Organisation for Economic Co-operation and Development

DSTI/STP/NESTI(2023)3/FINAL

Unclassified

English - Or. English

14 November 2023

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INNOVATION
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY

Working Party of National Experts on Science and Technology Indicators

Government support for business innovation: Results from measurement pilots in five OECD countries

This report presents the results from the business innovation support mapping pilots carried out in collaboration with five countries (Australia, Canada, France, Netherlands, Norway) as part of the SUPRINNO work-package within the OECD MABIS project. Conducted under the auspices of the Working Party of National Experts on Science and Technology Indicators (NESTI), this work aims to provide a more comprehensive overview of the landscape of government support for business innovation and its directionality. The pilots, conducted between April 2022 and March 2023, set out to assess the feasibility of comprehensively capturing the main qualitative and quantitative features of public support for innovation by following a new measurement framework for mapping the landscape of government support for business R&D and innovation.

This document was declassified by written procedure by the OECD Committee for Scientific and Technological Policy on 16 October 2023.
PWB 1.3.2.1.1 Public support for research and innovation: directionality and impacts

For further information please contact: Science and Technology Policy Division, OECD/DSTI

- Silvia Appelt, Silvia.Appelt@oecd.org
- Fernando Galindo-Rueda, Fernando.Galindo-Rueda@oecd.org

JT03531749

Mapping Business Innovation Support (MABIS)

Project partly funded under the Horizon 2020 Programme of the European Commission

MABIS Project 101004099

Output 4.3: Report on country innovation support measurement pilots[1]

October 2023

Work package 4. Mapping the landscape of government support for business R&D and Innovation (SUPRINNO)

Report status: Public

Abstract

This report presents the results from the business innovation support mapping pilots carried out in collaboration with five countries (Australia, Canada, France, Netherlands, Norway) as part of the SUPRINNO workpackage within the OECD MABIS project. Conducted under the auspices of the Working Party of National Experts on Science and Technology Indicators (NESTI), this work aims to provide a more comprehensive overview of the landscape of government support for business innovation and its directionality. The pilots, conducted between April 2022 and March 2023, set out to assess the feasibility of comprehensively capturing the main qualitative and quantitative features of public support for innovation by following a new measurement framework for mapping the landscape of government support for business R&D and innovation.

[1] This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Acknowledgements

This report has been prepared by Justin Quemener, Silvia Appelt and Fernando Galindo-Rueda, all from the Directorate for Science, Technology and Innovation. This work, conducted under Programme of Work and Budget of the CSTP, has benefitted from voluntary contribution funding from the European Union's Horizon 2020 Programme under grant agreement No 101004099; Measurement and Analysis of Business Innovation Support policies (MABIS). This report corresponds to project output 4.3 (Report on country innovation support measurement pilots), under Work package 4 "Mapping the landscape of government support for business R&D and Innovation (SUPRINNO)".

The OECD wishes to thank all national experts who contributed to mapping pilots which overall involved five OECD countries: Australia, Canada, France, the Netherlands, and Norway. The results contained in this report build upon their data contributions and expert feedback. The preparation of this and related MABIS outputs also benefited from comments from and interactions with OECD colleagues involved in the Science and Technology and Innovation Policy (STIP) Compass and the Project on Quantifying Industrial Strategies (QUIS). Any errors or omissions are the authors' sole responsibility.

National contact points contributing to the SUPRINNO mapping pilots: 2022-23

Australia	Tim Beard, Australian Department of Industry, Science and Resources Tao Yuan, Australian Department of Industry, Science and Resources Charlotte Tabi, Australian Department of Industry, Science and Resources Mitch Stubberfield, Australian Department of Industry, Science and Resources Antonio Balaguer, Australian Department of Industry, Science and Resources Francesco Tornatore, Australian Bureau of Statistics
Canada	Ryan Kelly, Innovation, Science and Economic Development Canada Rim Chatti, Statistics Canada Marie Albertine Djuikom Tamtchouong, Statistics Canada Dominique Gagnon, Statistics Canada Jenifer Levesque, Innovation, Science and Economic Development Canada
France	Margot Perben, French Ministry of Higher Education, Research and Innovation Christophe Bonte, French Ministry of Higher Education, Research and Innovation
Netherlands	Alexandra Vennekens, Rathenau Institute Linda Bruls, Statistics Netherlands Piet Donselaar, Ministry of Economic Affairs and Climate Policy
Norway	Marina Rybalka, Statistics Norway Kaja Wendt, Statistics Norway Erik Fjaerli, Statistics Norway

Executive summary

The **study of government support for innovation** and its impacts relies upon the availability of high-quality and fit-for purpose data. While significant progress has been made in the measurement of R&D tax incentives, major measurement gaps persist in key areas that are critical for the transformation of innovation systems to contribute to major transitions. **Understanding the intended and actual directionality of public support** can help anticipate and assess impacts informing policy reform. Investing in internationally comparable and comprehensive data on business innovation support can also provide the international community with the **evidence tools required to foster a level playing field** in which countries can compete and cooperate on business support under a shared rules-based system.

The OECD project on the Measurement and Analysis of Business Innovation Support (MABIS) has developed a **measurement framework** for "Mapping the landscape of government support for business R&D and innovation" under its SUPRINNO work package. This framework has been **tested through a pilot mapping exercise in collaboration with five countries, namely Australia, Canada, France, Netherlands and Norway**, with a focus on the 2018-2022 period. The pilots, conducted between April 2022 and March 2023, set out to assess the feasibility of comprehensively capturing the defining qualitative and quantitative features of public support for innovation.

The **pilots have applied the measurement framework to available data sources**, principally administrative data, exploring five major interrelated questions on innovation support programmes involving government expenditures: 1) what innovation activities or outputs are supported; 2) what are the policy objectives; 3) who in government provides the support; 4) who is eligible to receive support; 5) on what basis is support provided, i.e. under what type of instrument and mechanism; and 6) how is support quantified?

Tax incentives play a pre-eminent role in measured innovation support portfolios. Their design is characterised by a low degree of ex-ante directionality and discretion on the part of governments. Tax incentives account for over 50% of total measured business innovation support, except for Canada and Norway where this percentage reaches 45% and 40% respectively. Norway is the only country where grants and not tax incentives are the predominant innovation support instrument. In Australia and Netherlands tax support goes up to close to 70%. Innovation support through grants and equity investment features as second and third most used instrument on average.

Measured **procurement support for innovation,** the most directional type of instrument by design, only exceeds the 10% mark in the case of France, mostly attributable to defence spending. Public procurement of R&D from businesses and innovative solutions in general is widely understated across all countries. The **provision of infrastructure, goods and services** appear to play a significant role in the business innovation support policy mix of the Netherlands and Australia and to a lesser extent also in Canada. In the Netherlands and Australia, this type of support can be attributed to applied R&D institutes with a mission to provide services to businesses.

Across all five pilot countries, **R&D represents the main object of business innovation** support, with over 70% of total government support in Australia and France and close to 50% in the other three pilot countries. Identified explicit support for non-R&D innovation activity tends to be rather minimal, except for Canada where around 20% of business innovation support is oriented towards non-R&D related innovation activities. There are

also indications of a rising number of mixed programmes targeting R&D and other innovation activities in combination. Programmes **targeting innovation outputs** as opposed to activities aiming to result in innovation play a minor role in all countries with the sole exception of the Netherlands (37%), where the Innovation box is the single largest instrument supporting business innovation.

In terms of policy objectives, business innovation support among pilot countries exhibits limited directionality. Given the predominant role of tax incentives and other programmes designed as horizontal, business initiative-driven instruments without thematic or sectoral constraints, most business innovation support is by default allocated to the socio-economic objective "Industrial production and technology". The **"Environment" and "Energy" objectives** account for just over a quarter of total innovation support in Norway while **"Defence"** stands out as a government objective in France with 14%. Directionality may be present at delegated levels of decision-making for some generic instruments, which might explain the **minor role apparently played by objectives such as health** during the pandemic.

The study shows that each pilot country's data infrastructures present **unique strengths and limitations** when it comes to facilitating a reasonably exhaustive mapping of innovation support along key dimensions. The pilots have demonstrated that **the measurement of innovation support** and its directionality is very much **driven by data availability and the administrative procedures that shape the existence and features of these data**. There is a de-facto monitoring bias against non-R&D, demand-driven support for business innovation operated by ministries and agencies outside the core set of ministries of science, research and innovation. As **whole-of-government approaches towards innovation policy** become more common, it is important to have in place coordination mechanisms to monitor support for innovation, particularly when it comes to challenge-oriented policies. Programmes with a major diffusion component, supporting new-to-firm only innovations, needs to be explicitly acknowledged as being innovation support since such programmes may otherwise not be accounted for.

The pilots clearly indicate how important it is to **map the mechanism for channelling support towards its ultimate beneficiaries**, as this shapes the measurability of the different elements of the taxonomy as well as their interpretability in international comparisons. The use of intermediaries like funding agencies or investing partners may represent a reduction in government directionality through the partial delegation of directing responsibilities.

Robustness and replicability of innovation support mapping outputs can be enhanced through transparent communication of decision rules, heuristics, tagging and coefficients applied at programme level, as well as by providing information on innovation-connected programmes excluded from the scope for practical reasons. The pilot measurement experience has revealed that **countries have a shared interest in measuring government support for STI and business innovation**, but find themselves applying and investing in relatively uncoordinated, highly country-specific monitoring approaches, which renders international synthesis and comparison overly complex but not entirely impossible.

Whilst some of the measurement challenges might appear to be unsurmountable, the pilots suggest that there is **room for greater international coordination towards common representation approaches and better use of available data resources**, whilst making progress towards higher quality and interoperable underlying administrative data. These will be the goals of future OECD work in this area.

Table of contents

FIGURES

TABLES

Government business innovation support - Results from the SUPRINNO mapping pilots

1. Introduction

1. Governments worldwide use a range of financial and non-financial support instruments to promote business innovation, economic growth and social wellbeing. Despite its importance and recent progress, for example in terms of tax support for innovation (OECD, 2023a), this remains a policy area with significant measurement gaps, both in terms of monitoring support for innovation activities other than R&D as well as support provided through indirect mechanisms. Mapping the full landscape of government support for business innovation is a prerequisite for assessing the intended direction, impact and value for money of different policy instruments, alone or in combination with each other.

2. The OECD project on the Measurement and Analysis of Business Innovation Support (MABIS), carried out under the auspices of the OECD Working Party of National Experts on Science and Technology Indicators (NESTI), aims to improve the consolidation of OECD statistics in this area and expand the measurement of business R&D and innovation government support to less measured policy instruments, examine the key challenges to data availability on public support for business innovation and explore the use of administrative data sources.

3. This report presents the exploratory results from a series of pilot measurement exercises on business innovation support mapping exercise carried out as part of the MABIS project. This exercise builds upon and tests a proposed new framework for mapping and quantifying government support for business innovation at the programme level – a proposal [DSTI/STP/NESTI(2022)7/REV1] based on the experience of previous and existing OECD conceptual, measurement and policy reporting frameworks and mechanisms.

4. The innovation support mapping pilots, carried out between April 2022 and March 2023, benefit from the engagement of five countries, namely Australia, Canada, France, the Netherlands. The pilots were intended to provide a concrete set of examples to reflect upon before considering the possibility of recommending approaches or developing a broader data infrastructure. They are thus key to the development of a roadmap for measuring public support for business innovation support – another key objective of the SUPRINNO project. This type of mapping exercise, as well as the expertise established in the measurement of R&D tax incentives, can also exhibit considerable synergies with OECD reviews of innovation policy as well as thematic projects where countries ask OECD for diagnosis and policy design and implementation advice.

5. The report is structured as follows. Section 2 describes the framework for mapping government support and the methods and sources through which it was applied in the measurement pilots. Section 3 presents the mapping results for the five pilots on a country-by-country basis. This is followed by Section 4 which presents combined results. Section 5.3 concludes by spelling out the main methodological lessons learned from the pilots and implications for future work, outlining plans to continue and expand this line of work.

2. Methodology for the innovation support measurement pilots

2.1. Overview of the mapping pilots' approach

6. The measurement pilots followed the following process to implement the draft OECD measurement framework which provides the guiding model for data collection.

- Identification of pilot countries, aiming for a diverse range of innovation systems, but prioritising in first instance countries with known data infrastructures suitable for the analysis, several of which had been presented to OECD peers in recent years.
- Implementation of individual country pilots.
  - OECD background desk research on data sources and stocktake of mapping possibilities and apparent limitations.
  - Bilateral detailed scoping and examination of preliminary mapping. This session provided a basis for national experts to review and discuss the results from the initial OECD stocktaking exercise of national business innovation support policies, including relevant data sources.
  - Additional data requests and exchanges, aiming to identify innovation content within programmes and exploring opportunities to address potential gaps within the main reference sources.
  - Bilateral examination of country-specific results and discussion of necessary qualifiers and explanations for interpretation.
- Compilation of results for multiple countries and discussion on the interpretation of the combined results, allowing for a final round of checks with participating countries in view of potential comparisons.
- Review of substantive and methodological findings with a view to inform potential updates in the design of the measurement framework and providing guidance for data compilation.

7. Throughout this process national contact points played a key role in identifying relevant publicly available data sources (e.g. budgets, spending and ad hoc analysis), proposing possible arrangements for the sharing of confidential data and responding to mutually agreed data requests, and providing feedback on the interpretation and international comparability of the exploratory mapping results.

2.2. Data sources used for mapping purposes

8. The mapping pilots focussed on the reference period 2018-2022 (fiscal years 2017-18 to 2021-22 in the case of Australia and Canada) and relied on various national and international data sources for identifying, classifying and quantifying government business innovation support policies in the five participating countries. Table 1 describes the different data sources contributing to the analysis. Given the nature of the exercise, the mapping pilots primarily drew upon administrative data sources, complemented in some cases by statistical survey sources.

Table 1. Main data sources employed in the SUPRINNO country mapping pilots

Type of data	Administrative					Statistical survey
National scope	**International**		**National**			
Level of reporting	**Programme**	**Project - contract**	**Programme**		**Project- contract**	**Programme/ Ministry**
Source of data			**Budget**	**Ministry/Funding Agency**		
Australia	• STIP compass • OECD R&D tax incentives database (based on national sources) • OECD KNOWINTAX project (based on national sources)	-	• **SRI budget tables 2021-22** • Industry, science and resources Portfolio (2017-23)	• CSIRO (2017-22) • CEFC (2017-22) • IISA annual reports (2017-22)	• Medical Research Future Fund (MRFF) recipients • GrantConnect recipients	
Canada			• **Government of Canada (GC) InfoBase** (2017-22) • Budgetary programme reports	• BDC annual reports (2017-22) • SDTC annual reports (2017-22) • Provincial funding agency annual reports (2017-22) <u>Subnational:</u> • Alberta Enterprise annual reports • Alberta Innovates annual reports • Government of British Columbia website • Innovate BC annual reports • Manitoba Economic Development, • Investment and Trade annual reports • Venture Ontario annual reports • Ontario Centre of Innovation annual reports • Investissement Quebec annual reports • Ministry of Finances of Quebec website	• **Business Innovation and Growth Support database (BIGS)** tabulations (2018-20)* • **Proactive Disclosure - Contracts, Grants and Contributions** • ITB data tabulations*	
France		• Tenders Electronic Daily (TED) award notification datasets	• Budgetary programme reports 2018-22	• Public Investment Bank (BPI) annual reports 2018-21 • Other institutional data	• French research agency (ANR) projects and partners' datasets	• National BERD survey*
Netherlands			• **TWIN database** (2018-24 to 2020-26) • Budgetary programme reports	• Invest-NL annual reports 2020-21 • RVO		
Norway			• **Database on business research policy instruments**, programme level (2018-22)*	• Innovation Norway • Research Council of Norway • Enova annual reports		

Note: Main national reference databases in bold font. *Data contributions by pilot countries in case data sets that are not publicly available.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

2.2.1. National data sources

9. In collaboration with national contact points, open data sources on business innovation support programmes including quantitative information on the amount of support provided were identified. All countries but France had one major domestic reference dataset readily available for analysis purposes, reflecting the pre-selection of pilot countries. Nevertheless, given the coverage gaps, it was necessary in all cases to retrieve additional information from published institutional sources (e.g. budgetary documents, funding agency annual reports and programme descriptions). In addition to this, national contact points also provided additional information drawing on unpublished sources. Details on the national sources used for analysis are available under Section 3 presenting the country specific results.

2.2.2. International data sources

10. The mapping exercise built upon the EC-OECD STIP compass database (https://stip.oecd.org/). At the beginning of each pilot, the STIP Compass was used to obtain a baseline mapping of innovation support programmes. The STIP Compass specifies the type of instrument and beneficiary (e.g. business or university) and provides a description of the programme, including budget range. However, it was not designed to provide an additive characterisation of government support for STI. The budget ranges specified for the main programmes were thus used as a reference point but did not enter into quantification of business innovation support as such. With the exception of tax incentives and some procurement-based R&D&I support, the latter exclusively relied on national data sources.

11. While funder-based[2] OECD statistics on Government Budget Allocations for R&D do not provide information at the programme level nor provide a breakdown for funding provided to business, the statistics on R&D tax incentives used in the pilots were available on this basis. In the case of expenditure-based R&D tax incentives, the mapping exercise used the OECD R&D tax incentives database, covering R&D tax incentives in nearly 50 countries, as primary source of information for qualitative policy information and quantitative data on the cost and of R&D tax relief provisions at central and subnational government level (https://oe.cd/rdtax). Outputs from the OECD KNOWINTAX project[3] in turn served as source of information for income-based tax incentives for R&D and innovation.[4] OECD performer-based statistics on sources of funding provide an additional basis for contrasting support amounts obtained from the pilots.

[2] The funder-based approach to reporting government R&D funding involves identifying all the budget items that may support R&D activities and measuring or estimating their R&D content, while the performer-based approach entails a survey of resident units that perform R&D (businesses, institutes, universities, etc.) in order to identify the amount spent on intramural R&D performance in the reference year. For additional information on the performer-based and funder-based approach, and how to reconcile the differences in these two approaches, see OECD (2015).

[3] The results from the KNOWINTAX project, carried out jointly by the Directorate of Science, Technology and Innovation (STI) and the Centre for Tax Policy and Administration (CTPA) also under the framework of MABIS, provide evidence on the design, cost and uptake of income-based incentives (Appelt et al, 2023; González Cabral et al., 2023).

[4] Preferential tax relief provisions may apply to R&D inputs (expenditure-based R&D tax incentives, e.g., R&D tax credits) or to the outcome of R&D and related efforts (income-based tax incentives). Income-based tax incentives provide relief in form of a reduced tax rate or tax exemption on revenues connected with outputs of the innovation activity of the firm (Appelt et al, 2023).

12. Given the generalised lack of reporting of demand-oriented[5] support for business innovation, the EU Tenders Electronic Daily (TED) database was also examined in the case of European countries in the pilot to track "Innovation partnerships" (INP). INPs are an innovation-oriented procurement procedure (OECD, 2021) introduced in 2014 through an EU Directive to facilitate the award of public contracts for novel solutions requiring brand new development innovation. As INPs represent only one among several other possible ways to promote innovation and the use of this relatively new procedure by EU countries is rather limited up until now, this represents a very confined and partial attempt at addressing a major evidence gap.

2.3. Applying the general mapping framework to available data sources

13. The mapping pilots relied on a common framework for mapping and quantifying government support for business innovation at the programme and instrument level [DSTI/STP/NESTI(2022)7/REV1]. The framework provides taxonomies for several key inter-connected dimensions for characterising and measuring support attempting to address the following questions:

1. What innovation activities or outputs are supported?
2. What are the policy objectives of support for business innovation?
3. Who in government provides the support and by whom is it delivered?
4. Who is eligible to receive support and who is the ultimate beneficiary?
5. On what contractual basis is support provided? Does it entail a transfer or subsidy component?
6. How is support measured? What do monetary figures represent?

14. These questions also play an important role in defining the boundaries of the measurement exercise which operates mostly at the level of programmes.

- Support must be provided with the intention of supporting innovation, as defined in the proposed OECD framework, although innovation need not be the primary motivation [taxonomy elements 1,2]. Support for innovation can be focused on the underpinning activities, such as R&D, its outputs, or the companies that engage intensively in innovation. This calls for a search of relevant programmes beyond the strict policy ownership of science and innovation ministries.
- Support must be provided by domestic government institutions [3] from their own internal budgetary resources, although there may be funds provided by third parties including supranational governmental authorities like the EU.
- Businesses have to be the ultimate beneficiary of support insofar as innovation activity is concerned [4], even if the outcomes of innovation may be of direct benefit to the users of the innovations, e.g. government and public at large in the case of procurement of innovative solutions.
- There is no presumption that support is provided in the form of transfers or concessional forms of financing.[6] Beneficiaries may be required to provide

[5] Demand-side innovation policies include public procurement of innovation, standardisation and regulation, lead market and user-driven innovation initiatives (Appelt and Galindo-Rueda, 2016).

[6] For additional information on the nature of innovation support mechanism and transfer and exchange funds, see mapping framework [DSTI/STP/NESTI(2022)7/REV1] and OECD (2015).

something in return to government or to a third party [5]. Support may be provided in-kind in the form of goods and services, and can be provided via intermediaries.

- Support needs to be monetarily quantifiable [6].

15. While several government programmes in the pilot countries completely fullfil these requirements in their entirety, there are several others requiring some degree of apportioning of funding between business innovation and other support.

16. The different components of the framework required simplification and country-specific adaptations to be implementable with the data resources available for each country. Pilots have implemented only part of the overall measurement framework owing to reasons connected with both data availability and resources and time required for comprehensive mapping.

17. The mapping pilots for each country triangulated multiple sources of information to classify government business innovation support programmes according to the measurement taxonomies proposed in the mapping framework and quantified the level of support. Table 2 provides a summary overview of the main data sources that were used to map programmes. Both the characterisation and quantification of business innovation support policies relied on multiple sources of information. However, while the quantification of business innovation support relied largely on administrative data (e.g. budgetary documents) and information from institutional sources (e.g. annual reports of funding agencies), expert feedback was crucial for the classification and tagging of programmes, highlighting that tacit, non-codified knowledge is key in the initial stages of capturing and describing the landscape of government support for business R&D and innovation.

18. Table 2 also highlights that the main national databases on R&D&I funding programmes provide information on the amount of government support but tend to exhibit gaps in terms of qualitative information such as the type of instrument used to provide funding or type of innovation activity that is supported, or the policy objectives that government authorities pursue in providing business innovation support through a particular programme or policy.

Table 2. Main data sources used to map government business innovation programmes.

Country	A. Support mechanism – Instrument type	B. Innovation activity supported	D. Eligible beneficiaries – Beneficiary sector	E. Policy objectives - SEO	F. Quantification
Australia	• Relevant government websites • Expert feedback	• SRI budget tables • Expert feedback	• SRI budget tables • Relevant government websites • MRFF datasets	• SRI budget tables • Relevant government websites	• SRI budget tables • CSIRO annual reports • CEFC annual reports • IISA annual reports • MRFF datasets
Canada	• BIGS tabulations • Proactive Disclosure - Grants and Contributions • Relevant government websites	• Relevant government websites	• BIGS tabulations • Proactive Disclosure - Grants and Contributions • Relevant government websites	• Relevant government websites	• GC InfoBase • Budgetary data • BIGS • Proactive Disclosure - Grants and Contributions • Relevant government websites • BDC and SDTC annual reports • Provincial funding agencies
France	• Relevant government websites • BPI annual reports	• Relevant government websites • BPI annual reports	• Relevant government websites • ANR datasets	• Relevant government websites	• BPI annual reports • Budgetary data • ANR datasets • BERD tabulations from experts • Relevant government websites
Netherlands	• Relevant government websites • Expert feedback	• TWIN	• TWIN	• TWIN • Relevant government websites	• TWIN • Budgetary data • Invest-NL annual reports • Relevant government websites
Norway	• Business research policy instruments, programme level	• Relevant government websites	• Business research policy instruments, programme level • Relevant government websites	• Relevant government websites	• Business research policy instruments, programme level • Enova annual reports • Innovation Norway annual reports • Research Council of Norway annual reports

Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

2.3.1. What innovation activities or outputs are supported?

19. The framework identifies three categories of innovation activity that may qualify for government support, namely STI inputs (expenditures for innovation activities), STI outputs (income from innovation activities) and activities that relate specifically to innovative businesses. The scope of the national data bases explored during the pilots varied in terms of the type of government programmes covered. The link to innovation was relatively simpler in the case of countries with policy databases explicitly adopting the definition of innovation in the Oslo Manual in defining its scope.

20. The mapping of business growth and export programmes is particularly challenging. While such programmes often contain elements of support for business process innovation, not all of the support provided is necessarily geared towards innovation activities. In addition, as the mapping pilots highlighted, the coverage of such programmes

in national databases on STI funding varies largely across countries, making it difficult to account for such programmes in the mapping exercise in an equal fashion. Programmes supporting business growth and exports with an explicit and identifiable innovation focus/component were included in the analysis. Likewise, government VC programmes that support the growth of innovative companies fell withing the scope of the mapping.

21. For programmes that support both innovation and non-innovation related activities, an attempt was made to identify the relevant R&D&I component, whenever possible, in line with the international guidelines for measuring R&D (OECD, 2015) and innovation (OECD/Eurostat, 2018). The TWIN database in the Netherlands is already available with a programme-specific coefficient that reflects the innovation related component of programmes. In the case of other pilot countries, the policies were included at the full amount of support in the mapping if most of activities supported appear to be innovation related based on the policy descriptions available.

Support for R&D vs other innovation activity

22. The pilots also explored the possibility of separately identifying the R&D and non-R&D innovation related components of government support programmes. Some innovation policies may support R&D while others support other non-R&D related innovation activities, such as demonstration and diffusion.[7]The pilots for Australia and the Netherlands, relied on their databases' own classification of R&D and non-R&D related innovation activities. In the case of the other three countries, the amount of support provided through programmes that support both R&D and non-R&D related innovation activities was assigned to the mixed category 'R&D and non-R&D Innovation' due to the impossibility of computing a meaningful weight for the R&D vs non-R&D related innovation component of each programme. One exception is the Strategic Innovation Fund in Canada, where granular data on sub-programmes was available and made it possible to the identify and quantify the R&D and non-R&D innovation related components of the programme.[8].

23. In the case of business activities supported through government equity investments, the R&D vs non-R&D innovation component of programmes was classified according to the business development stage of the activities supported. Government equity investments that supported activities during the seed, start-up and other early stages were considered to support "R&D and non-R&D innovation activities" – as innovative companies are more likely to undertake R&D activities in these stages. Investments supporting activities in later stages were classified as support of "Non-R&D innovation activities".

