BUSINESS
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HEADING FOR THE 4 PERCENT TARGET

Perspectives on the road for Finland to reach the government's target of 4 percent R&D spending as share of GDP by 2030

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BUSINESS FINLAND
We believe in the power of ideas. That's why we fund and help Finnish companies grow quicker and develop their innovations to become global success stories.

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FOREWORD

The government has set a target for Finland's research and development expenditure to be 4% of gross domestic product by 2030. Finland needs to develop a long-term plan to improve the R&D and innovation environment, aiming to reach a level of private and public investment and financing that accounts for four percent of gross domestic product. At the same time, it seeks to strengthen the international competitiveness and attractiveness of the Finnish research and science community by investing in research environments and research infrastructures.

Finland's strengths are well-functioning R&D system, a competitive overall cost level for R&D operations, strong expertise in a few knowledge and industry sectors, as well as a robust and evolving startup culture (OECD economic Surveys: Finland 2022). Challenges for Finland include the lack of long-term funding, a growing shortage of skilled professionals, slow productivity growth, and a narrow base of industrial structure. At the same time, the quality of R&D activities must be enhanced, and the R&D environment developed, especially as international competition intensifies.

The purpose of this study was to produce scenario-based view of Business Finland's success in achieving the objectives associated with a goal to reach 4 % R&D level of GDP by 2030. Main evaluation questions were: How can Business Finland succeed to increase public R&D funding that the society goal of 4% R&D level of GDP can be achieved? What might be the revolutionary ideas how to renew Business Finland's activities and the Finnish R&D and innovation system?

The evaluation team of Menon Economics AS carried out this scenario analysis. Business Finland wishes to thank the evaluators for their thorough and systematic approach. Business Finland expresses its gratitude to the steering group and all others who have contributed to the study.

Helsinki, November 2025
Business Finland

TIIVISTELMÄ

KOHTI 4 PROSENTIN T&K-TAVOITETTA

Suomella on kansallinen tavoite nostaa tutkimus- ja kehittämistoiminnan (T&K) kokonaismenot 4 prosenttiin bruttokansantuotteesta (BKT) vuoteen 2030 mennessä. Tämä Business Finlandin tilaama raportti tarkastelee, miten Suomi voi saavuttaa tämän tavoitteen perustuen kansainvälisiin vertailuihin, data-analyyseihin ja haastatteluihin suomalaisen innovaatiojärjestelmän toimijoiden ja kansainvälisten asiantuntijoiden kanssa. Raportissa keskitytään myös siihen, miten Business Finland voi omalla toiminnallaan tukea tätä kasvua. Raportin toimeksiannon mukaan tavoitteena on hahmottaa tulevaa kehityssuuntaa, tunnistaa keskeiset esteet ja mahdollistavat tekijät sekä esittää kunnianhimoisia politiikkatoimia, joilla voidaan kasvattaa yksityisiä T&K-investointeja ja samalla vahvistaa Suomen innovaatioekosysteemiä.

JULKISEN T&K-RAHOITUKSEN LAKI JA 4 PROSENTIN TAVOITE

Julkista T&K-rahoitusta koskeva laki astui voimaan 1. tammikuuta 2023. Lain mukaan julkisen sektorin on lisättävä T&K-rahoitustaan 1,2 prosenttiin BKT:sta vuoteen 2030 mennessä. Tämä vastaa noin kolmasosaa 4 prosentin tavoitteesta, jolloin jäljelle jäävät kaksi kolmasosaa tulee kattaa yksityisellä rahoituksella. Vuonna 2023 Suomen T&K-menot nousivat 3,09 prosenttiin BKT:sta, mikä oli korkein taso lähes kymmeneen vuoteen. Lähimmäs 4 prosentin tavoitetta Suomi pääsi vuonna 2009, jolloin T&K-menot olivat 3,73 prosenttia BKT:sta. Tämän jälkeen valtiontalouden sopeutustoimet ja Nokian matkapuhelinliiketoiminnan romahdus kuitenkin laskivat kansallisia T&K-panostuksia merkittävästi.

Neljän prosentin tavoitteen saavuttaminen edellyttää, että Suomen kokonais- T&K-menot nousevat nykyisestä noin 8 miljardista eurosta yli 12 miljardiin euroon vuoteen 2030 mennessä. Tämän vuoksi politiikkatoimien on oltava sekä mittakaavaltaan kunnianhimoisia että rakenteeltaan sellaisia, että ne lisäävät yksityisiä T&K-investointeja selvästi nykyistä enemmän.

