10. Policy environment for innovation

Venture capital investment, 2014
As a percentage of GDP
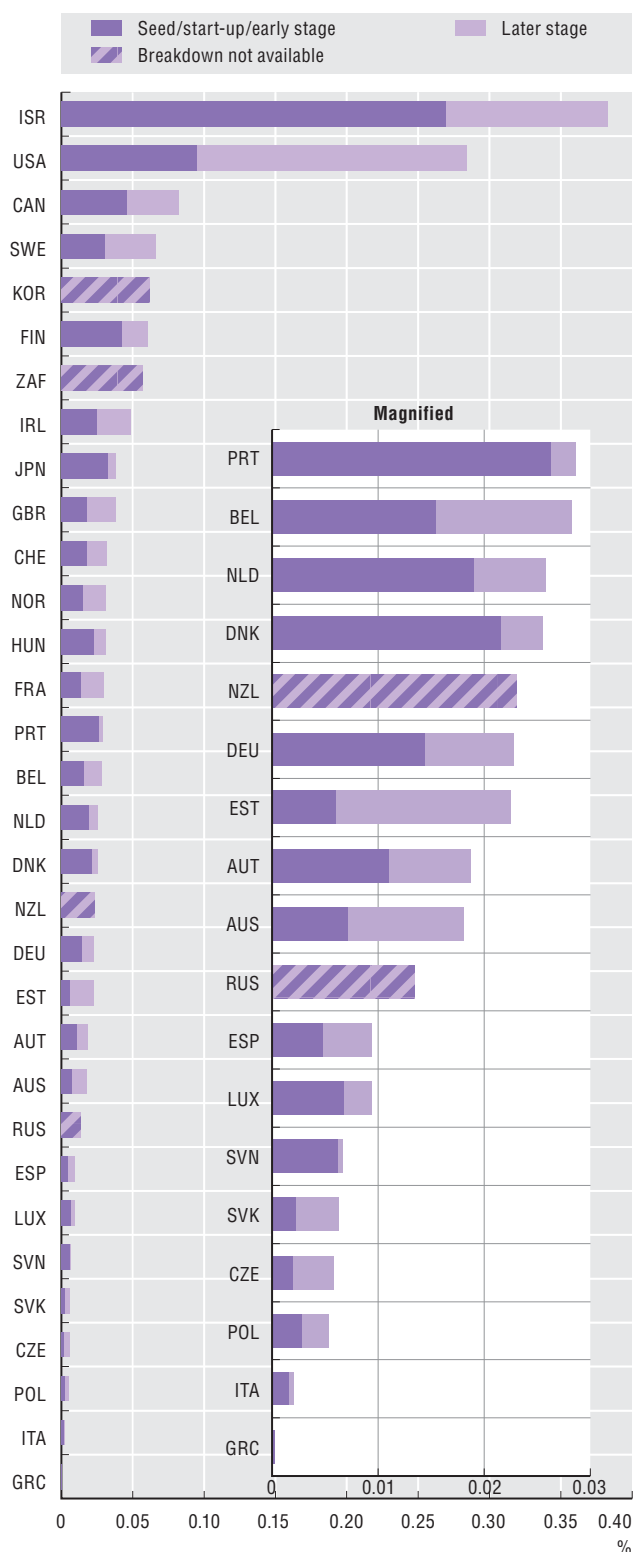
The policy environment plays an important role in encouraging the creation of new firms and promoting healthy competition in the economy. Less red tape facilitates business creation while good insolvency regimes reduce the stigma of bankruptcy for firms and individuals, encouraging entrepreneurs to take risks and innovate. Young innovative firms are particularly crucial for economic growth and job creation especially during the post-crisis recovery period. However, they encounter obstacles when seeking financing as they generally lack collateral or a business track record. While not all start-ups require (or deserve) external capital, they often encounter difficulties in obtaining seed and early-stage financing because of uncertain profit expectations and riskier growth perspectives.

The crisis severely affected the venture capital industry with seed and start-up stage financing holding up better than later-stage financing. Today, pre-seed and seed stage investments represent a considerable portion of total venture capital in countries such as Denmark, Israel, Japan, Portugal and Slovenia.

A high-quality regulatory framework facilitates market entry and growth for businesses. During the last decade, barriers to entrepreneurship have been lowered in most OECD countries, especially in Poland and the Slovak Republic.