Behavioural requirements

24. Support eligibility may be defined in connection with specific behavioural requirements in the conduct of innovation activities. The mapping pilots account for the five specific potential behavioural requirements, namely collaboration, knowledge exchange, entrepreneurship, greening, and digitalisation. These can be interpreted to be in connection with policy objectives. In contrast, the pilots do not yet account for the existence

[7] This classification focusses on R&D and non-R&D related innovation activities (i.e. innovation inputs) but does not account for whether or not such activities are 'innovation related', i.e. lead to innovation as an outcome.

[8] See https://ised-isde.canada.ca/site/strategic-innovation-fund/en/project-requirements/businness-innovation-and-growth

of more favourable support terms within instruments for companies that engage in the listed behaviours.

2.3.2. What are the policy objectives of support for business innovation?

25. The mapping pilots focussed on the classification of business innovation support policies by socio-economic objective. The ex-ante socio-economic objective (SEO) of the government providing support may differ from the ex-post realised objectives, especially in the case of horizontal policies (e.g. R&D tax incentives) where the choice of R&D&I project (e.g. R&D in a particular fields or on a specific technology) is left to the firm. In line with the mapping framework, the mapping pilots focussed on the socio-economic objective of the government, i.e. the functional intention of government as defined in the design, budgeting and implementation of programmes and supporting instruments, rather than the SEO of business. With a focus on the SEO of the government, the SEO 'Industrial production and technology' was assigned to horizontal policies in the mapping pilots.

26. The mapping pilots used the SEO specified in the national databases, where available: the TWIN database (Netherlands) and SRI Budget tables (Australia) which included such information for R&D programmes. In other instances, the identification of the socio-economic objective (SEO) of the government relied on policy descriptions and discussion with national contact points.

27. Governments may pursue multiple policy objectives when providing business innovation support. The SEO classification was used in a tagging format rather than applying a mutually exclusive approach. Since this prevents additivity, some visualisations implicitly apportion on equal parts the funding for a programme across tagged SEOs. The SEOs 'Environment' and 'Energy' were bundled into one combined category given a high degree of co-occurrence.

2.3.3. Who in government provides the support and who delivers it?

28. The taxonomy characterises the actors involved in the provision of support, i.e. the funder and funding intermediary, where applicable. The funder refers to the level of government from which budgetary funding authority originates (supranational, central government or local/subnational government), while the funding intermediary refers to the authority in charge of implementing support, which can differ from the funder, such as government funding agencies.

29. The mapping pilots principally focus on business innovation support at central government level. They account for supranational (e.g. EU funding) and subnational policies to the extent to which relevant data are available but flag these policies separately with a view to ensuring comparability of business innovation support at different levels of government. At the time of reporting, data on supranational (i.e. Norway) and subnational (i.e. Canada, Norway) policies are only available for a subset of countries and often partial, i.e. not necessarily covering the full set of supranational and subnational R&D&I programmes available in a given country. This possibly limits the comparability of the mapping for countries with a centralised vis-à-vis decentralised government model which in principle hinges on the coverage of both national and subnational support programmes.[9]

[9] In the context of Canada, this is particularly significant, as provincial government expenditures outweigh federal government expenditures. Provinces take on substantial responsibilities for pivotal state functions, and numerous projects financed through the federal Business Innovation and Growth support (BIGS) programme involve co-financing by provinces.

2.3.4. Who is eligible to receive support and who is the ultimate beneficiary?

30. The funded entities or beneficiaries correspond to the recipients of the government support. In administrative data sources, business support policies typically relate to policies that benefit private for-profit companies. Private non-profit organizations or public sector corporations with a market activity are treated differently even if they formally qualify as business enterprises according to international statistical standards. To ensure comparability and account for possible differences in the definition of business across different data sources, the mapping exercise separately itemised support for private enterprises and private and public sector organisations with a market activity where possible.

31. The taxonomy also distinguishes between **direct and indirect beneficiaries** to account for the different pathways of support involving businesses that may also build upon different types of instruments. For example, when an R&D organisation (e.g. a Dutch TO2 institute) receives government funding (e.g. grant) to provide services to private businesses, the pilot treated the R&D organisation as intermediary and the business enterprise as recipient. This treatment is in line with the classification of policies by instrument type where such a policy would be classified as "Provision of infrastructure, goods and services" rather than as a "Grant" (see heading below on [5]).

32. Some innovation support programmes may support both business and non-business entities. To identify the business-related component of multi-sector programmes, the pilots either relied on country-specific flags (Norway) included in national databases or made use of project/beneficiary level data (Australia, Canada and France, see Table 1) to identify the business beneficiary component of some multisector programmes. In the case of the Netherlands, the data available did not permit the identification of the business-component of multi-sector programmes (e.g. International Innovation, Eurostars, Carbon Capture and Storage, SME MIT, NGF), overstating the amount of support allocated to business.

Business type-specificity of support programmes

33. Based on policy descriptions, the mapping pilots classified programmes by their size-specificity, i.e. the extent to which business innovation support is only accessible by firms of a specific size. Business innovation support policies may target SMEs or young companies and be only available to this group of firms, for example. Equity investment programmes supporting the seed phase, start-up and other early stage of companies were classified as size-specific, for instance, as they target in practice mostly young SMEs. As the definition of SMEs can vary across countries and some polices may be available to slightly larger firms aside SMEs, the definition of size specificity was not restricted to a given size class of firms (e.g. SME-specific programmes) in the pilots. The definition of size-specificity also does not account for the availability of enhanced support provisions for firms of a specific size. Preferential terms often apply in the context of R&D tax incentives (e.g. enhanced R&D tax credit rate or refund terms for SMEs), for instance. Sector or geographic specificity have not been captured so far in the pilots either.

2.3.5. On what basis is support provided to firms?

34. The mapping exercise drew upon the classification of policies by type of instrument contained in the main national databases. Where this classification was not available, the classification by the OECD Secretariat relied on additional programme descriptions and potentially expert feedback. In only very few ambiguous cases, business innovation support instruments were assigned to a mixed category (e.g. 'Grants and loans'). Some business innovation policies can also rely on a combination of instruments. When it was not possible

to identify the amount of support per type of instrument, the whole budget was allocated to a mixed category (e.g. 'Grants and loans').

35. In the case of business innovation support via an intermediary institution, the instrument used by government may differ from the instrument used by the intermediary that provides support to the innovative business. For example, governments may provide grants to a public infrastructure or research and technology organisation (e.g. TO2 institutes in the Netherlands) which provides services to businesses, or the government may provide tax relief to individuals who increase their equity investments in innovative firms. In the case of an intermediary funding institution, the mapping used the instrument used by the intermediary, as this is the instrument that benefitted the innovative business.

2.3.6. How is support measured?

36. The quantification of public support for innovation under the different categories outlined is a complex and potentially sensitive task. With an international comparison perspective, the main objective is to first understand on what basis different figures are available, to then attempt to report them in a consistent basis. The quantification of public support has registered information on the use of gross measures of support versus grant-equivalent measures, national currency, reference period and whenever possible the nature of budgetary estimates (budgeted or appropriated amounts, commitments or actual expenditure). As different data sources within a country may report different amounts of support for a given programme, the quantification of government support within the mapping pilots prioritised the use of the main national databases.

37. Government expenditure can significantly differ from budgeted amounts in the government's budget document. The mapping exercise focussed on expenditure figures, where available, and only used budget figures when data on expenditures were not available. Data on expenditure are less timely and as a result some countries report them side by side, for example, the TWIN database (Netherlands) and SRI budget tables (Australia), report historical spending while budgeted amounts are reported for the most recent year and upcoming years.

38. The reference period of funding flows may also differ across national databases in terms of country specific fiscal year or calendar year. In line with other OECD statistics, the pilots use the highest overlap calendar year as reference for presentation purposes.

39. Multi-year commitments and plans are also challenging to attribute to a reference period. Data on expenditures are more straightforward to allocate but timing on when expenditures are committed and when disbursements are made can also differ. The pilot focuses on reporting when the eligible business activities that accrue the support are incurred, but this is not always possible. In the case of multi-year programmes, the pilots annualised government support amounts proportionally over the reference period.

40. As described in the mapping framework, the value of government business innovation support may be reported in gross (total resource flow) or net (grant/subsidy-equivalent) terms, depending on what information one wishes to convey. In the case of loans, for instance, values of support seem to be systematically reported in gross rather than subsidy-equivalent terms. This may raise comparability issues with other instruments such as grants if support amounts for the latter are reported in net terms. Due to data availability, the pilots tended to capture gross figures, although such figures make it challenging to capture indirect innovation support instruments with a non-subsidy component in a comparable fashion.

Metadata

41. The framework further proposes to collect metadata for each support instrument such as the name of the instrument, a short policy description, the date of announcement/ implementation, time horizon of adoption, legislation, and processing comments.

3. Business innovation support within pilot countries

42. This section presents the exploratory results from the mapping pilots on a country-by-country basis. Each set of country specific results describes the business innovation support policies covered in the mapping, including extent of possible measurement gaps, and presents the main findings.

3.1. Australia

3.1.1. Data sources

43. The Science, Research and Innovation (SRI) budget tables for 2021-2022 represent the main source used in the case of Australia. SRI budget tables provide a measure of the Australian Government's investments in R&D and innovation, and those made by other Science, Research & Innovation (SRI)-related Australian Government organisations. The data in the SRI budget tables, focussing on federal policies and dating back to 1978-79, are collected by the Department of Industry, Science and Resources through an annual census of Australian Government departments. In addition to the quantitative budget figures, SRI budget tables also contain qualitative information on R&D&I programmes such as the type of STI activity supported by the programmes, the sector of the beneficiary, the allocation method (discretionary dimension of policies), and the socio-economic objective (SEO).

44. As the SRI budget tables contain limited quantitative data on programmes supporting businesses through equity investments and knowledge transfer programmes, additional information on investment-based programmes for business innovation was retrieved from Australia's National Science Agency (CSIRO), the Clean Energy Finance Corporation (CEFC) and the Industry Innovation and Science Australia' annual reports. For the Medical Research Future Fund (MRFF) – an AUD 20 billion funding programme supporting Australian health and medical research – data on grant recipients from the Department of Health and Age Care were used to obtain an estimate of the amount of support going to business.

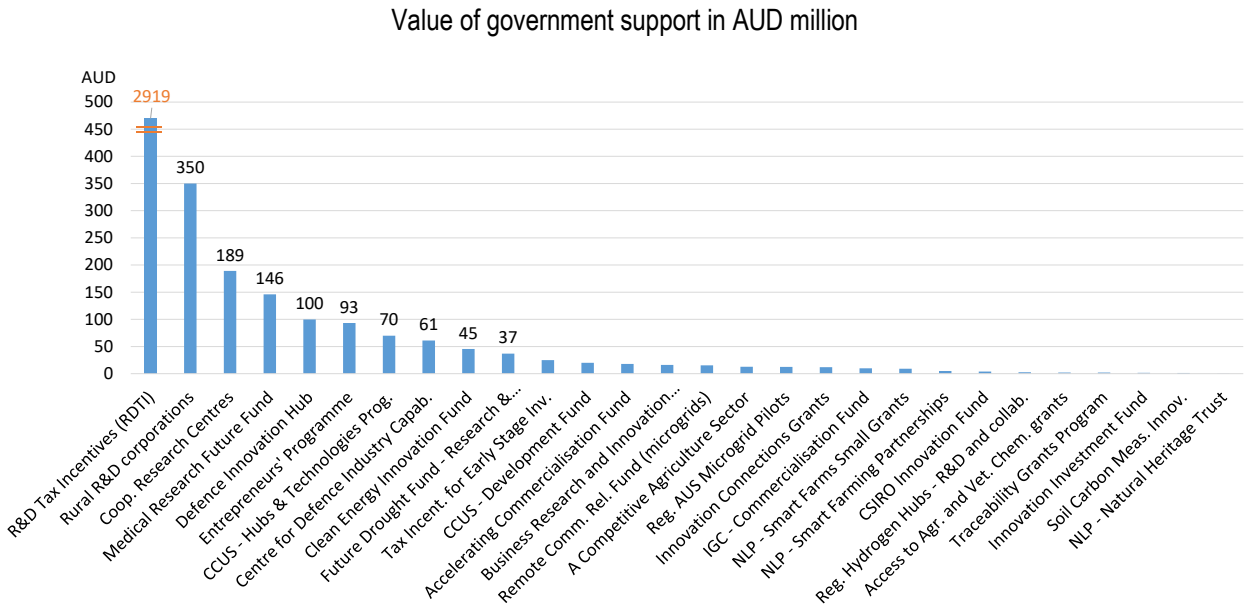
45. In addition, the pilot for Australia used qualitative data from institutional sources, such as Australian government departments (Business, Industry, Agriculture, Defence, Taxes…), government agencies and public enterprises to classify programmes by type of instrument and assess the size-specificity of programmes, i.e. the extent to which they are exclusively available to companies of a specific size.

3.1.2. Innovation support programmes

46. The mapping pilot for Australia identifies 37 business innovation support programmes (Figure 1) in fiscal year 2021-22. A positive amount of business support was recorded for 28 out of these 37 programmes. The R&D Tax incentive (RDTI), with a budget of over AUD 2.9 billion in fiscal year 2021-22, represents by far the largest business innovation support programme. The RDTI is followed in quantitative significance by the Rural Research and Development Corporations (RDCs), the Cooperative Research Centres,

the Medical Research Future Fund (MRFF)[10], the Defence Innovation Hub and the Entrepreneurs' Programme. The Defence Innovation Hub, a public procurement programme, is the fifth largest business innovation support programme in Australia in 2021-22 with annual support worth AUD 100 million. The remaining 32 programmes in Australia offer support worth AUD 476 million in total, around one sixth of the amount of business innovation support provided through the RDTI.

Figure 1. Business R&D and innovation support programmes, Australia, 2021-22



Note: For 2021-22, zero funding amounts were recorded for nine Australian programmes: AMESRF, AUS-IND Cyber Partnership, Automotive Innovation Lab Access Grants, Automotive Transformation Scheme, Biomedical Translation Fund, IGC Initiative - Project Fund, Industry Growth Centres (IGC), Industry Skills Fund, Quantum Computing (NISA).
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Consistency checks with performer-based R&D statistics

47. A comparison of the funder-based, SUPRINNO estimate of direct[11] funding of business R&D (through grants, loans and procurement) with the BERD survey-based indicator of government financed BERD (Figure 2) shows that the SUPRINNO estimate for 2018-19 (AUD 346 million) is notably lower than the BERD-survey data based figure of government-financed BERD for 2019 (AUD 527 million).

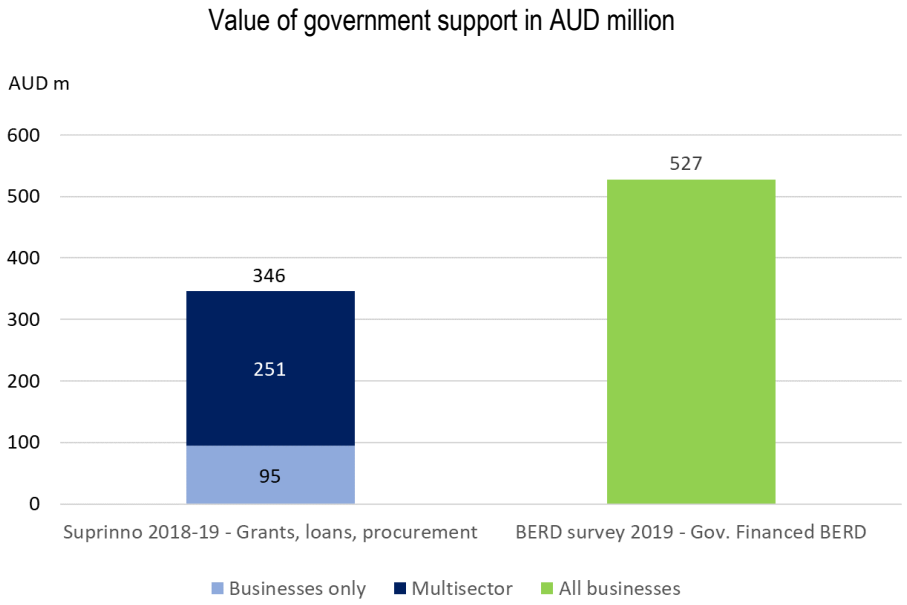
48. While differences in R&D funder-based and R&D performer-based estimates of government-support can arise due to discrepancies between government reporting of funds to industry and the sector's reporting of such support (OECD, 2015), the discussion with national experts highlighted specific reasons potentially driving this gap:

[10] The estimate only accounts for the business-related component of the MRFF programme

[11] Tax incentives are excluded from this visual representation to ensure consistency with government-financed BERD.

- The mapping accounts for one procurement-based support measure - the Defence Innovation Hub programme - and thus only a small part of government R&D procurement.
- The difficulty of identifying multisectoral R&D&I support programmes that benefit businesses. The mapping may not have captured all relevant business support policies as many Australian policies are multisectoral and several may be under the responsibility of the different states and territories in the Australian Commonwealth and thus not captured. The SRI budget tables do not specify the beneficiary sectors in the case of multisector programmes nor include subnational programmes.

Figure 2. Direct funding of business R&D: SUPRINNO vs. official R&D statistics, Australia, 2019



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.1.3. Modalities of business innovation support

Type of instrument

49. Table 3 provides an overview of the number of business innovation support programmes by type of instrument. Grants represent the most frequently listed policy instrument, accounting for 51% of all business innovation support instruments.

50. In terms of expenditures, business innovation support in Australia is highly concentrated on the RDTI tax incentive, which accounts for 70% of the total government support for innovation in 2021-22. Instruments such as grants and the provision of infrastructure, goods and services also account for a sizeable share of government support (respectively 12% and 9% of the total), while only 2% of the total business innovation support in Australia is attributable to equity investments and procurement policies. However, these two types of instruments are only partially covered in SRI budget tables, and although a significant effort has been made to extend the scope of the analysis by using external data sources, the importance of these instruments remains probably understated.

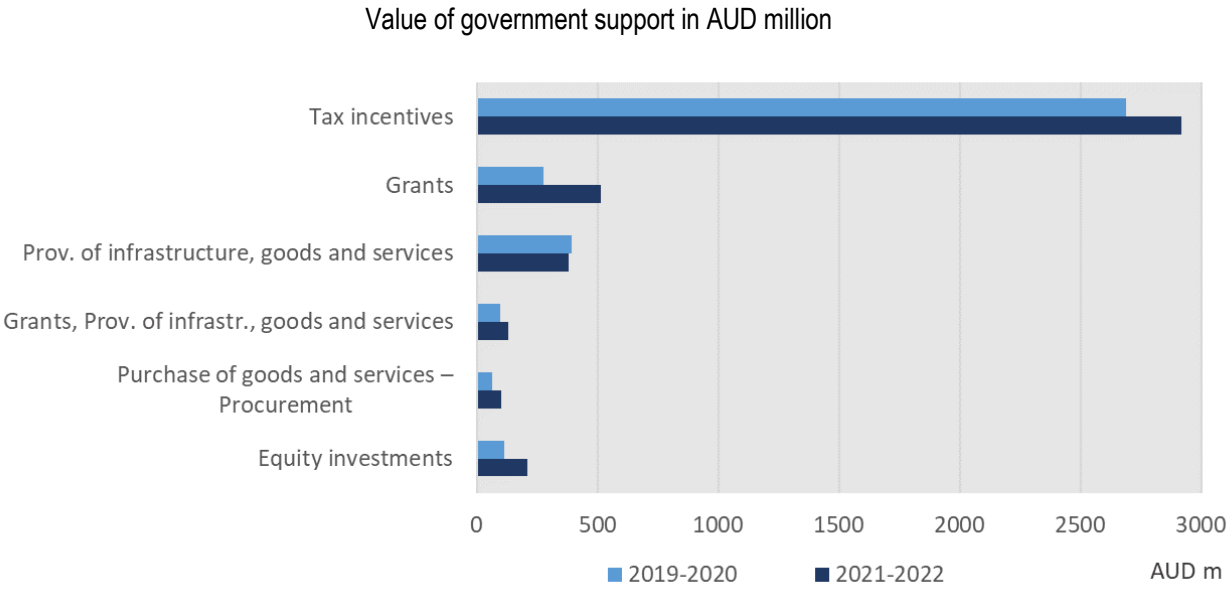
Table 3. Business innovation support programmes by type of instrument, Australia, 2021-22

Instrument type	Number of programmes	Percentage
Grants	19	51
Prov. of infrastructure, goods and services	7	19
Equity investments	6	16
Grants + Prov. of infrastructure, goods and services	3	8
Tax incentives	1	3
Purchase of goods and services - Procurement	1	3
Loans	0	0
Total number of instruments	**37**	**100**

Note: As one programme can employ multiple types of instruments, the total count of instruments can be higher than the total of count of programmes.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

51. Figure 3 illustrates how the magnitude of business innovation support provided through different policy instruments evolved between 2019-20 and 2021-22. While the amount of tax support and grant funding increased from 2019-20 to 2021-22 (the absolute value of the latter almost doubled), the value of other instruments remained relatively stable. The increase in grant funding is mainly driven by four programmes: the Cooperative Research Centres (CRC), the Medical Research Future Fund (MRFF), the Carbon Capture, Use and Storage (CCUS) and the Centre for Defence Industry Capability (CDIC).

Figure 3. Business innovation support by type of instrument, Australia, 2019-22



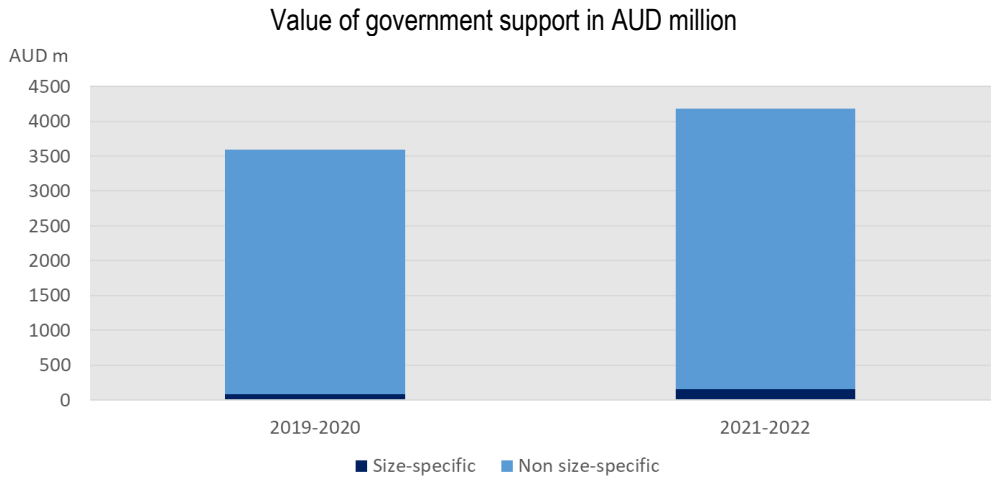
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Business size specificity of innovation support

52. Relatively few innovation support programmes in Australia are size-specific in terms of exclusive eligibility. The share of such policies in the estimated total amount of

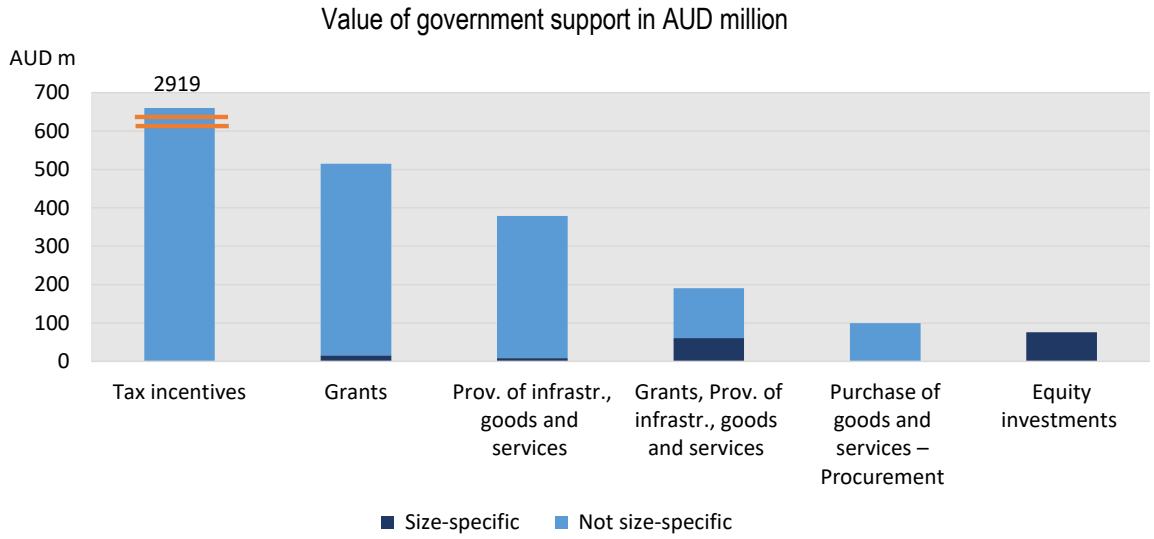
business innovation support in Australia (Figure 4) increased from 2% in 2019-20 to 4% 2021-22.[12]

Figure 4. Business size-targeted innovation support, Australia, 2019-20 and 2021-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 5. Business size-targeted innovation support, by instrument type, Australia, 2021-22



Note: Note: The column referring to the Tax incentive is only based on the access to the funds, it does not take into account preferential provisions affecting the level of generosity of the incentive for SMEs.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

53. As Figure 5 shows, the size-specificity of support varies across different instruments. Equity investments and programmes combining grants and the provision of

[12] The indicator on the size-specificity of business innovation support focusses on accessibility to the program and does not account for the availability of preferential provisions or higher generosity of the incentive for SMEs, as applicable under the R&D Tax Incentive in Australia, see https://stip.oecd.org/innotax/countries/Australia.

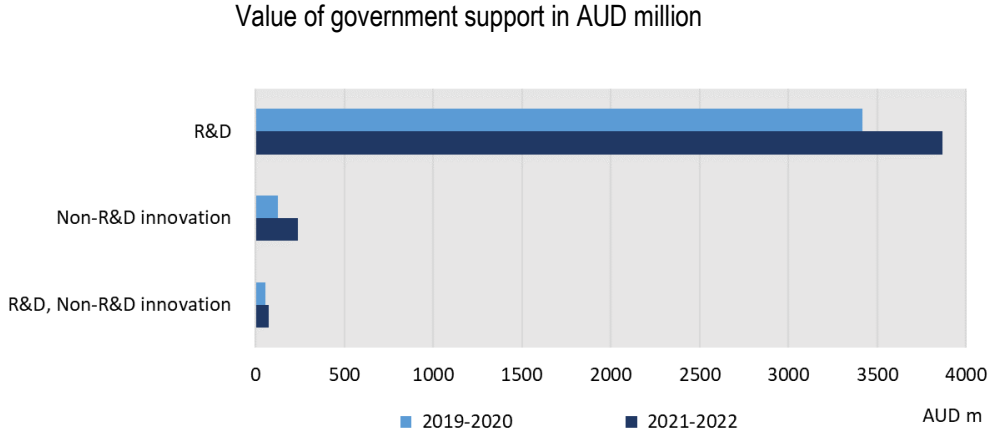
infrastructure, goods and services appear to be the main size-specific instruments in Australia in 2021-22. 100% of all equity investments and 32% of support via the provision of infrastructure, goods and services are only available to SMEs.