SUOMEN JULKINEN TUKI JA KANSAINVÄLINEN VERTAILU

Harvat maat ovat pystyneet kasvattamaan T&K-panostuksia yhtä nopeasti kuin mitä 4 prosentin tavoite edellyttää, ja siellä missä kasvu on ollut nopeaa yritysten T&K-investoinnit ovat olleet ratkaisevassa asemassa. Siksi Suomen on lisättävä yksityisen sektorin T&K-investointeja huomattavasti, jotta 4 prosentin tavoite voidaan saavuttaa. Yritysten T&K-toimintaan suunnattu julkinen tuki on Suomessa kansainvälisessä vertailussa tänään melko vaatimattomalla tasolla ja painottuu lähes kokonaan suoraan

rahoitukseen (noin 0,06 prosenttia BKT:sta), kun taas verokannustimien osuus jää pieneksi (noin 0,01 prosenttia) suhteessa verrokkimaihin.

BUSINESS FINLANDIN ROOLI JA RAHOITUKSEN LISÄVAIKUTUS YRITYSTEN T&K-TOIMINTAAN

Business Finlandilla on keskeinen rooli Suomen T&K-politiikan toteuttamisessa ja 4 prosentin tavoitteen saavuttamisessa vuoteen 2030 mennessä. Business Finlandin budjettia on kasvatettu 32 prosentilla viimeisten viiden vuoden aikana, ja valtion julkisen talouden suunnitelman (2025–2028) mukaan Business Finlandille kohdennetaan seuraavina vuosina noin miljardin euron lisärahoitus. Tämän kehityksen myötä keskeiseksi kysymykseksi nousee, miten Business Finlandin rahoitus voidaan kohdentaa mahdollisimman tehokkaasti yritysten T&K-panostusten kasvun vauhdittamiseksi.

SUOSITELLUT PAINOPISTEET BUSINESS FINLANDIN RAHOITUKSELLE 4 PROSENTIN T&K-TAVOITTEEN SAAVUTTAMISEKSI

Raportissa tarkastellaan viittä politiikkaskenaariota, joiden avulla arvioidaan keinoja tukea 4 prosentin T&K-tavoitteen saavuttamista vuoteen 2030 mennessä. Skenaarioanalyysin perusteella esitetään keskeisiä strategisia toimenpiteitä sekä suositukset siitä, miten Business Finlandin tulisi kohdentaa rahoitustaan, jotta se voisi tehokkaimmin vauhdittaa yritysten omia T&K-panostuksia. Analyysin perusteella Business Finlandin rahoituksen tulisi painottua seuraavasti:

- *Rahoitusta myöhäisemmän TRL-tason hankkeisiin,* mikä myös tarkoittaa suurempia tukisummia valituille hankkeille. Rahoitus voidaan lisäksi porrastaa projektin etenemisen mukaan.
- *Lisäresursseja ekosysteemirahoitukseen,* jotta syntyisi enemmän verkostovaikutuksia ja uusia yritysyhteyksiä sekä kotimaassa että kansainvälisesti.
- *Tukea innovatiivisiin julkisiin hankintoihin,* esimerkiksi puolustuksen ja vihreän siirtymän alueilla. Hankinnat voidaan kohdentaa kansallisiin missioihin, kuten turvallisuusteknologioihin, uusiutuvaan energiaan ja terveyteen liittyviin palveluihin. Näin julkista kysyntää voidaan hyödyntää strategisesti luomaan uusia markkinoita ja T&K-toiminnan vetureita.

Vaikka on epävarmaa, riittävätkö yllä kuvatut toimet 4 prosentin tavoitteen saavuttamiseen, ne lisäävät jo itsessään merkittävästi julkista tukea yritysten T&K toimintaan. Siksi yksi vaihtoehto on ensin kokeilla näitä strategioita ennen kuin siirrytään muihin toimenpiteisiin. Jos halutaan kokeilla myös toimia jotka eivät kuulu nykyisen T&K lain piiriin, suosittelemme seuraavia lisätoimia:

- *Laajemmat ja paremmin suunnitellut verokannustimet*. Nykyisiä T&K-verokannustimia tulisi

laajentaa merkittävästi, jotta Suomi voisi lähestyä OECD:n johtavien maiden tasoa. Verokannustimet tulisi suunnitella mahdollisimman vaikuttaviksi ja rakentaa hyödyntäen muiden maiden toimivia käytäntöjä. Kannustimien olisi oltava riittävän houkuttelevia pienille yrityksille, ja samalla tukien keskittymistä suurille yrityksille tulisi ehkäistä esimerkiksi yrityskohtaisten enimmäismäärien avulla. Tukikelpoisuuden tulisi olla riittävän laaja, jotta verokannustimet tukisivat teollisuuden ohella myös muita aloja, kuten palveluinnovaatioita.

