures are for final consumption and may have few productivity or innovation benefits. It would be preferable to have data on ICT investment rather than ICT expenditure, but reliable investment data are not yet available.



Years used: see Annex Tables D and E.



Trend base years: see Annex Tables H and I.

4.6 Share of manufacturing value-added in high-tech sectors

Definition

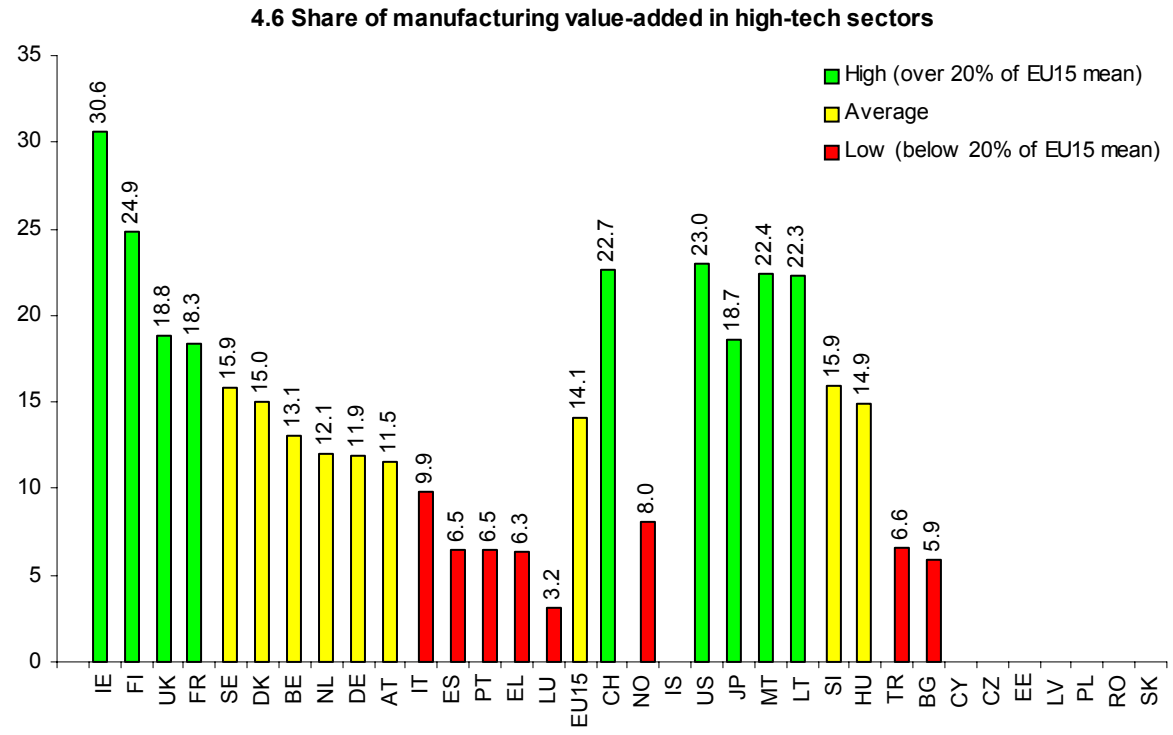
Numerator: Total value added in manufacturing in five high technology industries: pharmaceuticals (NACE 24.4), office equipment (NACE 30), telecommunications and related equipment (NACE 32), instruments (NACE 33) and aerospace (NACE 35.3).

Denominator: Value added of total manufacturing sector, in national currency and current prices.

Source: EUROSTAT: Structural Business Statistics. OECD: STAN database.