3.1.4. Directionality of business innovation support

Innovation activity

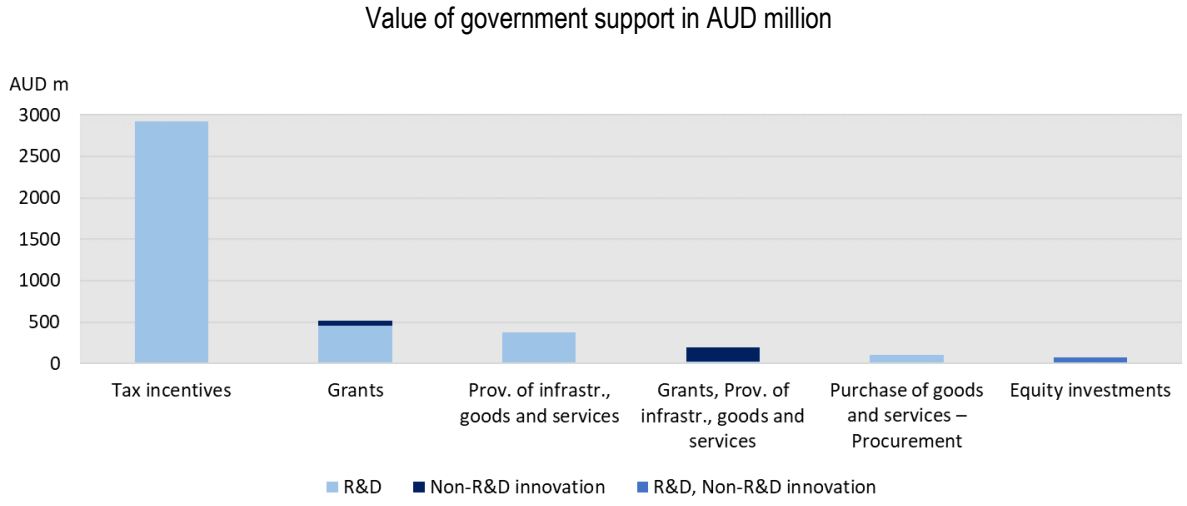
54. Government support for business innovation in Australia appears to focus mainly on R&D (Figure 6), 93% of the total quantified amount of business R&D&I support being directed towards R&D in 2021-22. Support for non-R&D related innovation activities increased from 3% in 2019-20 to 6% in 2021-22.

Figure 6. Business innovation support by type of innovation activity supported, Australia, 2019-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 7. Support by type of instrument and innovation activity, Australia, 2020-21



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

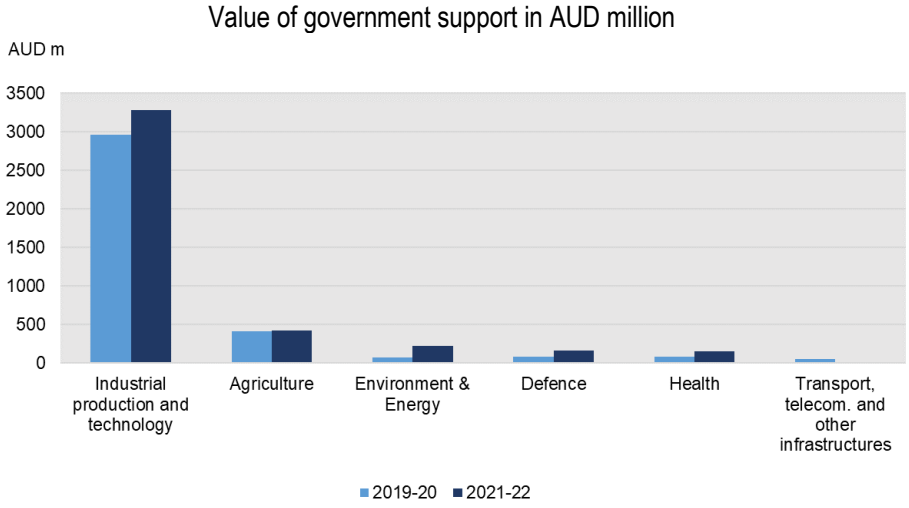
55. Some variation in the type of STI activity supported can be observed across different policy instruments (Figure 7). Tax incentives, procurement-based measures of

support and the provision of infrastructure, goods and services appear to support exclusively R&D investment while grants seem to support a mix of activities – mainly R&D but also to a lesser extent non-R&D related innovation activities. Programmes using a mix of instruments -grants and the provision of services - mainly support non-R&D related innovation.

Policy objectives

56. The main socio-economic objective (SEO) in the Australia's business innovation support landscape appears to be "Industrial production and technology" (Figure 8). This result is driven by the prominent role of the R&D Tax Incentives in the business innovation support policy mix of Australia to which this instrument is assigned. As explained earlier in this document, this indicator reflects government intentions and horizontal policies, such R&D tax incentives, are classified under the SEO heading of "Industrial production and technology" by default.

Figure 8. Business innovation support by socio-economic objective (SEO), Australia, 2019-22

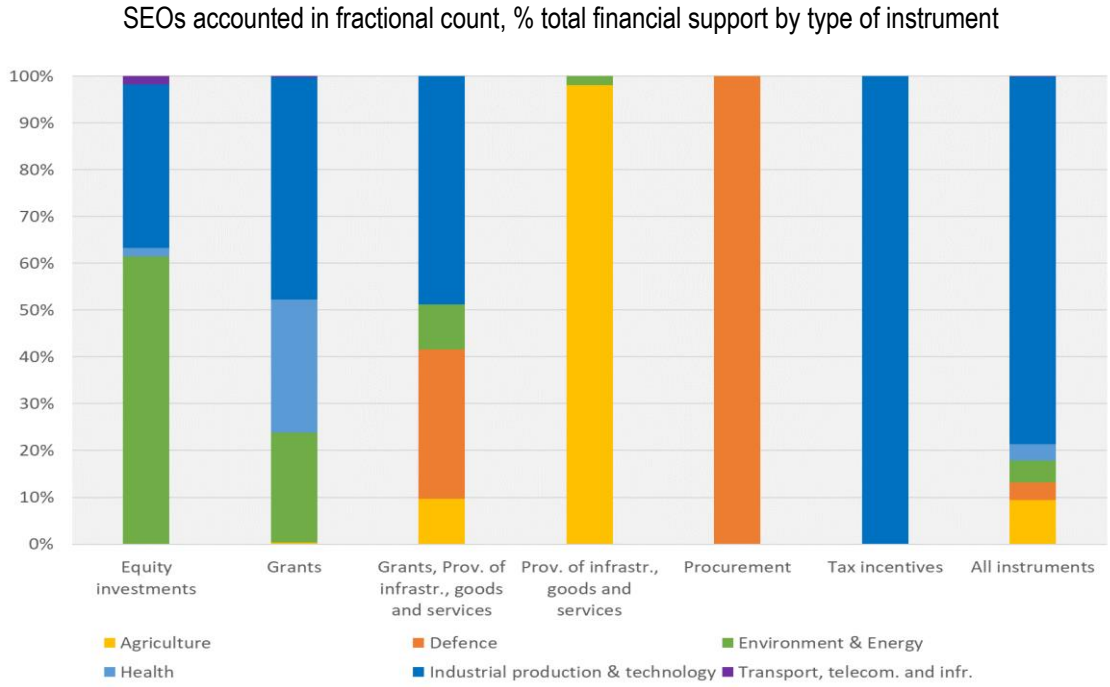


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

57. The second most prominent policy objective in terms of level of business innovation support is "Agriculture". Most programmes in this area benefit directly Rural R&D corporations (RDCs). The 15 RDCs, which are co-funded by the Australian government and the business sector, manage R&D services that are relevant for the agricultural industry. Most of the 10 industry-owned RDCs also provide other industry services such as marketing. Another agricultural related innovation policy is the Future Drought Fund (Research & Adoption), a programme that connects farmers with agricultural experts in their region to harness innovation and adopt new practices. Support for other objectives (e.g. Environment & Energy, Defence and Health), although much smaller in size, appears to have increased in 2021.

58. Figure 9 shows that policy objectives vary by type of business innovation support instruments (support amounts are assigned to SEOs on an equal fractional counts basis). Business innovation support in form of the provision of infrastructure, goods and services appears to be mostly driven the objective of 'Agriculture', procurement-based support by the objective of 'Defence', tax incentives by the objective 'Industrial production and technology', and equity investments by 'Environment & Energy'.

Figure 9. Support by instrument and socio-economic objective (SEO), Australia, 2021-22

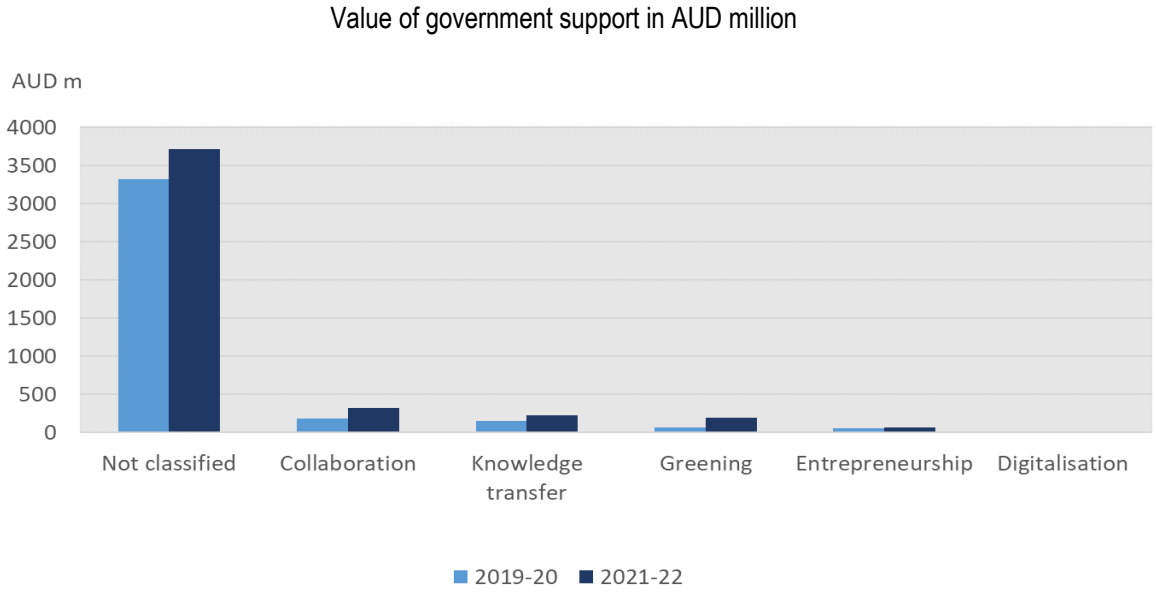


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

59. The distribution of business innovation support by behavioural requirements in the innovation activity of firms (Figure 10) suggests that the importance of "Collaboration", "Knowledge transfer" and "Greening" objectives has increased over the period covered in the analysis. The increase in collaboration related business innovation support is mainly driven by the Cooperative Research Centres and CCUS - Hubs & Technologies programmes. Since the tax incentive does not include such eligibility requirements, a significantly the large share of business innovation support appears as "non-classified".

60. The level of support provided with an "Entrepreneurship" objective is also potentially understated due to the comparatively low coverage of equity investments in the mapping exercise. This affects all pilot countries, and especially those with significant subnational policies such as Australia. In some cases, the value of business innovation support via equity investments might also only represent a lower bound. For instance, in the case of Clean Energy Finance Corp. (CEFC), the estimated value of equity investments only reflects the Clean Energy Innovation Fund (AUD 45 million) but does not capture all equity investment policies by CEFC (AUD 657 million). As national experts in Australia pointed out, it is not straightforward to identify the innovation component of CEFC's equity investments.

Figure 10. Business innovation support targeted to specific behaviours, Australia, 2021-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.2. Canada

3.2.1. Data sources

61. The mapping pilot for Canada relied on three main national data sources that provide complementary information on business innovation support programmes: the Government of Canada (GC) InfoBase, the Business Innovation and Growth Support (BIGS) and the Proactive Disclosure - Grants and Contributions Awards' databases.

62. The open dataset "Public Accounts of Canada - Transfer payments" from the Government of Canada (GC) InfoBase system provides information on support programmes funded by the Federal government of Canada through grants or contributions. This is a report of the Government of Canada prepared annually by the Receiver General. The detailed records of transfer payments are maintained by responsible departments and agencies. Equity or tax relief-based support programmes are not included, and neither are subnational programmes. While the dataset covers business and non-business beneficiaries, it does not specifically flag the type of recipient.

63. BIGS covers federal government activities that support business innovation and growth. At the time of reporting, data coverage was limited to the years 2019-20. Due to confidentiality reasons, information on support amounts were often not available or specified for combined group of beneficiary enterprises, which includes higher education institutions operating as business enterprises.

64. The database on Proactive Disclosure for Grants and Contributions Awards provides information on all Federal grants and contributions larger than CAD 25,000 (or later amended so that their value rises to CAD 25,000 or above) at the award level. This open database indicates the name of the programme, a description of the project, the beneficiaries of the award (including the institutional sector), and the amount of the award. It complements BIGS in that it provides more up-to-date data on a time-series basis.

65. As the GC InfoBase database does not provide qualitative data on the modalities of support (i.e. type of STI activity supported, type of beneficiary, type of instrument and SEO) such data were retrieved from institutional websites as well as BIGS tabulations for the year 2017-18. The latter included information on the type of policy instrument and the type of beneficiary enterprise at programme level.

66. For procurement and equity investment government policies in Canada, quantitative data were in turn derived from additional data administrative sources (e.g. Business Development Bank of Canada – BDC - annual reports for equity investments).

67. Due to the significant role of subnational innovation support programmes in Canada, additional efforts have been made to account for them in this pilot. A preliminary and non-exhaustive list of provincial programmes was derived based on information from provincial funding agencies and other government sources (see Table 1).

3.2.2. Innovation support programmes

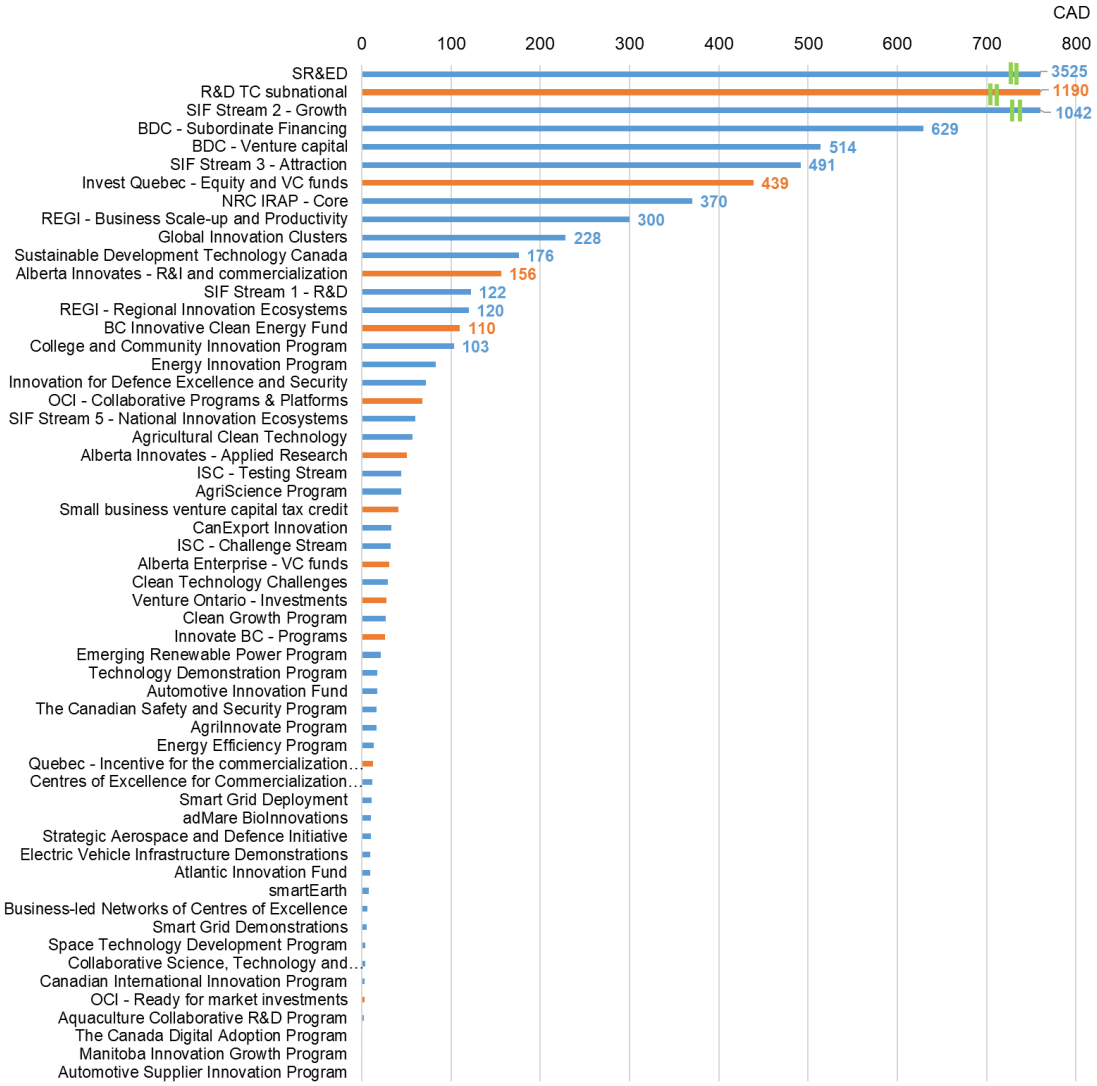
68. The mapping pilot for Canada tracks 60 business innovation support programmes (Figure 11) over the period 2017-18 to 2021-22. A positive amount of business support was recorded for 56 programmes in 2021-22 (44 programmes at the federal level and 13 at the subnational level, and one programme being co-funded by both central and subnational government). R&D tax incentives at federal and provincial level, worth CAD 3.5 billion and CAD 1.2 CAD billion respectively, represent the largest business innovation support policies in Canada.

69. A significant amount of business innovation support is provided through Stream 2 of the Strategic Innovation Fund (CAD 1042 million) as well as by the Business Development Bank of Canada (BDC) with its subordinate financing and venture capital instruments worth CAD 629 million and CAD 514 million respectively. Other federal policies also provide significant amounts of support for business R&D and innovation, such as the NRC IRAP, the Business Scale-Up and Productivity programme supported by Regional Development Agencies (RDAs), the Global Innovation Clusters and Sustainable Development Technology Canada. The equity and venture capital funds from Investissements Québec, the R&I programmes from Alberta Innovates and the British Columbia (BC) Innovative Clean Energy Fund represent in turn larger-scale business innovation support policies at provincial level.

70. Figure 12 shows that federal business innovation support policies (worth CAD 8.3 billion in total) accounted for the bulk of business innovation support in Canada with a share of around 80% in the total quantified amount of business R&D&I policy support in Canada in 2021-22. The percentage for provincial business innovation support (worth CAD 2.1 billion in total) amounted to 20% in that year.

Figure 11. Business R&D and innovation support policies, Canada, 2021-22

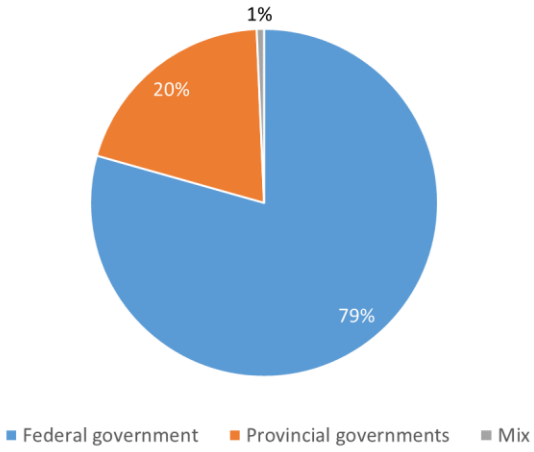
Value of government support in CAD million, federal (blue) and provincial (orange) levels



Note: Bars in orange refer to subnational policies.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 12. Business R&D and innovation support by government level, Canada, 2021-22

Share in estimated total (central and subnational) government support for business innovation



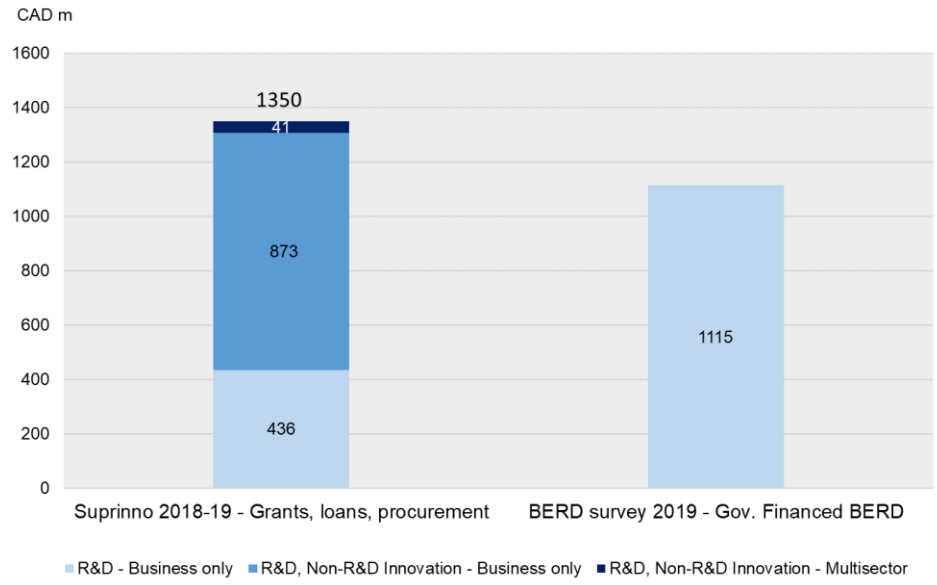
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Consistency checks with performer-based R&D statistics

71. Figure 13 shows that the SUPRINNO estimate of Federal direct support for business R&D (CAD 1350 million) is larger than the BERD survey-based estimate of government financed BERD (CAD 1115 million). However, since a significant share of the business innovation support programmes covered in the mapping pilot target both R&D and non-R&D innovation and these cannot be separately identified, the pilots may not be fully accounting for all government support for business R&D.

Figure 13. Direct funding of business R&D: SUPRINNO vs. official R&D statistics, Canada, 2018-19

Value of government support in CAD million



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

72. As for other countries, the coverage of procurement-based business innovation support policies in innovation administrative data is partial in the case of Canada. For instance, the R&D component (pillar) of the 'Industrial and Technological Benefits (ITB) Policy' (an economic benefits policy applied to eligible Canadian defence and Coast Guard procurements) is not accounted for, due to the very long-term scope of the Policy, preventing the derivation of an annualized estimate of government R&D procurement. This support may in turn be reported by firms when they respond to the BERD questionnaire.

3.2.3. Modalities of business innovation support

Type of instrument

73. Close to a third of programmes are entirely based on grants (Table 4), while several others combine grants with the provision of infrastructure, goods and services. Provincial R&D tax relief provisions are depicted as one single programme (Figure 11).

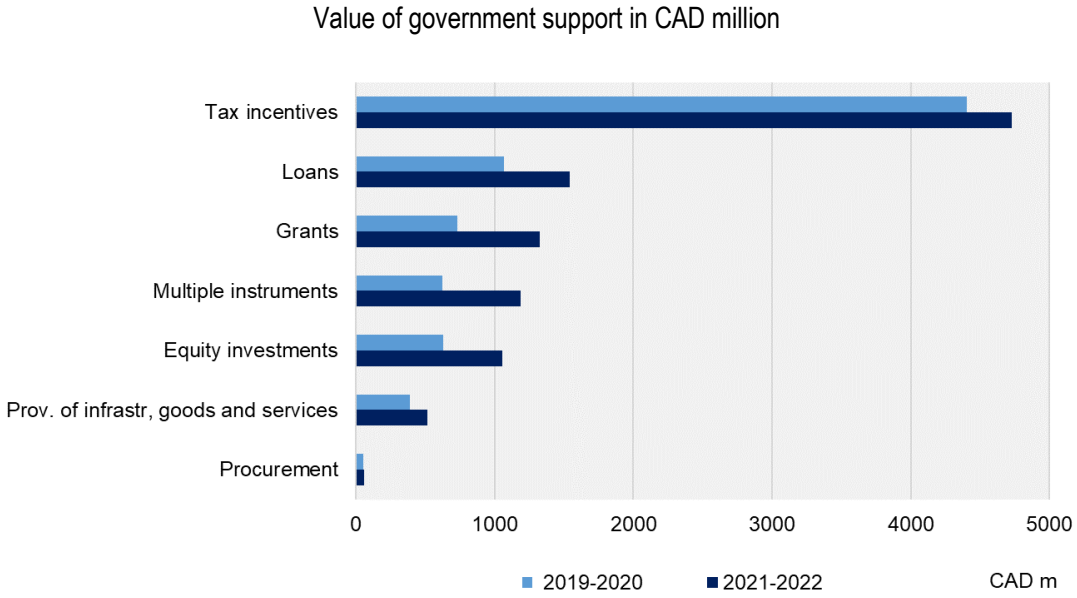
Table 4. Business innovation support programmes by type of instrument, Canada, 2021-22

Instrument type	Number of programmes*instruments	Percentage
Grants	20	30
Grants + Prov. of infrastructure, goods and services	10	15
Loans	9	13
Equity investments	6	9
Prov. of infrastructure, goods and services	6	9
Grants + Loans	6	9
Tax incentives	3	4
Equity investments + Prov. of infrastructure, goods and services	2	3
Public procurement	2	3
Grants + Loans + Prov. of infrastructure, goods and services	1	1
Grants + Procurement	1	1
Grants + Procurement + Prov. of infrastructure, goods and services	1	1
Total number of instruments	**67**	**100**

Note: As one programme can employ multiple types of instruments, the total count of instruments can be higher than the total of count of programmes.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

74. Support for business innovation in Canada appears to be highly concentrated on tax incentives, with the federal SR&ED tax credit and provincial R&D tax incentives respectively accounting for 34% and 12% of the estimated total value of business innovation support in 2021-22. Instruments such as loans, grants and equity investments account for 15%, 13 and 10% of the total (Figure 14) However, the share of R&D tax incentives in the estimated total value of business innovation support declined from 56% in 2019-20 to 45% in 2021-22, while the relative role of other policy instruments - grants (9% in 2019-20 vs 13% in 2021-22), equity investments (8% in 2019-20 vs 10% in 2021-22) and combined use of multiple instruments (8% in 2019-20 vs 11% in 2021-22) – increased in the policy mix in Canada over recent years.