- *Houkuttelevammat riskilainat ja hybridirahoitusinstrumentit*. Business Finlandin laina- ja takausinstrumentteja tulisi laajentaa ja tehdä nykyistä houkuttelevammiksi. Vaikka nämä instrumentit eivät kuulu hallituksen tämänhetkiseen suunnitelmaan, niiden käyttöönotto olisi perusteltua. Muutokset voisivat sisältää markkinakorkoa alhaisemmat lainat, pankkien riskienjaon parantamisen ja ehdolliset tukimuodot, jotka muuntuvat lainoiksi hankkeen onnistuessa. Hybridimallit tekisivät lainoista varteenotettavan vaihtoehdon suoralle tuelle ja voisivat tukea erityisesti suuria, myöhäisemmän TRL-tason hankkeita. Näin voitaisiin rahoittaa useampia suuria projekteja ilman suhteellisesti suurempia julkisia menoja.
- *Laajempaa kansainvälistä yhteistyötä ja vahvempia ekosysteemejä.* Suomi ei voi saavuttaa korkeaa T&K-intensiteettiä ilman tiiviitä yhteyksiä kansainvälisiin verkostoihin. Siksi Business Finlandin ja muiden rahoittajien tulisi voida rahoittaa hankkeita, joita toteutetaan osittain ulkomailla, kunhan ne vahvistavat suomalaisia yrityksiä ja ekosysteemejä. Tämä voi tarkoittaa yhteishankkeita monikansallisten yritysten kanssa, yhteiskehitystä ulkomaisten tutkimusorganisaatioiden kanssa tai jopa kansainvälisten alihankkijoiden rahoittamista silloin, kun se on strategisesti

EXECUTIVE SUMMARY

perusteltua. Tavoitteena on tuoda kansainvälinen osaaminen ja toimijat osaksi suomalaisia ekosysteemejä, jotta niistä syntyy kotimaisia hyötyjä ja uusia T&K-panostuksia.

Finland has set a clear national ambition: to raise total research and development (R&D) expenditure to 4 percent of GDP by 2030. This report, commissioned by Business Finland, examines how Finland can get there, drawing on international comparisons, new data analysis, and interviews with actors across the Finnish innovation system as well as foreign/international experts. The report also focuses on what Business Finland can do to support this growth. The mandate is to look forward, map obstacles and enablers, and recommend quite radical policy pathways that can increase private R&D investment while strengthening the broader innovation fabric.

THE LAW ON PUBLIC R&D FUNDING AND THE 4 PERCENT TARGET

The law on public R&D funding[1] entered into force on January 1st, 2023. It commits the public sector to increase R&D funding to 1.2 percent of GDP by 2030 (roughly one third of the overall 4 percent target). The remaining two thirds must come from the private sector, with the law establishing monitoring mechanisms and the possibility to adjust public allocations if private investments underperform. This framework gives Finland predictable public funding and a shared accountability structure with employers' organizations and major companies, many of whom have pledged to raise their R&D spending in line with the target. In 2023, total R&D reached 3.09 percent of GDP, the highest in almost ten years. The closest Finland has been to reaching the target was in 2009, when R&D peaked at 3.73 percent, before the combined effects of fiscal consolidation and the collapse of Nokia's mobile business lowered national R&D.