The decision to start a business is also affected by taxes and tax policy, in particular, general taxes (personal income, corporate and capital gain tax rates, and social security contributions) and targeted tax policies (tax incentives for start-ups, young firms, and small and medium-sized enterprises). OECD analysis (Johansson et al., 2008) finds that reducing top marginal personal income tax rates raises productivity in industries with potentially high rates of enterprise creation.
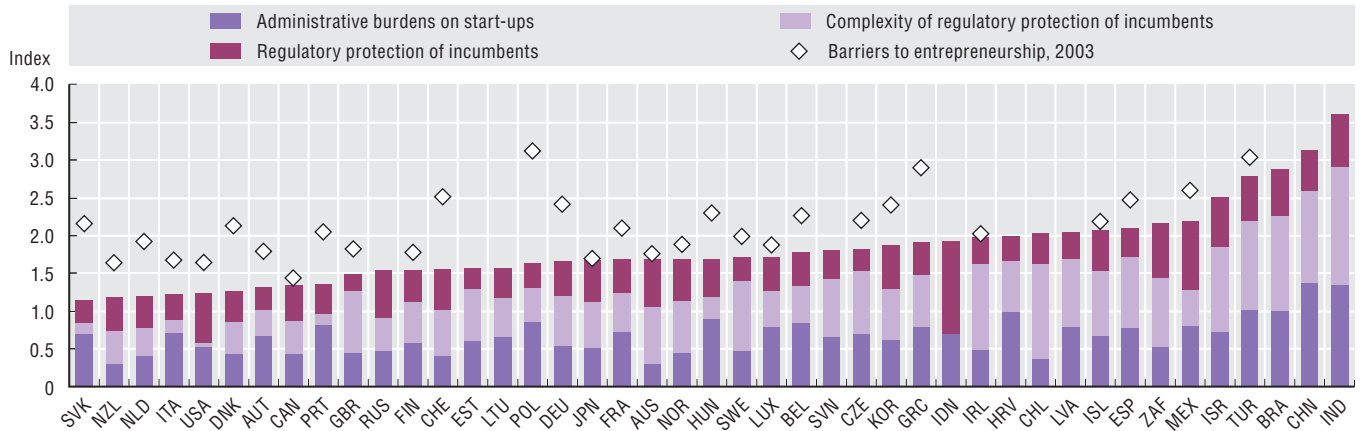
Definitions

Venture capital is private capital provided by specialised firms acting as intermediaries between primary sources of finance (insurance, pension funds, banks, etc.) and private start-up and high-growth companies whose shares are not freely traded on any stock market.

The *barriers to entrepreneurship* indicator measures the regulations affecting entrepreneurship on a scale of 0 to 6, with lower values suggesting lower barriers. The index includes the administrative burden for creating new firms, the regulatory protection of incumbents (legal barriers, antitrust exemptions, barriers in network sectors), and the complexity of regulatory procedures (licences, permits, simplicity of procedures).

The *marginal tax rate* covers employees' and employers' social security contributions and personal income tax. The *corporate income tax rate* is the statutory tax rate applicable to incorporated businesses. It combines the central and sub-central (statutory) corporate income tax rate.

Source: OECD (2015b), *Entrepreneurship at a Glance 2015*, OECD Publishing, Paris. See chapter notes.

StatLink ⟨≡⟩ http://dx.doi.org/10.1787/888933274374
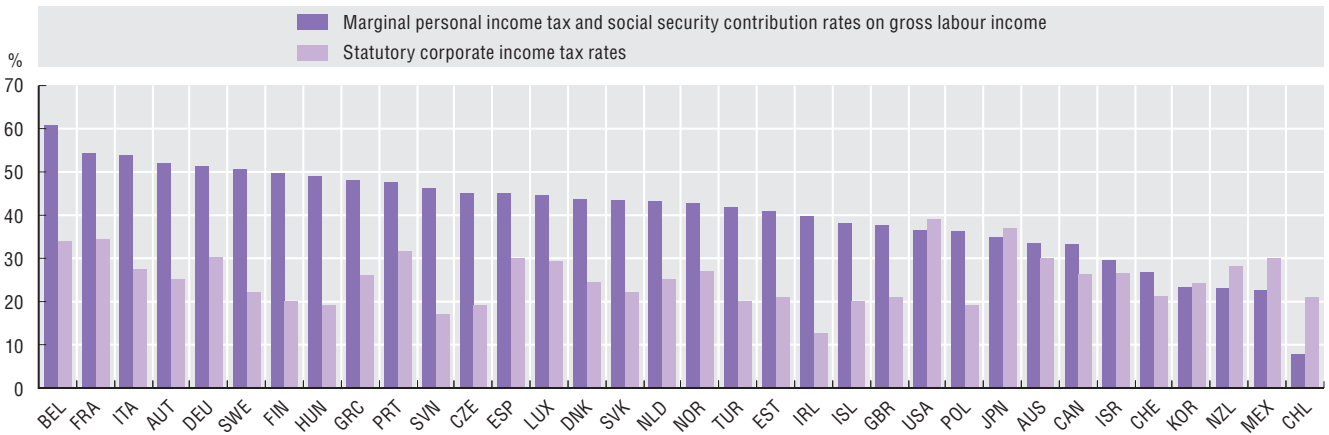
Barriers to entrepreneurship, 2013

Scale of 0 to 6 from least to most restrictive

Source: OECD, *Product Market Regulation Database*, www.oecd.org/economy/pmr, June 2015. See chapter notes.

StatLink http://dx.doi.org/10.1787/888933274385

Taxation on corporate income and personal income, 2014

Source: OECD (2015c), *Taxing Wages 2013-2014*, OECD Publishing, Paris. See chapter notes.

StatLink http://dx.doi.org/10.1787/888933274393

Measurability

Data on venture capital are drawn from national or regional venture capital associations and commercial data providers. There is not a standard international definition of venture capital or the breakdown by stage of development. The OECD *Entrepreneurship Financing Database* aggregates original data to fit the OECD classification of venture capital by stages.

The OECD's *Product Market Regulations (PMR) Database* contains quantitative indicators derived from qualitative information on regulations that can affect competition. The information is collected from national administrations. Higher-level (composite) indicators, such as the barrier to entrepreneurship indicator, are calculated as weighted averages of lower-level indicators using equal weights for aggregation. The database is updated every five years starting from 1998.