Figure 14. Business innovation support by type of instrument, Canada, 2019-20 vs 2021-22

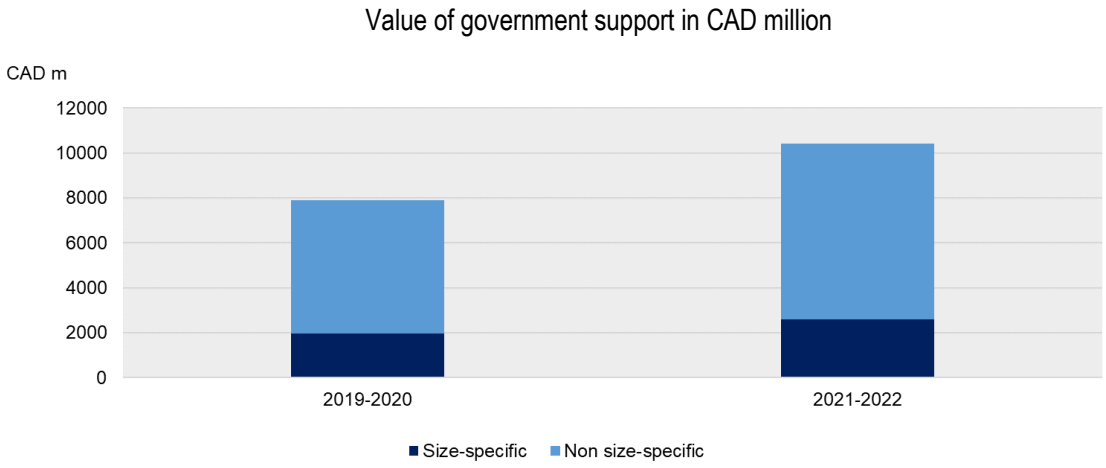


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Business size specificity of support

75. The share of innovation support restricted to SMEs (Figure 15) remained constant at 25% between 2019-20 and 29% in 2021-22. Several federal business innovation support policies benefit exclusively SMEs such as the Industrial Research Assistance Program, the Sustainable Development Technology Canada grant programme and Innovative Solutions Canada. Likewise, most of the provincial policies covered in the mapping exercise target SMEs, such as Alberta Innovates, Innovate BC and Ontario Centre of Innovation programmes. Equity programmes from Investissements Quebec, Venture Ontario, Alberta Enterprises and the Small business venture capital credit are also classified as size specific as they target in practice young SMEs.

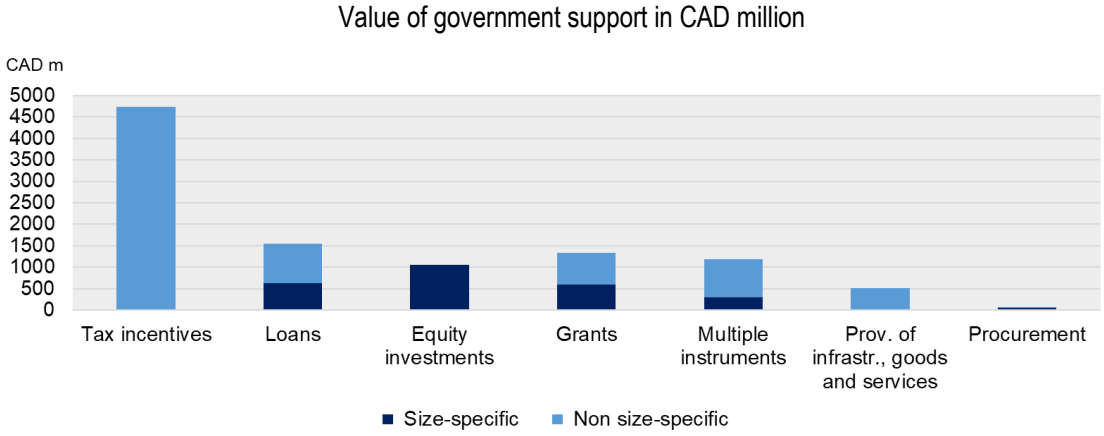
Figure 15. Business size-targeted innovation support, Canada, 2019-20 and 2021-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

76. As Figure 16 shows, the size-specificity of support varies across different instruments. Equity investments, grants and loans appear to be the most SME oriented instruments in Canada in 2021-22. Tax incentives and the provision of infrastructure, goods and services support businesses of all sizes, although they also offered more generous conditions to SMEs in the majority of cases.

Figure 16. Business size-targeted innovation support, by instrument type, Canada, 2021-22



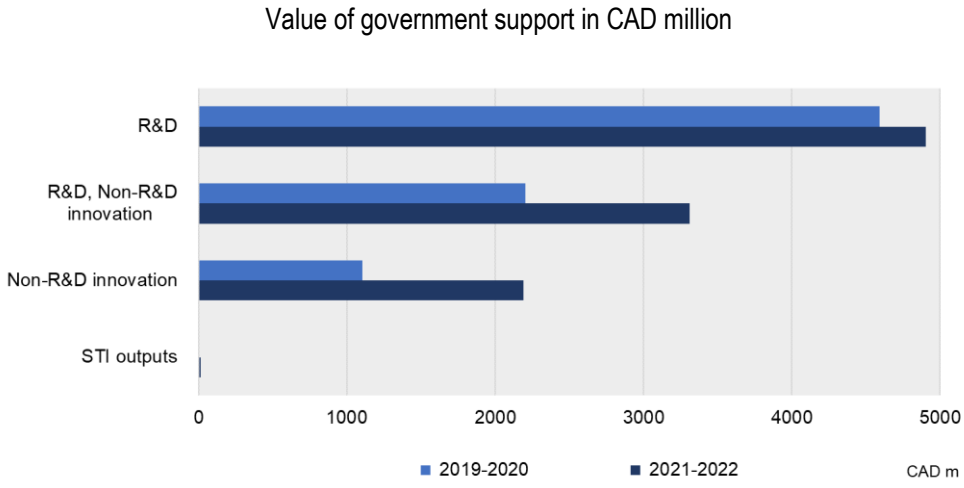
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.2.4. Directionality of business innovation support

Innovation activity

77. Business innovation support in Canada is largely focussed on R&D activities (Figure 17), accounting for nearly 50% of the estimated total support for business innovation in 2021-22. Furthermore, about a third (fifth) of total support was classified as supporting both R&D and non-R&D innovation activities (non-R&D related innovation activities). Support for STI outputs (0.1%, attributable to the Quebec Incentive for the commercialization of innovations) plays a minor role.

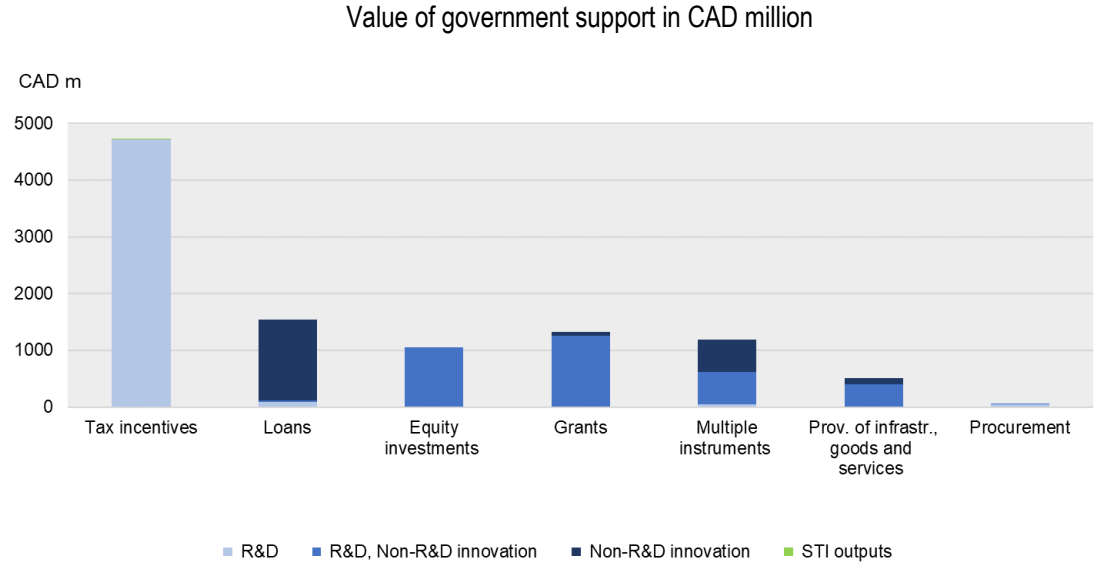
Figure 17. Support by type of innovation activity supported, Canada, 2019-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

78. When looking at business innovation support by type of instrument and STI activity supported (Figure 18), tax incentives appear to support exclusively R&D investments, whereas loans seem to support primarily more downstream, non-R&D related innovation activities. By contrast, other types of policy instruments in Canada appear to support a combination of R&D and non-R&D related innovation activities.

Figure 18.Support by type of instrument and innovation activity, Canada, 2020-21

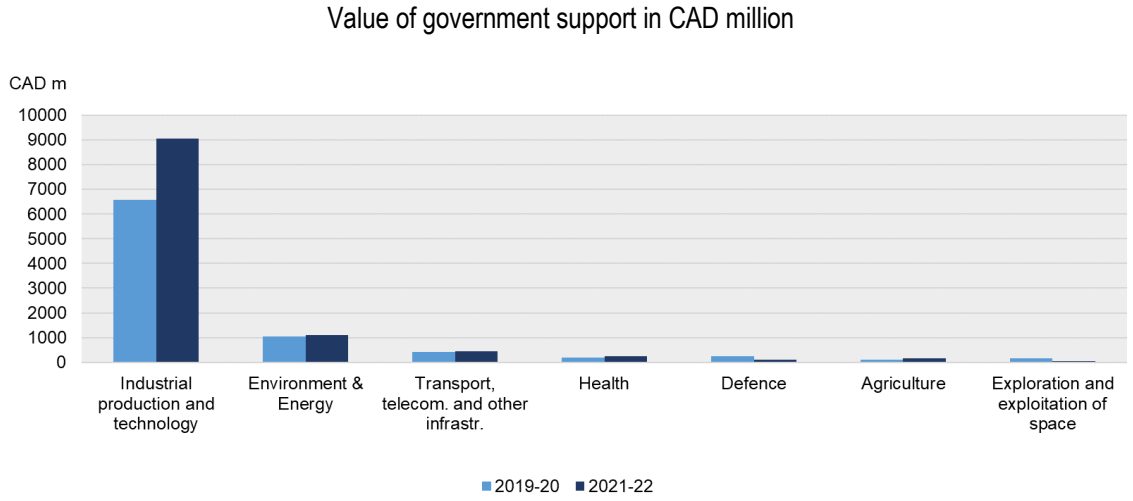


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Policy objectives

79. The main socio-economic objective (SEO) in the Canadian innovation support landscape appears to be "Industrial production and technology" (Figure 19), reflecting the pre-eminent role of horizontal policies, such as the SR&ED and provincial tax incentives. Business innovation support policies with an Environment or Energy related SEO rank second in terms of level of business innovation support, namely Sustainable Development Technology Canada grants, the Clean Growth Program, Energy Innovation Program, Smart Grid program, Agricultural Clean Technology Program and Clean Technology Challenges and at the provincial level BC Innovative Clean Energy Fund.

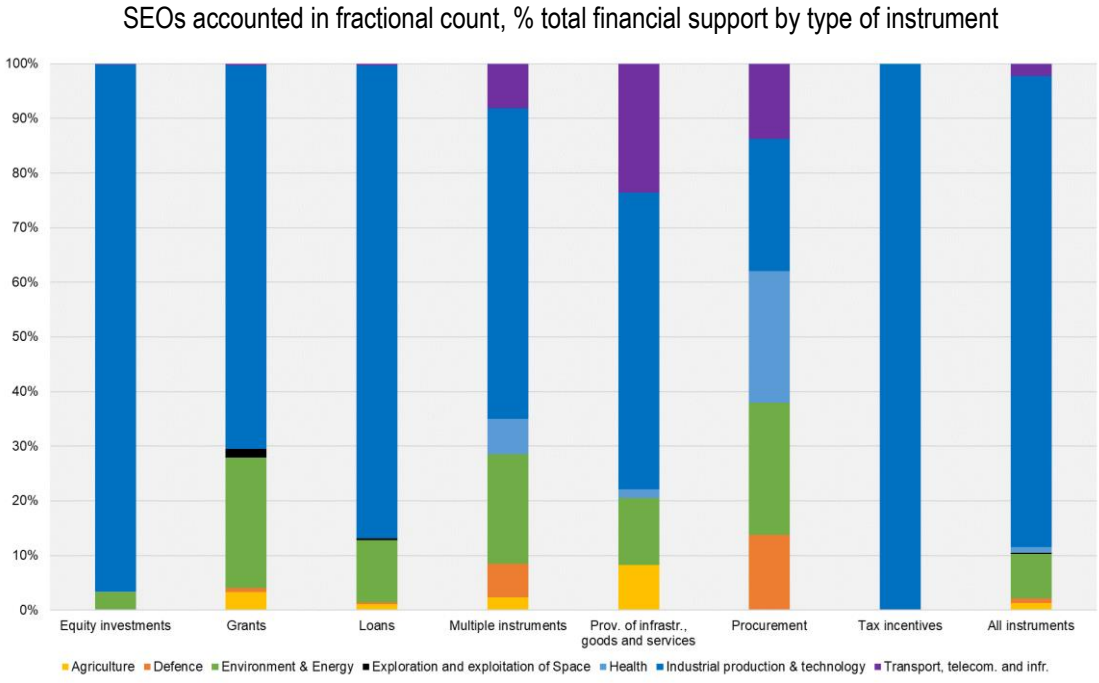
Figure 19. Business innovation support by socio-economic objective, Canada, 2019-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

80. A breakdown of business innovation support by type of instrument and SEO confirms that 'Industrial production & technology' is the predominant objective across all types of instruments, with the sole exception of procurement (Figure 20), for which several different SEOs appear to be pursued by the Canadian government. Moreover, the objectives 'Environment & Energy' (bundled into one combined category) also appear to play an important role in the case of grant funding and business innovation support leveraging multiple instruments.

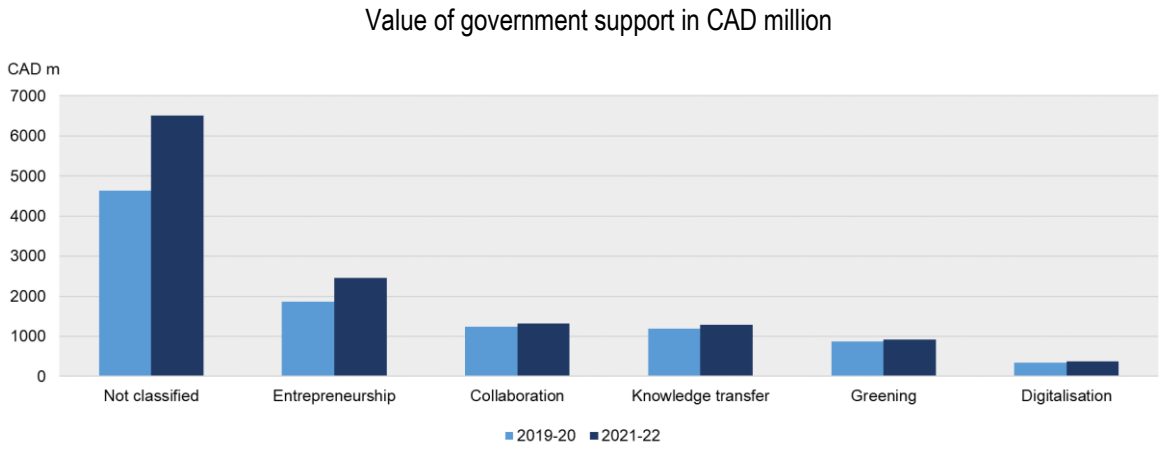
Figure 20. Support by type of instrument and socio-economic objective, Canada, 2021-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

81. A significant share of business innovation support in Canada is targeted to innovation activities pertaining to entrepreneurship, collaboration and knowledge transfer behaviours (Figure 21). Entrepreneurship support encompasses equity investment programmes (e.g. Development Bank Canada equity funds), support through Sustainable Development Technology Canada, REGI-Business Scale-up and Productivity. The main programmes with a collaboration requirement are the Global Innovation Clusters, the Strategic Innovation Fund Collaborations and Networks (streams 4 and 5), REGI-Regional Innovation Ecosystems as well as several provincial programmes.

Figure 21. Business innovation support targeted to specific behaviours, Canada, 2019-22



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.3. France

3.3.1. Data sources

82. As confirmed in the bilateral discussions with official contact points, there is currently no open database explicitly encompassing information on the features and funding for innovation support programmes in France. The pilot thus relied on various data institutional data sources to compile the relevant information on business innovation support programmes – budgetary documents, institutional websites and funding agency reports (e.g. BPI France annual reports) – in addition to BERD survey data.

83. Based on the institutional data sources, the pilot drew upon information on innovation support programmes from the "Investments for the future" programme (PIA), and budgetary data corresponding to the Ministries in charge of Economics, Research, Environment and Defence (e.g. budgetary programmes P144, P172, P190, P192, P421-P425). The qualitative information contained in institutional data sources (budgetary documents, websites from the ministries of the French government, funding agency reports) facilitated the classification and tagging of programmes according to the taxonomies established by the common measurement framework. Project/award level data were additionally used to estimate the amount of business innovation support provided by the French Research Agency (ANR). Identifying cases where businesses were lead project beneficiaries. Some corrections were made when recipients appeared to be incorrectly classified as businesses.

84. As the French BERD survey collects relatively detailed information on the source of direct government funding of business R&D, this was used as a complementary source

of information on government funding streams that were challenging to measure solely based on the administrative data at hand, such as business innovation support at subnational level and R&D procurement contracts from the Ministry of Defence (e.g. Development projects in weapon programmes), the French Alternative Energies and Atomic Energy Commission (CEA) and the French space agency (CNES).

3.3.2. Innovation support programmes

85. The mapping exercise for France (Figure 22) identified 49 business innovation support programmes. A positive amount of business support was recorded for 47 programmes in 2021 With an amount[13] of support equal to 6.4 billion EUR in 2021, the R&D tax credit (Crédit d'Impôt Recherche – CIR) stands out as the main business innovation support programme. In addition to the CIR, three[14] other tax incentives are available in France – the Innovation Tax Credit (CII), the payroll withholding tax credit for young innovative firms and young university firms (JEI, JEU) and the IP Box. Other larger-scale programmes are managed by the Ministry of Defence (programme for Upstream studies and programme for Development projects) and the French Public Investment Bank (BPI) which offers:

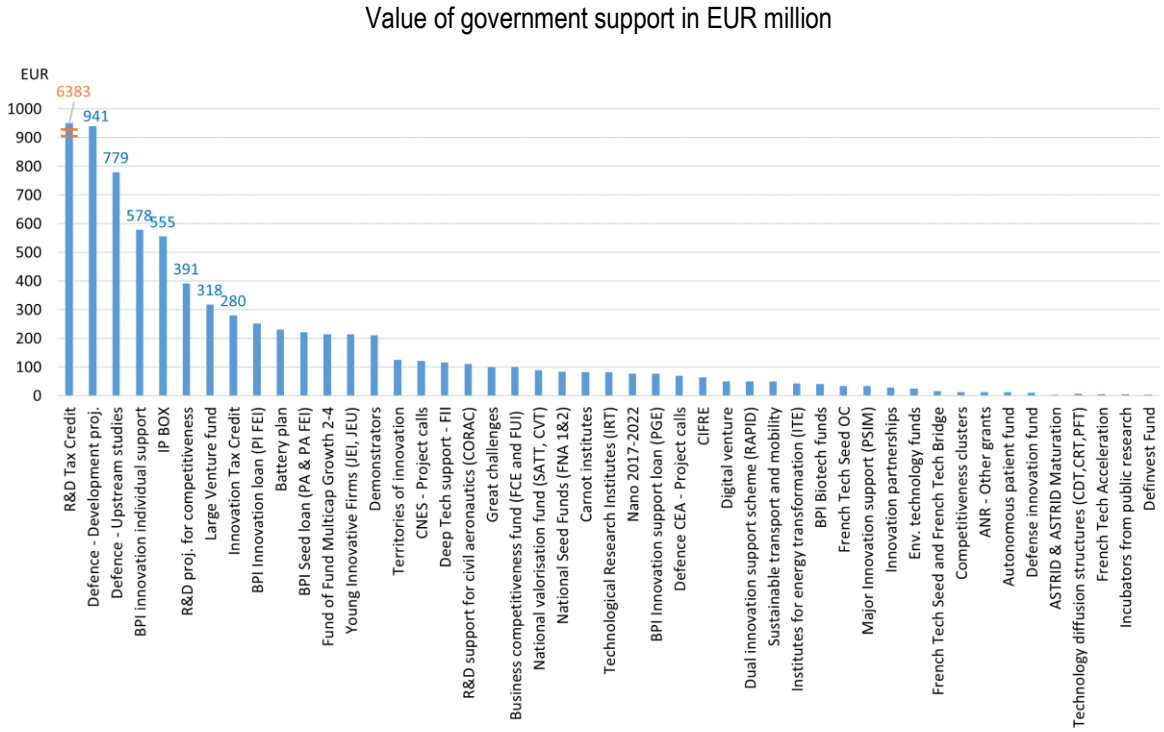
- individual innovation support (grants and loans for innovative SMEs);
- support for R&D projects for competitiveness (PSPC[15]), providing support for collaborative R&D projects;
- the Large Venture Fund, support for technology companies with high potential at the later stages of equity.

[13] Cash-based estimate of government R&D tax relief reported for the Crédit d'Impôt Recherche for 2021 by France in the 2022 OECD R&D tax incentives survey.

[14] The mapping does not account for the tax credit for collaborative research (Crédit d'impôt collaborations de recherche - CICo) introduced by France in 2022. Relevant data are not yet available.

[15] The PSPC programme has been replaced by i-Démo as part of the France 2023 investment plan.

Figure 22. Business R&D and innovation support policies, France, 2021

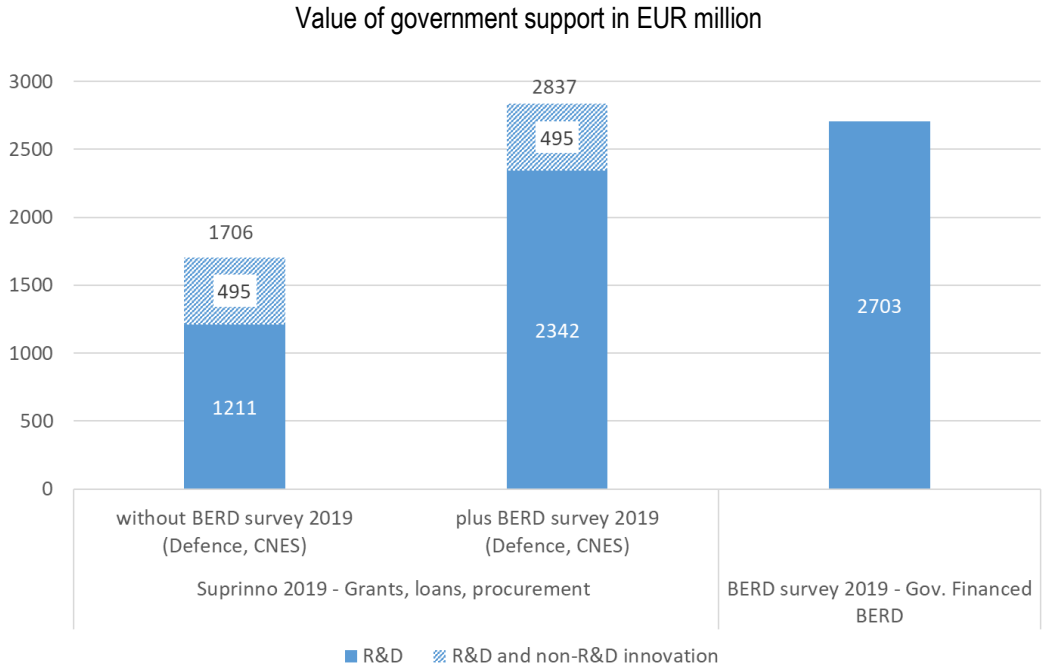


Note: Government authorities at central or subnational government level may carry out innovation partnerships, an innovation-oriented procurement procedure available in the EU area.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Consistency checks with performer-based R&D statistics

86. The SUPRINNO estimate of government direct funding of business R&D based on administrative data sources (EUR 1706 million) falls short off the BERD survey-based estimate of government financed BERD (EUR 2703 million) by a large margin (Figure 23). Enhancing the core SUPRINNO data with BERD survey data on R&D funding received from the French Ministry of Defence (primarily procurement-based support), the French Alternative Energies and Atomic Energy Commission (CEA) and French Space Agency (CNES) the gap narrows significantly. The improved coverage of R&D funding sources in the cases of France highlights the benefit of combining administrative and survey data in a coherent fashion.

Figure 23. Direct funding of business R&D: SUPRINNO vs. official R&D statistics, France, 2019



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.3.3. Modalities of business innovation support

Type of instrument

87. Equity investments, grants and loans are the most often listed innovation support instrument in France (Table 5). However, tax instruments account for the majority (well over 50%) of government support for business innovation, mostly from the R&D Tax Credit (CIR) (Figure 24). Procurement programmes also play an important role, accounting for 14% of business innovation support, while loans, equity investments and grants account for a smaller share (10%, 8% and 6% respectively).