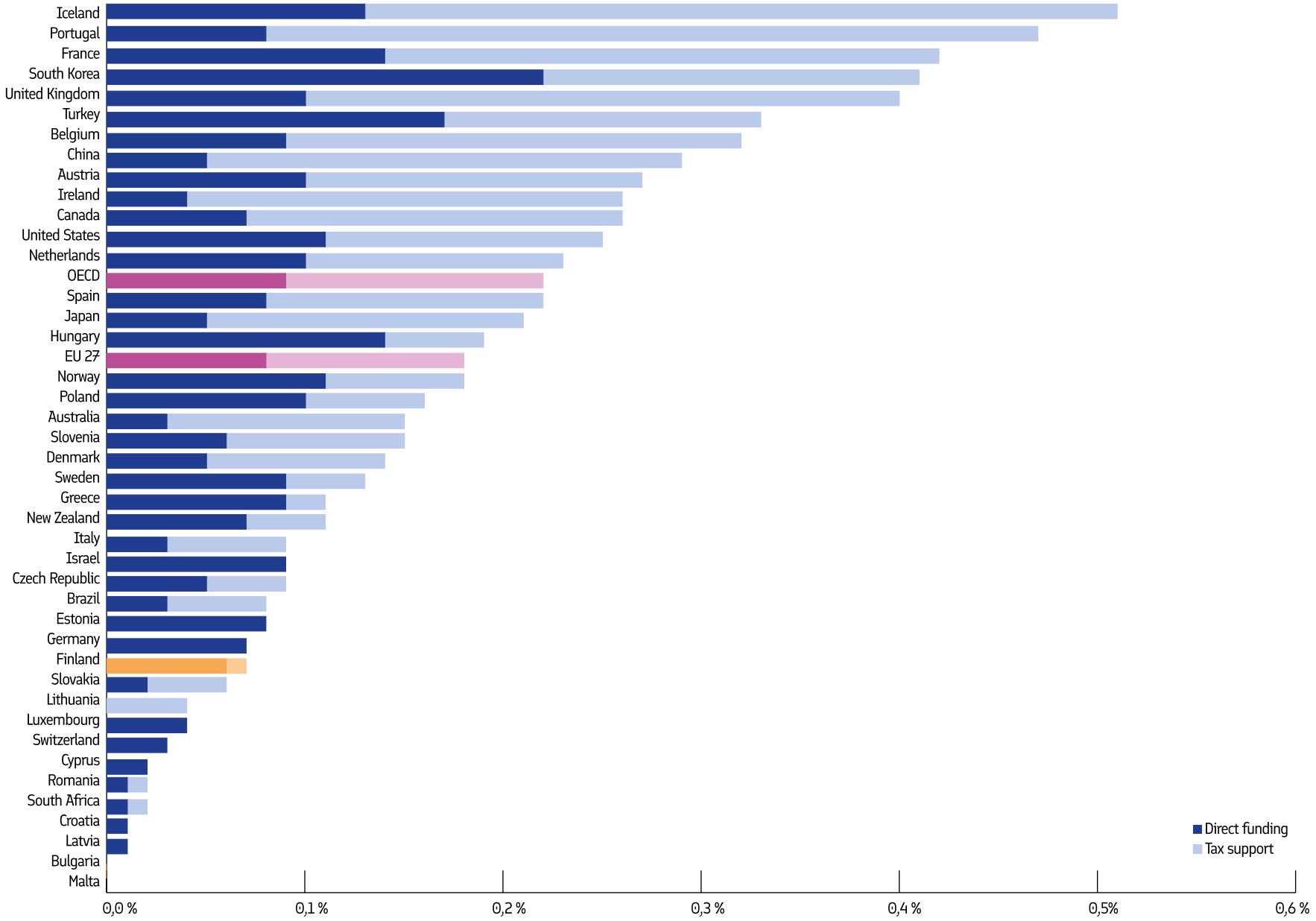
FINLAND HAS MODEST LEVELS OF SUPPORT TARGETED TOWARDS PRIVATE SECTOR R&D

Finland's public support targeted directly at business R&D remains modest by international standards, and its composition stands out. In 2023, combined government subsidies for business enterprise R&D (BERD) was about 0.07 percent of GDP, far below OECD and EU averages. Moreover, support is skewed toward direct funding (around 0.06 percent of GDP) with a very small tax deduction component (about 0.01 percent). R&D tax incentives were reintroduced only in 2024 after a brief 2013–2014 trial, leaving Finland with an instrument mix that differs markedly from many peers that rely more heavily on tax incentives. Few countries have ever increased R&D levels as fast as what is required from Finland to achieve the 2030 goal of 4 per-

1 Act on the Financing of Research and Development Activities (1697/2022)

cent. Where such growth in R&D has been achieved, growth in BERD has been important, not public or higher-education R&D alone. To hit 4 percent by 2030, Finland must mobilize significantly more private investment than today. To identify successful R&D policies, we have examined countries with strong business R&D performance, rapid growth in R&D intensity, or ambitious national strategies. Evidence shows that growth is almost always driven by the business enterprise sector, though the balance between public and private financing varies. Israel and South Korea have large-scale private investment, Belgium and Iceland rely more on tax incentives, while the Netherlands and the United Kingdom use mission-oriented strategies.

Business Finland is given a central role in the plan for reaching 4 percent by 2030. The budget has been increased by 32 percent over the last five years and, based on the General Government Fiscal Plan (2025–2028), a further increase of EUR 1bn will be provided for grant funding through Business Finland over these next years. In light of these changes, a key question arises: what tools should Business Finland apply to speed up overall business R&D spending most efficiently? Economists label this kind of efficiency with the word "additionality": how many euros in private R&D spending will one euro in support from the government provide? Clearly, this is not only relevant for instruments today managed by Business Finland. Hence, we also discuss the additionality of alternative policy strategies in this report.