Factors affecting individuals' decision to start a business include personal income taxes and the difference between the treatment of self-employment income and wage income. Corporate taxes determine after-tax returns on investment and therefore drive firms' investment decisions. Personal income tax rates on gross wage income are calculated in the OECD Taxing Wages framework.

Cyprus

The following note is included at the request of Turkey:

"The information in this document with reference to 'Cyprus' relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the 'Cyprus issue'."

The following note is included at the request of all of the European Union Member States of the OECD and the European Union:

"The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus."

Israel

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities or third party. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law."

"It should be noted that statistical data on Israeli patents and trademarks are supplied by the patent and trademark offices of the relevant countries."

4.1. Business R&D

R&D expenditure by performing sectors, 2013

For Australia, data refer to 2004 and 2011.

For Austria, data refer to 2004 and 2013.

For Ireland and South Africa, data refer to 2012.

For Mexico, data refer to 2011.

For Switzerland, data refer to 2004 and 2012.

For China, Ireland and Turkey, no estimates are available for the PNP sector.

For Germany, Luxembourg, the Netherlands and Norway, the PNP sector is reported as included in the government sector.

For Hungary, a small part of R&D expenditure (1.3%) is not allocated by performing sector.

For Israel, defence R&D is partly excluded from available estimates.

For New Zealand, the PNP sector is reported as included in the business sector.

Business R&D and government support for business R&D, by size, 2013

For a number of countries, methodological improvements were adopted over the period 2003-13, which may hinder data comparisons over time.

For Australia, Belgium, France, Italy, Germany, Greece, Sweden and the United States, data refer to 2003 and 2011.

For Austria, data refer to 2002 and 2011.

For Chile and New Zealand, data refer to 2007 and 2013.

For Denmark, data refer to 2003 and 2009.

For Estonia, data refer to 2005 and 2013.

For Japan, firms with less than JPY 10 million in capital are excluded from the scope of R&D surveys. This leads to overstating the share of R&D accounted for large firms.

For Luxembourg, data refer to 2005 and 2009.

For Portugal and the United Kingdom, data refer to 2003 and 2012.

For Switzerland, data refer to 2004 and 2012.

For the United States, figures reported refer to current expenditures, but include a depreciation component which may differ from the actual level of capital expenditure.

R&D specialisation, top three performing industries, 2013

Figures are based on estimates of business R&D by sector reported on a main activity basis, in ISIC Rev. 4.

ISIC Rev. 4 divisions are as follows: Agriculture, mining, utilities and construction: 01-03, 05-09, 35-39 and 41-43; Chemicals and minerals: 19-23; Community, social and personal services: 84-99; Electrical equipment and machinery nec: 27-28; Finance and other business services: 64-66 and 69-82 excluding 72; ICT equipment: 26; Information and communication services: 58-63; R&D services: 72; Transport equipment: 29-30 and Wholesale, retail and transport services: 45-47, 49-53, 55-56.

For Australia, Denmark, France, Germany, Hungary, Israel, Italy, Portugal, the Slovak Republic, Switzerland, the United Kingdom and the United States, data refer to 2012.

For Austria, Belgium, Greece, Iceland and Mexico, data refer to 2011.

4.2. Top R&D players

General note for all figures:

Industries are defined according to ISIC Rev. 4.

Additional notes:

R&D investment per patent of top corporate R&D companies, 2010-12

Data relate to industries featuring at least 20 companies' headquarters in the top 2000 corporate R&D sample having filed for patents in 2010-12. R&D expenditures are presented in EUR million at constant prices, using the inflation rate of the euro area. Patent data refer to IP5 patent families by first filing date owned by the top R&D companies.

Industrial and technological specialisation and affiliates' location of top R&D companies, 2010-12

Industry specialisation (concentration ratio – CR4) reflects the share of the top 4 industries of companies' affiliates in the total number of affiliates of top R&D companies performing in a given industry.

Technology specialisation (concentration ratio – CR4) reflects the share of companies' patent portfolio filed in the top 4 technology fields in which they patent in the total number of patents filed by top R&D companies performing in a given industry. Data refer to IP5 patent families by first filing date owned by the top R&D companies. Patents are allocated to technology fields on the basis of their International Patent Classification (IPC) codes, following the concordance provided by WIPO (2013).

Data relate to industries featuring at least 25 companies' headquarters in the top 2000 corporate R&D sample.

Net sales per trademark of top corporate R&D companies, 2010-12

Data refer to new trademark applications filed at the USPTO and the OHIM, by filing date and main industry of the applicant's corporate group using fractional counts. Industries are ranked according to USPTO median figures. Data relate to industries featuring at least 20 companies' headquarters in the top 2000 corporate R&D sample having filed for trademark applications in 2010, 2011 or 2012 and sales information in 2010, 2011 and 2012 in the top 2000 corporate R&D sample. Net sales figures are presented in EUR million at constant prices, using the inflation rate of the euro area.

4.3. ICT and innovation

R&D expenditure in information industries, 2013

The "information industries" aggregate comprises ISIC Rev. 4 Divisions 26 and 58-63. The terms "ICT equipment", "Publishing, audio-visual and broadcasting activities", "Telecommunications" and "IT and other information services" refer to ISIC Rev. 4 Divisions 26, 58-60, 61 and 62-63 respectively.