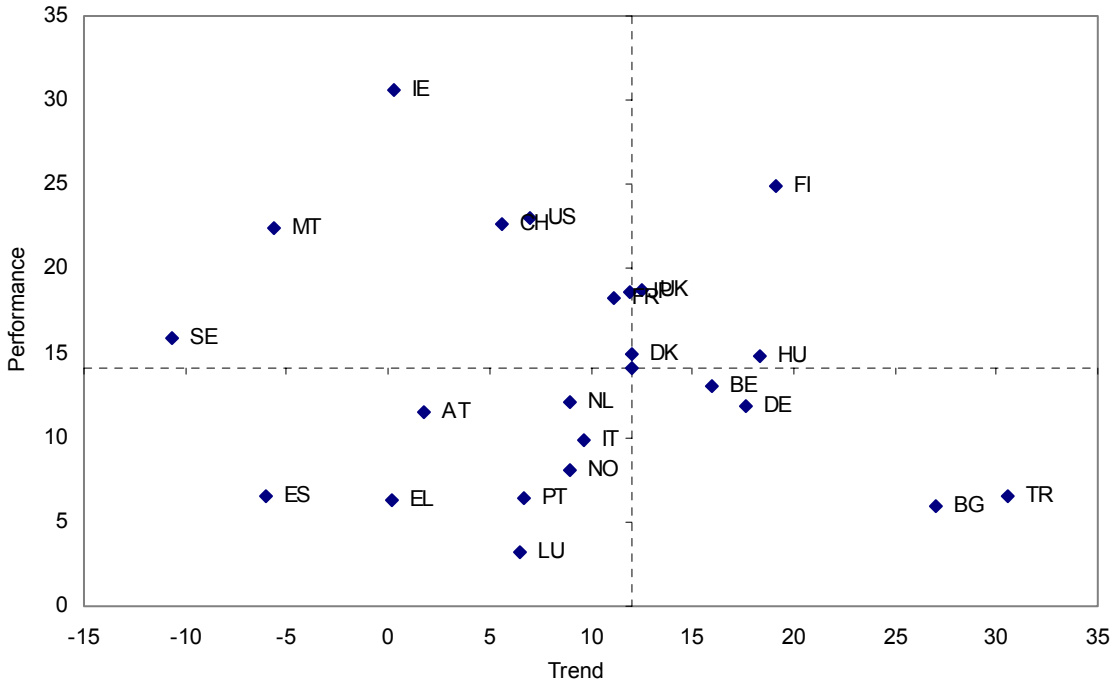
Interpretation

Value-added is the best measure of manufacturing output, whereas other indicators such as total production can be biased by 'screwdriver' plants with little value-added. The requirement for good data on value added creates a lag of two or more years longer than for GDP and other economic data. The main disadvantage of the main indicator is that a hollowing-out of manufacturing, as in the UK, can lead to relatively good results, if low and medium technology industries no longer survive.



Years used: see Annex Tables D and E.

4.6 Share of manufacturing value-added in high-tech sectors



Trend base years: see Annex Tables H and I.

4.7 Volatility rates of SMEs (% of manufacturing SMEs and % of services SMEs)

Definition

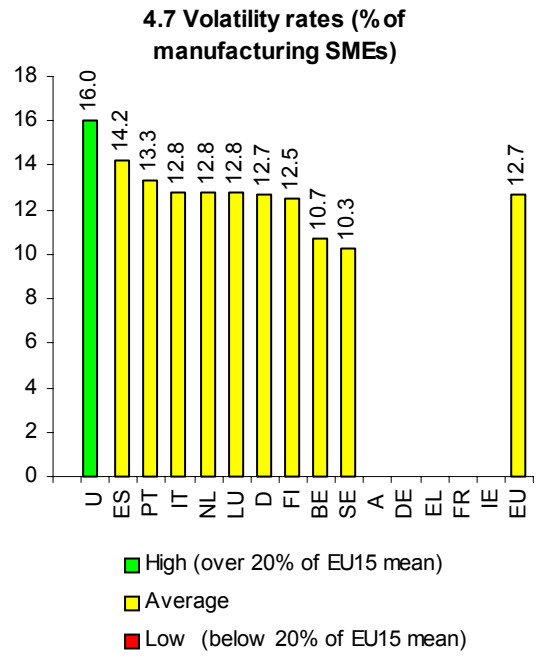
Numerator: Volatility rates are defined as the sum of birth and death rates. "A birth (death) amounts to the creation (dissolution) of a combination of production factors with the restriction that no other enterprises are involved in the event. Births (deaths) do not include entries into/exits from the population due to mergers, break-ups, split-off (take-overs) or restructuring of a set of enterprises. It does not include entries into (exits from) a sub-population resulting only from a change of activity"[4].