DIRECT GOVERNMENT FUNDING AND GOVERNMENT TAX SUPPORT FOR BUSINESS R&D AS SHARE OF GDP IN 2023

Even with an optimal composition of grants offered by Business Finland, we believe that there is still a substantial way to go in order to reach the 4 percent goal. Notice that in order to reach the 4 percent target, the annual total spending on R&D has to grow from approximately EUR 8 bn today to more than 12 bn in 2030. Hence, policy must be scaled and designed to raise private sector R&D investments substantially.

POLICY SCENARIOS WITH POSSIBLE R&D FORECASTS FOR 2030

We have designed five policy scenarios to examine how different policy instruments can help in achieving the 4 percent goal. Scenarios A, B and E are closely linked to Business Finland's policy instrument portfolio, while Scenarios C and D examine instruments that at least today are not a part of Business Finland's mandate. These scenarios are based on insights from other countries with a strong growth in the R&D share of GDP over the last decades as well as policy suggestions from expert interviews and the literature on R&D instruments. Together, these scenarios provide complementary perspectives on how Finland can achieve 4 percent R&D to GDP by 2030.

Scenario A highlights the pivotal role of Business Finland (BF) in driving Finland's R&D agenda. While BF's funding has expanded by 32 percent in recent years, a stronger focus is needed to reach the 4 percent target. We recommend shifting to a stronger emphasis on grants that support projects in the later TRL-stages as well as grants allowing for a stronger involvement of foreign R&D collaborators. In addition, we argue strongly for a more attractive framing of risk loans and hybrid instruments, enabling larger projects at higher TRL levels. We are aware of that the existing government strategy does not include loans, but it should. Also, expanding programs like the Young Innovative Company scheme and introducing funding for "first-of-a-kind" demonstrations can help SMEs scale. Broadening support into underrepresented sectors and explicitly financing international cooperation will increase reach, additionality, and long-term impact, making BF a central engine for growth.

Scenario B scales ecosystem financing around instruments such as Business Finland's Veturi and the Research Council's Flagships. The idea is to move from fragmented cooperation to platforms that hard-wire SME inclusion, shared test and pilot facilities, and regional diffusion, so that spillovers reach beyond dominant incumbents and the Helsinki area. Speed is medium (leveraging existing networks is quick, but new facilities and governance take time) while additionality depends on bringing mid-sized firms and services into advanced R&D environments.

Scenario C proposes a big push on tax incentives from today's rather small base. Properly designed with refundability targeted to SMEs, caps and incremental rates for large firms, broader eligibility that recognises software and services, and a five-year sunset with evaluation, this is the fastest lever and could quickly mobilise volume, attract foreign R&D units, and reach many firms. The report's worked example suggests that lifting deductions from below 0.1 percent to around 0.25 percent of GDP could bring national R&D intensity to about 3.75 percent by 2030, provided tax support is aligned with missions, procurement and ecosystem programmes. In this scenario, Business Finland's plays a complementary and enabling role through e.g. advisory services.

Scenario D addresses Finland's "scaling" bottleneck with a more proactive, state-driven venture model. By tripling the capital channelled through Tesi and structuring public co-investment to crowd in private money, the state would lower risk thresholds for late-stage, R&D intensive growth. Effects arrive more slowly than for tax incentives because funds must be formed and deployed, but the long-term gains, anchoring new R&D intensive companies in Finland, could be substantial. On the report's assumptions, this path could lift intensity to roughly 3.5 percent by 2030, with larger effects thereafter. In this scenario, Business Finland plays an enabling role, e.g. through helping start-ups and scale-ups reach the stage where they are investment-ready, or co-financing high-risk pilot projects, demonstrations, or early R&D activities that private investors might still consider too uncertain.

Scenario E is based on mission-based innovative procurement. Finland already leads on innovative procurement metrics, with a national 10 percent goal, the Hilma portal, and Business Finland grants that require at least 80 percent R&D content. In this scenario we shift from generic quotas to mission-anchored portfolios that align big buyers with national priorities and track euro-level R&D content and outcomes. This route can scale relatively quickly by repurposing existing budgets, but buyer capabilities and contracting models must be upgraded to avoid lock-in and ensure spillovers. However, we believe that it is not realistic for innovative procurement to lead to a large increase in R&D activity in the short run, and not before 2030.

THE RECOMMENDED POLICY COMBINATION

Based on our scenario analysis, we point at a combination of strategic moves that we assess would help Finland to climb towards the 4 percent target in 2030. From scenario A, B and E, we have outlined the following suggestions for what types of grants Business Finland should devote more resources to:

- Grants focusing on projects in the later TRL-stages, implying larger grants to each projects, potentially applying a milestone structured grant financing.

