Industry in Focus

International Research Funding Systems: Appendices

April 2025

pwc

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Approach

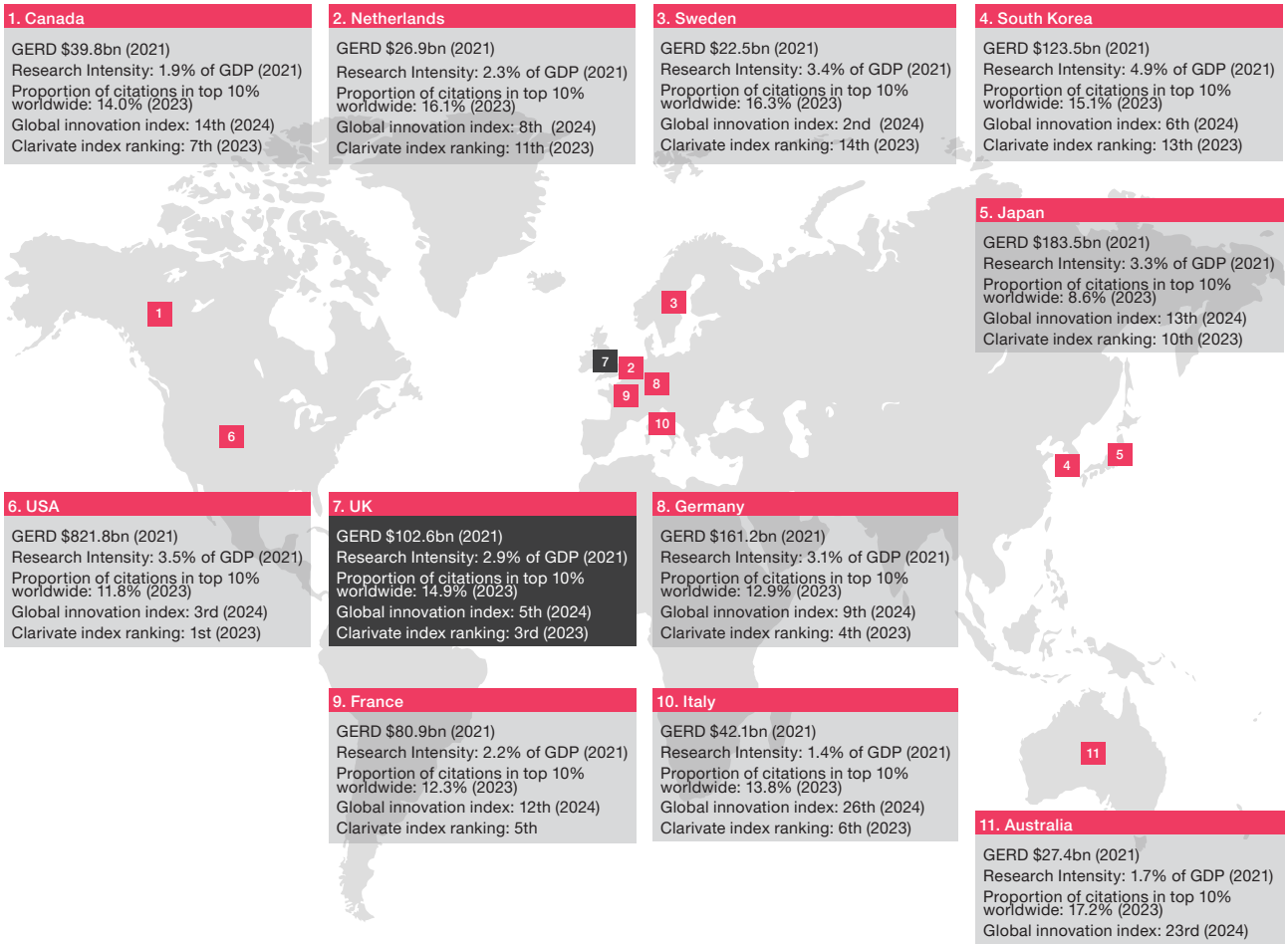
Longlist comparison

To better understand the relative strengths and weaknesses of the UK's dual-funding system, we first undertook a high-level comparison of the research funding systems in a longlist of ten international comparator countries.

In order to provide the most useful comparison, we sought to include comparator countries in our longlist that:

- Have developed research ecosystems that are similarly successful on the international stage, including world-leaders.
- Operate within a political, cultural and social context that is not significantly different to the UK to mitigate the impact of material external factors on any comparison.
- Are sufficiently transparent and for which data on funding systems was available.
- When taken together, present a range of funding systems, some with similarities to the UK and some that are quite different.

From this longlist comparison, we identified a shortlist on which to undertake a deeper dive comparative analysis and assessment.



1. Canada
GERD $39.8bn (2021)
Research Intensity: 1.9% of GDP (2021)
Proportion of citations in top 10% worldwide: 14.0% (2023)
Global innovation index: 14th (2024)
Clarivate index ranking: 7th (2023)

2. Netherlands
GERD $26.9bn (2021)
Research Intensity: 2.3% of GDP (2021)
Proportion of citations in top 10% worldwide: 16.1% (2023)
Global innovation index: 8th (2024)
Clarivate index ranking: 11th (2023)

3. Sweden
GERD $22.5bn (2021)
Research Intensity: 3.4% of GDP (2021)
Proportion of citations in top 10% worldwide: 16.3% (2023)
Global innovation index: 2nd (2024)
Clarivate index ranking: 14th (2023)

4. South Korea
GERD $123.5bn (2021)
Research Intensity: 4.9% of GDP (2021)
Proportion of citations in top 10% worldwide: 15.1% (2023)
Global innovation index: 6th (2024)
Clarivate index ranking: 13th (2023)

5. Japan
GERD $183.5bn (2021)
Research Intensity: 3.3% of GDP (2021)
Proportion of citations in top 10% worldwide: 8.6% (2023)
Global innovation index: 13th (2024)
Clarivate index ranking: 10th (2023)

6. USA
GERD $821.8bn (2021)
Research Intensity: 3.5% of GDP (2021)
Proportion of citations in top 10% worldwide: 11.8% (2023)
Global innovation index: 3rd (2024)
Clarivate index ranking: 1st (2023)

7. UK
GERD $102.6bn (2021)
Research Intensity: 2.9% of GDP (2021)
Proportion of citations in top 10% worldwide: 14.9% (2023)
Global innovation index: 5th (2024)
Clarivate index ranking: 3rd (2023)

8. Germany
GERD $161.2bn (2021)
Research Intensity: 3.1% of GDP (2021)
Proportion of citations in top 10% worldwide: 12.9% (2023)
Global innovation index: 9th (2024)
Clarivate index ranking: 4th (2023)

9. France
GERD $80.9bn (2021)
Research Intensity: 2.2% of GDP (2021)
Proportion of citations in top 10% worldwide: 12.3% (2023)
Global innovation index: 12th (2024)
Clarivate index ranking: 5th

10. Italy
GERD $42.1bn (2021)
Research Intensity: 1.4% of GDP (2021)
Proportion of citations in top 10% worldwide: 13.8% (2023)
Global innovation index: 26th (2024)
Clarivate index ranking: 6th (2023)

11. Australia
GERD $27.4bn (2021)
Research Intensity: 1.7% of GDP (2021)
Proportion of citations in top 10% worldwide: 17.2% (2023)
Global innovation index: 23rd (2024)
Clarivate index ranking: 9th (2023)

Sources: OECD MSTI July 2024; Scimago 2023; Global Innovation Index 2024; Clarivate

Longlist country summaries

USA

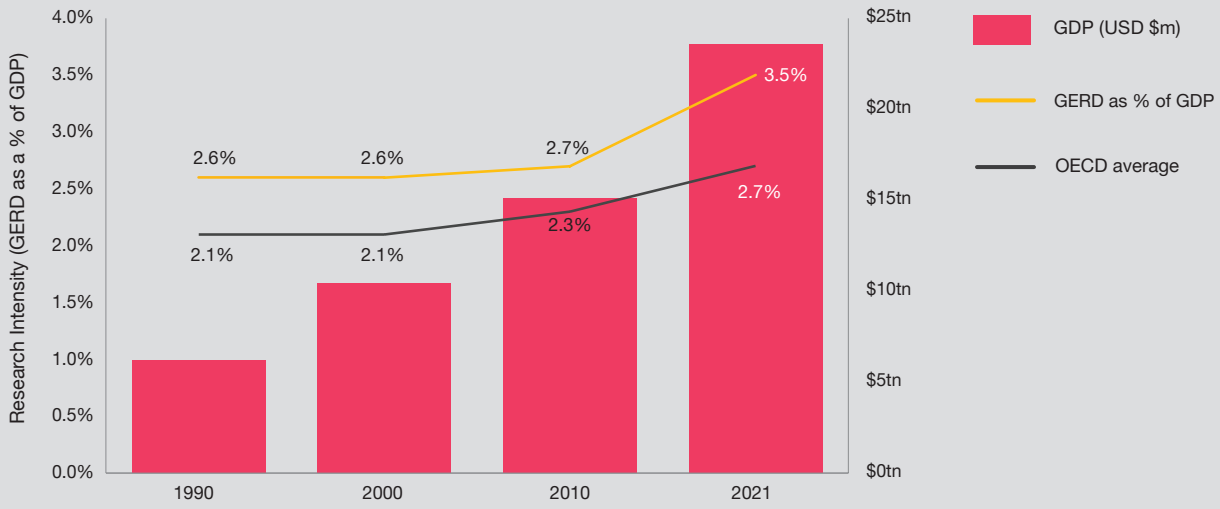
Please note that our summary is based on evidence of the US R&D funding system prior to the Trump administration commencing in January 2025. Any changes to the system made since then, have not been captured in this report.

US R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in the USA totalled $822bn and has been growing at a compounded annual growth rate of 10% since 2018.

This represents 3.5% of GDP, above the OECD average, and highest in the G7. It is the second highest research intensity in our comparator group.

USA's GERD as a percentage of GDP has been tracking consistently higher than the OECD average since 1990, and has shown a significant increase between 2010 and 2021 (from 2.7% to 3.5%), above the OECD average.



The current R&D ecosystem

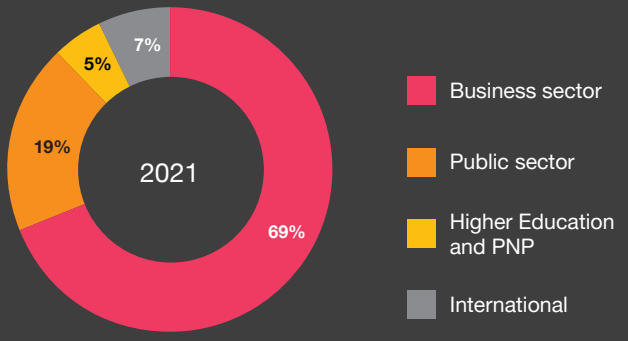
US R&D is performed and funded by a mix of public sector organisations (both federal and provincial) and private sector organisations (business and non-profit), with the business sector funding c.69%, and performing even more at c.78% (the third highest for both in our comparator list, only marginally behind Japan and South Korea).

Once business sector-funded R&D is removed, of the remaining $255bn the vast majority (c.60%) is funded by the public sector, followed by higher education and other private non-profits (17%) and international funders (22%).