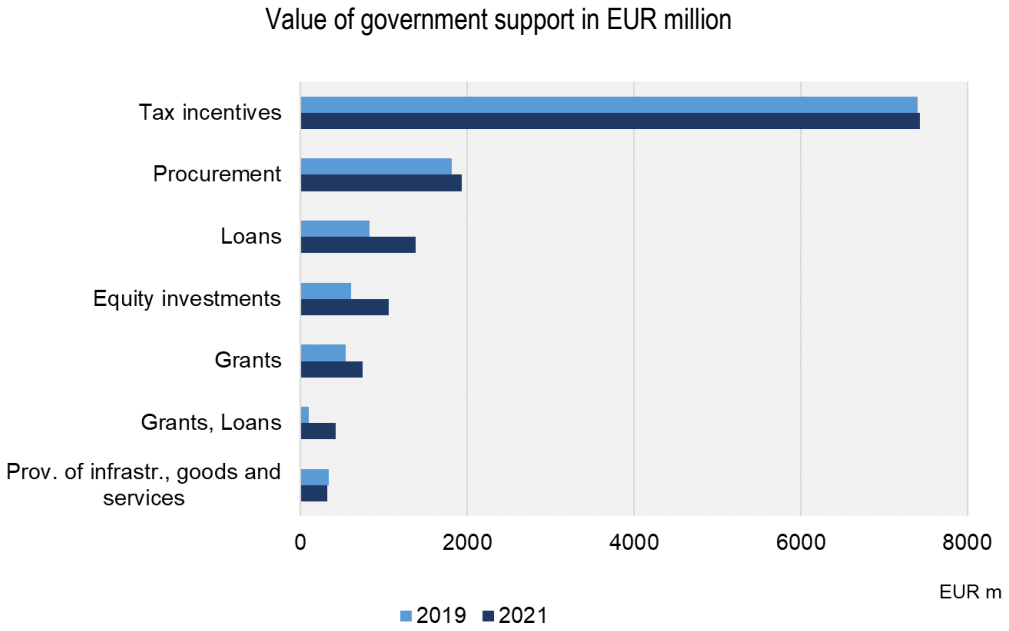
Table 5. Business innovation support programmes by type of instrument, France, 2021

Instrument type	Number of programmes	Percentage
Equity investments	15	27
Grants	12	21
Loans	9	16
Prov. Of infrastructure, goods and services	7	13
Procurement	5	9
Tax incentives	4	7
Grants + Loans	3	5
Grants + Equity investments	1	2
Total number of instruments	**56**	**100**

Note: As one programme can employ multiple types of instruments, the total count of instruments can be higher than the total of count of programmes.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

88. While tax incentives appear to have maintained their pre-eminent role as support instrument, the share of grants, loans and equity investments in the business innovation support policy mix has increased between 2019 and 2021. This increase has been driven by BPI innovation support financing programmes.

Figure 24. Business innovation support by type of instrument, France, 2019-21



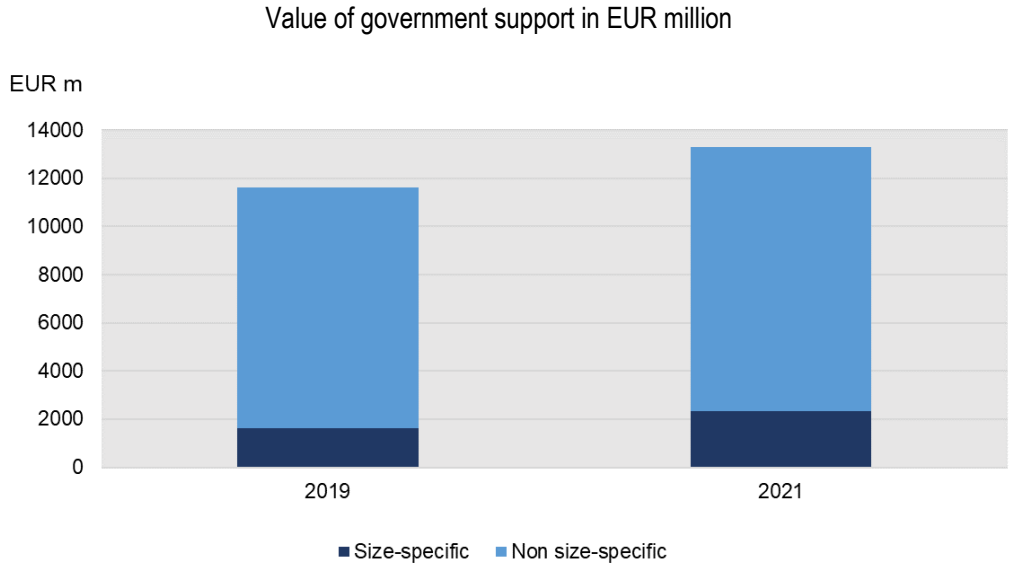
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Business size specificity of innovation support

89. France has a comparatively large share of innovation support programmes targeted towards SMEs, and SME targeted support increased from 14% to 17% between 2019 and 2021 (Figure 25). As Figure 26 shows, the size-specificity of support varies across different instruments. SME targeting is most pronounced among loans and equity investments, under programmes managed by BPI. While the R&D tax credit is available to all firms[16], two tax instruments are solely targeted to SMEs and young innovative enterprises: the Innovation Tax Credit and the provision for young innovative and university spin-offs.

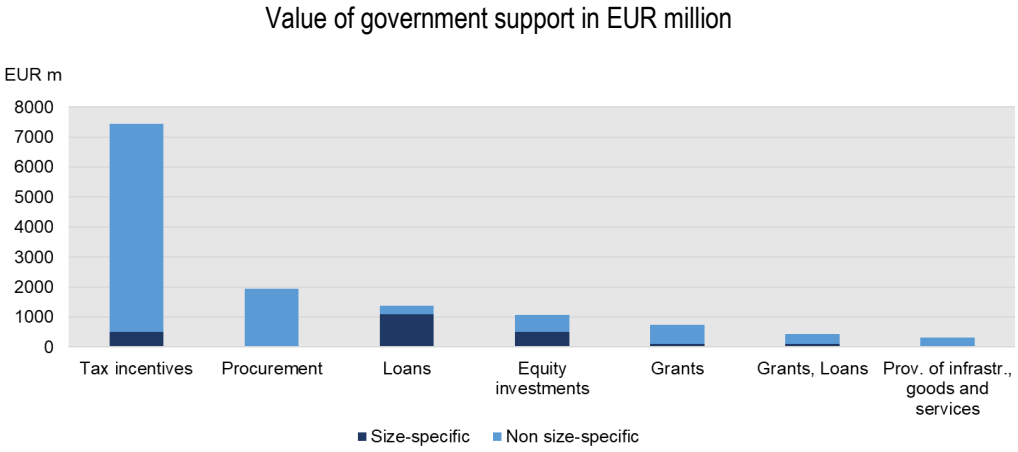
[16] The R&D tax credit in France offers more generous to SMEs but spending attributable to such more generous terms are not captured in Figure 25 and Figure 26 in line with the employed definition of size-specificity (see Section 2.3.4).

Figure 25. Business size-targeted innovation support, France, 2019-21



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 26. Business size-targeted innovation support, by instrument type, France, 2021



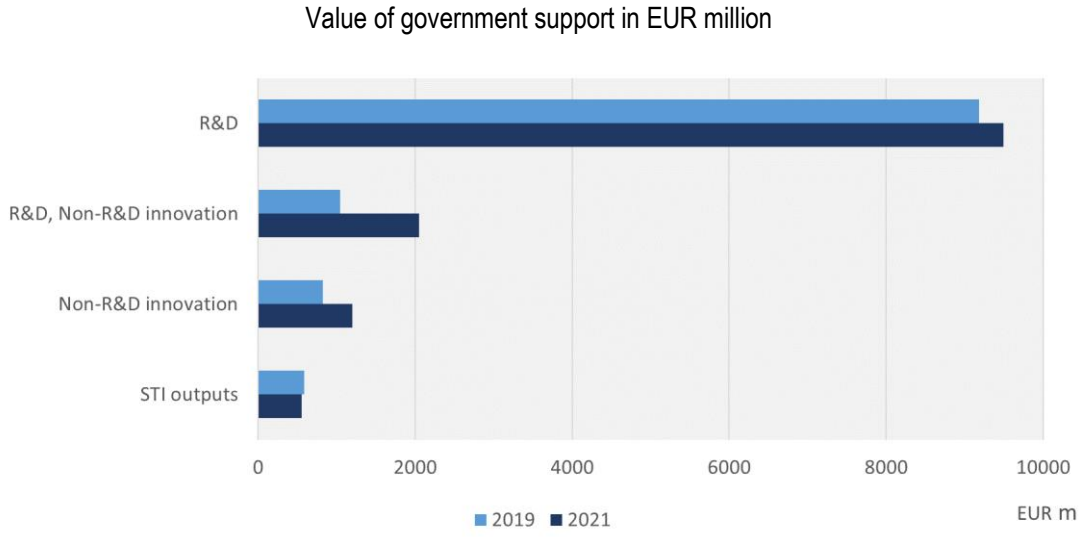
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.3.4. Directionality of business innovation support

Innovation activity

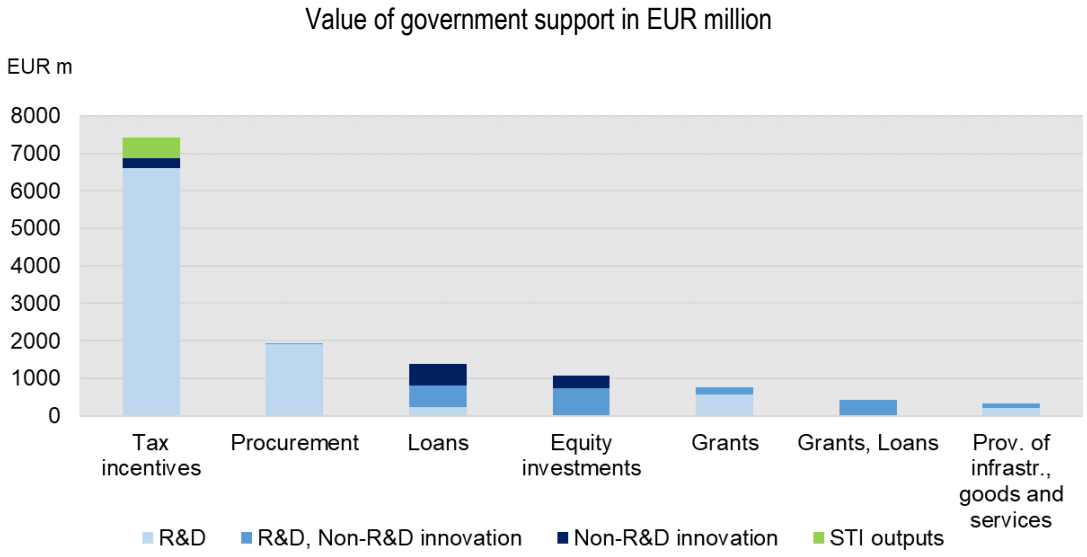
90. Business innovation support in France is largely focussed on R&D activities. These account for 71% of the estimated total support for business innovation in France in 2021, but it is down from 79% in 2019 (Figure 27). There has been a slight shift towards non-R&D and hybrid programmes combining support for R&D and other innovation activities. This appears to be driven by the rise of programmes such as the Innovation Tax Credit, the Large Venture Fund and diverse BPI programmes supporting later stages of the innovation process. Analysis of business innovation support by type of instrument and STI activity supported (Figure 28) also shows the use of tax incentives to provide support towards outputs of innovation activity through the IP Box.

Figure 27. Business innovation support by type of innovation activity supported, France, 2019-21



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 28. Business innovation support by type of instrument and innovation activity, France, 2021



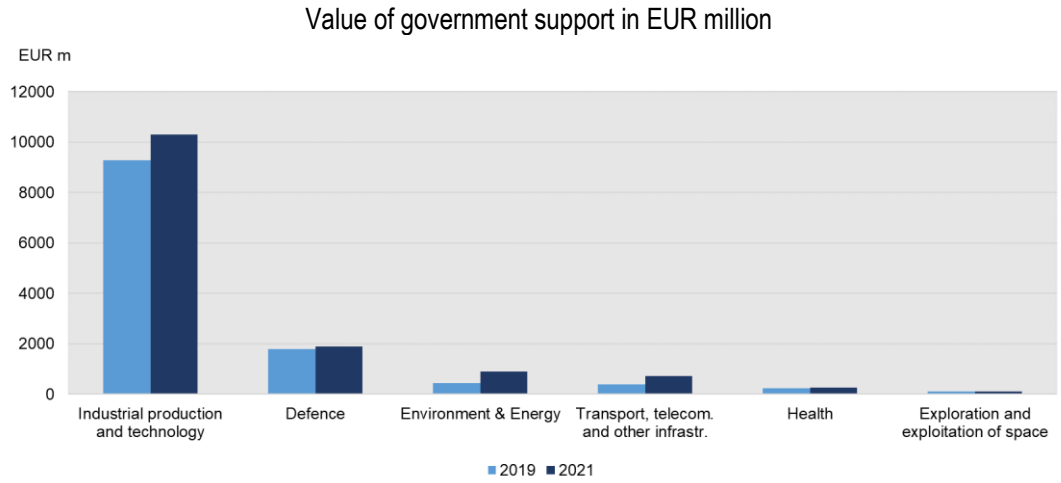
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

91. Procurement-based support measures covered in the mapping pilot of France are by design focused on R&D activities, since BERD survey data have been used to address a significant data gap. Data on procurement for innovative solutions from business beyond R&D is still not available. While grants also appear to support mostly R&D (e.g. R&D projects for competitiveness – PSPC and R&D support for civil aeronautics - CORAC), loan and equity instruments seem to focus more on innovation activities downstream from R&D.

Policy objectives

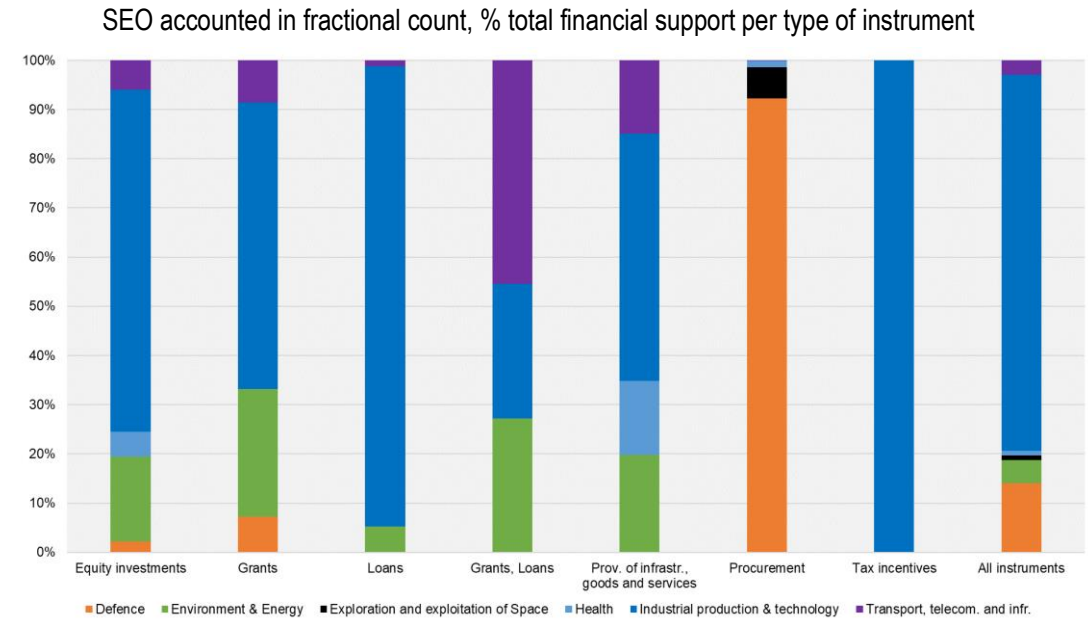
92. The main socio-economic objective in the France's innovation support landscape is "Industrial production and technology" (Figure 29), reflecting the pre-eminent role of horizontal tax credits and most of BPI support. "Defence" comes in second place as policy objective of innovation support, as captured by R&D procurement by the French Ministry of Defence (Figure 30). Business innovation support under the "Environment & "Energy" objectives increased between 2019 and 2021, reflecting growing policy support for the energy transition (e.g. Battery plan, R&D support for civil aeronautics - CORAC - oriented toward sustainability, Sustainable transport and mobility, Demonstrators in the field of energy transition, Institutes for energy transformation).

Figure 29. Business innovation support by socio-economic objective, France, 2019-21



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

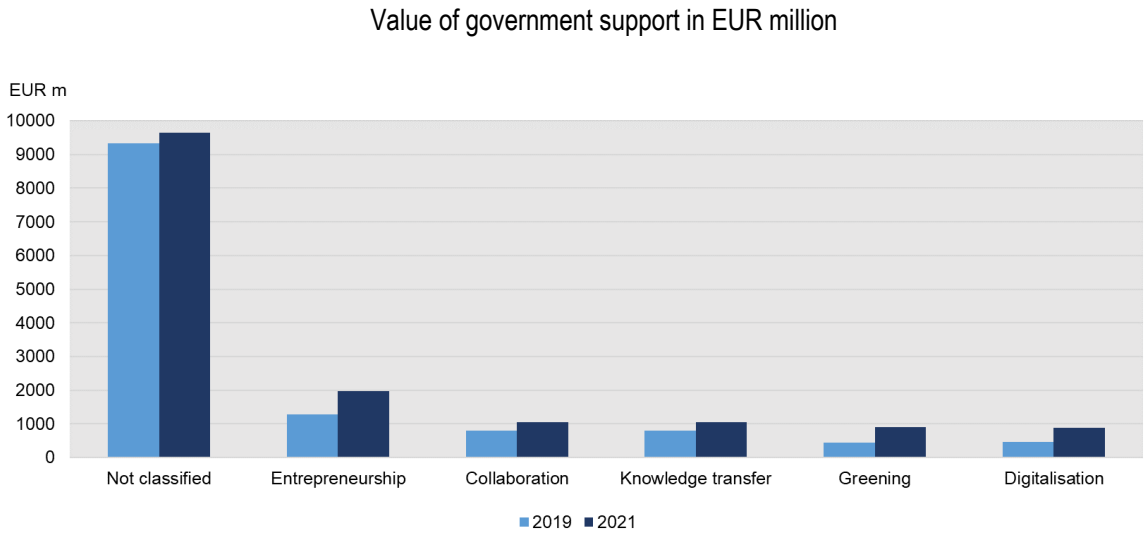
Figure 30. Support by type of instrument and socio-economic objective, France, 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

93. A significant share of business innovation support in France targets "Entrepreneurship" activity (Figure 31), followed by "Collaboration", "Knowledge Transfer", "Greening", and "Digitalisation". The importance of "Entrepreneurship" can be explained by BPI support for the creation or the growth of small and new innovative companies and tax incentives policies such Payroll withholding tax credit for young innovative firms (JEI) and young university firms (JEU).

Figure 31. Business innovation support targeting specific behaviours, France, 2019-21



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.4. Netherlands

3.4.1. Data sources

94. The mapping pilot for the Netherlands primarily relied as key reference source on the open "Total investment in science and innovation" (TWIN) database produced by the Rathenau Institute[17]. This database, which results from an explicit focused effort to map government financial support for science and innovation beyond GBARD, covers national government programmes supporting R&D and related science and innovation activities. Additional sources such as budgetary documents from the Ministry of Finance and the Dutch Investment Agency (Invest-NL) annual reports were used to complement the quantitative information available in the TWIN database.

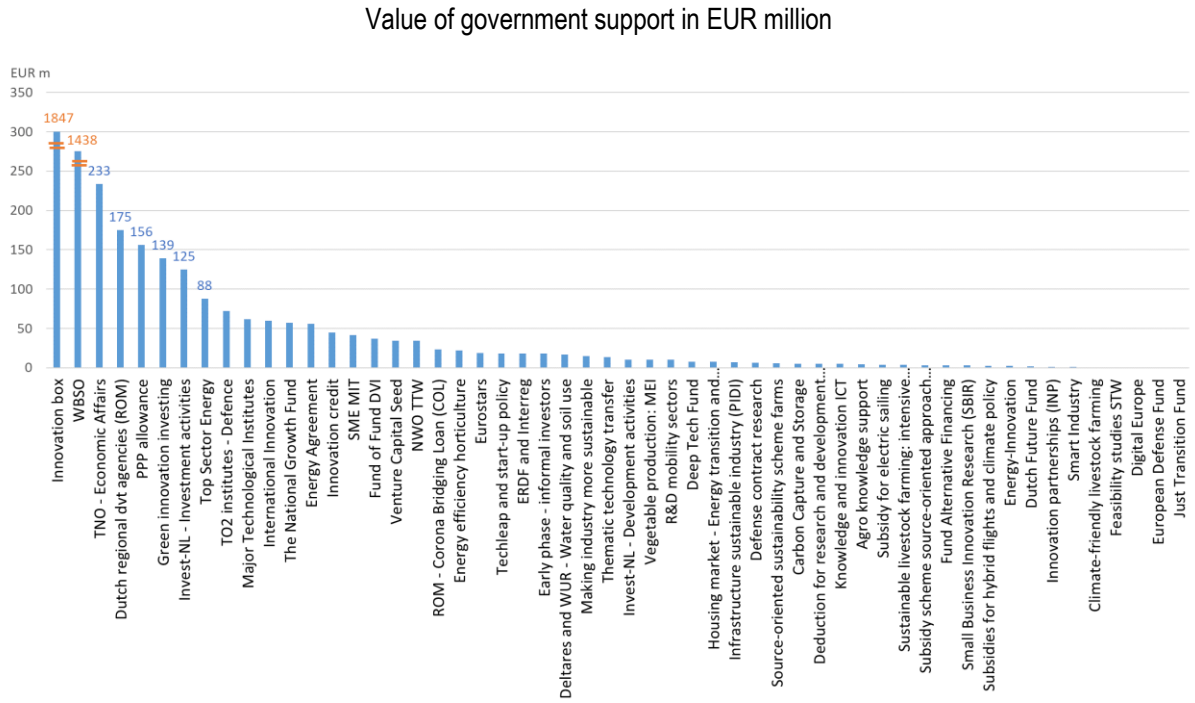
95. TWIN contains qualitative information on several policy dimensions such as the type of STI activity supported, the sector of the beneficiary, the socio-economic objective (for R&D programmes only) and the organisational nature of the activity supported (institutional or project based - for R&D programmes only). This information was used for the classification and tagging of programmes in combination with information on the type of policy instrument and the size-specificity of programmes from institutional data sources from the Dutch government ministries (Finance, Economic Affairs and Climate Policy and Agriculture, Nature and Food Quality to name a few).

[17] See https://www.rathenau.nl/nl/werking-van-het-wetenschapssysteem/totale-investeringen-wetenschap-en-innovatie-twin-2021-2027

3.4.2. Innovation support programmes

96. The mapping pilot identifies 54 business innovation programmes over the period 2018-2022, of which 52 are registered with positive amount of supports in 2021 (Figure 32). With a budget of around EUR 1.8 and 1.4 billion in 2021, the two Dutch tax incentives – the Innovation Box and payroll withholding tax credit (WBSO) – are the main programmes of business innovation support. A comparatively smaller but non-negligible amount of business innovation support is provided through the Netherlands Organisation for Applied Scientific Research (TNO), the Regional development agencies (ROM), the Private-Public Partnerships (PPP) allowance, the Green innovation investing (MIA/VAMIL), Invest-NL (investment activities) and Top Sector Energy.[18]

Figure 32. Business R&D and innovation support policies, the Netherlands, 2021



Note: Government authorities at central or subnational government level may carry out innovation partnerships, an innovation-oriented procurement procedure available in the EU area.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Consistency checks with performer-based R&D statistics

97. A comparison of the funder-based, SUPRINNO estimate of direct funding of business R&D[19] (through grants, loans and procurement) with the BERD survey-based indicator of government financed BERD (Figure 33) shows that the SUPRINNO estimate

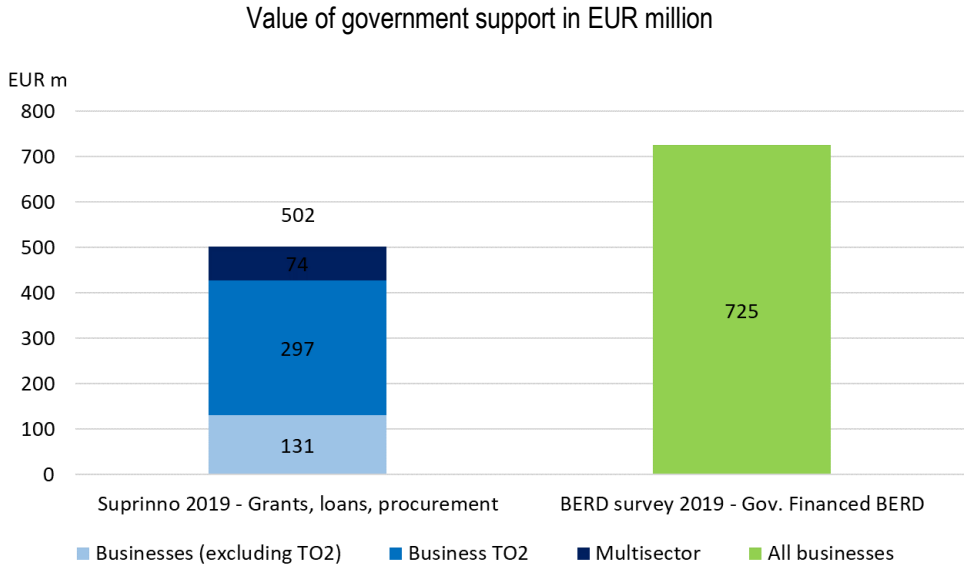
[18] The Sustainable energy production subsidy scheme (SDE++) is not included in SUPRINNO as it is not listed in the TWIN database, apparently because of challenges identifying potential innovation support components.

[19] The SUPRINNO estimates focus on government support for business R&D, abstracting from non-R&D related business innovation support measures. They exclude R&D support to non-business TO2 institutes (i.e., WUR and Deltares) which as governmental organisations are considered to be part of the government sector in the Dutch business R&D survey.

of direct government funding (EUR 502 million) is lower than its BERD survey counterpart (EUR 725 million) for 2019. As for several other countries, this gap is partly driven by the incomplete coverage of government support for business R&D at regional and local level, including procurement-based measures of support for business innovation. R&D statistics are unfortunately not available in detail to address this gap.

98. Most of the registered direct support measures also appear to benefit TO2 institutes in the business sector rather than for-profit private enterprises.[20] As discussed earlier in this document in relation to the definition of business and the scope of the pilots, programmes supporting TO2 institutes (business or non-business TO2 institutes - WUR and Deltares in the case of the Netherlands) are included in the mapping pilots and classified as "Provision of infrastructure, goods and services" in terms of policy instrument, since the main role of these institutes is to provide innovation-related services to businesses.