For Australia, Austria, Belgium, Greece, Ireland and Mexico, data refer to 2011.

For Denmark, France, Germany, Hungary, Iceland, Israel, Italy, Portugal, Switzerland, the United Kingdom and the United States, data refer to 2012.

R&D ratios are normalised using official GDP figures. These are compiled according to the *System of National Accounts* (SNA) 2008 except for Japan and Turkey, where figures are available on the basis of SNA 1993.

Patents in ICT-related technologies and major players, 2010-13

Data refer to IP5 patent families with members filed at the EPO or at the USPTO, by first filing date, the applicant's residence using fractional counts. Patents in ICT are identified following a new experimental classification based on their International Patent Classification (IPC) codes. Data from 2012 are estimates.

Innovative enterprises in ICT manufacturing and IT services, 2010-12

International comparability may be limited due to differences in innovation survey methodologies and country-specific response patterns.

Data refer to product, process, marketing or organisational-innovating firms (including ongoing or abandoned innovation activities) with ten or more persons employed.

ICT manufacturing refers to ISIC Rev. 4 Division 26 (Manufacture of computer, electronic and optical products). Information technology (IT) services include Publishing, Computer programming and consultancy, and Information service activities under ISIC Rev. 4 Divisions 58, 62 and 63. Innovation core service activities include ISIC Rev. 4 Divisions G46, H, J, K, M71-72-73.

4.4. Mixed modes of innovation

General notes for all figures:

Section 1:

International comparability may be limited due to differences in innovation survey methodologies and country-specific response patterns. European countries follow harmonised survey guidelines with the Community Innovation Survey. Please see *www.oecd.org/sti/inno-stats.htm* for more details.

For countries following the Eurostat CIS 2012 the Industry core coverage includes ISIC Rev. 4 Sections and Divisions B, C, D, E, G46, H, J, K, M71-72 and 73. Only enterprises with 10 or more employees are covered.

For Australia, data come from the Business Characteristics Survey (BCS) and refer to financial year 2012/13. The sectoral and size coverage of enterprises matches the CIS scope.

For Brazil, data come from the Brazil Innovation Survey 2011 (PINTEC) and refer to 2009-11. The industries surveyed differ from the CIS core coverage. ISIC Rev. 4 Section E, is not included and only selected services are covered (Divisions and Groups: 592, 61, 62, 631, 71 and 72).

For Canada, data come from the Survey of Innovation and Business Strategy (SIBS) 2012 and refer to 2010-12. The survey covered firms with 20 or more employees and with at least CAD 250 000 annual revenue in 2009. The industries covered are NAICS (2007) 31-33, 41, 48, 49, 51, 52 and 54.

For Chile, data come from the Chilean Innovation Survey 2013 and refer to 2011-12. The survey covers firms with more than UF 2 400 in annual revenue, no cut-off by size is applied. Sectoral coverage is larger for the industrial sector and besides CIS core activities includes: ISIC Rev. 3 Sections A, Agriculture, hunting and forestry; B, Fishing and F, Construction. The services covered are ISIC Rev. 3 (G, I, J and K).

For Colombia, data come from the Survey of Development and Technological Innovation in the Manufacturing Sector 2011-12 and from the Survey of Development and Technological Innovation in the Service Sector 2012-13. Data refer to 2011-12 for manufacturing and to 2012-13 for services. The size of the enterprise surveyed varies according to the sector. For ISIC Rev. 4: Sections D and E, data are collected for firms with 20 employees or more. For Division 46, data are collected for firms with 20 employees or more. For Section H, Division 49 is not available, Division 51 and 53 are collected respectively for firms with 20 and 40 employees or more. For Section J, Division 63 is not entirely available (only 631 is surveyed) and data for Divisions 59, 60 and 61 are collected for firms with 40 employees or more, while data for Divisions 62 and 631 are for firms with 75 employees or more. For Section K, only Groups 6411 and 6412 are available on a census basis. Divisions 71 and 73 are not surveyed. Division 72 is collected on a census basis.

For India, data come from the Indian National Innovation Survey and refer to 2010-11. The sample is drawn from the Indian Annual Survey of Industries 2009-10 database. Sectoral coverage is broader than that of CIS and also includes: ISIC Rev. 4 Sections A, F and all service activities except for Sections T and U.

For Israel, data come from the Israel Innovation Survey, 2010-12. The sectoral and size coverage of enterprises matches the CIS scope.

For Japan, data come from the Japanese National Innovation Survey (J-NIS 2012). Data refer to the financial years 2009/10, 2010/11 and 2011/12. The sectoral and size coverage of enterprises matches the CIS scope.

For Korea, data come from the Korean Innovation Survey. The survey is carried out separately for manufacturing and services, but both sets of data refer to 2011-13. The phrasing of the question on product innovation is slightly different from the guidelines given in the *Oslo Manual*. As a result the introduction of new services by manufacturing firms or of new goods by service firms might be under reported. Sectoral coverage is smaller than CIS for the industrial sector and includes ISIC Rev. 4 Section C, Manufacturing only. All services are covered except for Section (O) Public administration and defence; compulsory social security.

For the Russian Federation, data refer to 2011-13 and firms with 15 or more employees. The industries surveyed differ from the CIS core coverage. ISIC Rev. 3.1 Sections C, Mining and quarrying; D, Manufacturing; E, Electricity, gas and water supply and Divisions 64, 72, 73 and 74 for services, are covered.