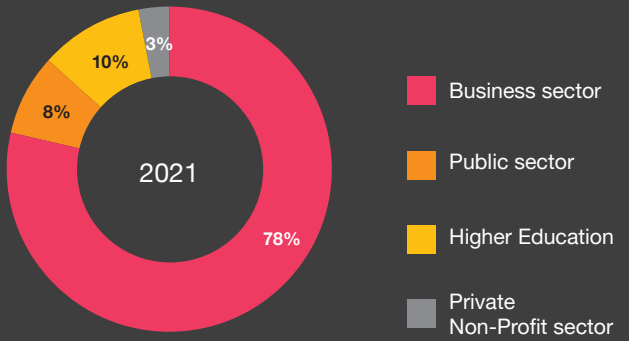
Public sector-performed R&D is predominantly undertaken by the higher education sector (47%). There are over 4000 HEIs in the US (including public universities, private universities and community colleges), however, a significant proportion of research is undertaken by R1 and R2 universities, of which there are 146 and 133, respectively.

In addition, the public sector performs $68.4bn of R&D itself, through for example Federally Funded Research and Development Centers (FFRDCs) and National Labs, and a small amount of private non-profit organisations performed $27bn in 2021.

R&D funding by sector



R&D perfomance by sector



1. Carnegie Classification of Institutes of Higher Education, 2021

Sources: OECD MSTI July 2024 data; Note: Due to lack of data OECD and EU averages for 1990 are assumed the same as 1991

USA

Government funding bodies

Please note that our summary is based on evidence of the US R&D funding system prior to the Trump administration commencing in January 2025. Any changes to the system made since then, have not been captured in this report.

Over half of U.S. R&D funding comes from the federal government, through 12 primary departments or agencies, and 18 independent arms lengths bodies.

Departments and agencies receive their funding through annual appropriations bills passed by Congress and signed into law by the President, specifying the budgets for various departments and programmes, including R&D. The Presidential administration sets multi-agency R&D priorities to help guide agency budget submissions.

In 2022, of the total c.$197bn R&D federal funding obligations, 94% was distributed to five key federal departments or agencies:

- Department of Defense (DoD) - 37% or $73bn[1].
- Department of Health and Human Services (DHHS) - 38% or $74bn.
- Department of Energy (DoE) - 9% or $18bn[2].
- National Aeronautics and Space Administration (NASA) - 6% or $12bn.
- National Science Foundation (NSF) - 4% or $7bn.

Approximately half of this R&D funding is then distributed to external parties (higher education, businesses, non-profit organisations, state and local governments) through block and competitive grant funding, although this varies significantly by department - for example, the DoD and DHHS externally distributed 59% and 52% of funding in 2022, whereas DoE only externally distributed 27%, and NSF distributed as much as 94%.

HEIs received a total of c.$40bn of federal R&D funding in 2022, of which 67% came from DHHS and 15% came from NSF. $15bn was disbursed to the 42 Federally-Funded Research and Development Centres (FFRDCs) - public-private partnerships operated by universities and corporations, and sponsored by one or more federal department or agency.

States are both funders and performers of R&D, disbursing federal R&D funding, as well as a proportion of their own funding, however state R&D expenditure is a relatively small proportion of total government R&D spend, totalling just $2.6bn in 2022.

Federal funding is not distributed evenly across US states, with District of Columbia, California, and Maryland the top three recipients in 2022, receiving 18%, 12% and 11% of all federal R&D funds, respectively.

System developments

ARPA model

The new Advanced Research Projects Agency (ARPA) model has been gaining traction as an alternative model for competitive project grant funding since it was first pioneered by the DoD (DARPA) in 1958, with agencies such as the Department of Health, Department of Energy, Department of Transportation, Office of the Director of National Intelligence now establishing their own models, namely ARPA-H (Health), ARPA-E (Energy), ARPA-I (infrastructure) and IARPA (Intelligence).

In 2023, the ARPA models received a total of c.$7bn of funding- DARPA (c.$4B), ARPA-H ($2.5B), ARPA-E ($470M), and IARPA.

The ARPA model invests in high-risk, high-reward programmes, by setting ambitious goals or “moonshots” and creating programmes to reach them in 3-4yrs. It employs an “extended pipeline” model of innovation that focuses on outcomes instead of just early research, providing support for the ‘valley of death’ phase of funding which often lacks both government or venture capital funding.

In contrast to other completive grants, the ARPA model is driven by deliverables against pre-agreed milestones and are re-evaluated after each milestone. The research conducted is measured and evaluated closely, with heavy involvement from the funding agency. As a result, there is more flexibility in the system, but researchers and their institutions have less certainty of funding in the medium term.

The ARPA model also places heavy reliance on programme managers that have significant autonomy, are encouraged to challenge existing ideas, and empowered to work flexibly with researchers with a focus on impact and not risk.

EPSCoR

In 1979, the NSF initiated the Established programme to Stimulate Competitive Research (EPSCoR) as a federal-state initiative to redress concerns about geographical concentration of federal R&D funding by proactively directing competitive project grant funding to states and territories that have traditionally lacked strong university-based research efforts (currently 28). This programmes has since been replicated in six further federal agencies.

1. Note that DoD R&D funding includes Testing and Evaluation (i.e. of weapons and systems), which rarely supports work done at universities.
2. A sizeable portion of DoE funding is directed towards FFRDCs.

Source: OECD Main Science and Technology Indicators (MSTI), 2021; NSF and NSB, Research and Development: U.S. Trends and International Comparisons Table 61, 2022; DARPA budget, 2025; ARPA-H financial report, 2024; ARPA-E budget, 2024; NSF Science & Engineering indicators

USA

Federal government funding is predominantly disbursed through project grant funding

>95%

with block funding relatively limited.

Primary government funding mechanisms

Project grants dominate the U.S. research ecosystem comprising almost all of federal R&D funding. Funds are awarded through a competitive process to individual researchers, institutions, or collaborative projects.

Traditionally, grants are awarded following a peer review of submitted proposals, and therefore tend to be more conservative and risk averse. To counter this, the DARPA model has been gaining traction as an alternative, allowing investment in the best scientific researchers across both applied and basic sciences.

To support the wider facilities, administrative and operational costs associated with undertaking R&D, the Federal Government provides support through the reimbursement of certain eligible indirect costs that is added to project grant funding allocations. Universities must negotiate their indirect cost recovery rate with the Federal Government on a regular basis. Within this, the administrative cost recovery is capped at 26% of a subset of direct project costs, but other components are uncapped and are negotiated on a case-by-case basis. The subset of costs, which consists of direct costs less a federally defined set of exclusions, such as equipment and the portion of each sub-award greater than $50,000, is multiplied by the indirect cost recovery rate to arrive at an indirect cost recovery amount.

The share of **block or formula-based funding** allocated to institutions is relatively limited, and is confined to state-controlled public universities that receive operating funding from state governments. Whilst these funds may be used at the universities' discretion for R&D, they are intended to fund all university operations, including tuition.

In addition to the block funding above, some universities receive land grants, which are formula-based block / capacity grants provided to land grant institutions administered by the U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA NIFA). In 2022, capacity grants totalled c.$825m, representing less than 1% of the total federal R&D funding and the majority of which required matching from the states and other parties.

Other government funding

Challenge funding is increasing as federal priorities shift toward applied, translational research with real-world impact. This funding is aimed at solving specific, high-priority challenges, often requiring interdisciplinary or applied research approaches.

The Federal Government also coordinates a "challenge hub" through which each agency can announce new challenge competitions for public and private researchers and organisations - in many cases these prize funds are awarded once the challenge or problem has been solved (i.e. the work has been done), rather than to fund the work itself. Note these awards are relatively immaterial within the wider US R&D landscape.

The Federal Government also provides incentives for additional private investment in R&D via the R&D tax credit as well as by allowing a full and immediate deduction (expensing) for R&D investment.

First introduced in 1981 as part of the Economic Recovery Tax Act, and permanently extended in 2015, the Federal Research and Experimentation tax credit now amounts to upwards of $12bn of federal budget allocations each year, with no annual limit. In 2021, R&D tax relief provisions accounted for c.50% of total public support for business R&D.

In addition, there is a wide range of state R&D tax credits, ranging from credits as low as 3-5% to some exceeding 20% of qualified R&D expenses - with some offering refundable tax credits as well.

While the Federal Government is the primary source of R&D funding, the secondary source of R&D funding in the US is the institutions themselves, thanks in part to large endowments and philanthropic funds. However, these funds tend to be used for projects specified by the donors (e.g. new buildings). In some cases, private foundations also have specific calls for research programmes and award funds competitively (in the form of gifts) to the participating universities.

Sources: United States Department of Agriculture, 2022; OECD R&D tax incentives, 2021

Longlist country summaries

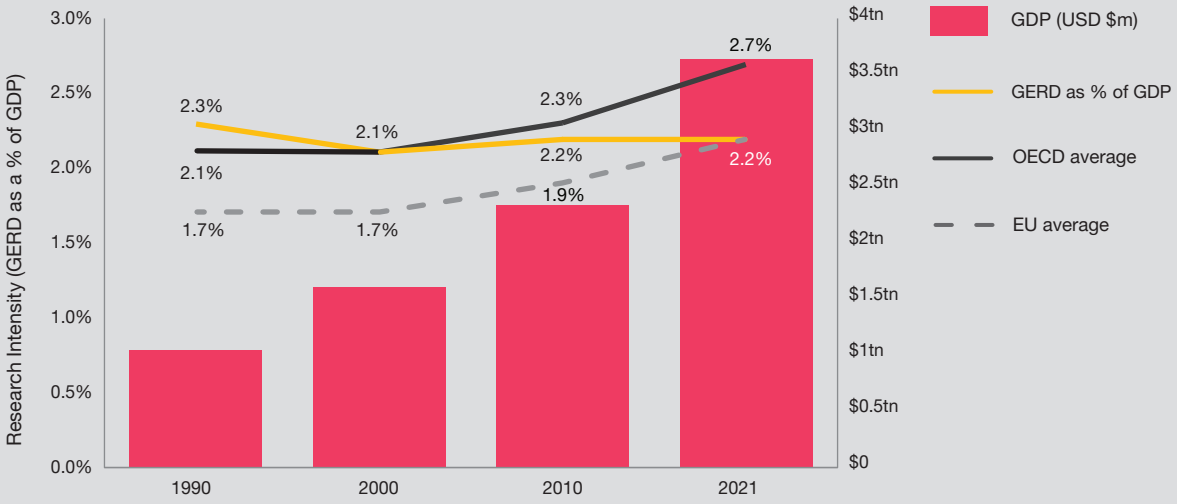
France

French R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in France totalled €56bn ($81bn)[1] and has been growing at a compounded annual growth rate of 5.6% since 2018.

This represents 2.2% of GDP, below the OECD average of 2.7%, and only the fifth highest in the G7 (below USA, Japan, Germany and UK).

France's GERD as a percentage of GDP dropped below the OECD average in 2000, remaining consistent at 2.2% since 2010, whilst other countries increased their R&D investment as a proportion of GDP.



The current R&D ecosystem

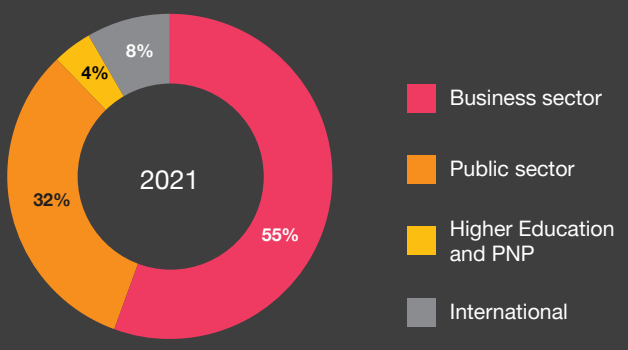
French R&D is performed and funded by a number of different parties within the research ecosystem, with the business sector funding the majority at 55% (third lowest in our comparator list), and performing 66% (in the middle of the group).