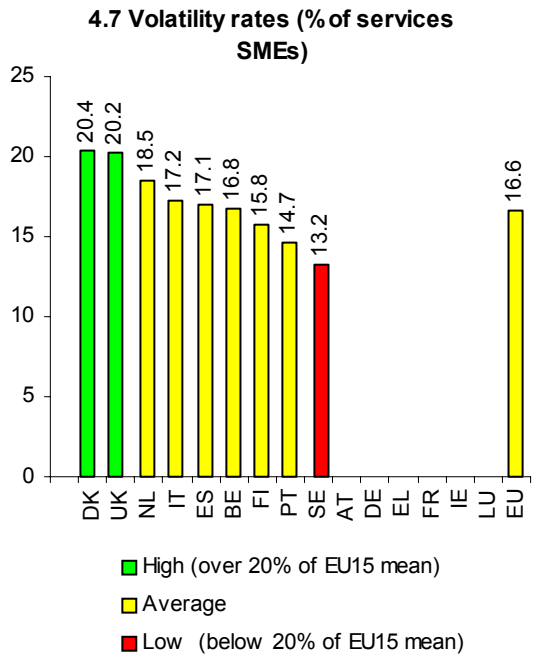
Denominator: Number of manufacturing/services SMEs.

Source: EUROSTAT: Business Demography Statistics.

Interpretation

Accelerated destruction and creation of companies (and jobs) has been highlighted as a major driver of innovation in the US. As less innovative and efficient companies die or contract, more innovative companies take their place. "Volatility rates indicate entrepreneurial dynamism, both births and deaths of firms can contribute to higher productivity. Especially in times of technological change as at present, where the diffusion of new technologies (ICT) requires innovation and on condition that death rates are similar or lower than birth-rates, high volatility rates indicate primarily an economy's ability to adapt to change" (SEC(2002), 1213).





Years used: see Annex Tables D and E.

[4] As defined in the Commission Regulation concerning the definitions of characteristics for structural business statistics and as quoted in: EUROSTAT, Business demography in 9 Member States: Results for 1997-2000. Statistics in Focus, Theme 4 - 9/2003.

Annex A: High-tech patent classes

The high technology patent classes include pharmaceuticals, biotechnology, information technology, and aerospace. The following IPC subclasses are included:

- Computer and Automated Business Equipment:
  - B41J: typewriters; selective printing mechanisms, i.e. mechanisms printing otherwise than from a form; correction of typographical errors
  - G06C: digital computers in which all the computation is effected mechanically
  - G06D: digital fluid-pressure computing devices
  - G06E: optical computing devices
  - G06F: electric digital data processing
  - G06G: analogue computersG06J: hybrid computing arrangements
  - G06K: recognition of data; presentation of data; record carriers; handling record carriers
  - G06M: counting mechanisms; counting of objects not otherwise provided for
  - G06N: computer systems based on specific computational models
  - G06T: image data processing or generation, in general
  - G11C: static stores
- Microorganism, genetic engineering:
  - C12M: apparatus for enzymology or microbiology
  - C12N: micro-organisms or enzymes; compositions thereof; propagating, preserving, or maintaining micro-organisms; mutation or genetic engineering; culture media
  - C12P: fermentation or enzyme-using processes to synthesize a desired chemical compound or composition or to separate optical isomers from a racemic mixture
  - C12Q: measuring or testing processes involving enzymes or micro-organisms
- Aviation:
  - B64B: lighter-than-air aircraft
  - B64C: aeroplanes; helicopters
  - B64D: equipment for fitting in or to aircraft; flying suits; parachutes; arrangements or mounting of power plants or propulsion transmissions
  - B64F: ground or aircraft-carrier-deck installations
  - B64G: cosmonautics; vehicles or equipment therefore
- Communications:
  - H04B: transmission
  - H04H: broadcast communication
  - H04J: multiplex communication
  - H04K: secret communication; jamming of communication
  - H04L: transmission of digital information, e.g. telegraphic communication
  - H04M: telephonic communication
  - H04N: pictorial communication, e.g. television
  - H04Q: selecting
  - H04R: loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers; deaf-aid sets; public address systems
  - H04S: stereophonic systems
- Semiconductors:
  - H01L: semiconductor devices; electric solid state devices not otherwise provided for
- Laser:
  - H01S: devices using stimulated emission