- More resources devoted to ecosystem funding to ensure spillovers and activation of business linkages both at home and abroad.
- More resources devoted to grants that support innovative contracts associated with government procurements. One could follow a mission-based procurement strategy focusing on defence and green challenges. By linking procurement more explicitly to national missions (such as defence and security technologies, green transition, renewable energy, and health-related services) public demand can be used more strategically to create lead markets.

Even if it is uncertain whether the measures listed above will be enough to reach the 4 percent targe, these policy measures will on their own represent a large increase in the public resources targeting private sector R&D. Hence, one option is to first test out these strategies before trying other measures. If one wants to proceed with other measures, outside of the current R&D law, we recommend the following for highest additionality:

First, generous and well-designed tax incentives. The current scheme should be scaled up significantly to reach levels closer to leading OECD peers. Refundability must be targeted to SMEs and younger firms, where responsiveness is highest, while large companies should receive incremental credits at lower rates. Firm-level caps and declining marginal rates are recommended to prevent excessive concentration of benefits among a handful of incumbents, but deductions must remain substantially more attractive than today. Eligibility rules should explicitly include not only traditional manufacturing but also other areas, like service innovation, AI, and software development. A five-year sunset clause with mandatory evaluation would help ensure fiscal sustainability and allow adjustments if costs escalate or additionality proves weaker than expected.

Second, more attractive risk loans and hybrid instruments. Business Finland's loan and guarantee instruments should be scaled up and made more favourable. We are aware of the fact that such tools are not a part of the government plan today, but they should. This move could include lowering interest rates below market levels, providing banks with more generous loss-sharing arrangements, and offering conditional grants that convert into loans if projects succeed. Such hybrids would strike a balance between risk-sharing and fiscal prudence, making loans a more appealing alternative to grants. Larger R&D projects at higher TRL levels, where costs are greatest, would particularly benefit from this shift. Over time, this move would allow Finland to finance a greater number of large projects without requiring proportionally larger government outlays.

Third, expanded international cooperation and stronger ecosystems. In today's globalised innovation landscape, no country can achieve high R&D intensity without good connections to international networks. Finland should therefore allow Business Finland and other agencies to co-finance projects that are partly conducted abroad, provided that they strengthen the capacity of Finnish firms and ecosystems. This could include joint projects with multinational companies, co-development with foreign research organisations, or even financing international subcontractors when strategically justified. The key is to anchor foreign firms and capital in Finland's ecosystems, ensuring that international knowledge flows translate into domestic spillovers and subsequent domestic R&D investments.

1 INTRODUCTION AND BACKGROUND

1.1 THE 4 PERCENT TARGET AND RECENT POLICY MEASURES TO REACH IT

The Finnish government has set a target of raising research and development (R&D) expenditure to 4 percent of GDP by 2030. This target is a part of the law on public R&D funding, which entered into force on January 1st 2023.[2] The law aims to ensure predictable and sustained public R&D funding for the 2024–2030 period. The government considers R&D important for supporting productivity growth, industrial renewal, and a base for funding the welfare state. It also aims to enable Finland to address societal challenges such as the green transition and to strengthen the country's ability to adopt to digital transformations and develop new technologies.

Under the law, public R&D funding will increase annually to reach 1.2 percent of GDP by 2030, accounting for slightly less than one-third of the overall target. The private sector is expected to provide the remaining two-thirds of

2 Hallituksen esitys eduskunnalle laiksi valtion tutkimus- ja kehittämistoiminnan rahoituksesta vuosina 2024–2030, HE 211/2022

total R&D investment, consistent with private sector share of R&D in EU countries. In 2022, R&D financed by the government accounted for 0.77 percent of GDP, with an additional 0.07 percent coming from the higher education and private non-profit sectors. R&D financed by the business enterprise sector equalled 1.73 percent of GDP. As part of the legislative process, Finnish employer organisations, industry associations, and large corporate representatives participated in a parliamentary R&D working group and committed to increasing private R&D investments in line with the 4 percent target. The law includes mechanisms for monitoring private R&D spending and allows adjustments to public funding or its allocation, if private investments do not develop as planned.

Key measures to reach the target include drafting a multi-year national plan for allocating public R&D funds, monitoring private sector R&D investment levels, and strengthening cooperation between businesses, universities, and research organisations to promote innovation and economic growth.

1.2 THE MANDATE OF THIS PROJECT

Business Finland has requested Menon Economics to carry out a forward-looking, scenario-based analysis to support Finland in achieving the national target of increasing R&D expenditure to 4 percent of GDP by 2030. More specifically, the goal of this report is to examine how Business Finland can contribute to increasing private R&D spending and explore transformative approaches for renewing both its own activities and the wider Finnish R&D and innovation system. The report aims to include benchmarking against advanced economies to identify effective strategies for stimulating private R&D investments. Furthermore, it should map out funding and innovation pathways for 2025–2030, identify key actors and funding sources, and assess opportunities and bottlenecks, including challenges related to private capital, industrial renewal, and workforce development. Using data analysis and insights from leading experts, the report should provide recommendations and propose tools to strengthen Finland's innovation capacity and international competitiveness over the next five years.