Once business sector-funded R&D is removed, the remaining €25bn is primarily funded by the public sector (73%), followed by international sources (17%) and higher education institutions and private non-profits (10%).

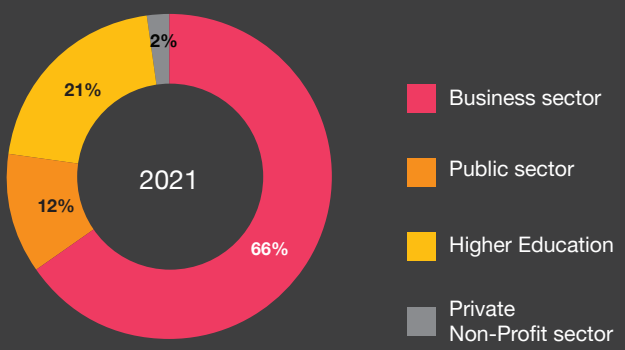
Public sector-performed R&D is predominantly undertaken by the higher education sector (€11.4bn or 60%). The public sector performs €6.5bn of R&D itself through a number of national research organisations for example, the Centre National de la Recherche Scientifique (CNRS).

Private non-profit organisations also performed €1.2bn (6%) of public sector-performed R&D in 2021.

R&D funding by sector



R&D perfomance by sector



Sources: OECD MSTI July 2024 data; Ambassade De France au Royaume-Uni
Note: Due to lack of data OECD and EU averages for 1990 are assumed the same as 1991,
1.Presented in USD as per OECD MSTI July 2024 data for GERD in current Purchasing Power Parity (PPP) USD

France

Government research funding bodies

The research and education budget for France (€31.1bn in 2025) is managed by the Interministerial Mission for Research and Higher Education (MIRES) across six ministries including research, finance, health, energy, defence and agriculture. Of these ministries, the Ministry of Higher Education and Research (MESR) oversees industrial R&D and innovation for France and receives the bulk (86%) of the funding at €26.8bn.

Operating under the supervision of MESR, the Agence Nationale de la Recherche or National Research Agency (ANR) is the primary distributor of project grants to both private and public researchers for fundamental and research projects, across all scientific fields. While MESR is its primary supervisory body, the ANR collaborates with various other ministries to align its funding programmes with national research priorities. As of 2025, ANR's total budget is €1.4bn.

In addition, project grants are awarded through other public funding agencies such as the energy transition agency (ADEME), the Public Investment Bank (BPI France), Institut National du Cancer (INCA) Caisse des Depots, as well as regional authorities - together making up a combined funding allocation of c.€460m.

National research organisations are funded and overseen by one or more ministries, and are characterised as state-owned scientific and technological establishments (EPSTs), or state-owned industrial and commercial establishments (EPICs).

CNRS, an EPST, is considerably larger than all other institutions (and the largest research agency in Europe), with an annual budget of €4bn - primarily made up of MIRES funding, and supplemented by research contracts and subsidies from other institutions (e.g. universities). 87% of its funding is allocated to its 1,100 laboratories, most of which are Joint Research Units or UMRs (Unités Mixtes de Recherche) governed through agreements with partner organisations, such as universities.

Regional funding is limited, however investment is concentrated in regions like Île-de-France, which hosts the majority of France's top research institutions.

System developments

Historically, France relied heavily on block funding for public research institutions like the CNRS and universities. With the aim of increasing the share of project grants within public sector R&D, the ANR was established in 2005, encouraging research institutions to compete for resources by aligning with national priorities and enhancing scientific outputs.

In recent years, the French government has implemented several long-term strategies to bolster R&D, including:

The Research Progamming Law (LPR), 2021

A framework aimed at ensuring France's competitive edge in global innovation and science by increasing public funding in R&D by €25bn before 2030, improving research infrastructure, and enhancing career opportunities in research and higher education. Between 2021 and 2025, €2.7bn was added to the MESR's budget under the LPR, reflecting the LPR's critical importance in the broader research ecosystem.

An increased investment in R&D

The 2025 budget for MESR has been set at €26.8bn, and is to be distributed amongst three main programmes. €15.3bn is for higher education and university research and a further €8.3bn is for multidisciplinary scientific and technological research. However, whether this will materialise may be questioned, given that the ambition of the LPR to inject an additional €25bn injection of funds was not met in the most recent budget (October 2024) due to France's high budget deficit, with a slight decrease in the government's overall research budget.

Transformation of R&D ecosystem

Following the Gillet report which criticised the current R&D ecosystem with low levels of private investment, high levels of bureaucracy, administrative complexity and fragmentation, in December 2023 President Macron announced his vision for the future of research. These reforms are currently underway, and include the transformation of the existing national research organisations into 'programme agencies' that would be responsible for steering research at a national level by defining priorities, developing research infrastructure, and coordinating all the various stakeholders. The reforms also include greater autonomy for universities to conduct research and the creation of the Presidential Science Council.

The France 2030 programme

A €54bn strategic investment plan overseen by the General Secretariat for Investment (CGI) and other government agencies, provided in addition to the R&D budget assured by the LPR, in order to foster R&D addressing contemporary challenges. This €54bn investment includes €20bn from the Investments for Future (PIA) programme, and is managed largely by the ANR in tandem with BPI France. €35bn of this funding has already been committed and channelled into universities, research organisations and industrial R&D projects, with the remaining €13bn earmarked for research, higher education and innovation from 2020-27.

Sources: Science Adviser, 2024; ANR Work programme, 2025; Gov.UK; CNRS Activity Report, 2023; MESRI, 2024; France Government website, 2024; Science.org, 2024; Science & Business, 2023

France

The cross-departmental MIRES block budget forms approximately

80%

of government funding for public sector R&D with project grants making up c.20%.

Primary government funding mechanisms

Block funding is the primary government funding mechanism in France, making up 80% of R&D public sector funding overall, c.75% of the block funding for HEIs specifically (€4.4bn), and 85% for public research institutions (the EPST's and EPIC's) such as CNRS and INSERM (€9.1bn) in 2021.

University block funding is agreed on an institution-by-institution basis, based initially on the "SYMPA" formula - that considers both HEI outputs in teaching and research, and inputs i.e. number of students - and is overlaid with negotiations between government and the HEI taking into account the HEI's budgetary needs and government's strategic priorities. This collaborative process ensures that allocated funds support both the institutions' objectives and national goals The internal allocation of these funds can be used to support research activities at the HEIs discretion.

Project grants are the secondary funding mechanism, making up c.25% of HEI R&D funding (€1.3bn) and 15% for public research institutes (€1.5bn). Project grants are administered through calls for proposals based on peer-review from scientific evaluation panels and French or foreign experts.

The ANR is the primary distributor of project grants, representing 72% of all publicly funded research grants in 2023, and 70% of all publicly funded research grants received by HEIs. The remaining c.30% (or c.€500m) being disbursed by other public funding agencies such as ADEME.

ANR's 2023 funding budget was divided between Generic Calls for Proposals (AAPG) (€670m or 56%) - supporting non-targeted 'free' research', Specific Calls for Proposals (AAPS) (€133m or 11%) - supporting specific government priorities and societal challenges, the Préciput (€209m or 18%) and other projects including the Carnot programme, INCA and RTB (€180m or 15%).

Préciput funding refers to the additional contribution that ANR makes directly to institutions, not individual researchers, to cover indirect costs incurred in undertaking research projects. The préciput rate rose to 30% in 2023, and is composed of four elements: management, hosting, laboratory and site.

Other government funding

In addition to block and grant funding, the French government has announced a number of strategic investments to specifically direct efforts at key priorities. Some examples of strategic funding include:

- **The programme d'Investissements d'Avenir" (PIA)**, launched in 2010 and continued through the France 2030 Investment Plan's €57bn of strategic funding. Most recently this has included almost €800m in funding for the Excellence projects, intended to support institutions implement ambitious transformation projects to meet the training, research and innovation needs of their region. Launched in September 2022, and closed in January 2023, the final wave led to the selection of 14 additional HEI recipients.
- **The France Relance (French Recovery Plan)**, launched in 2020, a €100bn scheme (€40bn of which came from EU funding sources) aimed to enable the economy to return to pre-crisis level by mid 2022. It includes €300m in funding for research, some of which is included in ANR's annual project grants, but some of which employs different mechanisms such as sharing resource between private businesses and public laboratories, with government funding salaries.
- **University Innovation Clusters (PUI) programme** - Co-funded by ANR and BPI France with a budget of €106m, this programme supports local research and innovation stakeholders to work together and implement a regional roadmap for innovation clusters.

French tax incentives are a key factor the competitiveness of French R&D, with the volume-based Research Tax Credit (CIR) that allows French companies to claim up to 30% on eligible R&D expenses during the calendar year. This is in addition to certain SME corporate tax exemptions for carrying out a high proportion of R&D activity, and the IP Box regime, which introduced a favourable tax rate for patents and innovative software. In 2021, R&D tax relief provisions accounted for c.67% of total public support for business R&D, which is one of the highest proportions in the OECD, demonstrating the importance of tax incentives for the R&D ecosystem in France.

France ranks 2nd in EU research funding, securing 10.6% of Horizon Europe funds, especially in climate, space, and mobility projects.

Sources: State of Higher Education, Research, and Innovation in France; France Strategie report, 2024; ANR Annual Report, 2023; France Corporate Tax Credits and Incentives, PwC 2024; MESR report, 2024; OECD MSTI July 2024 data

Longlist country summaries

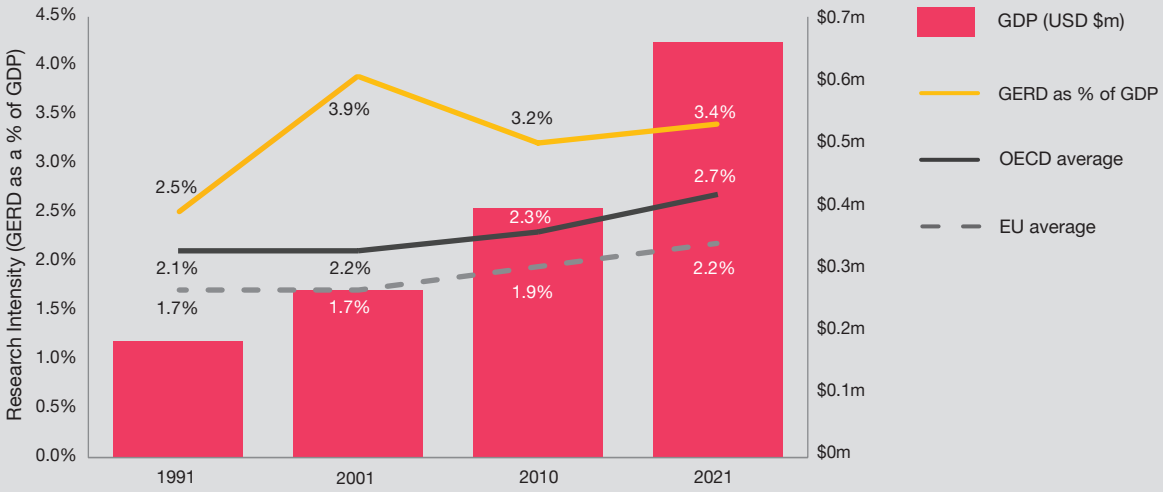
Sweden

Swedish R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in Sweden totalled kr187bn ($23bn)[1] and has been growing at a compounded annual growth rate of 7.5% since 2018.

This represents 3.4% of GDP, significantly higher than both the OECD and EU average - and third highest in our comparator group.

Sweden's GERD as a percentage of GDP has been consistently higher than both the OECD and EU average since 1991, with a significant increase between 1991 and 2001 before reducing back to around current levels.