For Switzerland, data come from the Survey of Innovation Activities in the Swiss Economy, 2013 and refer to 2010-12. The sectoral and size coverage of enterprises matches the CIS scope.

Section 2:

For countries following the Eurostat CIS 2012, Australia, Japan and Korea the data include ongoing or abandoned innovative activities. For the remaining countries ongoing or abandoned innovative activities are not included.

4.5. New-to-market innovation

General notes for all figures:

See under 4.4 (Section 1).

4.6. The IP bundle

IP bundle of top 12 applicants on the European, Japanese and US markets, 2011-13

Data are presented by filing date and residence of the applicant. Data for the European market (the Japanese market) refer to the 12 economies with the highest number of patent applications at the EPO (the JPO) and trademark and design applications at OHIM (the JPO). Data for the US market refer to the 12 economies with the highest number of patent and trademark applications at USPTO.

Economies are ordered according to the percentage of patents in the market considered.

Trademark specialisation in European, Japanese and US markets, 2012-14

Data refer to trademark applications at USPTO, OHIM and JPO by filing date and applicant's residence using fractional counts.

The following aggregated fields based on the Nice Classification are used: Chemicals: Classes 1, 2 and 4; Construction: Classes 6, 17, 19, 27 and 37; Tools and machines: Classes 7 and 8; Agricultural products: Classes 29, 30, 31, 32, 33 and 34; Furniture and household goods: Classes 11, 20 and 21; Leisure and education: Classes 13, 15, 16, 28 and 41; Health, pharma and cosmetics: Classes 3, 5, 10 and 44; Transport: Classes 12 and 39; R&D: Class 42; Clothes, textiles and accessories: Classes 14, 18, 22, 23, 24, 25 and 26; Advertising and business services: Classes 35, 36 and 45; ICT and audio-visual: Classes 9 and 38 and Hotels, restaurants and other services: Classes 40 and 43.

Data for OHIM refer to economies with at least 2 000 trademark applications over the period, at least 1 000 applications for USPTO and at least 200 applications for JPO. Fields are ordered by the median share at USPTO.

Design specialisation in European and Japanese markets, 2011-13

Data refer to design applications at OHIM and JPO by filing date and applicant's residence using fractional counts.

The following aggregated fields based on the Locarno Classification are used: Furniture and household goods: Classes 6, 7 and 30; Clothes, textiles and accessories: Classes 2, 3, 5 and 11; Tools and machines: Classes 4, 8, 10 and 15; Health, pharma and cosmetics: Classes 24 and 28; Leisure and education: Classes 17, 19, 21 and 22; Agricultural and food products: Classes 1, 27 and 31; Construction: Classes 23, 25 and 29; ICT and audio-visual: Classes 14, 16 and 18; Electricity and lighting: Classes 13 and 26; Advertising: Classes 20 and 32; Transport: Class 12 and Packaging: Class 9.

Data for OHIM refer to economies with at least 300 design applications over the period, data for JPO refer to economies with at least 100 design applications over the period. Fields are ordered by the median share at OHIM.

4.7. Registered designs

Design applications by application field, 2006-08 and 2011-13

Figures are calculated using the application date and fractional counts of the Locarno classes mentioned in the design registrations.

The following aggregated fields based on the Locarno Classification are used: Furniture and household goods: Classes 6, 7 and 30; Clothes, textiles and accessories: Classes 2, 3, 5 and 11; Tools and machines: Classes 4, 8, 10 and 15; Health, pharma and cosmetics: Classes 24 and 28; Leisure and education: Classes 17, 19, 21 and 22; Agricultural products and food preparation: Classes 1, 27 and 31; Construction: Classes 23, 25 and 29; ICT and audio-visual: Classes 14, 16 and 18; Electricity and lightning: Classes 13 and 26; Advertising: Classes 20 and 32; Transport: Class 12 and Packaging: Class 9.

Class 32 (Graphic symbols and logos, surface patterns, ornamentation) has been included in the Locarno Classification since the ninth edition, which entered into force in January 2009.

Acceleration in the development of registered design fields, 2005-13

Data relate to design applications filed at each of the three offices. Design counts are based on the application date and fractional counts of the Locarno subclasses (4-digit level). Design "bursts" correspond to periods characterised by a sudden and persistent increase in the number of designs registered in a specific subclass. Top design bursts are identified by comparing the filing patterns of all Locarno subclasses, excluding Class 32 (which was introduced in the Locarno classification in 2009). Only Locarno subclasses corresponding to at least 20 applications in 2005-13 and featuring a positive burst intensity in the 2000s are included in the analysis.

The labels included in the graphs summarise the content of the following Locarno subclasses: Screen displays: 14-04; Printers: 18-02; Photocopiers: 16-03; Measurement accessories: 10-07; Lighting: 26-02; Prostheses: 24-03; Vending machines: 20-01; Office machinery n.e.c.: 18-99; Transport n.e.c.: 12-99; Aircraft and space vehicles: 12-07; Generators and motors: 13-01; Medical equipment n.e.c.: 24-99; Entertainment articles: 21-03; Recording: 14-01; Communication: 14-03; Machines n.e.c.: 15-99; Construction machinery: 15-04; Pharma: 28-01 and Games and toys: 21-01. Full descriptions of the Locarno subclasses are available at: *www.wipo.int/classifications/nivilo/locarno/index.htm*.