1.3 OUR APPROACH AND INFORMATION SOURCES

We have used the following data sources to collect and analyse information for this report:

Data analysis. Data on Finland's and other countries' R&D efforts and policies from Business Finland and OECD. The analysis draws on data from several OECD sources,

including the Main Science and Technology Indicators, the ANBERD database, National Accounts, the STAN Database, and the R&D Tax Incentives Database.[3] These databases provide comparable information on R&D, innovation, and industry-level developments across OECD member countries. In addition, Business Finland provides publicly accessible data on its grant schemes and funding recipients, offering transparency on the allocation of public R&D support.[4]

Review of relevant literature. Research evidence on the effectiveness of various R&D policies and evaluations on countries' R&D performance. To assess the effectiveness of different R&D policy instruments, we conducted a review of relevant international research literature, primarily peer-reviewed studies identified via Google Scholar. Two recent studies have been particularly relevant for analysing Finland's R&D performance and historical development: the OECD report "Targeting R&D intensity in Finnish innovation policy" (2021), conducted under the 2019–20 OECD project on R&D intensity as a policy target, and the Horizon Europe report "Support to Finland on improving R&D collaboration between research organisations and the private sector" (2025). Comparative information on R&D policies and performance in other countries has been drawn from these sources, as well as official government reports, evaluations, and additional OECD work, including the MICROBERD+ project.

Interviews. Views from stakeholders in Finland's R&D ecosystem and international experts on how to increase R&D performance. The Finnish stakeholders included representatives from Business Finland, industry, universities, the Research Council of Finland, relevant ministries, and other policy organisations. The international experts, primarily academics and researchers, were selected for their ability to contribute alternative perspectives and propose novel approaches to enhancing R&D policy. We have gathered information from 17 informants during the project.

1.4 A BRIEF REFLECTION ON WHY A PERCENTAGE TARGET IS VALUABLE

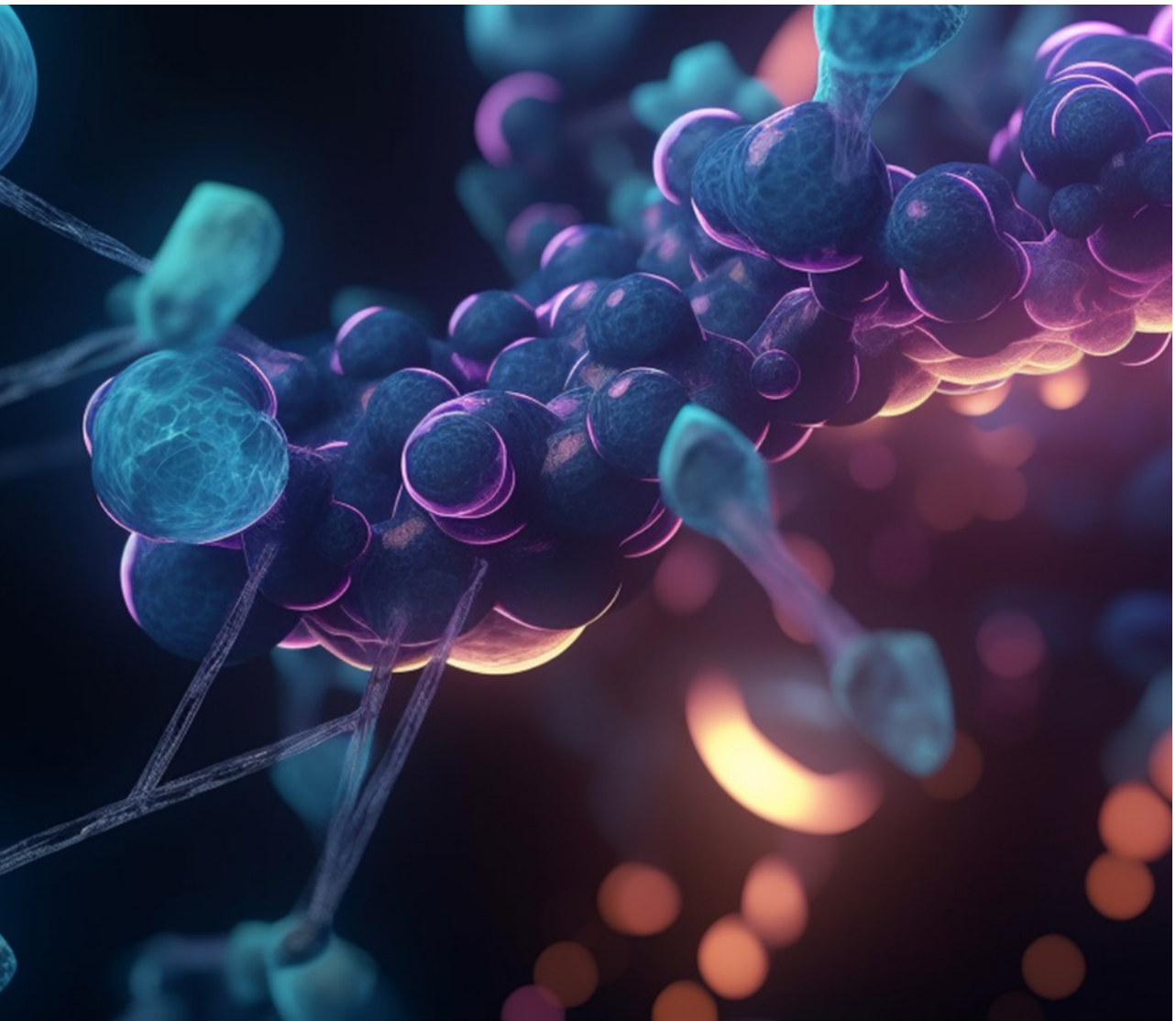
A country's commitment to innovation is frequently proxied by its R&D intensity, defined as gross research and development (GERD) as a percentage of GDP. Over the past decades, economists and international organizations have extensively studied the link between innovation and productivity, finding a broad consensus that greater innovation effort (as reflected in higher R&D spending) tends