The current R&D ecosystem

Swedish R&D is performed and funded by a number of different parties within the research ecosystem - at a high level more than half (61%) of all R&D is funded by industry (middle of the comparator group, just above the UK), and 72% is performed by industry (fourth highest in the comparator group).

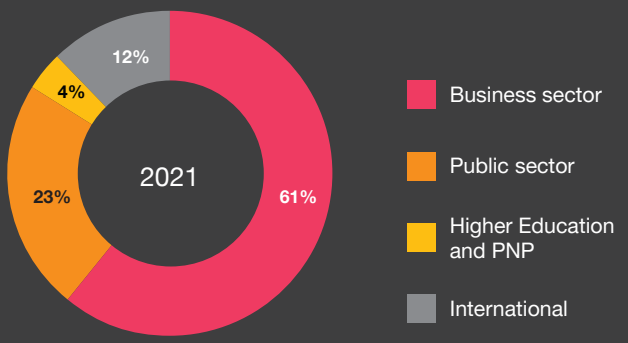
Once business sector-funded R&D is removed, 59% of the remaining kr73bn is funded by the public sector, with international sources contributing 30% and Higher Education and private non-profit sector providing 11%.

Public sector-performed R&D is predominantly undertaken by the higher education sector (83%).

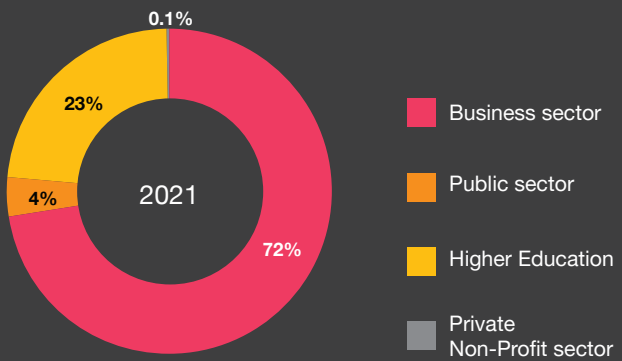
Whilst there are over 50 HEIs in Sweden (including universities and university colleges), the majority of research is undertaken by the universities ("hogskolor"), of which there are 18.

In addition, the public sector performs kr8.2bn of R&D itself through research institutes such as RISE (Research Institutes of Sweden), operating under the Ministry of Enterprise and Innovation. Additionally, a small amount of private non-profit organisations performed kr372m in 2021.

R&D funding by sector



R&D perfomance by sector



1.Presented in USD as per OECD MSTI July 2024 data for GERD in current Purchasing Power Parity (PPP) USD

Sources: OECD MSTI July 2024 data; European Commission, 2024. Note: No OECD data for Sweden for 1990 or 2000, so 1991 and 2001 data has been presented instead.

Sweden

Government research funding bodies

The Ministry of Education and Research is primarily responsible for public sector R&D activity, funding universities through direct budget appropriations and coordinating research-specific funding through government agencies. R&D and innovation budgets are set every four years through the Research and Innovation Bill.

There are four key government agencies that fund public sector R&D:

The Swedish Research Council (SRC, Vetenskapsrådet) - Allocates funding for research in the natural sciences, technology, medicine and health, humanities and social sciences, among other fields. Reports to Ministry of Education and Research.

Formas - A government research council for sustainable development - allocates funding for research in environment matters, agricultural sciences and spatial planning. Reports to Ministry of Enterprise and Innovation.

Forte - The Swedish Research Council for Health, Working Life and Welfare - allocates funding for research in labour market issues, work organisation, work and health, public health, welfare, social services and social relations. Reports to Ministry of Health and Social Affairs.

Vinnova - Sweden's innovation agency - allocates funding primarily for research in technology, transportation, communication and working life. Reports to Ministry of Enterprise and Innovation.

In addition, a number of state-funded foundations allocate public R&D funding on a varying annual basis, estimated to be 0.6% of the total R&D funding (kr1.2bn). Amongst others, these foundations include:

- The Knowledge Foundation (KK-stiftelsen)
- The Swedish Foundation for International Cooperation in Research and Higher Education (STINT)
- The Swedish Foundation for Strategic Research (SSF)

Another major source of funding is Riksbankens Jubileumsfond, an independent foundation initially financed by the Swedish central bank, the Riksbank, but since established as an independent financial actor.

System developments

Sweden's policy goal is to explicitly exceed the 3% of GDP R&D goal of the Europe 2020 strategy. In the draft 205 budget, in contrast to other recent budget announcements in Europe, the government has committed to increase the R&D budget by kr6.5bn by 2028, focusing on sustainable energy systems, environmental technology, and sustainable urban planning.

Following a year-long enquiry into research and innovation funding led by Formas, that found high levels of complexity and fragmentation of funding agencies, a major system overhaul was proposed in October 2023 to channel public competitive project funding through three new authorities instead of the existing 20 agencies, with a combined annual budget of kr17.7bn (US$1.6bn). As of December 2024, the implementation status of this proposal remains under review.

Through this proposed restructuring, the government aims to improve resource allocation, reduce administrative overhead, and enhance support for interdisciplinary research initiatives.

The report also noted that the quality of Swedish research has not kept pace with the county's increasing level of investment, the failure to address societal challenges and the inability of the funding system to adapt to rapid social changes.

In 2024, the government announced a change in funding for research infrastructures (RIs), increasing grant funding periods from 6 years to 10 years, to reduce the financial unpredictability and uncertainty caused by short term funding.

A 2023 OECD report on Swedish research funding noted that the existing traditional research support systems and universities do not incentivise researchers to pursue transdisciplinary research and high-risk, high-reward research or mission-oriented research - proposing a number of potential improvements to the current system.

Sweden's new Research and Innovation Bill 2025-28 was announced in January, and has been welcomed by researchers for the commitment to distribute a total of kr6.5bn for research up to 2028, albeit the majority is to be distributed towards the end of this period, and it has been criticised for reducing the proportion of block, institutional funding in favour of project grants. The new bill also reinstated the use of performance indicators to determine university block grant funding allocations - specifically looking at highly cited publication metrics, proportion of external funding received (including from the EU), and strategic recruitment.

Sources: Swedish Research Barometer, 2023; University World News, 2023; OECD report- Public Research Funding in Sweden; University World News, 2025

Sweden

Approximately

65%

of Swedish government funding is transferred to HEIs as block grants, with the remaining c.25% disbursed as project grants through one of the key four agencies.

Primary government funding mechanisms

Currently, c.65% of government R&D funds in Sweden are transferred to universities through **block grants**, pre-determined based on legacy data (size of institution, historical funding) and performance metrics. Funds are allocated on a multi-year basis, often aligned with governmental budget cycles.

These direct funds are provided to universities through General University Funds (GUFs) who can then allocate resources based on their strategic priorities. In 2023, this amounted to kr18.2bn (42% of the overall R&D funding received by HEIs).

Until the recent 2025-26 Research and Innovation bill, a large majority of the block funding was distributed based on legacy data, with the remainder tied to performance-based indicators. However, the performance evaluation model has not been followed strictly for a number of years, such that current performance is no longer driving funding allocations. Smaller institutions also face challenges in securing equitable funding due to historical allocations that favour larger universities. The new bill now promotes curiosity driven research, with an emphasis to support bottom up research, and is therefore expected to place more of a focus on performance indicators such as number of highly cited publications. Funds to universities are expected to be re-allocated accordingly, and some universities may be more affected than others.

RIs also receive direct budgetary appropriations from government for up to 10 year periods to cover ongoing operational costs and long term investments.

Project grants are allocated based on the merit of research proposals, and account for c.25% of government R&D funding in Sweden, for which the SRC is the primary source (kr8bn budget in 2023), followed by Vinnova (kr3.4bn), Formas (kr1.9bn), and Forte (kr0.9bn). Funds are usually granted on an annual or bi-annual basis.

The proportion of direct government appropriations to overall R&D decreased between 2017 and 2019, at the same time as overall funding increased, indicating a shift away from block funding, towards project-based funding.

Other government funding

Agencies like Vinnova and Formas sometimes issue challenge-based funding calls aimed at addressing specific societal or industrial challenges through targeted initiatives. These challenge-based funds are less flexible, as they are earmarked for projects that align with predefined goals and objectives.

The Swedish Association of Higher Education Institutions (SUHF) has established a standardized model for allocating indirect costs across HEIs, calculated as a percentage surcharge on direct costs, and ensures that both direct government appropriations and external research grants contribute proportionally to covering indirect costs.

However, each HEI independently sets its own indirect cost rates, and while governmental agencies like the SRC provide full cost coverage, many private foundations and EU grants only partially cover indirect costs, leading to financial shortfalls. HEIs therefore often need to allocate internal resources from direct government appropriations to subsidize externally funded research projects.

Various other incentives promote business R&D investment in Sweden, including government agency grants and subsidies, accelerated depreciation of R&D-specific assets, payroll tax deductions for R&D employees, deductions of direct and indirect costs from taxable income, and tax credits for collaborative R&D.

Relative to other government funding, tax incentives do not represent a significant tool for the Swedish government. In 2021, R&D tax relief provisions accounted for only c.30% of total public support for business R&D, which is the second lowest of our comparator group.

Sources: Swedish Research Barometer, 2023; Swedish Research Council, 2019; Note this refers to universities - the majority of university colleges do not deliver PHDs and do not get state funding for research and are not part of the performance based research allocation discussed here; OECD MSTI July 2024 data;

Longlist country summaries

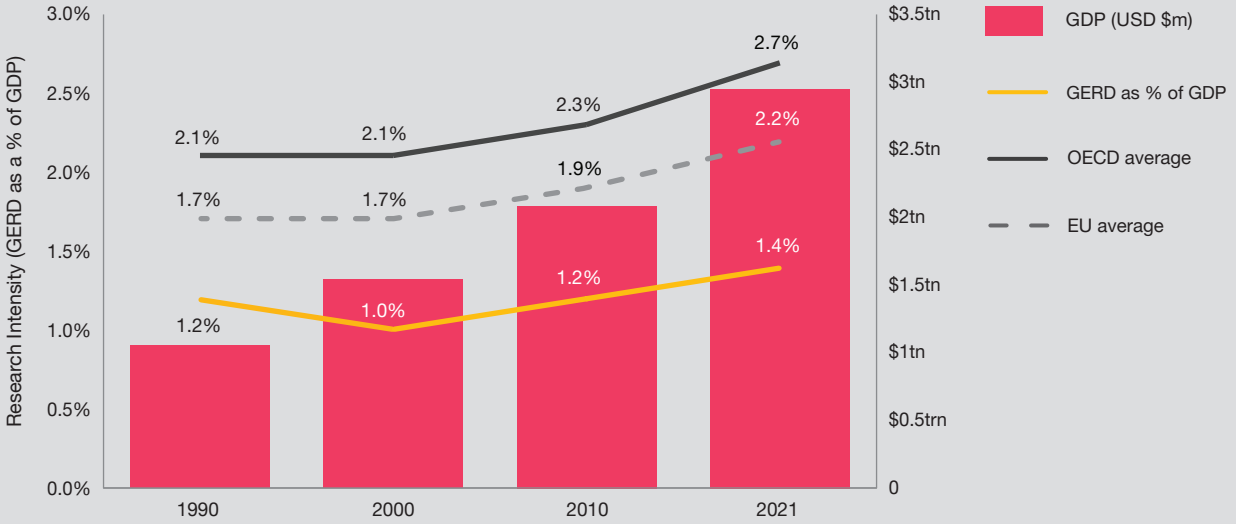
Italy

Italian R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in Italy totalled €26bn ($42bn)[1] and has been growing at a compounded annual growth rate of 4.4% since 2018.