Annex Table D: EIS 2003 – Most recent years used (Member States, US and Japan)

		EU15	BE	DK	DE	EL	ES	FR	IE	IT	LU	NL	AT	PT	FI	SE	UK	US	JP
1.1	S&E grads	2000	2001	2000	2001	--	2001	2000	2001	2000	2000	2001	2001	2001	2000	2001	2001	2000	--
1.2	Work pop w 3rd educ	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001	2001
1.3	Lifelong learning	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	--	--
1.4	Emp h-tech manuf	2002	2002	2002	2002	2002	2002	2002	2002	2002	2000	2002	2002	2002	2002	2002	2002	--	--
1.5	Emp h-tech services	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	--	--
2.1	Public R&D exp	2002	2001	2001	2001	1999	2001	2002	2001	2000	2000	2000	1998	2001	2002	2001	2002	2002	2001
2.2	Business R&D exp	2002	2001	2001	2001	1999	2001	2002	1999	2001	2000	2001	1998	2001	2002	2001	2002	2002	2001
2.3.1	EPO h-tech pats	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
2.3.2	USPTO h-tech pats	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1997	2000	2000	2000	2000	2000
2.4.1	EPO patents	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
2.4.2	USPTO patents	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
3.1	SMEs innov in-hse manuf	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
3.1	SMEs innov in-hse serv	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
3.2	SMEs innov co-op manuf	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
3.2	SMEs innov co-op serv	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
3.3	Innov exp manuf	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
3.3	Innov exp serv	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
4.1	Hi-tech VC	2001*	2001*	2001*	--	2001	2001*	2001*	2001*	2001*	--	2001*	2001*	2001*	2001*	2001*	2001*	--	--
4.2	Early stage VC	2002*	2002*	2002*	2002*	2002*	2002*	2002*	2002*	2002*	--	2002*	2002*	2002*	2002*	2002*	2002*	2001*	--
4.3.1	New-to-mark prods manuf	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	--	--	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
4.3.1	New-to-mark prods serv	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
4.3.2	New-to-firm prods manuf	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
4.3.2	New-to-firm prods serv	CIS3**	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	CIS3	--	--
4.4	Internet access/use	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001	2001
4.5	ICT expenditures	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
4.6	VA h-tech manuf	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2000	2000
4.7	Volatility manuf	2000*	2000*	2000*	--	--	2000*	--	--	2000*	2000*	2000*	--	2000*	2000*	2000*	2000*	--	--
4.7	Volatility serv	2000*	2000*	2000*	--	--	2000*	--	--	2000*	--	2000*	--	2000*	2000*	2000*	2000*	--	--

* Average of this year and previous year. ** CIS3 results are for 2000, unless a specific year is mentioned. CIS3 EU means are calculated using GDP weights.