Figure 33. Direct funding of business R&D: SUPRINNO vs official R&D statistics, Netherlands, 2019



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.4.3. Modalities of business innovation support

Type of instrument

99. Grants are the most frequent type of innovation support instrument among the programmes identified, accounting for nearly half of all programmes (Table 6), followed by the provision of infrastructure, goods and services. In budget terms, tax support instruments account for 66% of government support for business innovation (Figure 34), with the Innovation box exceeding the level of support provided through the R&D tax incentive (WBSO) with a share of 37% and 29% respectively. Programmes supporting businesses through the provision of infrastructure, goods and services account for 12% of business innovation support, while grants, and equity investments account for a smaller share (9%, 8%) in the business innovation support policy mix. Figure 34 also shows that

[20] The mapping for the Netherlands captures three TO2 institutes in the business sector: the Netherlands Organisation for Applied Scientific Research (TNO), the Netherlands Aerospace Centre (NLR) and the Maritime Research Institute Netherlands (MARIN).

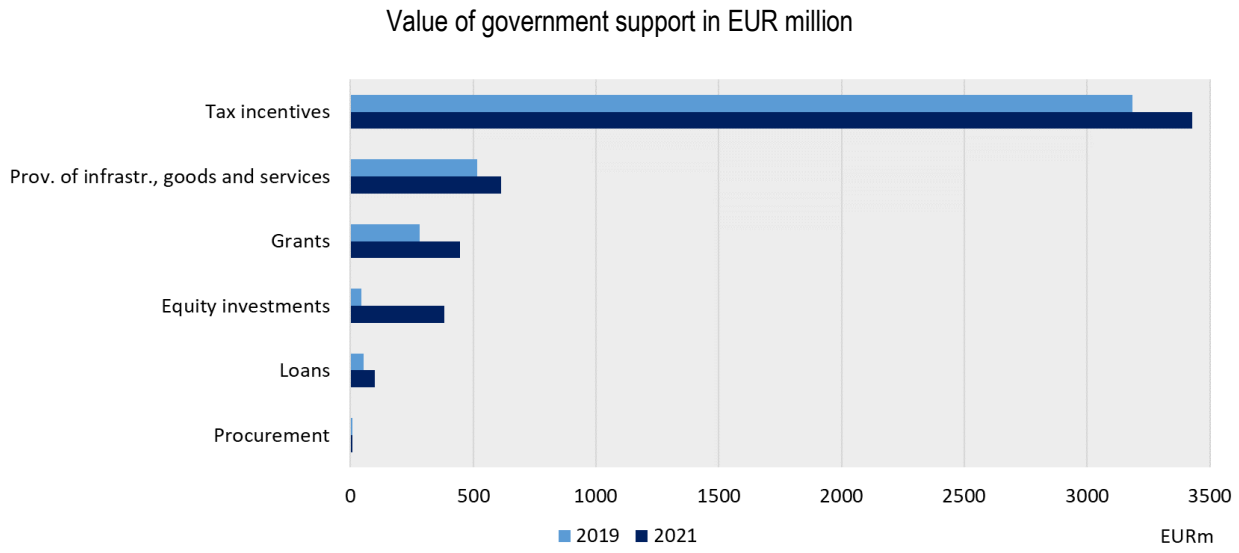
the business innovation policy mix in the Netherlands has been relatively stable in recent years, with comparable nominal increases across all instruments.[21] The volume of equity investments in 2021 increased in connection with the provision of central government support to the Dutch regional development agencies in the context of COVID-19 crisis and the launch of the new Invest-NL support programme in 2021.

Table 6. Number of business innovation support instruments by type, the Netherlands, 2021

Instrument type	Number of programmes	Percentage
Grants	27	47
Prov. of infrastructure, goods and services	11	19
Equity investments	7	12
Loans	6	11
Tax incentives	4	7
Public procurement	2	4
Total number of instruments	**57**	**100**

Note: As one programme can employ multiple types of instruments, the total count of instruments can be higher than the total of count of programmes.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 34. Business R&D&I support by type of instrument, the Netherlands, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

100. As for other countries, the lack of readily available information about subnational support programmes may bias the overall assessment in addition to understating total business innovation support. Likewise, procurement-based support for innovation is prone to be understated. In the case of the Netherlands, measured procurement support for

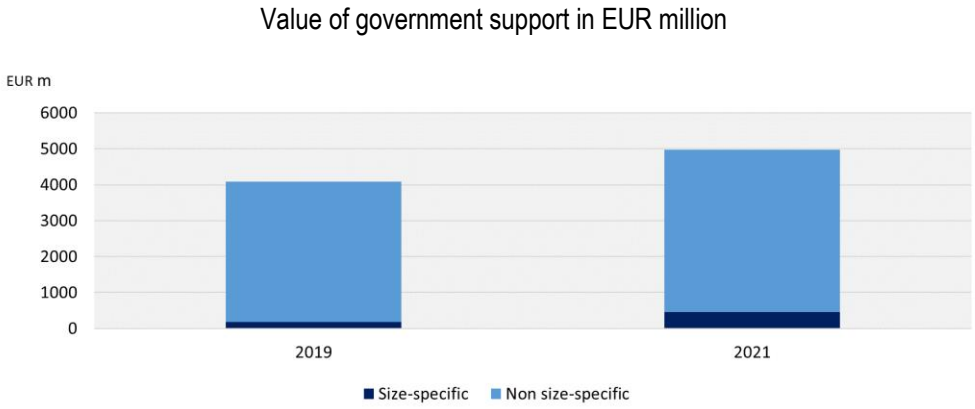
[21] R&D grant funding has been reported to be expected to increase in the next years, with around 50% of the National Growth Fund budget of approximately EUR 20 billion foreseen to be allocated to R&D&I projects over the 2021-2025 period (see https://www.nationaalgroeifonds.nl/english/the-national-growth-fund; https://www.rathenau.nl/en/werking-van-het-wetenschapssysteem/total-investment-research-and-innovation-2020-2026).

innovation only captures the Innovation partnerships recorded in the EU-TED database and defence related contract research[22].

Business size specificity of business innovation support

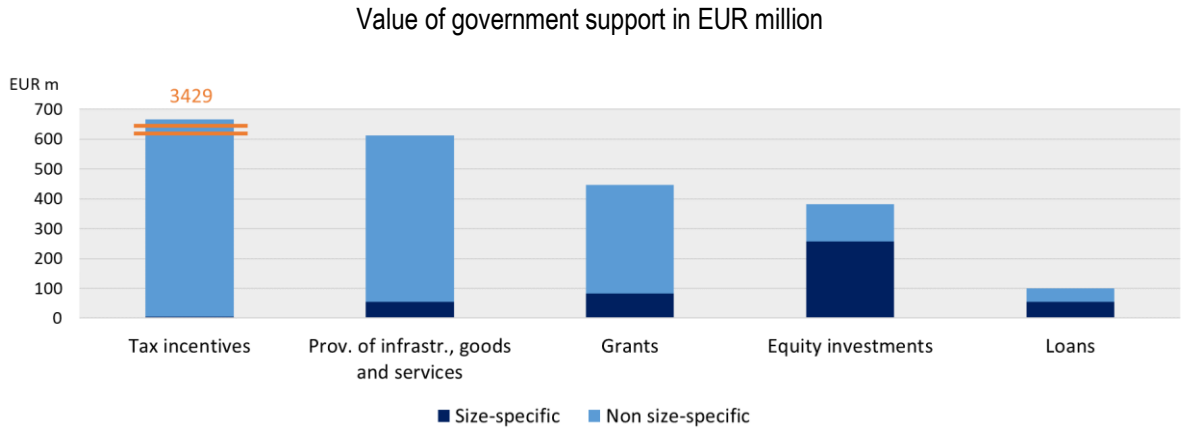
101. Most of the business innovation support in the Netherlands is available to all businesses regardless of their size (Figure 35). The mapping pilot records an increase in the relative importance of SME-targeted support from 4% in 2019 to 9% in 2021. Figure 36 provides additional details on the size-specificity of business innovation support by type of policy instrument. The most size-specific instruments appear to be equity investments (e.g. Dutch regional development agencies and Venture capital seed), and loans (e.g. Corona Bridging Loan and Early phase – informal investors). Moreover, some grant-based programmes are also size-specific, such as the SME Innovation Stimulation Top Sectors (MIT), Small Business Innovation Research and Feasibility studies STW.

Figure 35. Business size-targeted innovation support, the Netherlands, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 36. Business size-targeted innovation support, by instrument type, the Netherlands, 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

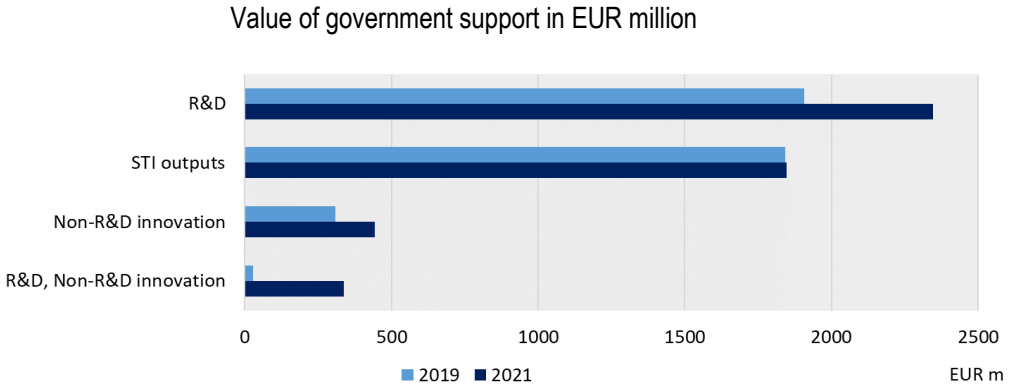
[22] The Dutch SBIR programme is classified as a grant.

3.4.4. Directionality of support

Innovation activity

102. Government support policies in Netherlands focus mainly on R&D and innovation outputs, accounting for respectively 47% and 37% of the estimated total volume of business innovation support in 2021, while support for non-R&D related innovation accounts for 9% (Figure 37). The importance of business innovation support for innovation outputs is rather unique to the Dutch innovation policy mix among the five pilot countries under consideration, driven by the Innovation box which is the largest innovation support programme covered in the mapping pilot. Figure 37 also indicates that support for R&D increased from 2019 to 2021, while support for innovation outputs remained constant.

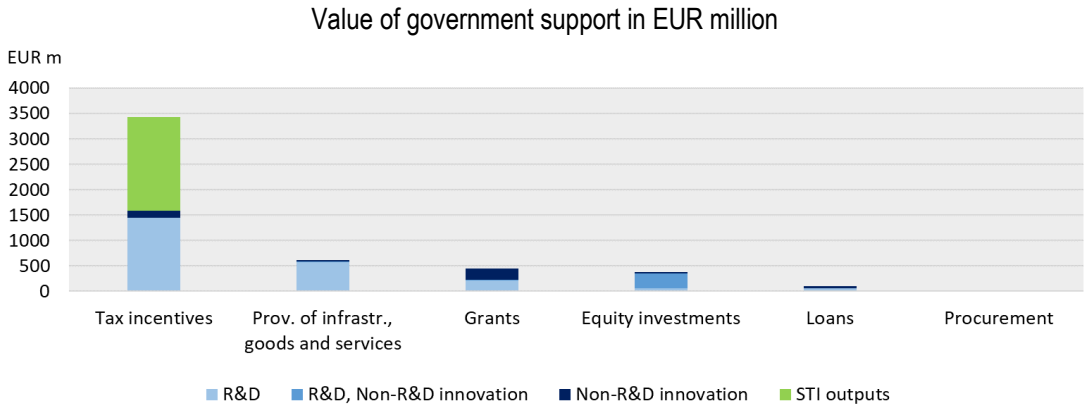
Figure 37. Business innovation support by type of innovation activity, Netherlands, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

103. When looking at business innovation support by type of instrument and STI activity supported (Figure 38), the lion's share of tax incentives is split between support for R&D and innovation outputs, with a small non-R&D innovation component related to green innovation (MIA/VAMIL). Business innovation support through the provision of infrastructure, goods and services is principally targeted towards R&D (e.g. TO2 institutes), while grants and loans appear to be slightly more geared towards downstream innovation activities in firms. Equity investments do not allow for a neat distinction.

Figure 38. Support by type of instrument and innovation activity, Netherlands, 2021

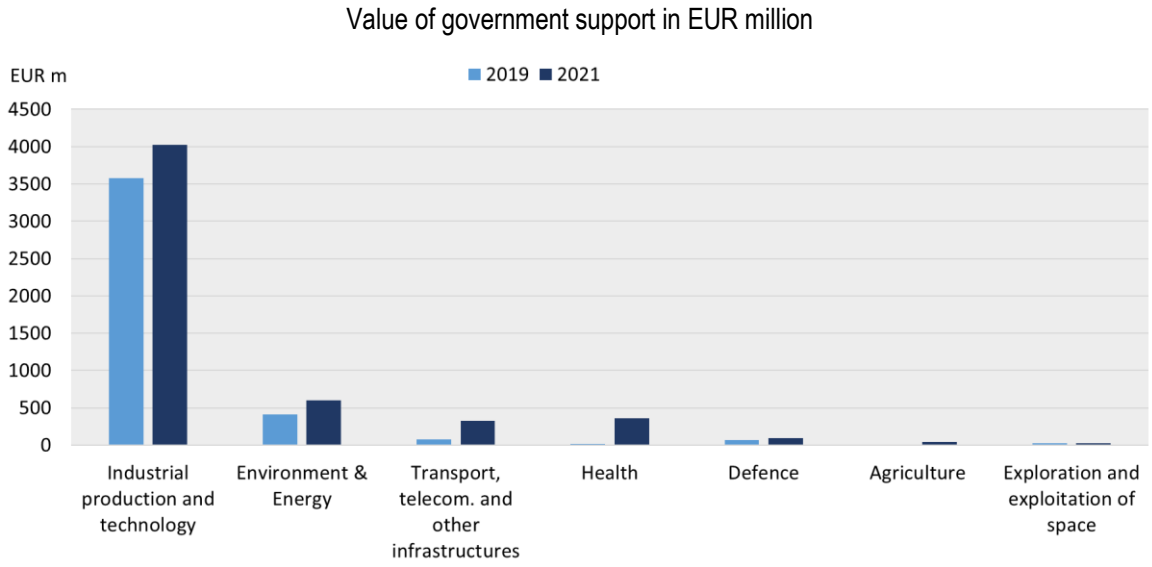


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Policy objectives

104. The main socio-economic objective in the Dutch innovation support landscape is the generic class of "Industrial production and technology" (Figure 39) which is used by convention for classifying horizontal tax incentives. Business innovation support policies with an "Environment & Energy" objective follow in terms of level of support. Among the latter, one can note the Green Innovation Investing (MIA and VAMIL) programmes that support the diffusion of green technology, Invest-NL, which aims to invest 65-70% of its capital in line with the EU Green Taxonomy[23], Top Sector Energy (comprising the Renewable Energy Transition HER+ and the Mission-driven R&D&I MOOI programmes) and the Energy Agreement (funding the Demonstration Energy and Climate Innovation DEI+ programme). The alignment between policy instruments and policy objectives is presented in Figure 40.

Figure 39. Business innovation support by socio-economic objective, Netherlands, 2019 vs 2021

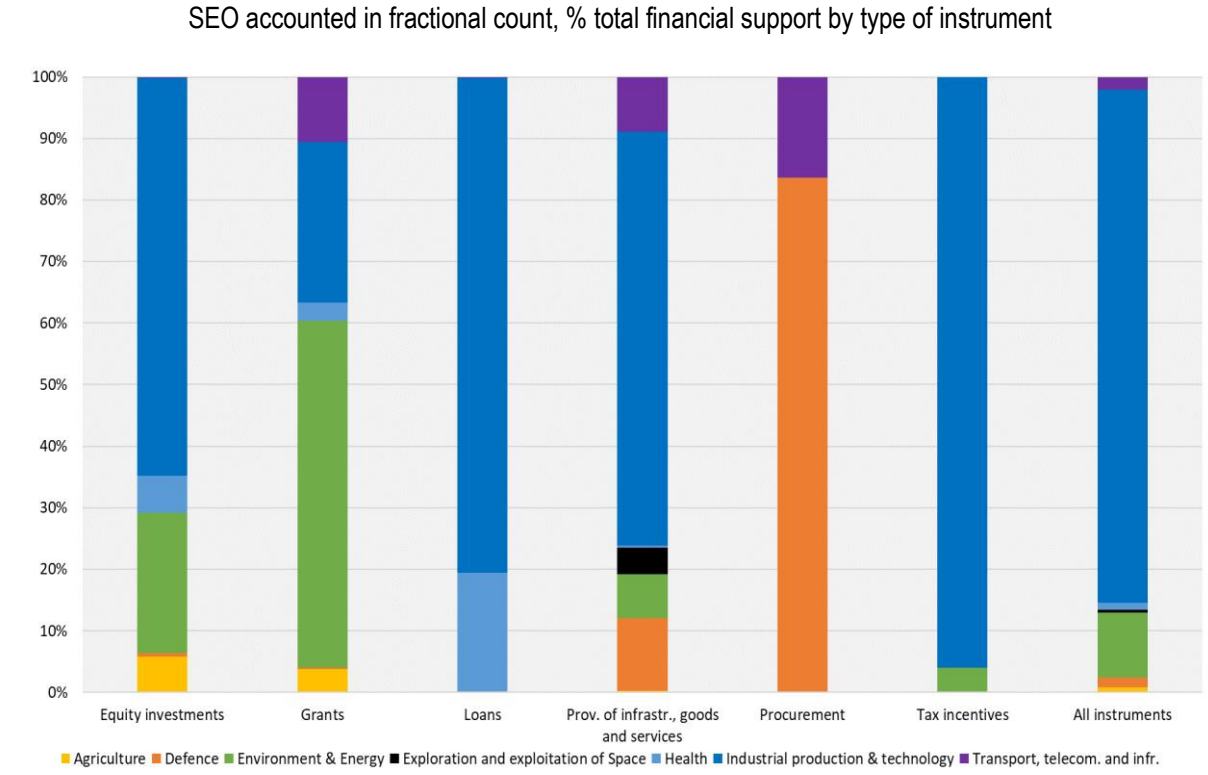


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

105. A significant share of business innovation support in the Netherlands aims to encourage greening, entrepreneurship, and collaboration (Figure 41). Moreover, the volume of business innovation support oriented towards these three objectives increased in absolute and relative terms from 2019 to 2021. The increased volume of business innovation support with an "Entrepreneurship" objective can be linked to the rise of the central budgets allocated to Invest-NL (whose activities started in 2020), the Dutch regional development agencies (accounting for the central government participation only, which seems to have increased significantly in the context of the COVID-19 crisis) and other smaller policies such as the venture capital seed funds and DVI Fund of Fund.

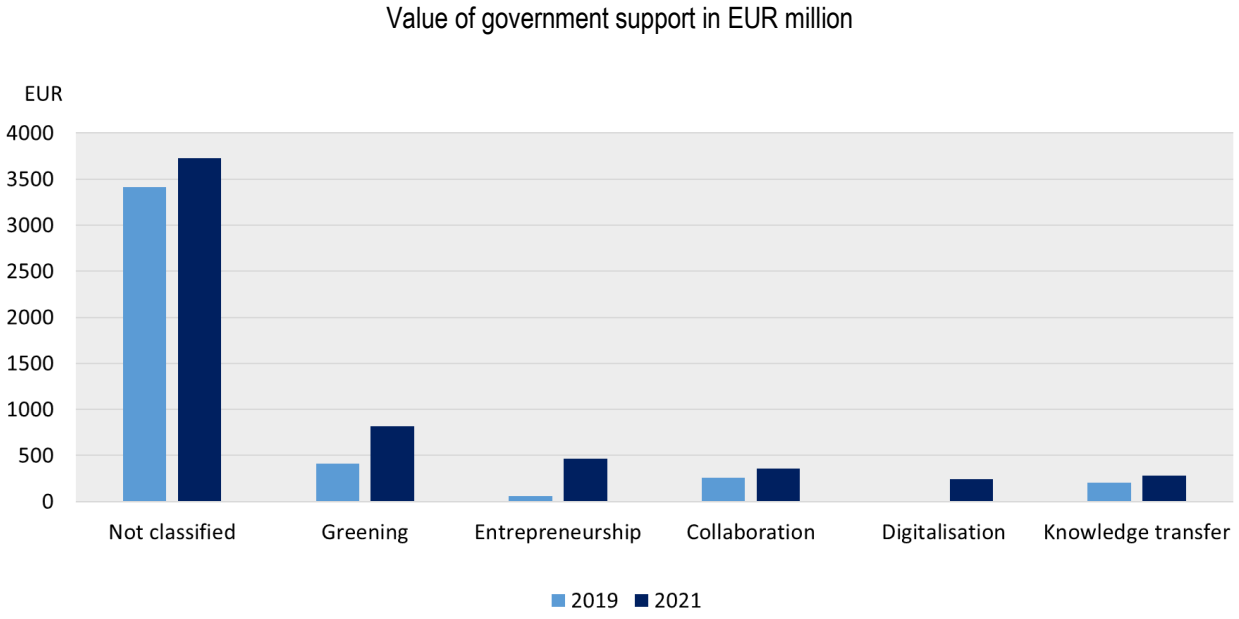
[23] Invest-NL annual report 2021 page 14, https://www.invest-nl.nl/media/attachment/id/2014

Figure 40. Support by type of instrument and socio-economic objective, Netherlands, 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 41. Business innovation support by behavioural requirement, Netherlands, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.5. Norway

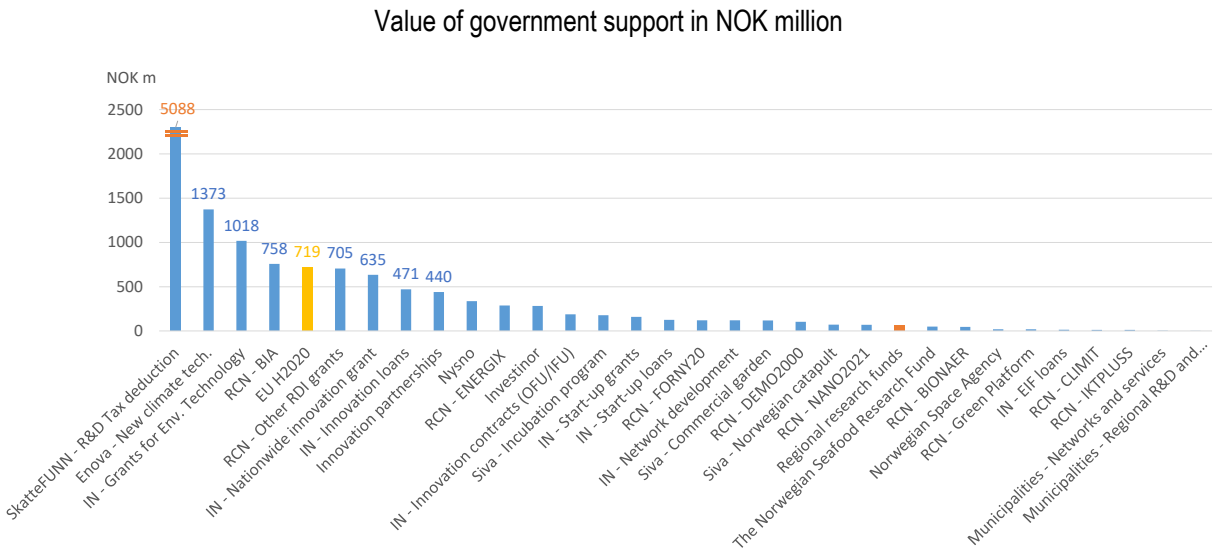
3.5.1. Data sources

106. The mapping pilot for Norway primarily relied on a database on public support to business enterprises kindly made available by Statistics Norway.[24] This dataset provides information on the amount of government support by funding agency and programmes, whilst also specifying the type of policy instrument used to provide funding. As confirmed in discussions with official contact points, this database covers a broad range of programmes, some of which support business activities beyond innovation. To facilitate the classification of programmes according to the measurement framework, additional information was retrieved from institutional data sources (i.e. Ministries and funding agencies, e.g. Innovation Norway, Research Council of Norway, Enova annual reports).

3.5.2. Innovation support programmes

107. The mapping pilot for Norway (Figure 42) identified 32 business innovation programmes for the 2018-2021 period (29 of which are registered with positive amount of supports in 2021), including 28 programmes at central government level, 3 subnational programmes and 1 supranational programme (EU H2020 programme).

Figure 42. Business R&D and innovation support policies, Norway, 2021



Note: Bars in orange refer to subnational policies while bars in yellow refer to supranational policies (e.g. support from the European Commission). Government authorities at central or subnational government level may carry out innovation partnerships, an innovation-oriented procurement procedure available in the EU area. For the R&D tax credit, figures refer to budget amounts and cover sole proprietors, and thus differ from the government tax relief figures (actual spent) reported for Norway in the OECD R&D tax incentives database.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

108. The SkatteFUNN R&D tax credit is the largest business innovation support programme in Norway, with an amount of NOK 5.1 bn in 2021. Other larger-scale programmes include Enova's business policy programme that supports new energy and

[24] See https://www.ssb.no/en/teknologi-og-innovasjon/forskning-og-innovasjon-i-naeringslivet/statistikk/naeringspolitiske-virkemidler

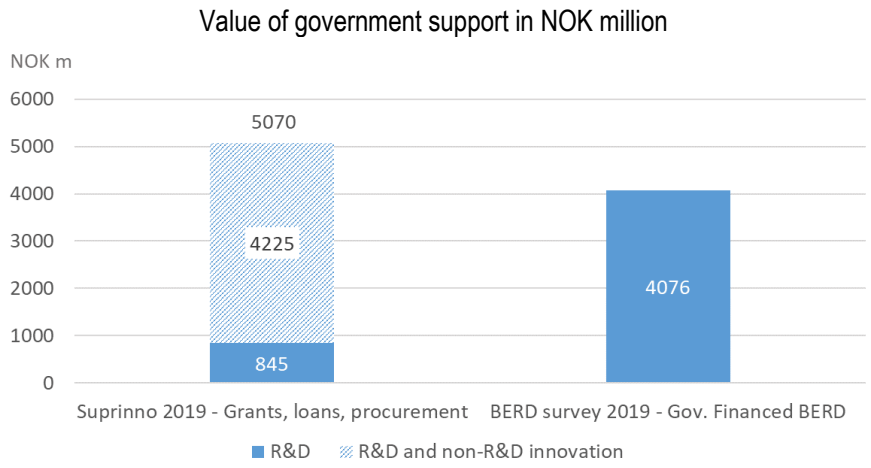
climate technologies (NOK 1.4 bn), the Environmental Technology scheme from Innovation Norway (NOK 1.0 bn) and the BIA grant for user-driven research-based innovation from the Research Council of Norway. Other noteworthy programmes are the Nationwide innovation grant, a one-off measure for innovative companies put in place during the pandemic, Innovation loans from Innovation Norway and the procurement policy "Innovation partnerships".