This represents 1.4% of GDP, below the OECD and the EU average, and is the lowest in our comparator group and in the G7.

Italy's GERD as a percentage of GDP has been consistently lower than the OECD and EU averages since 1990.



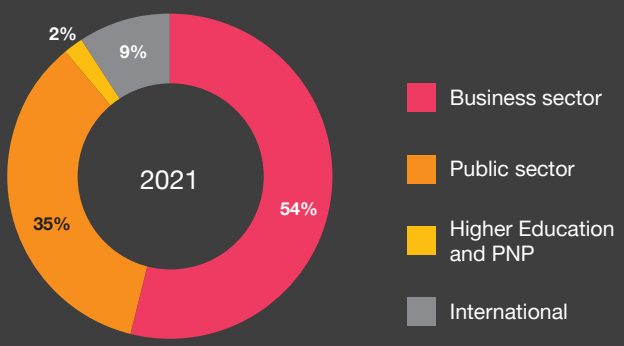
The current R&D ecosystem

Italian R&D is performed and funded by a number of different parties within the research ecosystem - just over half (c.54%) of all R&D is funded by the business sector, and 60% is performed by the business sector (the third lowest of our comparator group).

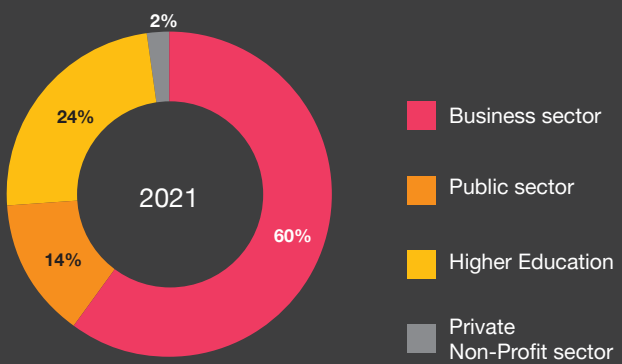
Once business sector-funded R&D is removed, the public sector funds 76% of the remaining c.€12bn, followed by international funders - 19%, and the higher education and private non-profit sector - 5%.

Public sector-performed R&D is predominantly undertaken by the higher education sector - 60%, through its 91 universities, but the public sector performs 35% or €3.6bn of R&D itself through public research organisations, such as the National Research Council (CNR), and the private non-profit sector undertakes an additional c.€0.5bn.

R&D funding by sector



R&D perfomance by sector



[1] Presented in USD as per OECD MSTI July 2024 data for GERD in current Purchasing Power Parity (PPP) USD
Sources: OECD MSTI July 2024 data
Note: Due to lack of data OECD and EU averages for 1990 are assumed the same as 1991

Italy

Government research funding bodies

Public R&D in Italy is supported mainly from public funds allocated by the Ministry of Universities and Research (MIUR) who oversees funding for 11 research institutions, universities, and the allocation of project grants for research. Central government funding is also provided by:

The Ministry of Health - provides funding to various research bodies including the Institutes for Research and Treatment of a Scientific Nature (IRCSS) and the National Research Institute (ISS).

The Ministry of the Environment and Energy Security - supervises the Institute for Environmental Research (ISPRA), and of the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) and plays a role in managing funds from EU programmes.

The Ministry of Economy and Finance - provides funds for different public research organisations, including the Italian Institute of Technology (IIT); and the Human Technopole.

The Ministry of Enterprises and Made in Italy (MIMIT) - funds industrial and collaborative research and oversees the Italian Space Agency.

R&D funding priorities are determined at a national government level and listed in the National Research programme (PNR) drawn up every three years. Whilst there are a number of specific government funds earmarked for research project funding (e.g. the National Research Fund), these are all administered by the ministries themselves, with no separate grant funding agency.

The National Research Council (CNR) is the largest of the public research organisations with a 2023 budget of €1.7bn, and is responsible for 88 research institutes that carry out their own research.

Public research funding is also provided at a regional level, from their own budgets, primarily to promote collaboration among universities and small to medium-sized enterprises.

System developments

Until the 1990s, the organisation and funding of Italian higher education was highly centralised, with university budgets characterised by funds allocated strictly according to a budget itemisation. In 1993, however, a new funding mechanism was introduced to increase the level of funding and administrative autonomy of universities and to allocate an increasing proportion of public resources on a performance basis.

More recently, the National Recovery and Resilience Plan redefines Italy's future by investing in cutting-edge R&D, fostering production capacity in strategic value chains and enhancing education, health systems and infrastructure. It plans to invest over €194bn in total across seven key missions between 2021 and 2026, including c.€30bn of funding related to education and research.

Having one of the lowest research intensity rates of all OECD countries, Italy intends to increase R&D funding to 1.8- 2% of GDP by 2027, in line with the National Research Plan (2021-27) established by the Ministry of Universities and Research.

Sources: MIMIT; MIUR, Science and Innovation Network; CNR; OECD; European Commission

Italy

Public sector R&D is predominantly funded through an institution block funding allocation however, project grant funding is also available direct from ministries.

Primary government funding mechanisms

Block grant funding is the primary funding mechanism for public research funding of universities through the regular operational budgets (Fondo di Finanziamento Ordinario, FFO). The FFO allocation is made up of:

- A basic share - related to the historic amounts received in previous years.
- A re-balance share - related to a "standard cost" per student, as well as performance criteria (including ANVUR quality assessment review, researcher recruitment and international student numbers).
- Any additional share, as agreed between individual universities and the MIUR.

The introduction of the FFO in 1995 increased the autonomy of universities by introducing a lump sum contribution that universities could use at their discretion. The share of funds linked to performance indicators is established annually by ministerial decree. For 2022, this was approximately 40% of the resources allocated.

In addition government provides direct budgetary funding for 'university buildings and great scientific' equipment (FEU) and funds for the 'development planning of university system' (FPS).

Project funding is also available through a number of government strategic funds, all administered by MIUR including:

Research Projects of Significant National Interest (PRIN) through the National Research Fund (FNR) as part of the National Recovery and Resilience Plan - €1.8bn to support projects in strategic priority areas for a three year period.

Fund for Investments in Scientific and Technological Research (FIRST) - supports basic research and selected based on evaluation criteria defined by the National Committee of Guarantors for Research (CNGR).

The Italian Science Fund - €475m to support fundamental research through Starting Grants, Consolidator Grants and Advanced Grants for a maximum duration of five years, and administered by MIUR.

Other government funding

Italy provides significant tax incentives to companies engaging in R&D activities. Eligible companies can claim tax credits in addition to deductions on corporate income tax for R&D expenditure, reducing the overall tax burden on companies investing in innovation.

For eligible R&D activities, the tax credit is equal to 20% of the eligible costs incurred, with a maximum annual amount of €4m. The 2021 Budget Law also enabled a 2 year extension for the increased benefit rates provided for R&D activities carried out in the South Italy regions.

Through the Fund to Benefit Industrial Research, companies can also receive loans, at a subsidized rate, for a period of six to ten years, of up to 50% of eligible R&D expenses, as well as grants of up to 25% for large companies and 35% for small companies.

Sources: Eurydice EU, European Commission; MIUR; OECD

Longlist country summaries

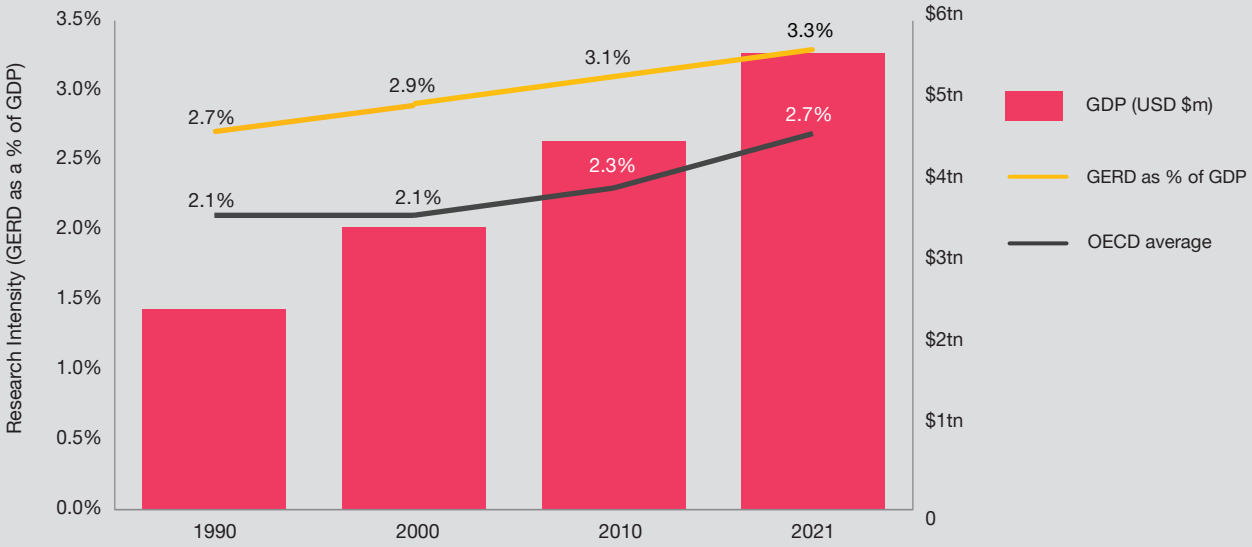
Japan

Japanese R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in Japan totalled ¥18tn ($183bn)[1] and has been growing at a compounded annual growth rate of 2.2% since 2018.

This represents 3.3% of GDP, above the OECD average, and second highest in the G7 below USA.

Japan's GERD as a percentage of GDP has remained consistently higher than the OECD average since 1990 by between 0.6% and 0.8%, and increasing by a similar amount to the OECD average over that period.



The current R&D ecosystem

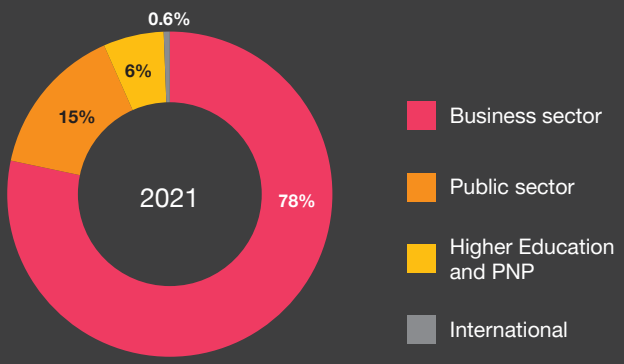
Japan R&D is performed and funded by a number of different parties within the research ecosystem - at a high level more than three quarters (c.78%) of all R&D is funded by industry (the highest proportion in our comparator group), and even more (79%) is performed by industry (the joint highest with South Korea).

Once business sector-funded R&D is removed, 70% of the remaining c.¥4.0tn is funded by the public sector, followed by the the higher education and private non-profit sectors - 27%. International sources only account for 3%.

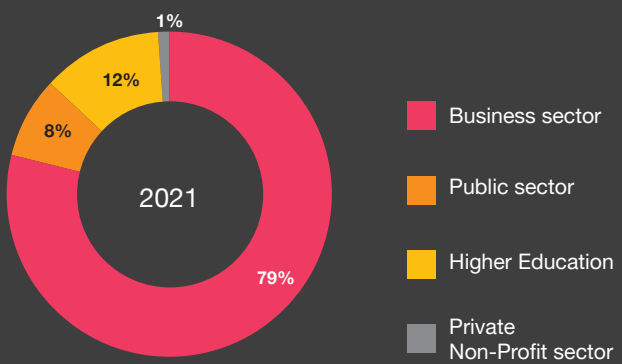
Public sector research in Japan is conducted in dedicated research institutions and higher education institutes. As of October 2024, there were 85 national universities, 103 public universities and 624 private universities in Japan, that performed ¥2.1tn (or 55%) of public sector R&D in 2021. The public sector then performed ¥1.5tn (or 39%) of public sector R&D itself primarily through its 27 national research institutions.