Annex Table E: EIS 2003 – Most recent years used (Associate, Acceding and Candidate countries)

		EU15	CH	IS	NO	BG	CY	CZ	EE	HU	LT	LV	MT	PL	RO	SI	SK	TR
1.1	S&E grads	2000	2001	--	2001	2001	2001	2000	2001	2001	2000	2001	2001	2001	2001	2001	2001	2001
1.2	Work pop w 3rd educ	2002	2002	--	2002	2002	2002	2002	2002	2002	2002	2002	2002	--	2002	2002	2002	2002
1.3	Lifelong learning	2002	1999	--	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
1.4	Emp h-tech manuf	2002	2002	--	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001	1999	2002	2002	2002
1.5	Emp h-tech services	2002	2002	--	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001	--	2002	2002	2002
2.1	Public R&D exp	2002	2000	2001	2002	2001	2001	2001	2001	2001	2001	2001	2001	--	2001	2001	2001	2000
2.2	Business R&D exp	2002	2000	2002	2002	2001	2001	2001	2001	2001	2001	2001	2001	--	2001	2001	2001	2000
2.3.1	EPO h-tech pats	2001	--	--	2001	2001	2001	2001	2001	2001	2001	2001	2001	2000	2001	2001	2001	2001
2.3.2	USPTO h-tech pats	2000	2000	--	2000	2000	1998	2000	--	--	2000	1998	--	2001	2000	--	2000	1999
2.4.1	EPO patents	2001	1998	--	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
2.4.2	USPTO patents	2001	2000	2000	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001
3.1	SMEs innov in-hse manuf	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	CIS2: 1998	CIS2: 1999	--	CIS3	CIS3: 2001
3.1	SMEs innov in-hse serv	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
3.2	SMEs innov co-op manuf	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	CIS2: 1998	--	--	CIS3	CIS3: 2001
3.2	SMEs innov co-op serv	CIS3**	CIS3: 2002	--	--	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
3.3	Innov exp manuf	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	CIS2: 1999	--	CIS3	CIS3: 2001
3.3	Innov exp serv	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
4.1	Hi-tech VC	2001*	2001*	--	2001*	2001*	--	--	--	--	2001*	--	--	--	2001*	--	--	--
4.2	Early stage VC	2002*	2001*	--	2002*	2002*	--	--	2001*	--	2001*	--	--	--	2001*	2001*	--	--
4.3.1	New-to-mark prods manuf	CIS3**	--	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	CIS2: 1998	--	--	CIS3	CIS3: 2001
4.3.1	New-to-mark prods serv	CIS3**	--	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
4.3.2	New-to-firm prods manuf	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
4.3.2	New-to-firm prods serv	CIS3**	CIS3: 2002	--	CIS3	CIS3	--	--	CIS3: 2001	CIS3	--	CIS3: 2001	CIS3: 2001	--	--	--	CIS3	CIS3: 2001
4.4	Internet access/use	2002	--	--	2001	--	--	2001	2001	2001	2000	2001	2001	2002	2001	--	2001	--
4.5	ICT expenditures	2001	2001	2001	2001	2001	2001	--	2001	2001	2001	2000	2000	2000	2001	2001	2001	2001
4.6	VA h-tech manuf	2001	2001	--	--	1999	2000	--	--	--	2000	1999	--	1998	--	--	1999	--
4.7	Volatility manuf	2000*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.7	Volatility serv	2000*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Average of this year and previous year. ** CIS3 results are for 2000, unless a specific year is mentioned. CIS3 EU means are calculated using GDP weights.

Annex Table H: EIS 2003 – Trend base years (Member States, US and Japan)