Top applicants' share in ICT and audio-visual-related design applications, 2006-08 and 2011-13

Figures are calculated using the application date and fractional counts of the applicants and the Locarno classes mentioned in the design registrations.

Computers correspond to designs in Locarno Subclasses 14-02, 14-04, 16-03, 18-01 and 18-02; Communication equipment correspond to designs in Subclass 14-03; Audio-visual devices correspond to designs in Subclasses 14-01, 16-01 and 16-02 and Miscellaneous ICT components and goods correspond to designs in Subclasses 14-99 and 16-06.

4.8. R&D tax incentives

General note for all figures:

Country specific notes are available at *www.oecd.org/sti/rd-tax-stats.htm*.

Direct government funding of business R&D and tax incentives for R&D, 2013

For Canada, Chile, France, Norway, Portugal, South Africa, Spain and the United Kingdom, preliminary R&D tax incentive estimates are reported for 2013 (or closest year). Figures are rounded to the second decimal unless rounding would result in a value of zero.

For Belgium, Brazil, Ireland, Israel, South Africa, Spain, Switzerland and the United States, figures refer to 2012. For Australia, Iceland, Mexico and the Russian Federation, figures refer to 2011.

Estimates of direct funding for Belgium, Brazil, France, Italy and Portugal are based on imputing the share of direct government-funded BERD in the previous year to the current ratio of BERD to GDP. For Austria, the 2011 share is used for 2013.

In Austria and South Africa, R&D tax incentive support is included in official estimates of direct government funding of business R&D. It is removed from direct funding estimates to avoid double counting. In the case of South Africa, where the overlap of estimates cannot be identified based on available budget data, this transformation was not undertaken.

Estonia, Germany, Luxembourg, Mexico, New Zealand, Sweden and Switzerland did not provide information on expenditure-based R&D tax incentives for 2013. For Israel the R&D component of incentives cannot be identified separately at present. No data on the cost of expenditure-based R&D tax incentive support are available for Poland.

Estimates do not cover sub-national and income-based R&D tax incentives and are limited to the business sector (excluding tax incentive support to individuals). Data refer to estimated initial revenue loss (foregone revenues) unless otherwise specified.

Estimates refer to the cost of incentives for business expenditures on R&D, both intramural and extramural unless otherwise specified. Direct support figures refer only to intramural R&D expenditures, except for Brazil.

Change in government funding of business R&D through direct funding and tax incentives, 2006-13

For Canada, Chile, France, Norway, Portugal, South Africa, Spain and the United Kingdom, preliminary R&D tax incentive estimates are reported for 2013 (or closest year).

For Belgium, Brazil, Ireland, South Africa, Spain and the United States, figures refer to 2012 instead of 2013. For Australia and Mexico, figures refer to 2011. For Belgium, Brazil, France, Italy and Portugal, estimates of direct funding in 2013 (or closest year) are based on imputing the share of direct government-funded BERD in the previous year to the current ratio of BERD to GDP. For Austria, the 2011 share is used for 2013.

For Belgium, Denmark, Italy, Korea, Mexico and Slovenia, figures refer to 2007 instead of 2006. For Chile, New Zealand, and Turkey, figures refer to 2008 instead of 2006. For New Zealand, the figure for direct government support for BERD is estimated as an average of 2007 and 2009 values. For Brazil, Greece and the Netherlands, estimates of direct funding in 2006 (or closest year) are based on imputing the share of direct government-funded BERD in the previous year to the current ratio of BERD to GDP.

Mexico and New Zealand repealed tax incentive schemes in 2009. In 2008, the cost of R&D tax support amounted to MXN 4 500 million in Mexico and to NZD 103 million in New Zealand.

In Austria and South Africa, R&D tax incentive support is included in official estimates of direct government funding of business R&D. It is removed from direct funding estimates to avoid double counting. In the case of South Africa, where the overlap of estimates cannot be identified based on available budget data, this transformation was not undertaken.

Estonia, Germany, Luxembourg, Mexico, New Zealand, Sweden and Switzerland did not provide expenditure-based R&D tax incentives for 2013. For Israel the R&D component of incentives cannot be identified separately at present. No data on the cost of expenditure-based R&D tax incentive support are available for Poland.

Estimates do not cover sub-national and income-based R&D tax incentives and are limited to the business sector (excluding tax incentive support to individuals). Data refer to estimated initial revenue loss (foregone revenues) unless otherwise specified.

Estimates refer to the cost of incentives for business R&D expenditures, both intramural and extramural, unless otherwise specified. Direct support figures refer only to intramural R&D expenditures, except for Brazil.

Tax subsidy rates on R&D expenditures, 2015

This is an experimental indicator based on quantitative and qualitative information representing a notional level of tax subsidy rate under different scenarios. It requires a number of assumptions and calculations specific to each country. International comparability may be limited.