An additional ¥0.2tn was performed by the private non-profit sector.

R&D funding by sector



R&D perfomance by sector



[1] Presented in USD as per OECD MSTI July 2024 data for GERD in current Purchasing Power Parity (PPP) USD
Sources: OECD MSTI July 2024 data. Note: Due to lack of data OECD and EU averages for 1990 are assumed the same as 1991

Japan

Government research funding bodies

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) is the primary research funder and science and technology policy coordinator in Japan, however, there are also funds available from other ministries such as the Ministry of Economy, Trade and Industry (METI). In addition, the Cabinet Office coordinates cross-ministerial flagship R&D projects such as the Moonshot R&D programme and the SIP programme.

Distribution of funds and implementation of policies are carried out by the individual ministries, but the administrative and operative level of funding happens through Independent Administrative Agencies or Institutions (IAA/IAIs) affiliated with each ministry, that run their own research or coordinate programmes for the support of researchers in Japan. IAAs were introduced in 1999 to introduce more autonomy, efficiency and transparency into the R&D funding landscape, separate from government bureaucracy. An IAA has discretion in how it achieves its goals, and direct interventions by the Minister are limited to cases when absolutely necessary.

The following four IAA/IAIs are responsible for allocating the majority of the Japanese government's competitive project grant funding:

Japan Society for the Promotion of Science (JSPS) - affiliated with MEXT, has the largest budget and provides competitive, bottom-up funding through grants-in-aid for scientific research. It also offers both inbound and outbound fellowships to encourage international collaboration. FY2024 budget of ¥297.7bn.

Japan Science and Technology Agency (JST) - affiliated with MEXT, provides top-down funding aimed at implementing national science and innovation policies. FY2024 budget of ¥ 240bn, of which 75% is spent on funding competitive programmes.

Japan Agency for Medical Research and Development (AMED) - established in 2015 to direct integrated research and coordinate funding for medical R&D from basic research to clinical trials. FY2022 budget of ¥160bn across 2,589 projects ranging from < ¥ 10m to > ¥1bn. 60% of this was allocated to universities.

New Energy and Industrial Technology Development Organisation (NEDO) - established in 1980, but recognised as an IAA in 2003 (before being recognised as a National Research and Development Agency in 2025), affiliated with METI and promotes R&D and commercialisation of industrial technologies. FY2024 budget of ¥182.2bn across 72 projects, but also funds a large number of other sizeable programmes led by other ministries and agencies or the Cabinet Office (e.g. Moonshot) or to support commercialisation (e.g. Deep-Tech Startups Support programme, Semi-conductor interest subsidies).

System developments

The framework and major goals of Japan's science policy are outlined in the 'Science, Technology, and Innovation (STI) Basic Plans' that are published every five years. They are compiled by the Council for Science, Technology and Innovation (CSTI), which reports directly to the Japanese Cabinet Office (CAO). The 6th STI Basic Plan, published in 2021, focuses on the measures and tools to implement Japan's vision of a super-smart and connected "Society 5.0".

The key three pillars of the policy are: social structural reform premised on the use of digital technologies, strengthening research capability, and development of human resources (strengthening of the "ability to explore ideas" and "a continuous learning mindset").

A significant characteristic of Japan's government research and development investment is the notably low funding for "defence" compared to other countries. However, this funding is expected to see substantial investment in the future.

In response to changes in the economic climate including international competition and an ageing population, the Japanese government sought to further drive R&D by reclassifying three new National Research and Development Agencies in order to give them increased autonomy, support and funding:

- RIKEN, (Institute of Physical and Chemical Research) - funded by MEXT.
- NIMS (National Institute for Materials Science) - funded by MEXT.
- AIST (Advanced Industrial Science and Technology) - funded by METI.

Sources: JSPS; JST; AMED; NEDO; METI; MEXT; CAO

Japan

Japanese public sector R&D funding is delivered primarily through project grant funding, but supplemented by the use of "basic" operational funding that universities receive from the MEXT.

Primary government funding mechanisms

Each of the 85 national universities receives a '**formula-based' block "operating grant**" calculated by MEXT, based on objective indicators such as number of students, number of faculty members and square metres of campus. This forms c.60% of universities' overall revenue and can now be used at a university's discretion and in 2023 this amounted to ¥1.1tn.

Around 16% of the operational grant is reported to be spent on research, not including the personnel costs for faculty members and researchers. The operational grant term lasts for six years, and funding is predicated on mid-term targets prescribed by MEXT, on which individual institutions must report.

A certain amount of block grant for the second term will be determined by taking into account the evaluation result of the university's performance in the first term in the areas of teaching, research and management. The National University Corporation Evaluation Committee, whose members are mainly academics, is engaged in the evaluation. Thus, from the second term, the 'formula-based' block grant also has the nature of performance-based funding.

In 2023, competitive **project grant** funding amounted to ¥2.4tn (including both initial budget estimate and supplementary budget). The largest amount of research funding is available from the Grant-in-Aid for Scientific Research programme (Kakenhi), which is a type of competitive research funding that is allocated to cutting-edge research, proposed by individual researchers - i.e. "bottom-up". MEXT and the JSPS provide these grants-in-aid, which cover a wide range of research forms.

In contrast, JST offers "top-down" Strategic Basic Research programmes where funding is offered for projects and areas that are designated by government and range substantially in budget size (several million yen to ¥1.2bn per project).

According to the Japan Federation of Academic Societies, the amount of Kakheni funding has remained stable at around ¥240bn each year, but a decrease in operating subsidies for universities, as a result of national financial challenges, has led to an increase in the number of researchers applying, resulting in a decrease in the amount allocated per research project.

Other government funding

In 2020, the Cabinet Office launched the new ¥100bn Moonshot R&D programme to be coordinated jointly under the CSTI and the Headquarters for Healthcare Policy and implemented across a number of ministries and IAA/IAIs, in particular JST, NEDO, AMED and Bio-oriented Technology Research Advancement Institution (BRAIN).

Another initiative, the "K programme", has been launched under the leadership of the Cabinet Office to advance research relating to economic security, by identifying 50 technologies to be supported by JST and NEDO through a ¥250bn fund set up by each organisation. The programme will promote research and development over a span of approximately five to ten years.

Recently, there has also been a growing movement to seek independent funding sources separate from the unstable and low-success-rate funds subject to strict reviews by the Ministry of Finance and other agencies. One such initiative is the "10 Trillion Yen University Fund." This movement aims to allocate flexible research funds at the discretion of universities through the investment profits of a government-funded endowment.

With one of the highest effective corporate income tax rates in the world, Japan has used R&D incentives as a cornerstone of its industrial policy—and a key lever in driving economic growth—as far back as 1967. OECD notes that in Japan tax relief accounted for over 80% of total public support for business R&D in 2021 - the fourth highest in the OECD. Japan has two permanent R&D volume-based tax credits: one for general R&D expenses and one for special "open innovation" R&D expenses.

Sources: See Item 12: Finance Table 12-1 and 12-3 https://www.janu.jp/wp/wp-content/uploads/2024/04/12.pdf; https://www8.cao.go.jp/cstp/compefund/kyoukin_r5-6.pdf; MEXT; CAO; OECD; JST; JSPS

Longlist country summaries

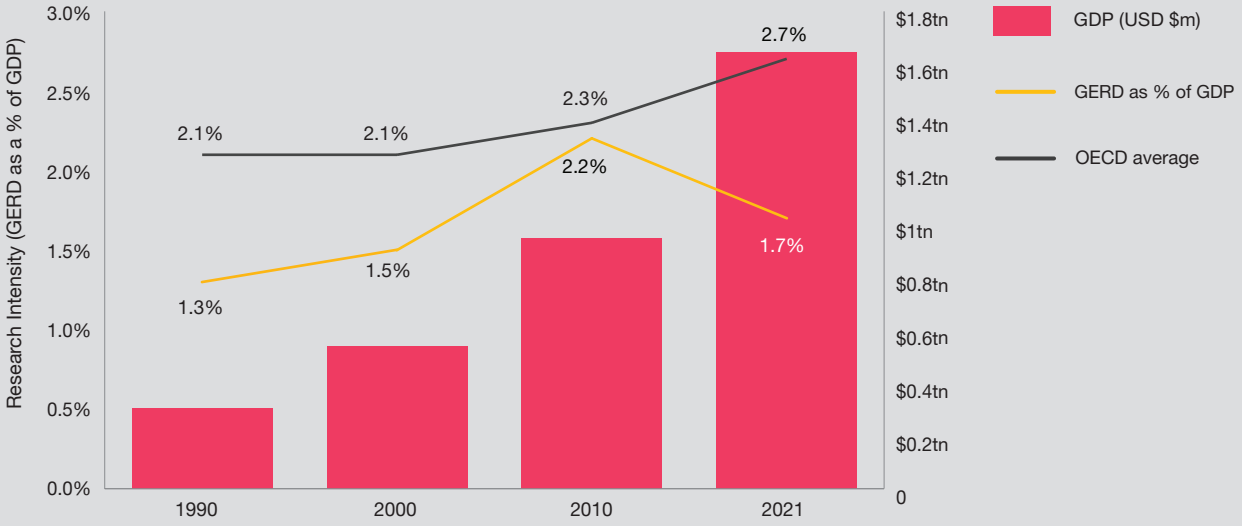
Australia

Australian R&D investment levels

In 2021, Gross Expenditure on R&D (GERD) in Australia totalled A$39bn ($27bn)[1] and has been growing at a compounded annual growth rate of 6% since 2019.

This represented 1.7% of GDP in 2021, below the OECD average, and the second lowest in our comparator group.

Australia GERD as a percentage of GDP has been consistently lower than the OECD average since 1990, falling materially between 2010 and 2021, despite significant increases in the preceding periods.



The current R&D ecosystem

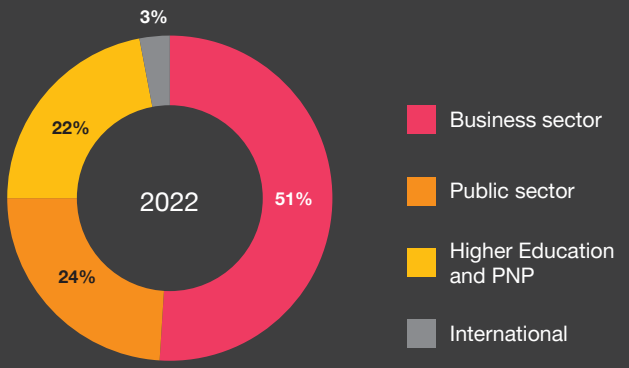
Australian R&D is performed by a number of different parties within the research ecosystem - with just over half (51%) of all R&D performed and funded by industry in 2022 (the lowest and second lowest in our comparator group, respectively, although note only 2022 data is available for Australia).

Once business sector-funded R&D is removed, 49% of the remaining c.A$20bn was funded by the public sector, followed by the higher education and private non-profit sectors - 46%. International sources only account for 6%.