109. With a budget of NOK 719 million NOK, the EU Horizon programme also plays an important role in the Norwegian business innovation support policy mix. As an associate state, Norway contributes to funding the EU Horizon programme in proportion to its GDP so that Norway-based institutions and researchers can participate, but these may receive larger or smaller amounts than contributed by the country's national budget. Since the focus of the pilot mapping has been on mapping earmarked domestic funding for innovation under defined domestically run programmes, it has been decided to exclude supranational funding such as this for the time being, thus aligning with the reporting conventions for GBARD statistics.

Consistency checks with performer-based R&D statistics

110. As Figure 43 shows, the SUPRINNO estimate of direct funding of business R&D (grants, loans and procurement) for 2019 turns out to be higher (NOK 5070 million) than the estimate of direct funding (NOK 4076 million) from the Norwegian BERD survey.

Figure 43. Direct funding of business R&D: SUPRINNO vs. official R&D statistics, Norway, 2019



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

111. This result can be linked to the broader scope of the mapping pilot which covers policies that support both R&D and non-R&D innovation and for which it was not possible to identify the R&D component separately. As the discussion with national experts in Norway highlighted, different definitions of "business" in the BERD survey vis-à-vis administrative data sources may also contribute to measurement differences. Whereas the BERD survey in Norway includes certain R&D institutions (TO2 institutes) in the business sector, most administrative data sources explored as part of the mapping pilots, did either not capture them or not consider them as business entities. This is a common point with other pilot countries, such as Australia and the Netherlands. Finally, procurement-based innovation support seems to be largely understated as it is in other pilot countries. In the

case of Norway, it only captures the value of "Innovation Partnerships" recorded in the EU-TED procurement database.

3.5.3. Modalities of business innovation support

Type of instrument

112. Grants represent the most frequently listed support instrument in Norway, accounting for 66% of all business innovation support instruments (Table 7). They account for 45% of government support for business R&D&I, while the SkatteFUNN R&D tax credit accounts for 39% of the estimated total volume of business innovation support (Figure 44).

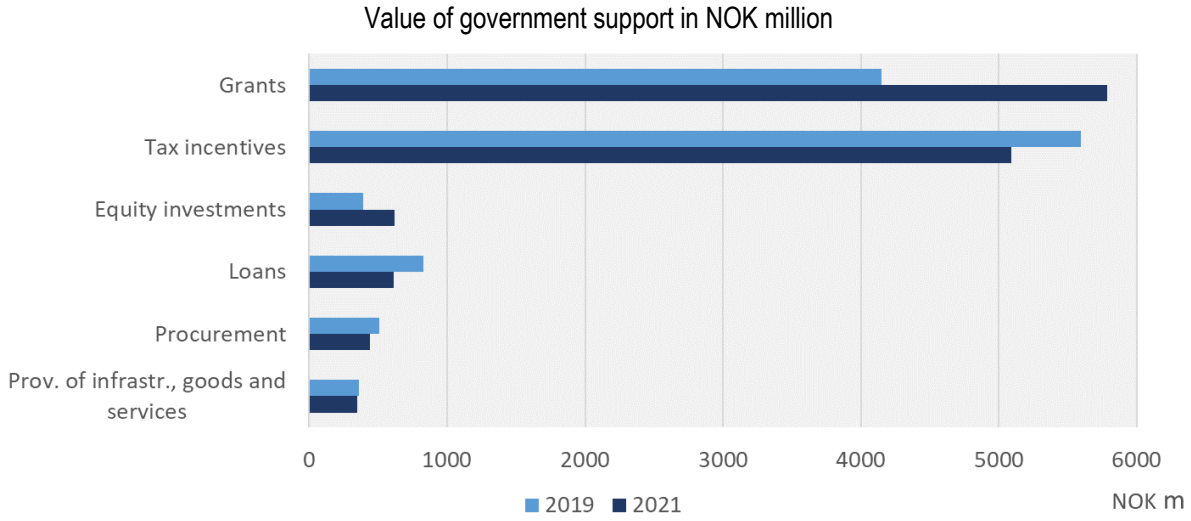
Table 7. Number of business innovation support instruments by type, Norway, 2021

Instrument type	Number of programmes*instruments	Percentage
Grants	22	66
Prov. of infrastructure, goods and services	4	13
Loans	3	9
Equity investments	2	6
Tax incentives	1	3
Public procurement	1	3
Total number of instruments	**33**	**100**

Note: As one programme can employ multiple types of instruments, the total count of instruments can be higher than the total of count of programmes.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

113. The reported volume of equity investments and loans for innovation is relatively small, but this partly a consequence of data availability. Some equity investments could not be included in the mapping exercise for Norway as investment amounts were reported in stocks and not flows and were thus not comparable with the figures available for other pilot countries. While the magnitude of tax incentive support seems to have slightly decreased in 2021 compared with 2019, the level of grant funding grew over these years, driven by the growth of BIA - the Environmental Technology scheme - and the Nationwide innovation grant in 2021.

Figure 44. Business innovation support by type of instrument, Norway, 2019 vs 2021

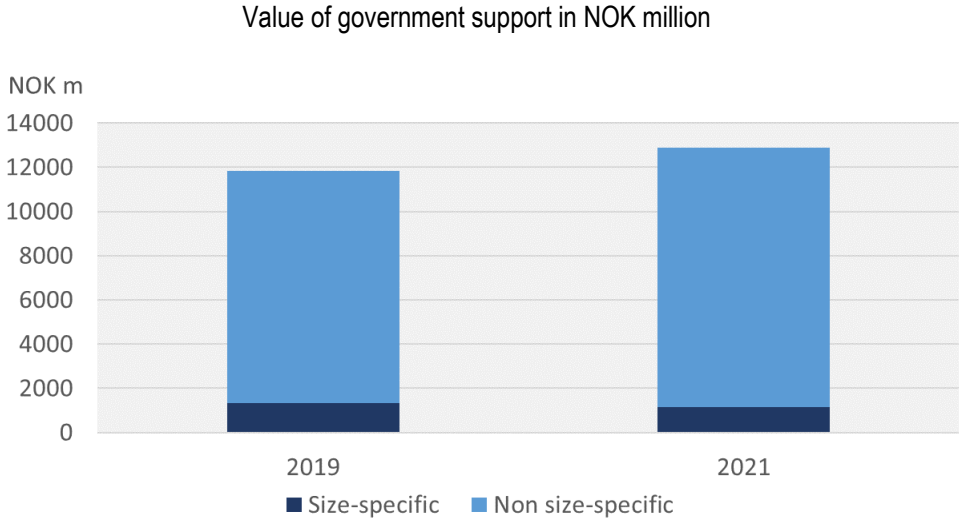


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Business-size specificity of innovation support

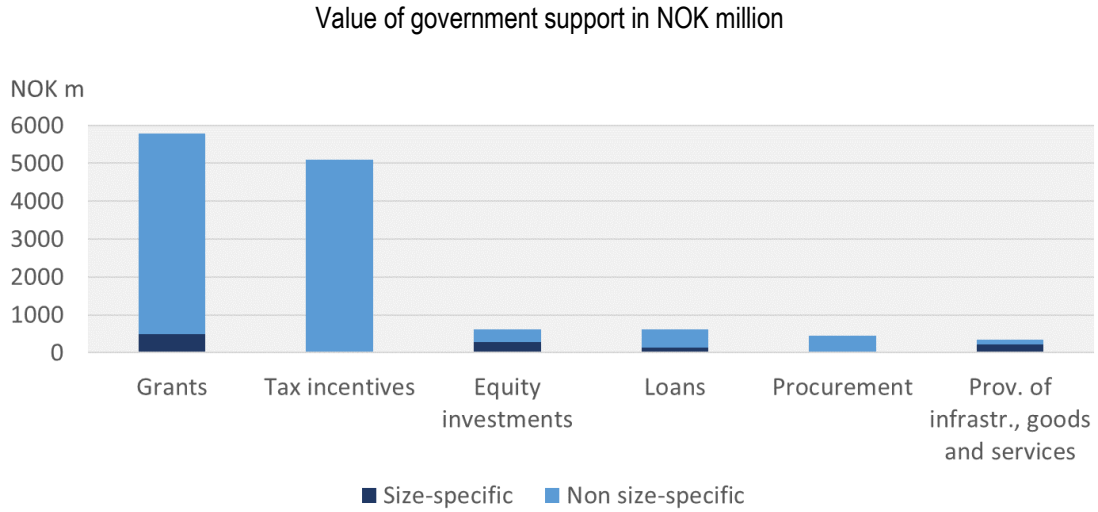
114. Norway's innovation support policy mix is not significantly characterised by instruments that exclude firms of a given size (Figure 45), although several effectively provide more favourable terms to SMEs, for example in the case of the SkateFUNN tax credit for R&D. Equity investments, the provision of infrastructure, goods and services and loans are the more likely to be constrained to SMEs (Figure 46). Examples of size-targeted instruments include Start-up grants, Start-up loans and Innovation contracts from Innovation Norway, and the policies from Siva (Incubation program, Norwegian catapult and Commercial Garden).

Figure 45. Business size-targeted innovation support, Norway, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Figure 46. Business size-targeted innovation support, by instrument type, Norway, 2021



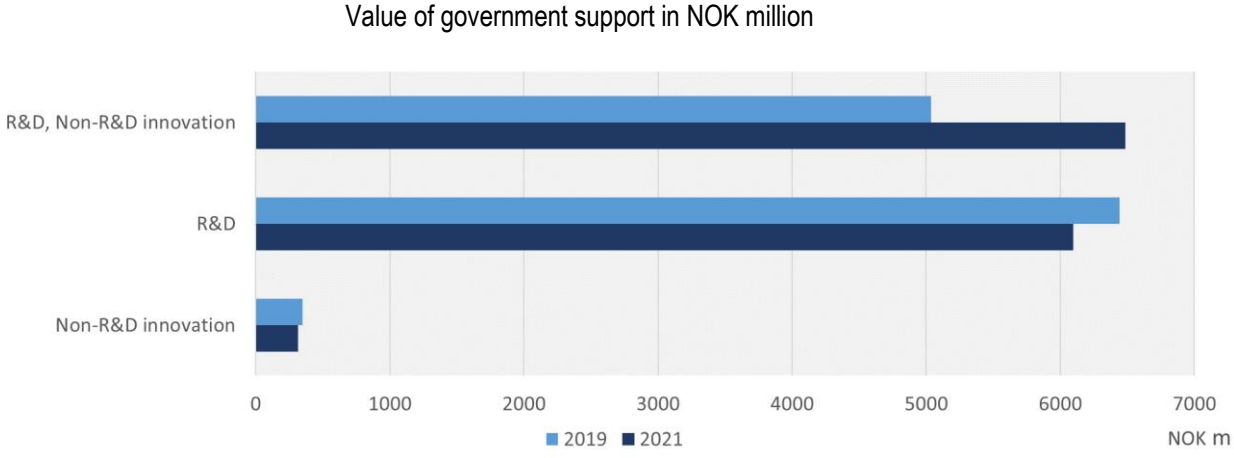
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

3.5.4. Directionality of business innovation support

Innovation activity

115. Innovation support programmes in Norway are principally targeted to support R&D activity (47% of total support) but a slightly larger volume of business innovation support (50% in 2021) aims to encourage R&D and other innovation activities in a combined fashion (Figure 47). This hybrid type of support has increased in absolute and relative importance. For some programmes, the unit of analysis is too aggregated to identify and quantify the R&D and non-R&D innovation components separately (e.g. Enova support for new energy and climate technologies). Most of the programmes from the Research Council of Norway, that were classified in the mixed category "R&D and non-R&D innovation", appear to support primarily R&D and to a lesser extent other innovation activities, such as technical demonstration (e.g. DEMO2000).

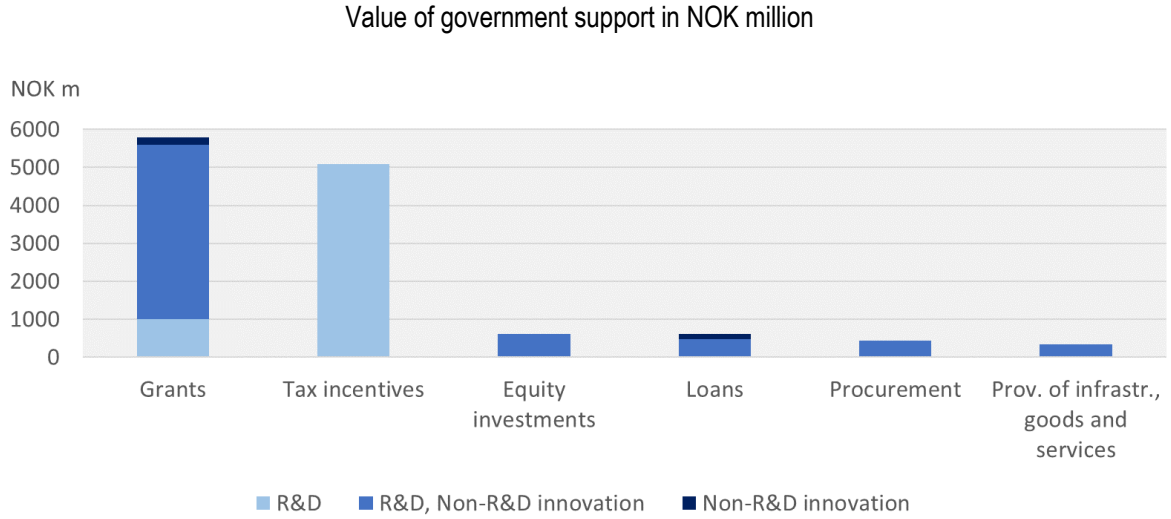
Figure 47. Support by type of innovation activity supported, Norway, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

116. Tax incentives via the SkatteFUNN R&D tax credit appear to be the only innovation support instrument neatly aligned to R&D activity, although this may be a reflection of the lack of detailed information on the STI activity supported in the case of other types of programmes (Figure 48).

Figure 48. Support by type of instrument and innovation activity, Norway, 2021

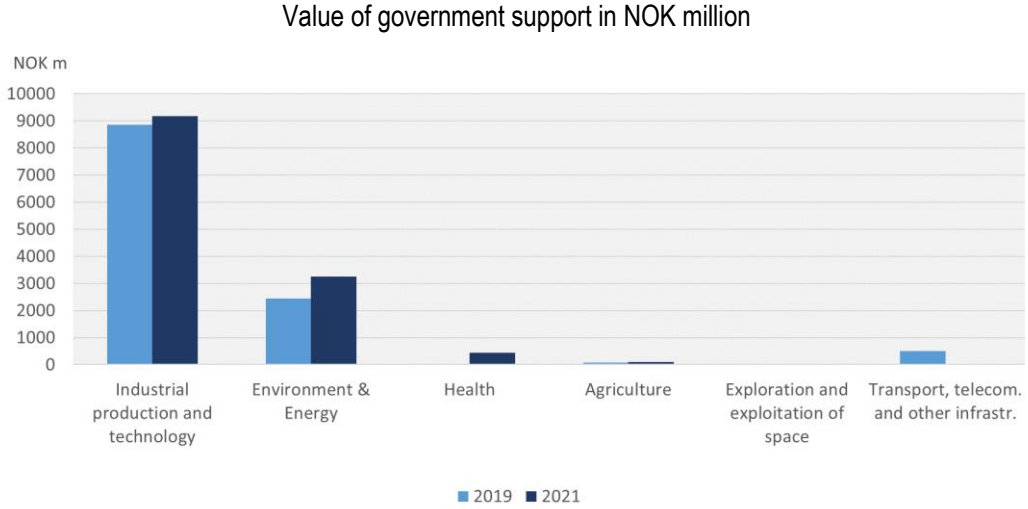


Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

Policy objectives

117. The main socio-economic objective (SEO) in Norway's innovation support landscape is "Industrial production and technology" (Figure 49), reflecting the important role of horizontal policies, such as the SkateFUNN tax credit and BIA. Business innovation support policies with an "Environment & Energy" related SEO rank second in terms of level of support and appear to be rising in both absolute and relative terms.

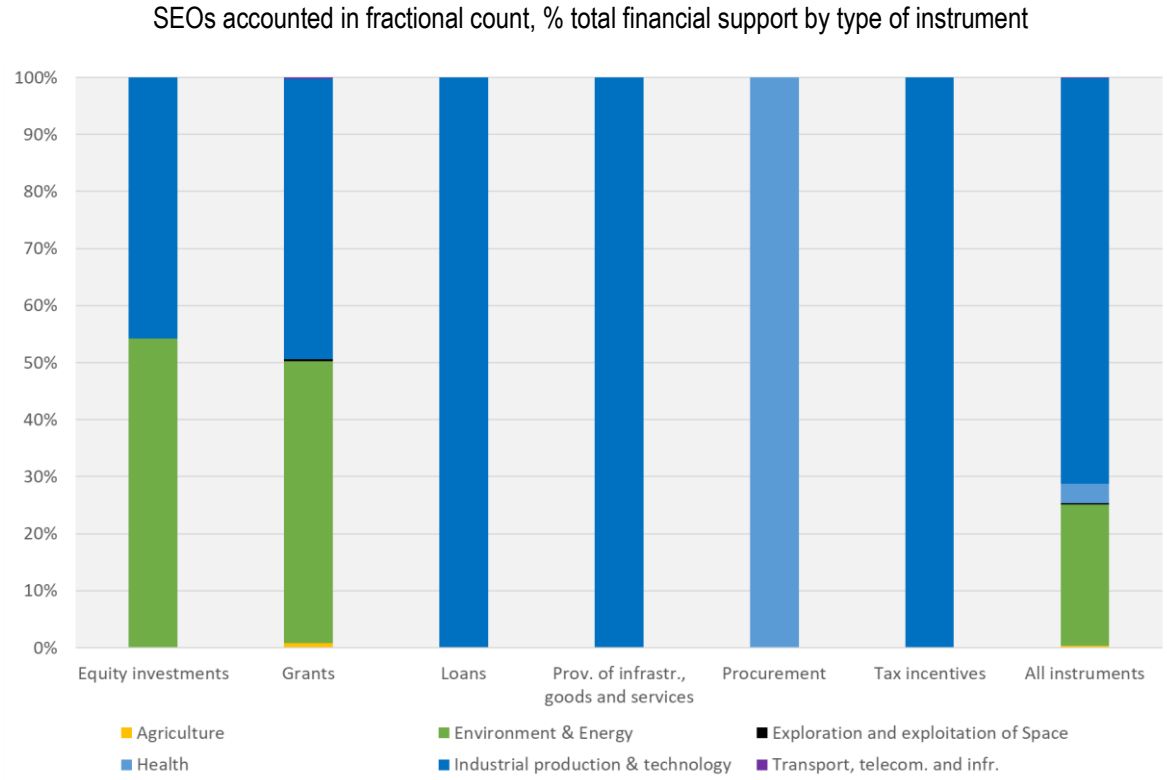
Figure 49. Business innovation support by socio-economic objective, Norway, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

118. Grants and equity investments as well as procurement are the instruments more attuned to the pursuit of objectives other than "Industrial production and technology" (Figure 50). 'Environment' and 'Energy' play a key role in the case of equity investments and grant funding: the grants from Enova which support new energy and climate technologies, the Research Council's Environmental Technology scheme, which supports pilot and demonstration projects with a positive impact on the environment, alongside other grants (e.g. ENERGIX, CLIMIT), as well as equity investments from Nysno, the Norwegian state's investor in companies developing climate-friendly technologies. Procurement-based support in Norway through the "Innovation Partnerships" procedure appears to have been oriented towards the 'Health' objective in 2021.

Figure 50. Support by type of instrument and socio-economic objective, Norway, 2021



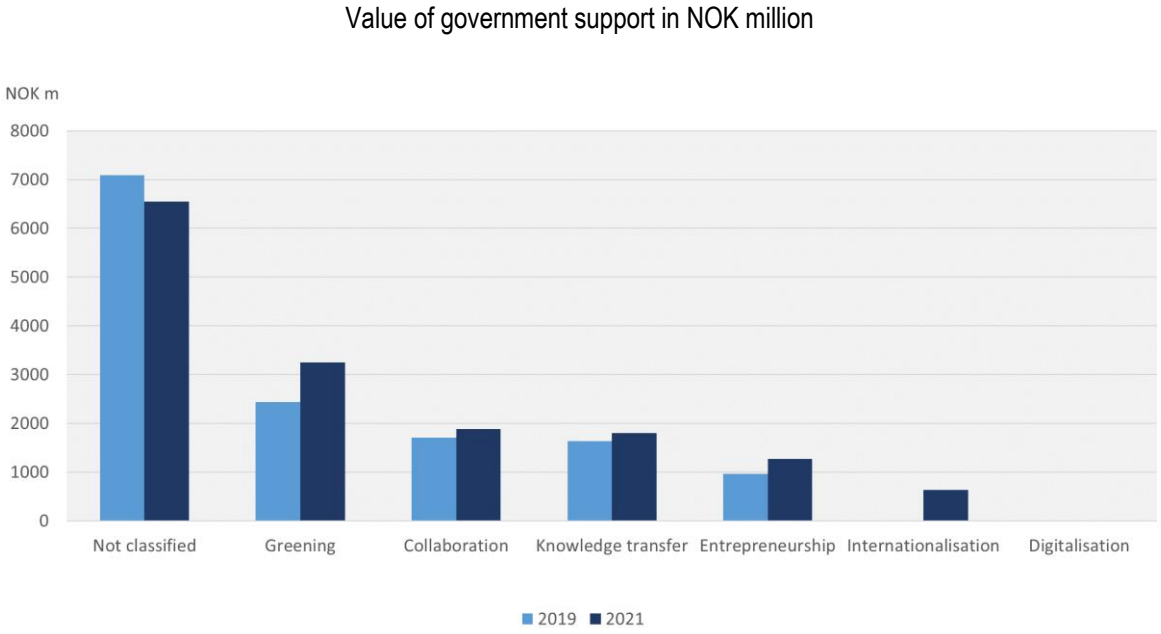
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

119. "Greening", "Collaboration" and "Knowledge transfer", as well as "Entrepreneurship", are important behavioural requirements in the Norwegian business innovation support policy mix (Figure 51). Policies with a collaboration requirement/objective encompass, for instance, the Cluster programme, the Incubation programme, Innovation Contracts, as well as BIA, DEMO2000 and Innovation partnership procurements. However, there are also policies with a digitalization requirement/objective in Norway such as RCN – IKTPLUSS, albeit with a comparatively much smaller budget in 2021.

120. In the case of horizontal policies such as the SkatteFUNN R&D tax credit in Norway, it is important to keep in mind that the ex-ante directionality of business innovation support by socio-economic objective (Figure 50) or behavioural requirement/objective (Figure 51) is prone to differ from the ex-post allocation of financial resources across policy domains. Complementary statistics on the ex-post allocation of the

SkatteFUNN R&D tax credit by policy area[25] for Norway, for instance, reveal that a notable fraction of R&D tax relief in 2019 supported business R&D investments in the areas of ICT/digitalisation (22%) and health (7.5%).[26]

Figure 51. Business innovation support by behavioural requirement, Norway, 2019 vs 2021



Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

[25] Each R&D project when approved for the SkatteFUNN R&D tax credit in Norway is classified by the Research Council of Norway (RCN) by different thematical topics. RCN applies a similar classification in the case of R&D projects financed through grants.

[26] Norway collects data on the directionality of R&D sources from R&D performing units in a national part of its R&D surveys. The Norwegian Long-term plan for research and higher education highlights different thematic priorities. These evolving priorities have been mapped in R&D surveys based on definitions jointly developed by Statistics Norway and the Research Council of Norway. Results for the business sector (which include SkatteFUNN funding) are available at https://www.ssb.no/en/statbank/table/13713/

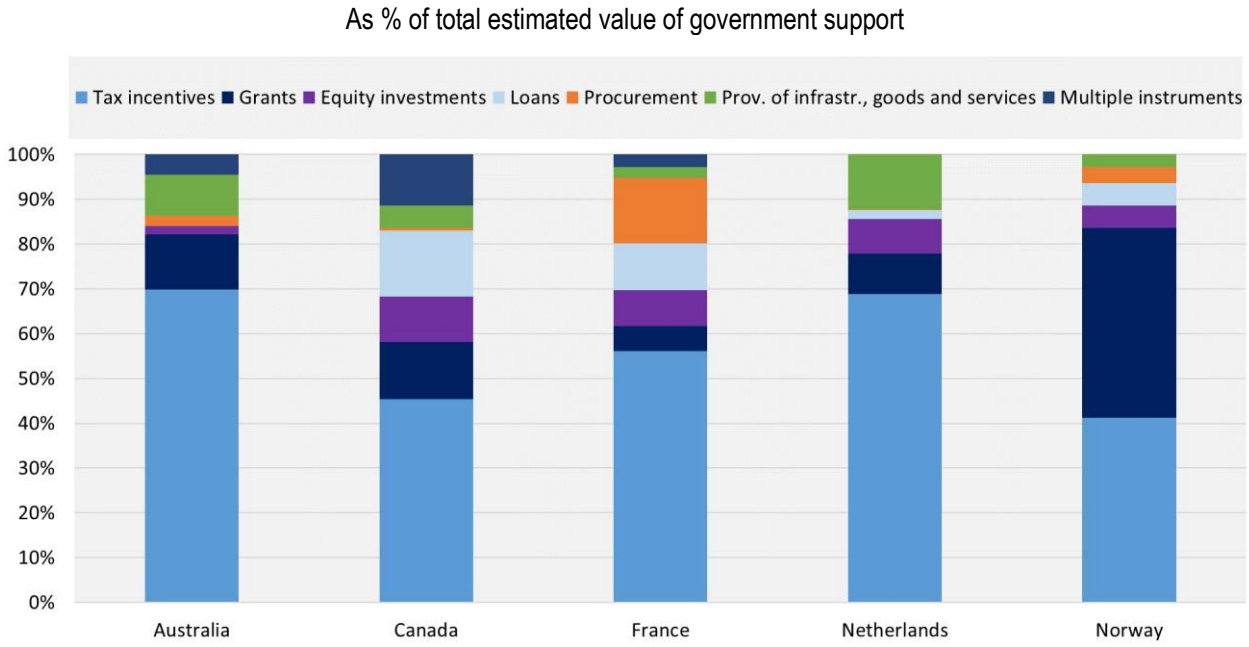
4. Cross-country comparisons of innovation support

121. Following the presentation of the results of the individual country pilots, this section brings together a selected number of innovation support indicators to explore cross-country differences in the modalities and directionality of government business innovation support, while also discussing international comparability. These results should be interpreted as experimental indicators and as not necessarily representative of business innovation support in these or other OECD countries.