The tax subsidy rate is calculated as 1 minus the B-index, a measure of the before-tax income needed to break even on USD 1 of R&D outlays (Warda, 2001). It is based on responses from national finance/tax/innovation authorities and R&D statistical agencies to the OECD questionnaire on R&D tax incentives and also draws on other publicly available information. As a measure of the marginal cost of R&D to users, the B-index is estimated based on marginal tax credit (allowance) rates. Whenever caps and thresholds applied to eligible R&D expenditure or the amount of R&D tax relief, an attempt was made to compute weighted marginal tax credit (allowance) rates for SMEs and large firms, using available data or proxy measures for the distribution of eligible R&D spending. Weighted marginal tax credit rates reflect the magnitude of marginal tax credit rates applicable to an extra unit of R&D spend across the firm population (e.g. SMEs or large enterprises). They are likely to differ from average tax subsidy rates as companies may surpass established R&D expenditure or R&D tax relief thresholds (cap).

Estimates allow for differences in the treatment of the various components of R&D expenditures: current (labour, other current) and capital (machinery and equipment, facilities/buildings) expenditures. A common 60:30:5:5 percentage distribution of labour, other current, machinery and equipment, and building expenditures is applied based on average estimates for OECD countries (*www.oecd.org/sti/rds*).

Benchmark tax data information, including statutory corporate income tax rates (non-targeted and small business corporate income tax rates), is obtained from the *OECD Tax Database*, May 2015, and public sources for non-OECD countries. The model accounts for targeted, SME-specific corporate income tax rates in Australia, Brazil, Canada, Hungary, Japan, Korea and the Netherlands.

Expenditures on capital assets used for R&D are depreciated over their useful life, using a straight-line or declining balance depreciation method, as applicable. Estimates of the net present value of provisions relating to R&D capital expenditures draw on information about the benchmark tax treatment of capital expenditures, as collected through the OECD-NESTI questionnaire on R&D tax incentives, and the OECD Centre for Tax Policy and Administration questionnaire on the tax treatment of the creation, acquisition and use of knowledge capital. Estimates of tax subsidy rates are fairly robust to different choices of sources and methodologies because of the small weight of this component in eligible R&D expenditures.

R&D tax allowances are deducted from taxable income while R&D tax credits are applied against corporate income tax payable (as is the case for payroll withholding tax incentives and wage taxes). R&D tax benefits are taxable in Australia, Canada, Chile, the United Kingdom (Above-the-line tax credit for large enterprises) and the United States. Exemptions of payroll withholding tax and social security contributions are effectively taxable as they reduce the amount of expenditure deductible from taxable income.

The model excludes incentives related to personal income, value added, property taxes, as well as taxes on wealth and capital and other forms of direct government support (grants and subsidies). Some countries remove in part or in full R&D expenditures funded through grants. These differences have not been modelled in the calculations.

Unless otherwise specified, figures refer to "representative" firms in their class for which caps or ceilings that limit the amount of eligible expenditures or tax support are not applicable. Ceilings on the amount of eligible R&D expenditure or R&D tax relief exist in Australia, Canada, Chile, Denmark, France, Hungary, Iceland, Italy, Japan, Korea, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States. A minimum R&D expenditure threshold determines eligibility for R&D tax relief in Australia, Spain and Italy. The rate of R&D tax relief varies below and above a certain level of qualified R&D expenditure (two level incentives) in Canada, France, the Netherlands (WBSO), and Hungary and the Russian Federation (exemption of social security contributions).

The B-index for the profit scenario assumes that the "representative firm" generates a sufficiently large profit to achieve the incentive's full potential benefit. An adjusted B-index is reported for a loss-making firm that is unable to claim tax benefits in the reporting period, using an adjusted effective tax rate that takes into account refundability and carry-forward provisions.

Refunds are generally modelled as immediate and full payment of tax incentive claims unless excess claims are payable over time and require discounting.

Carry-forwards are modelled as discounted options to claim the incentive in the future, assuming a constant annual probability of returning to profit of 50% and a nominal discount rate of 10%.

For simplicity, loss-making firms are assumed to enjoy an infinite carry-forward of standard deductions of current R&D expenditures and depreciation expenses arising from the use of machinery, equipment and buildings in R&D, unless expenditures are refundable.

The definitions of SMEs and large firms vary across countries and may also vary over time. In France, Italy, the Netherlands, Portugal and Spain, special tax incentive provisions are available for young innovative firms, start-ups and innovative SMEs as a subgroup of the SME population. The figure displays tax subsidy rates for large firms and SMEs. SME subgroup-specific B-indices are reported in the country-specific notes.

Estimates are not included for some countries that provide expenditure-based R&D tax incentives as these lack sufficient detail to carry out calculations for representative firms in the relevant categories.

Figures for Finland, Germany, Luxembourg, Mexico and Switzerland, which apply no special treatment to R&D, reflect the value (or lack thereof) of available allowances for current and capital expenditures.

4.9. Demand and support for innovation

General notes for all figures:

See under 4.4 (Section 1).

Additional notes:

Firms receiving public support for innovation, by firm size, 2008-10 and 2010-12

For countries following the Eurostat CIS 2012, Australia, Brazil, Japan and the Russian Federation, the data on public support for innovation include product or process innovative firms (including ongoing or abandoned innovation activities).

For Israel the data on public support for innovation include product or process innovative firms, while ongoing or abandoned innovation activities are not identified.

For Canada and Chile data on public support for innovation include organisational and marketing innovative firms in addition to firms with product or process innovation, while ongoing or abandoned innovative activities are not identified. Korea includes the four types of innovative firms and also their ongoing or abandoned innovation activities.