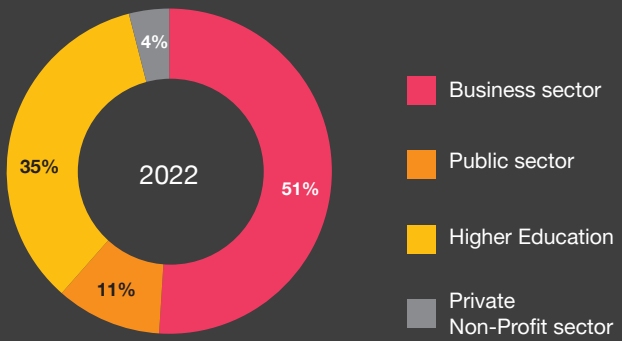
The vast majority (70%) of public sector-performed R&D is performed by the higher education sector. Whilst there are 42 HEIs in Australia, a significant proportion of R&D is undertaken by the larger research intensive universities, of which there are 8 (Group of 8, Go8).

The government also performs 22% or A$4.3bn of public sector R&D itself, and the remaining 8% or A$1.6bn is performed by the private non-profit sector.

R&D funding by sector[2]



R&D perfomance by sector[2]



[1]. Presented in USD as per OECD MSTI July 2024 data for GERD in current Purchasing Power Parity (PPP) USD
Sources: ABS, Research and Experimental Development: Businesses, Higher Education Organisations; Government and Private Non-Profit Organisations; OECD MSTI July 2024 data
[2]. Note: There is no 2021 OECD MSTI data for Australia so a different source has been used, and figures presented are for 2022. Due to lack of data OECD and EU averages for 1990 are assumed the same as 1991

Australia

Government research funding bodies

R&D falls primarily under the responsibility of the Department for Industry, Sciences and Resources, the Department of Education and the Department of Health.

Through the Department of Education's budget, the Commonwealth government provides direct funding for R&D to Australian HEIs providers (HEPs) in line with the Higher Education Support Act 2003 (HESA), and is responsible for national research infrastructure.

The Department for Industry, Science and Resources is also responsible for funding a number of arms-length research organisations including Australian Nuclear Science and Technology Organisation (ANSTO), and Commonwealth Scientific and Industrial Research Organisation (CSIRO).

In addition there are two main research councils primarily responsible for project grant funding:

The Australian Research Council (ARC) - is a Commonwealth entity within the Australian Government. The ARC reports to and is funded by the Minister for Education. The ARC advises the Government on research matters and administers the National Competitive Grants programme (NCGP).

National Health and Medical Research Council (NHMRC) is the Australian Government's primary health and medical research funding agency.

The Medical Research Future Fund (MRFF) was established by the Australian Government as an investment fund, managed by Future Fund and under the supervision of NHMRC. The net interest earned is used to provide grants of financial assistance to support health and medical research and innovation in improving the health and wellbeing of Australians.

The National Collaborative Research Infrastructure Strategy (NCRIS) supports Australia's national research infrastructure by providing funding for facilities or programmes to facilitate access to research infrastructure of national need. It currently funds 26 projects led by organisations including universities, publicly funded research organisations and private not-for-profit companies, including, for example, the Australian National Fabrication Facility (ANFF).

In addition to Commonwealth government funding, state and territory governments contribute to public research funding - in 2022/23 this represented 36% of total government R&D funding (A$1.5bn).

System developments

Public sector research funding levels have stagnated and now rarely cover the full economic cost of conducting research. The Go8 estimates that every $1 in research income requires $1.20 in indirect cost funding to support the research project.

In 2022, the Australian government announced the A$2.2bn University Research Commercialisation Plan including:

- A$243m over five years for the Trailblazer Universities program to boost prioritised R&D and drive commercialisation outcomes with industry partners.
- A$1.6bn over ten years for Australia's Economic Accelerator - a new stage-gated competitive funding program to help university projects bridge the so-called 'valley of death' on the road to commercialisation.
- A$150m capital injection to expand the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Main Sequence Ventures program, which backs start-up companies and helps create commercial opportunities from Australian research.
- A$296m to be invested in 1,800 industry PhDs and over 800 in fellows over ten years.
- The creation of a new IP Framework for universities to support greater university-industry collaboration and the uptake of research outputs.

In February 2024, the Australian Universities Accord Final Report was published, containing 47 recommendations for the government to create a long-term reform plan for the higher education sector to meet Australia's future skills needs, including strengthening its research system. Relevant recommendations included:

- A new multi-agency government strategy with targets to significantly increase national research intensity (GERD as a % of GDP).
- A new Solving Australia's Challenges Fund to reward universities that demonstrate effective application of their research expertise to solve national challenges.
- Increasing the price for research contracts such that government and industry pay at the least the full economic cost for the research they commission, and a higher and fixed case funding level through the Research Support Program (RSP) for the indirect costs associated with project grants.

Most recently, in February 2025, the Australian government commissioned a strategic examination of Australia's R&D system to consider opportunities to:

- Maximise the value of existing investment in R&D.
- Strengthen linkages between research and industry.
- Support the achievement of national priorities.
- Drive greater R&D investment and boost innovation.
- Uplift Australia's overall R&D intensity.

Sources: ARC; NCRIS; Go8; NHMRC; Department of Education;

Australia

Dual-funding system with approximately

20%

block funding element provided by Department of Education and c. 80% of project funding, predominantly from ARC, NHMRC and MRFF.

Like the UK, Australian public sector R&D funding is delivered through what is known as a 'dual-funding system' that combines both formula-allocated funding that can be used at the university's discretion and, grants that universities and other R&D actors can competitively bid for.

Project grants are a primary government funding mechanism, representing c.80% of total public sector R&D funding. The ARC is responsible for administering the National Competitive Grants programme (NCGP), which delivered c.A$900m in project funding in 2023/24 through the Discovery programme (focussed on 'blue sky' research across five schemes) and the Linkage programme (focussed on collaboration, and requiring match funding, channelled through seven schemes).

In 2023/24, the NHMRC allocated A$1bn of funding for 740 grants, across four funding streams: Investigator Grants, Synergy Grants, Ideas Grants and Strategic and Leveraging Grants - the latter of which will support research that addresses identified national needs.

The MRFF grew to A$22bn in December 2023, and has just announced A$6.5bn of project funding that it will provide over its ten year investment plan to 2033/34.

Block funding is a core government funding mechanism of R&D to universities via the Department of Education, totalling A$2.1bn in 2023. The Research Block Grant (RBG) is broken down into two elements:

1. **The Research Support programme (RSP)** provides funding to support the systemic costs of research such as laboratories, libraries, the salaries of support and technical staff and other research costs which are not covered via project grants. (A$1bn, 47% in 2023).
2. **The Research Training programme (RTP)** provides funding to support the training of domestic and overseas students undertaking research doctorate and masters degrees. (A$1.1bn, 53%).

The RBG allocation is disbursed annually and is formula-driven based on Higher Education Research Data Collection (HERDC) and other data (e.g. PHS students taught, competitive grant income, engagement income). The vast majority (c.70%) of block research funding is allocated to the top five research-intensive universities.

Other government funding

In addition to the core funding provided through the RBG and ARC, NHMRC and MRFF's traditional project grant funding, the government employs a number of other types of funding mechanisms, including:

Trailblazer Universities programme - The Australian Government is encouraging new research opportunities, investing in new industry engagement opportunities with the aim of driving commercialisation. Six Australian universities are currently part of the Trailblazer programme. Each Trailblazer university will receive A$50m in government funding which will be matched by university and industry partner contributions. Trailblazer universities were selected through a competitive two-stage application process.

Cooperative Research Centres (CRCs) - enhances ties between academia, government and industry. Support is offered through two channels:

- CRC grants - supporting medium to long term industry-led collaborations, up to ten years.
- CRC Projects grants - supporting short term, industry-led collaborative research, up to three years.

Challenge funding - A number of federal grant programmes can be characterised as mission-based challenge funding, including the Business Research and Innovation Initiative (BRII), and the Critical Technologies Challenge programme. These schemes encourage solutions and offer funding to Australia's most significant national challenges.

The 2024/25 budget announced a A$1.7bn Future Made in Innovation Fund to strategically support innovation, commercialisation and early stage development in target areas. It will be administered by the Australian Renewable Energy Agency (ARENA) with support from the Department for Industry, Science and Resources.

The Research and Development Tax Incentive (R&DTI) helps companies innovate and grow by offsetting some of the costs of eligible R&D, with the rate dependent on the size of the company. The OECD notes that in Australia tax relief accounted for almost 80% of total public support for business R&D in 2021 - the fifth highest in the OECD.

Sources: Department of Education; ARC; NHMRC; MRFF; OECD; Cooperative Research Australia; Department of Industry, Science and Resources; Australian Taxation Office

Longlist comparative summary

Primary government funding mechanisms

For each of the international research funding systems, a high-level desktop review has highlighted a number of key areas of differentiation to inform our shortlist list selection, including:

- the balance between project grant funding, as opposed to strategic institutional block funding;
- the different roles that national / federal governments play in countries with strong emphasis on devolved regional government (e.g. Germany, USA, Canada);
- the variety or plurality of funding sources; and
- the relative involvement of the business enterprise sector both in performing and funding R&D.

	Research funding system typology	National vs regional funding	Plurality of funding sources	Research Intensity (GERD as % of GDP, 2021)	R&D funding by sector (2021)	R&D performance by sector (2021)
UK	Dual funding system, with block funding (QR) element 32%, as well as project grants	Project grant funding distributed at a national level, with QR block funding distributed by devolved nations	Vast majority coordinated through single umbrella body (UKRI)	2.9%	59% 19% 11% 11%	71% 5% 23% 2%
Canada	Predominantly project grant funding (c.90%), with limited block or formula-based funding	Primarily federal (75%), with significant variation in provincial funding	Vast majority coordinated through existing Tri-Agency (and potential for single entity in future)	1.9%	46% 29% 14% 10%	58% 6% 35% 0.4%
USA	Predominantly project grant funding (>95%), with limited block or formula-based funding	Primarily federal (>95%), with minimal state funding specifically for research	Plurality of funding sources - 12 federal departments and 18 independent bodies, plus states	3.5%	69% 19% 5% 7%	78% 8% 10% 3%
France	Dual-funding system, with 80% block funding element. Prominent role played by public research institutions	Limited funding provided at a regional level	Coordinated through MESR and cross-party body MIRES, with one sole project grant funder, ANR	2.2%	55% 32% 4% 8%	66% 12% 21% 2%
Netherlands	Dual-funding system, with significant (c.68%) block funding element	Limited funding provided at a regional level (c.1-2% of total government R&D funding)	Project grant funding coordinated through NWO & the KNAW, with block funding direct from the ministries	2.3%	57% 31% 2% 10%	66% 6% 29%
Sweden	Dual-funding system, with c.65% block funding and c.25% project grant funding	Minimal regional funding provided, primarily for health and clinical R&D	Three primary funding agencies, with a number of off-shoot agencies	3.4%	61% 23% 4% 12%	72% 4% 23% 0.1%

Sources: OECD MSTI July 2024 data, PwC research

Longlist comparative summary

	Research funding system typology	National vs regional funding	Plurality of funding sources	Research Intensity (GERD as % of GDP, 2021)	R&D funding by sector (2021)	R&D performance by sector (2021)
					Business sector Public sector Higher Education and Private Non-Profit sector International	Business sector Public sector Higher Education Private Non-Profit sector
UK	Dual funding system, with block funding (QR) element 32%, as well as project grants	Project grant funding distributed at a national level, with QR block funding distributed by devolved nations	Vast majority coordinated through single umbrella body (UKRI)	2.9%	59% 19% 11% 11%	71% 5% 23% 2%
Germany	Funding system driven by individual Länder (state) choice of funding mechanism - significant variety, but the majority use some form of block funding, alongside federal and state project grants	Majority of funding is through the Länder, however the Federal Government is responsible for some funding for the PRO's and funds the majority (c.70%) of the DFG	Individual Länder & the DFG	3.1%	63% 30% 7%	67% 15% 18%
Italy	Dual funding system with significant block funding element	Limited funding provided at a regional level	Primarily funding from MUIR, with some additional research funded by other ministries	1.4%	54% 35% 2% 9%	60% 14% 24% 2%
South Korea	Predominantly project grant funding, alongside institutional funding for national institutes and university basic operational grants	Limited funding provided at a regional level	Funding is distributed by various institutes, however the NRF is the overarching research funding agency	4.9%	78% 23% 1%	79% 10% 9% 2%
Japan	Predominantly project grant funding, alongside proportion of block funding through basic operational grants	Limited funding provided at a regional level	Four funding agencies responsible for project grant funding, and Ministry of Education responsible for block funding	3.3%	78% 15% 6% 0.6%	79% 8% 12% 1%
Australia*	Dual funding system with c. 20% block funding element	Predominantly distributed at federal level, with some state contribution	Two primary federal funding agencies (ARC & NHMRC)	1.7%	51% 24% 22% 3%	51% 11% 35% 4%

Sources: OECD MSTI July 2024 data, PwC research
*Due to lack of OECD data, Australia's R&D funding and performance split is based on 2022 data, whilst the rest are based on 2021.