4.1. Mechanisms of business innovation support

122. All pilot-participating countries make extensive use of tax incentives, which account for over 50% of total business innovation support, with the exception of Canada and Norway where this percentage reaches 45% and 41% (Figure 52) respectively. Norway is the only country where grants and not tax incentives are the predominant innovation support instrument. In Australia and the Netherlands tax support goes up to close to 70%. Innovation support through equity investments features as the third most used instrument on average. In the case of Australia and the Netherlands, the exclusion of subnational programmes is prone to understate the total support provided through financial instruments. Indeed, in the case of Canada, where equity investments account for 10% of total support, 50% of this support is linked to subnational programmes. Loans in turn appear to play an important role in Canada and France, with a share in the business innovation support of 15% and 10% respectively.

Figure 52. Government support for business innovation by type of instrument, 2021



Note: Figures for France, Norway, and the Netherlands refer to calendar year 2021, while those for Australia and Canada refer to fiscal year 2021-22. The figures reported, especially those for Australia and the Netherlands are likely to understate the amount of business innovation support provided by government at subnational level. The category 'Multiple instruments' encompasses policies for which instruments are not separately identifiable.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

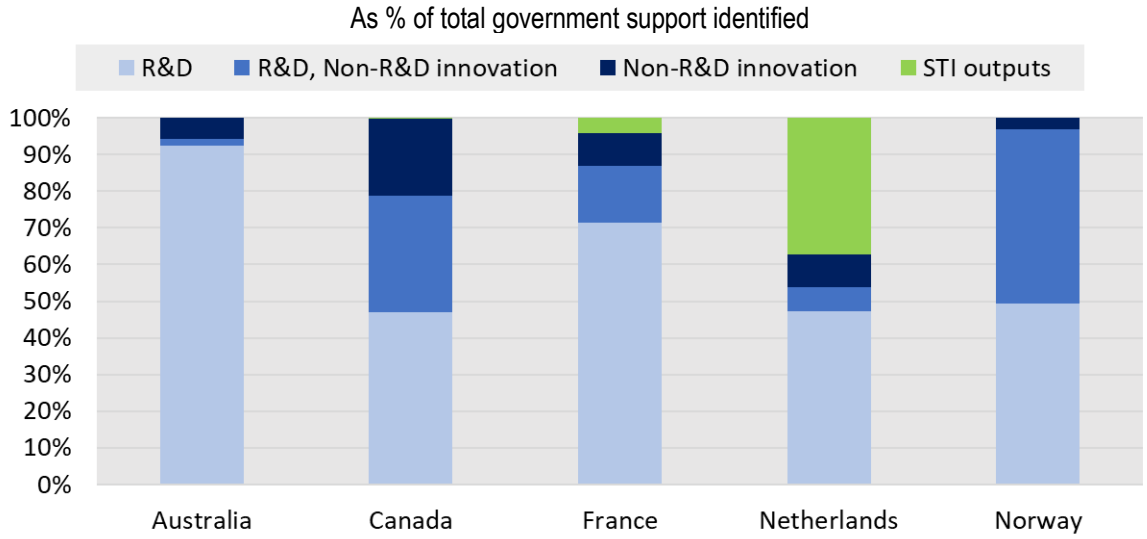
123. Measured procurement support for innovation appears to only exceed the 10% mark in the case of France, mostly attributable to spending by the Ministry of Defence. France is the only pilot country where BERD survey data on government financed BERD by source of funding were sufficiently granular to provide a measure of R&D procurement and could thus supplement the mapping exercise based on administrative data sources. Still, this would not capture the procurement of innovative solutions beyond separately identifiable R&D services. For other pilot countries, this form of support is without a doubt understated but it is unclear by how much. In the case of Canada, for instance, it was not possible to account for the R&D pillar of the ITB Policy and in the case of programmes that use multiple instruments categories (Innovative Solutions Canada Challenge Stream and Innovation for Defence Excellence and Security), procurement support features under the Category 'Multiple instruments' rather than a standalone category.

124. The provision of infrastructure, goods and services appear to play a significant role in the business innovation support policy mix of the Netherlands and Australia and to a lesser extent also in Canada. In the Netherlands and Australia, this type of support can be attributed to applied R&D institutes (respectively TO2 institutes and Rural R&D corporations) which can provide services to businesses.

4.2. Innovation activity

125. Across all five pilot countries, R&D represents the main innovation activity supported, accounting for over 70% of total measured government support in Australia and France and close to 50% in the other three pilot countries (Figure 53).

Figure 53. Government support for business innovation by type of innovation activity, 2021



Note: Figures for France, Norway, and the Netherlands refer to calendar year 2021, while those for Australia and Canada refer to fiscal year 2021-22. The figures reported, especially those for Australia and the Netherlands are likely to understate the amount of business innovation support provided by government at subnational level.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

126. For Canada and Norway, several programmes target multiple types of innovation activity and it is generally not possible to distinguish different components. While the analysis for Australia and the Netherlands is based on databases that quantify the amount

of support delivered by programmes for each STI component (R&D vs non-R&D innovation activity), such information is not available in case of Canada and Norway.

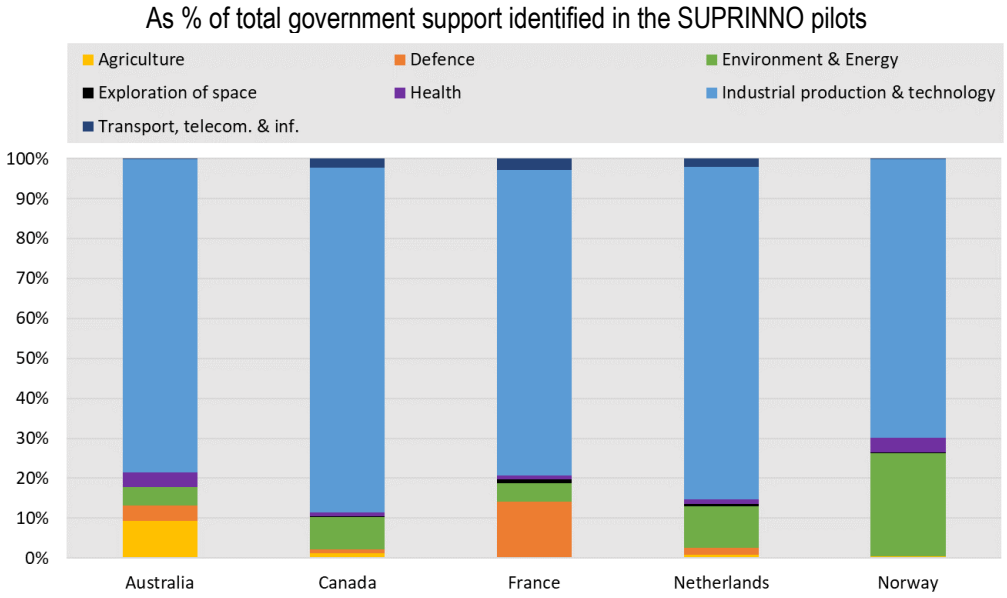
127. Programmes targeting non-R&D forms of innovation activity such as demonstration activities and adoption of innovation are measured to be around 20% in Canada, close to the 10% mark in France and the Netherlands, and around 6% in Australia and 3% in Norway. Although this may reflect to some extent a bias towards recording support for R&D, fully tracing innovation support programmes and their content remains a challenge, for example when conducted through standalone procurement actions.

128. The monitoring of support attached to innovation outputs as opposed to activities is only salient in the case of the Netherlands (37%), where the Innovation box is the largest instrument, and to a lesser extent in France (4%) or Canada (less than 1%).

4.3. Policy objectives

129. Given the predominant role of tax incentives and other programmes designed as horizontal, business initiative-driven instruments without thematic or sectoral constraints, most business innovation support is by default oriented towards the socio-economic objective (SEO) "Industrial production and technology" (Figure 54) since no other objective provides a better reflection of the government's intention.

Figure 54. Government support for business innovation by socioeconomic objective, 2021



Note: Figures for France, Norway, and the Netherlands refer to calendar year 2021, while those for Australia and Canada refer to fiscal year 2021-22. The figures reported, especially those for Australia and the Netherlands are likely to understate the amount of business innovation support provided by government at subnational level. In the case of programmes with multiple objectives, an equal weight fractional approach has been applied to the funding.
Source: OECD MABIS-SUPRINNO pilot mapping studies of business innovation support, June 2023.

130. When it comes to supporting business innovation directed to specific objectives, the areas of "Environment and Energy" (combined into one category), "Defence" and "Agriculture" stand out. With over a quarter of total business innovation support, Norway displays the largest orientation towards "Environment and energy", followed the

Netherlands and Canada[27]. In the case of France, as previously noted, "Defence" is a major driver of government support for business innovation with close to 15% of funding (Figure 29, Figure 30), capturing procurement-based support for R&D from the Ministry of Defence and other government organizations (French Alternative Energies and Atomic Energy Commission, CEA and of the French National Centre for Space Studies, CNES), made possible by the supplementary use of French BERD survey data. The objective "Agriculture" is most salient in the case of Australia (accounting for nearly 10% of business innovation support).

131. One potential paradoxical result is the relatively low degree of innovation support explicitly earmarked for the "Health" objective, especially during the first year of the COVID-19 pandemic in these five pilot countries. This might be explained by several measurement challenges already alluded to:

- the potential use by governments of generic business support instruments within which there have been specific calls for health objectives (an SEO classification problem);
- the use of public support towards public and non-business entities to undertake R&D on health, with implicit options for results to be available to business, such as in the context of collaborations (business support demarcation problem);
- the systematic under-reporting of government procurement of innovative solutions, under which the development of vaccines and treatments by firms may have been incentivised within firms (instrument and innovation identification problem).

[27] The focus on the central government and incomplete coverage of subnational business innovation support policies may potentially influence the distribution of business innovation support by socioeconomic objective. Within the Canadian context, it's important to note that domains such as energy, environment, education (including universities), health, agriculture, and transportation fall under the purview of provincial authorities. Conversely, the federal government assumes primary responsibilities in areas like Defence, space, and telecommunications.

5. Methodological findings and implications for future measurement

132. This report has presented the exploratory results from a pilot measurement exercise conducted in collaboration with five countries, namely Australia, Canada, France, Netherlands and Norway, between April 2022 and March 2023. The measurement pilots explored the use of administrative data sources with a view to mapping the landscape of government support for business innovation. The pilots identified more than 200 business innovation support programmes that vary in their size (see Section 3): 37 in Australia, 60 in Canada, 49 in France, 54 in the Netherlands, and 32 in Norway. The results, while preliminary and not necessarily fully comparable across countries, not only provide some insights on how countries design and implement support for innovation and direct it towards concrete goals, but also provide a basis for future OECD efforts to measure the directionality of public support for innovation.

5.1. Grasping directionality of innovation support

133. The application of the companion measurement taxonomy has allowed to provide a multidimensional view on directionality, an often used but complex concept that can lend itself to multiple interpretations. There is a significant distinction between **ex-ante directionality** as implied in the definition of a programme and its underlying instruments and eligibility rules, relative to the **ex-post directionality** of support implied by how resources have been allocated across different dimensions. While the latter can be somewhat anticipated from the former in combination with information about the overall structure of a country's innovation system (i.e. who stands to make use of support when support is available), there is no clear mechanism that joins the two thus requiring complementary measurement approaches.

134. The pilots, working at the level of data on programmes, have necessarily focused on features that are indicative of ex-ante additionality. R&D and innovation performer data are in principle best suited at present to examine ex-post directionality but more advanced tracking mechanisms for public funds can eventually also support the assessment of ex-post directionality.

5.1.1. Directionality as implied by the choice of policy instruments

135. Information on the policy support instruments used to provide support to businesses for innovation is particularly revealing of the capacity of governments to direct resources to specific policy priorities. By defining whether businesses have to provide anything to government in return, particularly when it is in the form of goods and services, the design of instruments will likely indicate what direction is being set through a programme. Conversely, support implemented through horizontal instruments is less likely to define a narrow direction, as it is the case for the majority of innovation tax incentives that have been documented in the pilots. Directionality of support through the provision of goods and services to innovative companies can sometimes be identified from the missions of the research and technology organisations funded by governments to fulfil such a role.

5.1.2. Directionality as implied by the companies eligible for support

136. Information on which companies are entitled to benefit from innovation support programmes is equally revealing of government priorities and direction setting. The pilots have identified the targeting of support towards firms of a specific size (e.g. SMEs), by restricting support to companies of a certain size group. The pilots did not systematically

track preferential subsidy terms for firms of a given size group and did not collect information on industry or technology specificity in terms of availability of support.

137. The mapping pilots highlighted the importance of having available **data on beneficiaries** and their sector for quantifying the business component of multi-sector programmes as well as other key features. Discussions with national experts as part of the pilot also pointed to surveys of the beneficiaries of main multi-sector programmes as one alternative approach to help advance measurement in the future.

5.1.3. Directionality as implied by the socioeconomic objectives of support programmes

138. The use of information on socioeconomic objectives for innovation support programmes along similar lines to those used for Government R&D Budgets provides a reasonable high-level view of the relative importance of general objectives that broadly map onto standard ministerial responsibilities, although lacking the thematic granularity that can only be gauged from looking at specific projects.

139. Whilst not explicitly used in the pilots because it is not a sufficient criterion, information on the agency or government body providing support has been extremely helpful for establishing initial hypotheses on the most likely socioeconomic objective(s) pursued. Governments may pursue multiple objectives in providing business innovation support under a specific programme. While the mapping pilots record multiple policy objectives, where applicable, it was not possible to facilitate an accurate apportionment of the amount of business innovation support directed to each policy objective.

140. The pilots' findings indicate that by and large, on an ex-ante basis, most of innovation support that has been documented pursues the general technological advancement of companies, rendering the classification as only informative of ex-ante directionality at the level of the programme as a whole, not its specific investments. The results appear to indicate that innovation support potentially targeted towards objectives like defence, health and energy/environment may not have been fully accounted in the pilots.

141. The SEO classification as it stands is not particularly well suited for the assessment of ex-post directionality from the viewpoint of either governments or the innovating companies.[28] For this reason the pilots have also implemented a categorisation of innovation linked to defined behavioural and transformation objectives.

5.1.4. Directionality as implied by the activities eligible for support

142. Information on the eligible activities for support is equally revealing of potential directionality. The pilots prioritised the distinction between R&D and other forms of innovation activity and outputs, revealing a widespread focus on R&D vis a vis other types of innovation activity. R&D emerges as the dominant object of support, but there remains considerable ambiguity as to whether other innovation support is indeed smaller or just not accounted for. This has to be one of the key priorities going forward given the need to achieve a good balance of support in areas like the green transition between developing brand new solutions that address the limitations of current green technologies and ensuring

[28] An additional challenge is the ambiguity of the term "industrial" under "Industrial production and technology", since it may be interpreted as either referring to manufacturing or all economic activities, potentially rendering other activity-oriented SEOs irrelevant in the latter case. A revision of this classification and its accompanying guidance may be considered in due course by OECD and EUROSTAT.

fast and widespread adoption of technologies that contribute to low carbon transition goals (Aulie et al. 2023).

5.2. Key takeaways for future work

143. The pilots have demonstrated that **the measurement of innovation support** and its directionality in particular is also very much **driven by data availability and the administrative procedures that shape the existence and features of these data**. The measurement pilots have grappled with the heterogeneous scope and nature of government programmes that support innovation in relation to the unit of analysis for which a defined expenditure figure is available. The main measurement challenges are summarised in Box 1**.**

144. This heterogeneity is multifaceted, with business innovation not always being the single or easily distinguishable subject and object of support. For instance, to address a specific societal challenge, governments may resort to initiatives that support a mix of activities. Measurement **needs to rely on administrative procedures** that contribute towards generating relevant information at the programme level, e.g. information required to comply with activity-dependent subsidy threshold rules, or **make use of heuristics, judgement and analysis**.

145. **Applying a functional definition of support for innovation** that draws upon the Oslo Manual definition of innovation (OECD/Eurostat, 2018) can provide an important focal point (OECD/Eurostat, 2018). Australia (SRI Budget tables) and the Netherlands (TWIN database) apply the Oslo Manual definition of innovation in the selection of programmes into their databases on public funding of science, technology and innovation. However, additional restrictions such as those imposed by the latter to remove programmes entirely focused on diffusion (i.e. support of new-to-firm only innovations), may impact on comparability.[29]

146. **Applying a criterion of policy ownership of support programmes by a science or innovation ministry or department** (or small group of them) can provide an initial starting point for measurement but this is unlikely to be sufficient. For example, policies that support greener business practices through the adoption of an existing environmentally friendly technology, or that promote the digitalisation of SMEs may in principle fall within the scope of policies that support business innovation. As **whole-of-government approaches towards innovation policy** become more common, it is important to have in place coordination mechanisms to monitor support for innovation, particularly when it comes to challenge-oriented policies.

147. **The policy language for characterising different units requires greater international alignment.** Although statisticians apply common standards, these do not necessarily resonate with the target groups of innovation support policies and intermediaries, often because statistics are not provided combining different classifications.

[29] The TWIN database guidance excludes from "innovation [support] expenditure": "Expenditures on the further roll-out of an - otherwise unchanged - innovation to a wider user group, after the innovation has already been made available to (potential) users, is not included as innovation expenditure." Following discussions regarding the use of the TWIN data in an international context as part of this report, the Netherlands decided to remove the restriction on diffusion activities in the forthcoming TWIN report (expected for spring 2024), ensuring a better alignment with the latest edition of the Oslo Manual. Government support for activities aimed at the upscaling or diffusion of innovations will from now onwards be included in the TWIN-database.

Box 1. Main measurement challenges encountered in the SUPRINNO pilots.

The **innovation nature and precise component of business support** may not be easily identifiable, particularly in the innovation downstream from R&D, unless there are strong administrative requirements, for example in terms of demonstrating compliance with state aid or related rules. Several programmes appear to be genuinely combining support for different types of innovation activity.

Support provided for business innovation under standalone initiatives can be harder to identify and quantify, while **programmes with defined instruments** tend to contain more accurate information. Procurement of innovative solutions is by far the most challenging instrument to measure because, despite increasing rhetoric about setting targets, there are virtually no mechanisms in place to track what procurement represents the acquisition of novel solutions, either on an ex-ante or ex-post basis (Appelt and Galindo-Rueda, 2016; OECD, 2021). Furthermore, different instruments can often be combined in a single programme or even in a single project.

Coverage of government providers of business innovation support is often not exhaustive, particularly when it comes to subnational levels of government and ministries and agencies less directly involved in R&D agendas.

The **business component** of support may not be easily identifiable in the case of programmes open to multiple types of actors in different sector or in presence of partnerships involving businesses and other actors. There may also be differences of practices in characterising business enterprises that may not match international statistical standards. Examples include the treatment of self-employed individuals, corporations in the public sector as well as non-profit institutions serving businesses, which are also formally part of the business sector. The latter can also be key actors for indirect forms of support through the provision of goods and services in assistance of innovation by businesses. Lack of information on beneficiaries and their characteristics also prevents a complete characterisation of support.

Quantification approaches to support are very instrument and context-specific, representing a challenge for meaningful within-country and international comparisons. Securing coherent reporting of support is particularly important for instruments that require companies to provide something in return, most likely in the future. Gross amounts are easier to report but their unqualified use may distort comparisons, while measurement of net support amounts is particularly hazardous and a sensitive issue for governments and businesses alike.

Measurement challenges are closely intertwined with each other, so that poor coverage of one dimension is also likely to distort the analysis of any other dimension.

148. **Accurate reporting of innovation support can be facilitated by a two-step procedure,** firstly identifying within-scope candidate programmes and initiatives, and secondly, by establishing the relevant innovation support component for support quantification. Both require considerable **domestic know-how of policies and data sources. Detailed programme descriptions** are particularly important for the first step. Additional quantitative data are required to derive proxy measures of the business innovation component of programmes that support a mix of innovation and non-innovation related activities. For quantification purposes, most pilot countries have adopted an all-or-nothing approach to measurement at the programme level. The Netherlands applies fractional measurement (using weight coefficients) in its TWIN database on government

funds for R&D and innovation to reflect the innovation component of policies. Granular data (e.g. on subprogrammes of the Strategic Innovation Fund in Canada) can also be helpful in identifying the R&D and non-R&D related innovation components of programmes but such data seem to be only available for few, selected policies.

149. The pilots clearly indicate how important it is to **map the mechanism for channelling support towards its ultimate beneficiaries**, as this shapes the measurability of the different elements of the taxonomy as well as their interpretability in international comparisons. The use of intermediaries like funding agencies or investing partners may represent a reduction in government directionality through the partial delegation of directing responsibilities.

150. **Despite heterogeneity, robustness and replicability** of innovation support mapping outputs can be enhanced through transparent communication of decision rules, heuristics, tagging and coefficients applied at programme level, as well as by providing information on programmes that are excluded for practical reasons from the effective scope of the analysis.

5.3. Concluding remarks and next steps

151. The pilot measurement experience has revealed that countries:

- Have a shared interest in measuring government support for science, technology and innovation beyond what they currently report in terms of government support for R&D. This mostly obeys to the need for public spending accountability and visibility of science, technology and innovation as a policy domain of a highly horizontal nature.
- This interest extends to monitoring structures that identify support beneficiaries on a sectoral basis, including business - a sector for which monitoring state aid is of particular interest from a within and cross-country perspective.
- Apply and invest in relatively uncoordinated, highly country-specific monitoring approaches, which renders international synthesis and comparison rather complex but not entirely impossible.

152. Whilst some of the measurement challenges might appear to be unsurmountable if envisaging the pursuit of trustworthy international comparisons, the pilots also suggest that there is room for greater coordination towards common representation approaches and better use of available data resources, whilst making progress towards higher quality and interoperable underlying administrative data. The experience of the pilots suggests it is relatively early to attempt to agree on a recommended overarching standard, implying that it is more insightful to allow some degree of discretion in terms of applying the framework as long as specificities and potential biases are transparently recorded.

153. These are likely to be the goals of the next stage of the SUPRINNO project under a MABIS2 initiative. Having tested the measurement approaches and procedures, the ambition would be to extend the coverage of the mapping pilots to other OECD countries, in synergy with the underlying efforts made by the Directorate for Science, Technology and Innovation to continuously update the STIP Compass database under the CSTP and the initiative to measure industrial policies under CIIE. The conditions appear to be ripe to make decisive progress towards a better understanding of how governments use public resources to promote innovation in the business sector.

References

Appelt, S. and F. Galindo-Rueda (2016), "Measuring the Link between Public Procurement and Innovation", OECD Science, Technology and Industry Working Papers, No. 2016/03, OECD Publishing, Paris, https://doi.org/10.1787/5jlvc7sl1w7h-en.

Appelt, S., et al. (2023), "Cost and uptake of income-based tax incentives for R&D and innovation", OECD Science, Technology and Industry Working Papers, No. 2023/03, OECD Publishing, Paris, https://doi.org/10.1787/4f531faf-en.

Aulie, F., et al. (2023), "Did COVID-19 accelerate the green transition?: An international assessment of fiscal spending measures to support low-carbon technologies", OECD Science, Technology and Industry Policy Papers, No. 151, OECD Publishing, Paris, https://doi.org/10.1787/5b486c18-en.

Criscuolo, C., et al. (2023), "Quantifying industrial strategies across nine OECD countries", OECD Science, Technology and Industry Policy Papers, No. 150, OECD Publishing, Paris, https://doi.org/10.1787/5f2dcc8e-en.

González Cabral, A., et al. (2023), "Design features of income-based tax incentives for R&D and innovation", OECD Taxation Working Papers, No. 60, OECD Publishing, Paris, https://doi.org/10.1787/a5346119-en.

OECD (2023a), OECD R&D Tax Incentive Database – 2022 edition, released April 2023, http://oe.cd/rdtax

OECD (2023b), Report on the OECD R&D Tax Incentive Database – 2022 edition, released June 2023, DSTI/STP/NESTI(2023)2/FINAL

OECD (2023c), Proposed OECD framework for mapping and quantifying government support for business innovation at the programme and instrument level. Forthcoming STI Policy Paper. DSTI/STP/NESTI(2022)7/REV1

OECD (2021), "Improving effectiveness of Lithuania's innovation policy", OECD Science, Technology and Industry Policy Papers, No. 123, OECD Publishing, Paris, https://doi.org/10.1787/a8fec2ee-en.

OECD (2015), Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities, 7th edition, OECD Publishing, Paris, http://oe.cd/frascati

OECD/Eurostat (2018), Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg, https://doi.org/10.1787/9789264304604-en.

OECD (2001), Improving Measures of Government Support to Industrial Technology, STI Review, Accessed from https://www.oecd.org/sti/37124998.pdf

OECD (1995), Industrial Subsidies: A Reporting Manual, OECD, Paris.

Annex A. Main data sources

Table A.1. Main open data sources employed in the country mapping pilots

	Name of data source	Web link
National		
Australia		
	CEFC annual reports 2017-22	https://www.cefc.com.au/who-we-are/governance/statutory-reports/
	CSIRO annual reports 2017-22	https://www.csiro.au/en/about/corporate-governance/annual-reports
	Industry, Science and Resources Portfolio Budget Statements (PBS)	https://www.industry.gov.au/corporate-governance/budget-statements
	Science, Research and Innovation (SRI), Budget Tables	https://www.industry.gov.au/publications/science-research-and-innovation-sri-budget-tables
Canada		
	Business Innovation and Growth Support (BIGS),	https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5304
	Business Development Bank of Canada (BDC) annual reports	https://www.bdc.ca/en/about/corporate-governance/financial-results
	Proactive Disclosure - Grants and Contributions	https://open.canada.ca/data/en/dataset/432527ab-7aac-45b5-81d6-7597107a7013
	Public Accounts of Canada - Transfer payments from Government of Canada (GC) InfoBase	https://www.tbs-sct.canada.ca/ems-sgd/edb-bdd/index-eng.html
	Sustainable Development Technology Canada (SDTC) annual reports	https://www.sdtc.ca/en/reports/
France		
	BPI annual reports	https://www.bpifrance.fr/espace-investisseurs
	Budget documents	https://www.budget.gouv.fr/documentation/documents-budgetaires
Netherlands		
	Budget documents	https://www.rijksfinancien.nl/memorie-van-toelichting/2022/OWB
	Invest-NL annual reports	https://www.invest-nl.nl/?lang=en
	Total Investment in Research and Innovation (TWIN)	https://www.rathenau.nl/en/werking-van-het-wetenschapssysteem/total-investment-research-and-innovation-
Norway		
	Innovation Norway annual reports	https://arsrapport.innovasjonnorge.no/2021/en/artikkel/fylkesvise-tildelinger-virkemiddel
	Statistics of Norway (SSB) database on Research instruments	https://www.ssb.no/en/teknologi-og-innovasjon/forskning-og-innovasjon-i-naeringslivet/statistikk/naeringspolitiske-virkemidler
International		
	EC-OECD STIP Compass	https://stip.oecd.org/stip/
	OECD R&D Tax incentives database	https://oe.cd/rdtax
	Tenders Electronic Daily (TED) award notification dataset	https://data.europa.eu/data/datasets/ted-csv?locale=en

Source: OECD