4.10. Policy environment for innovation

Venture capital investment, 2014

Data for Japan and South Africa refer to 2013.

The early stage includes: for Australia, pre-seed, seed and start-up stage; for Canada and the United States, seed and early stage; for European countries, seed and start-up stage; for Israel, seed/start-up stage and early/expansion stage; for Japan, seed, early stage and expansion stage.

The later stage includes: for Australia, early expansion stage; for the United States, expansion and later stage.

Korea, New Zealand, the Russian Federation and South Africa do not provide breakdowns of venture capital by stage that would allow for meaningful international comparisons.

Data providers are: EVCA (European countries), ABS (Australia), CVCA (Canada), KVCA (Korea), NVCA (the United States), NZVCA (New Zealand), PwCMoneyTree (Israel), RVCA (the Russian Federation), SAVCA (South Africa) and VEC (Japan).

Barriers to entrepreneurship, 2013

For China, data are based on preliminary estimates, as some of the underlying data has not been validated with national authorities. Subsequent data validation may lead to revisions to the indicators for this country.

For Indonesia, data refer to 2009.

For the United States, data refer to 2007.

Taxation on corporate income and personal income, 2014

General notes for the figure:

The marginal tax rate covers employees' and employers' social security contributions and personal income tax, with respect to a change in gross labour costs. It is given for a single person without dependent, at 167% of the average wage earner/average production worker. It assumes a rise in gross earnings of the principal earner in the household. The outcome may differ if the wage of the spouse goes up, especially if partners are taxed individually.

The marginal rates are expressed as a percentage of gross labour costs.

Corporate income tax shows the basic combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government rate plus the sub-central rate.

Additional notes for the statutory corporate income tax (CIT) rates:

For Australia, New Zealand and the United Kingdom, which have a non-calendar tax year, the rates shown are those in effect as of 1 July, 1 April and 5 April, respectively.

In Belgium, the effective CIT rate can be substantially reduced by a notional allowance for corporate equity (ACE).

In Chile, the Tax Reform Law enacted in September 2014 modified the Business Profits Tax from 20% to 21% in 2014.

In Estonia, since 1 January 2000, the corporate income tax is levied on distributed profits.

For France, the standard corporate income tax rate is 33.33%. It is increased by a 3.3% surcharge (Contribution Sociale sur les Bénéfices) for companies with a turnover of at least EUR 7 630 000 on the part of their liable tax payments in excess of EUR 763 000 – resulting in an effective tax rate of 34.43% for companies that have profits above EUR 2 289 000. It does not include the local business tax (Contribution économique territoriale, which replaced the former Taxe professionnelle from 1 January 2010) or the 10.7% temporary surtax, which applies to the standard corporate income tax liability for large companies with a turnover exceeding EUR 250 million. The CIT rate does not include the 3% additional contribution on distributed profits.

For Germany, the rates include the regional trade tax (Gewerbesteuer) and the surcharge.

For Greece, the 26% tax rate applies to Corporations and to Legal entities which maintain double entry books. For those entities that maintain single entry accounting books, a tax rate of 26% is applicable for income up to EUR 50 000 and 33% for any exceeding amount.

For Hungary, the rates do not include the turnover-based local business tax, the innovation tax, bank levy and surtax on the energy sector.

In Iceland, in late 2011, the Icelandic Parliament passed Act No. 165/2011 on a new financial activities tax (FAT) as part of a general set of measures aimed at increasing tax revenues. The FAT, collected from financial institutions and insurance companies (excluding pension funds), has two components: i) a levy on total remuneration paid to employees at a rate of 6.75% and ii) a special income tax of 6% on institutions' corporate income tax base in excess of ISK 1 billion.

In Israel, under the VAT law, financial institutions pay taxes on the combination of their wages and salaries and their profits. These amounts are deductible from profits in the assessment of corporate income tax.

In Japan, the combined corporate income tax rate was reduced to 34.6% in 1 April 2014.

For Italy, these rates do not include the regional business tax: Imposta Regionale sulle Attività Produttive (IRAP). The effective CIT rate can be substantially reduced by a notional allowance for corporate equity (ACE).

In Luxembourg, the contribution to the unemployment fund is 7%.

In the Netherlands, the CIT applies to taxable income over EUR 200 000.

In Poland, there is no sub-central government tax; however local authorities (at each level) participate in a given percentage of tax revenue.

Portugal implemented a state surtax in 2011. In 2012, the surtax was set at 3% for taxable profits above EUR 1.5 million, 5% for taxable profits above EUR 7.5 million and 7% for taxable profits above EUR 35 million.

In the Slovak Republic, as of 2014, there is a minimum tax license at three levels: EUR 480 for small corporations, not registered to VAT; EUR 960 for small corporations, registered to VAT and EUR 1 280 for large companies (turnover over EUR 500 000). These minimum amounts have to be paid if the tax calculated on the actual taxable income is lower. The minimum tax is paid as the ordinary CIT (i.e. when the tax return is filed). The difference between the minimum tax and the tax calculated based on taxable income may be carried forward and deducted from tax liability for up to three years. Companies in the first year of existence and non-profit organisations are exempt.

For Switzerland, church taxes, which enterprises cannot avoid, are included.

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From:

OECD Science, Technology and Industry Scoreboard 2015

Innovation for growth and society

Access the complete publication at:
https://doi.org/10.1787/sti_scoreboard-2015-en