Shortlist detailed metric comparison

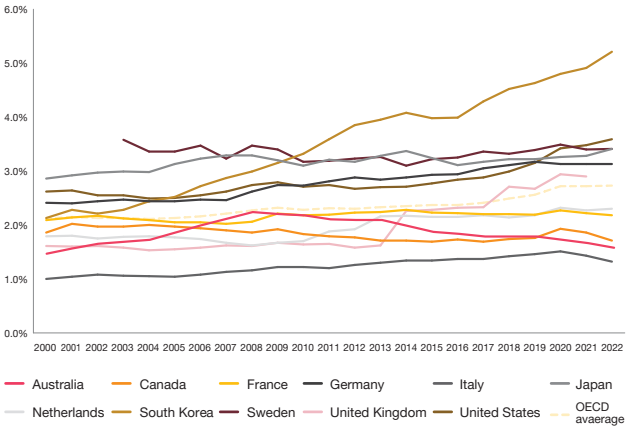
		UK			Canada			Germany			Netherlands			South Korea		
	GERD $ (2021)	$103bn			$40bn			$161bn			$27bn			$123bn		
	Research Intensity (GERD as a % of GDP) (2021)	2.9%			1.9%			3.1%			2.3%			4.9%		
		#	per million capita	Comparator Ranking	#	per million capita	Comparator Ranking	#	per million capita	Comparator Ranking	#	per million capita	Comparator Ranking	#	per million capita	Comparator Ranking
Research excellence	Published documents (2023)	238,568	3,490	4th	128,502	3,205	5th	202,397	2,395	7th	72,640	4,063	3rd	101,414	1,962	9th
	Citations (2023)	272,435	3,986	4th	137,877	3,439	5th	202,876	2,400	7th	88,906	4,973	3rd	103,479	2,002	8th
	Highly-cited documents (2023) SciVal	36,631	536	4th	18,455	460	5th	26,588	315	7th	12,053	674	3rd	15,608	302	8th
	Field-Weighted Citation Impact Ratio (FWCI) (2020)	1.57	-	1st	1.43	-	3rd	1.32	-	5th	1.72*	-	n/a*	1.06	-	7th
	Nobel prizes (1901 - 2023)	143	2.09	2nd	28	0.7	7th	115	1.36	3rd	22	1.23	5th	3	0.06	11th
	# unis in top 100 of QS ranking (2025)	15	-	-	4	-	-	5	-	-	2	-	-	5	-	-
	Nature Index Rank (2024)	4th	-	3rd	7th	-	6th	3rd	-	2nd	14th	-	10th	8th	-	7th
	Clarivate Research Fronts Leadership (2023)	3rd	-	2nd	7th	-	6th	4th	-	3rd	11th	-	9th	13th	-	10th
Innovation excellence	Patents (2023)	48,297	707	8th	24,145	602	9th	133,140	1,575	4th	25,921	1,450	6th	288,001	5,572	1st
	Ratio of patents to researchers (2021)	-	-	-	0.13	-	9th	0.30	-	4th	0.24	-	6th	0.57	-	2nd
	Global Innovation Index (2024)	5th	-	3rd	14th	-	9th	9th	-	6th	8th	-	5th	6th	-	6th
Efficiency	Published documents per $ million GERD	2.4	-	5th	3.4	-	3rd	1.3	-	8th	2.8	-	4th	0.8	-	10th
	Citations per $ million GERD	26.2	-	5th	34.6	-	3rd	12.2	-	8th	34.1	-	4th	7.8	-	10th
	Highly-cited documents per $ million GERD SciVal	0.4	-	5th	0.5	-	4th	0.2	-	8th	0.5	-	3rd	0.1	-	10th
	Patent applications per $ million GERD	0.5	-	10th	0.7	-	8th	0.9	-	5th	0.9	-	4th	2.2	-	2nd
Leveraging investment	% of GERD financed by business enterprise sector (2021)	58.5%	-	6th	46.4%	-	10th	62.8%	-	4th	56.5%	-	7th	76.1%	-	2nd
	% of GERD financed by rest of the world (2021)	10.6%	-	2nd	10.4%	-	3rd	6.9%	-	8th	10.3%	-	4th	0.3%	-	10th
	% of HERD financed by business enterprise sector (2021)	9.3%	-	3rd	6.9%	-	5th	13.1%	-	2nd	7.5%	-	4th	14.1%	-	1st

Sources: OECD MSTI July 2024 data; Scimago 2023; Elsevier; SciVal; World Population Review; International comparison of the UK research base, gov.uk, 2022; QS Rankings; Nature Index; Clarivate; WIPO Statistics database; Global Innovation ranking. Note all data is as at November 2024

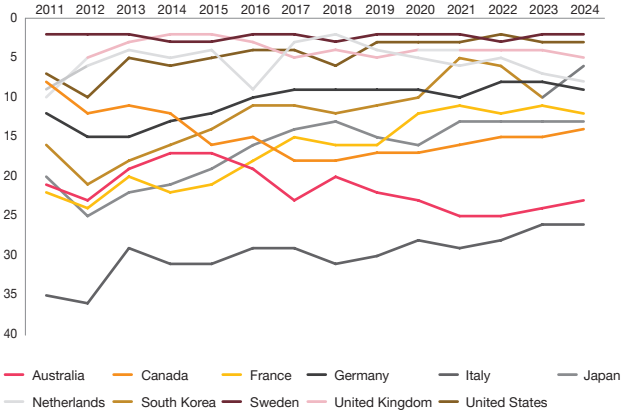
* Note that whilst FWCI 2020 data was not available for the Netherlands, a March 2024 Elsevier report on the Netherlands estimates a 1.72 FWCI based on academic output between 2018-2022 (Netherlands as a Science Nation, 2024). Germany, UK and Canada remain at similar FWCIs in this report, however, there is no datapoint for South Korea, so the Netherlands has not been included in the comparator ranking.

Time series data

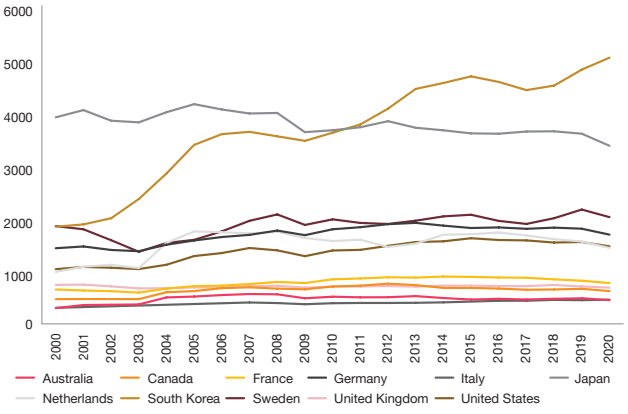
Research Intensity, i.e. GERD as a % of GDP



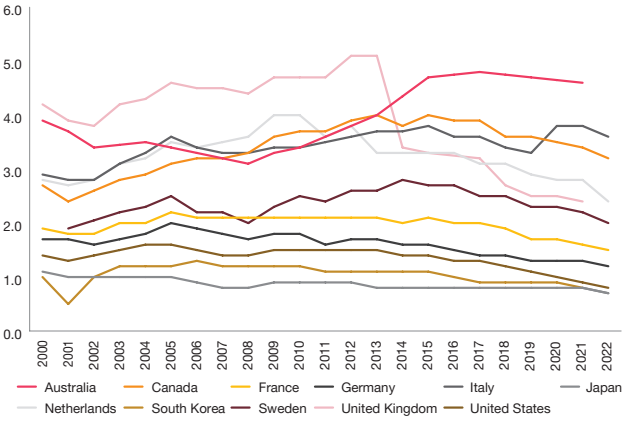
Global Innovation Index ranking



No. of patents per million GERD



No. of documents per million GERD



Sources: OECD MSTI July 2024 data, Elsevier's SciVal. No MSTI data was available for UK and Australia in 2022, but these have been found through other sources, including ONS and Research Australia. No data found for Australia in 2018 or 2020, for graphical purposes 2020 figure is mid-point between datapoints in 2019 and 2021.

Glossary

Term / Acronym	Definition
GERD	Gross Domestic Expenditure on Research & Development
Research Intensity	GERD as a percentage of GDP
HERD	Higher Education Expenditure on R&D
BERD	Business Expenditure on R&D
Citations	Number of citations received in the selected year by a journal to the documents published in the three previous years, --i.e. citations received in year X to documents published in years X-1, X-2 and X-3. All types of documents are considered. Source: Scimago
Highly-cited documents	Number of high-cited articles amongst the top 10% in the world. Note in 2023, the threshold for a publication being in the top 10% most highly-cited, was 9 citations. The data shown in this report was prepared and published using Elsevier's SciVal tool, part of its portfolio of products serving research institutions, government agencies, and funders. Whether your institution is conducting research or funding it, Elsevier provides the objective and analytical insight needed to improve your ability to establish, execute, and evaluate national and institutional research strategy. For more information about Elsevier's academic and government portfolio, please visit: elsevier.com/academic-and-government
Field-Weighted Citation Impact Ratio (FWCI)	Field-Weighted Citation Impact is the ratio of the total citations actually received by the denominator's output, and the total citations that would be expected based on the average of the subject field. A Field-Weighted Citation Impact of more than 1 means that the output is more cited than expected according to the global average; for example, 1.20 means 20% more cited than expected. Metrics in this report have been sourced from the UK government's 2022 International comparison of the UK research base analysis
Nature Index Rank	The Nature Index tracks contributions to research articles published in high-quality natural-science and health-science journals, chosen based on reputation by an independent group of researchers. The Index ranks countries and, as such, is an indicator of global high-quality research output and collaboration. See more information at www.nature.com.
Clarivate Research Fronts Leadership Index	The Research Leadership Index (RLI) is a comprehensive evaluation measure to determine the degree of activity in Research Fronts. A Research Front is composed of a group of highly cited core papers along with subsequent papers that cite the core literature. Source: Clarivate.
Investigator-led	Funding that is provided to projects that are proposed by individual researchers, or investigators, rather than to address government priorities.
Mission-led / Priority Driven funding	Funding that is provided only to address specific priorities or mission as set out by government. Applications for such funding will only be eligible if the research proposed will address the specified mission.
Block or strategic institutional funding	Funding that is provided as a lump sum to a university or institution and can be used primarily at their discretion.

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RITM0180655