		EU15	BE	DK	DE	EL	ES	FR	IE	IT	LU	NL	AT	PT	FI	SE	UK	US	JP
1.1	S&E grads	1997-98	--	1996,98	1997-99	--	1997-99	1997-98	1997-98	1996-98	--	1998-99	1998-99	--	1996-98	1997-99	1997-99	1996,98	--
1.2	Work pop w 3rd educ	1999,00	1998-00	1998-00	1999,00	1998-00	1998-00	1998-00	--	1998-00	1999,00	1998-00	1999,00	1998-00	1998-00	1998-00	1999,00	1997-99	1997-99
1.3	Lifelong learning	1999-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	1998-00	1998-00	1998-00	1999-00	1998-00	1998-00	--	1999,00	--	--
1.4	Emp h-tech manuf	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1996-98	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	--
1.5	Emp h-tech services	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	--
2.1	Public R&D exp	1998-00	1997-99	1997-99	1997-99	1995,97	1997-99	1998-00	1997-99	1996-98	--	1996-98	--	1997,99	1998-00	1997-99	1998-00	1998-00	1997-99
2.2	Business R&D exp	1998-00	1997-99	1997-99	1997-99	1995-97	1997-99	1998-00	1995-97	1997-99	--	1997-99	--	1997,99	1998-00	1997-99	1998-00	1998-00	1997-99
2.3.1	EPO h-tech patents	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99
2.3.2	USPTO h-tech patents	1996-98	1996-98	1996-98	1996-98	--	1996-98	1996-98	1996-98	1996-98	--	1996-98	1996-98	--	1996-98	1996-98	1996-98	1996-98	1996-98
2.4.1	EPO patents	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99
2.4.2	USPTO patents	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99
4.2	Early stage VC	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	1998-00	1998-00	1998-00	1998-00	1998-00	1998-00	1997-99	--
4.5	ICT expenditures	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99
4.6	VA h-tech manuf	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1996-98	1996-98

Annex Table I: EIS 2003 – Trend base years (Associate, Acceding and Candidate countries)

		EU15	CH	IS	NO	BG	CY	CZ	EE	HU	LT	LV	MT	PL	RO	SI	SK	TR
1.1	S&E grads	1997-98	1997-99	--	1997-99	1997-99	1997-99	--	1998-99	1997-99	1997-98	1997-99	1997-99	--	1997-99	1997-99	1997-99	1997-99
1.2	Work pop w 3rd educ	1999,00	1998-00	--	1999,00	1998-00	--	1999,00	1998-00	1998-00	1998-00	1998-00	1998-00	--	1998-00	1998-00	1998-00	1998-00
1.3	Lifelong learning	1999-00	--	--	1998-00	--	--	1999-00	--	1998-00	1998-00	1999-00	--	--	--	1998-00	--	--
1.4	Emp h-tech manuf	1998-00	1998-00	--	1998-00	1998-00	--	1999-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	--	1998-00	1998-00	1998-00
1.5	Emp h-tech services	1998-00	1998-00	--	1998-00	1998-00	--	1999-00	1998-00	1998-00	1998-00	1998-00	1998-00	--	--	1998-00	1998-00	1998-00
2.1	Public R&D exp	1998-00	--	1997-99	1998-00	1997,99	1997-99	1998-99	1997-99	1998-99	1997-99	1997-99	1997-99	--	1997-99	1997-99	1997-99	1996-98
2.2	Business R&D exp	1998-00	--	1998-00	1998-00	1997,99	1997-99	1998-99	1997-99	1998-99	1997-99	1997-99	1997-99	--	1997-99	1997-99	1997-99	1996-98
2.3.1	EPO h-tech patents	1997-99	--	--	1997-99	1997-99	1997-99	--	1997-99	1997-99	1997-99	1997-98	1997,99	1996-98	1997-99	1997-99	1997-99	1997-99
2.3.2	USPTO h-tech patents	1996-98	1996-98	--	--	1996-98	--	--	--	--	--	--	--	--	--	--	--	--
2.4.1	EPO patents	1997-99	1995-96	--	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99	1997-99
2.4.2	USPTO patents	1997-99	--	--	1997-99	1997-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99	1998-99
4.2	Early stage VC	1998-00	1997-99	--	1998-00	1998-00	--	--	--	--	--	--	--	--	--	--	--	--
4.5	ICT expenditures	1997-99	1997-99	1997-99	--	1997-99	1997-99	--	1997-99	1997-99	1997-99	--	--	--	1997-99	1997-99	1997-99	1997-99
4.6	VA h-tech manuf	1997-99	1997-99	--	--	1995-97	1996-98	--	--	--	--	--	--	--	--	--	--	--