3 OECD Data Explorer. Available here.
4 Business Finland: Funding Information. Available here.

to correlate with higher productivity and economic growth. Empirical research at firm, industry, and country levels strongly supports the positive link between innovation (proxied by R&D effort) and productivity. At the macroeconomic level, cross-country comparisons echo these findings. Nations that lead in productivity indicators typically are those with high innovation outputs and investments (Griffith, Redding, & Reenen, 2004). This study also shows that countries at the forefront of total factor productivity (TFP) performance also tend to have consistently high R&D intensities.

Nevertheless, it is important to notice that R&D intensity measures an input to innovation (the resources devoted to research) rather than innovation output or impact. While high R&D spending is generally associated with high levels of innovation and economic output, the relationship is not strictly linear. Above certain levels, additional R&D may yield diminishing returns, and the effectiveness of R&D can depend on how efficiently investments translate into commercialized innovations. There is no universally agreed "optimal" R&D intensity applicable to every country. Structural factors also influence national R&D intensity: for example, economies specialized in R&D intensive industries. Research across OECD countries indicates that R&D and human capital together act as universal drivers of productivity, and the impact of R&D is strongest when a country has a substantial stock of knowledge and skills to absorb new technologies (Khan, Luintel, & Theodoris, 2011). Another general insight from the empirical literature is that the R&D-productivity relationship can exhibit diminishing or nonlinear returns. At very low levels of R&D spending, firms or economies might not reach the critical mass needed to yield noticeable productivity gains, whereas beyond a certain threshold R&D can have substantial payoffs. Other studies point to increasing returns to research effort up to a point.

2 FINLAND'S R&D LANDSCAPE TODAY



Finland has recently reversed a long period of declining R&D investment, reaching 3.1 percent of GDP in 2023, the highest level in almost a decade. This development likely reflects renewed policy attention and stronger public and private commitment to R&D. Despite this progress, R&D intensity remains below the national 4 percent target and historic peak levels. Business R&D accounts for the majority of total investment, particularly within ICT-related industries. At the same time, public support for business R&D is relatively modest and primarily delivered through direct funding and secondarily tax incentives. Finland's industrial structure and sector specific R&D intensity both shape its current performance. Further progress will depend on a combination of structural shifts and more targeted policy instruments.

2.1 HISTORICAL DEVELOPMENT IN R&D SPENDING

In 2023, R&D expenditure in Finland reached 3.09 percent of GDP, the highest level in nearly a decade. Figure 2-1 illus-

trates the historical trajectory of Finland's R&D intensity and intensity target over time. Despite the recent gains, current R&D intensity remains below the level during the global financial crisis and prior to the decline of Nokia. Finland came closest to meeting its 4 percent target in 2009, when R&D expenditure peaked at 3.73 percent of GDP.[5] The following textbox provides a detailed account of the historical development.[6]

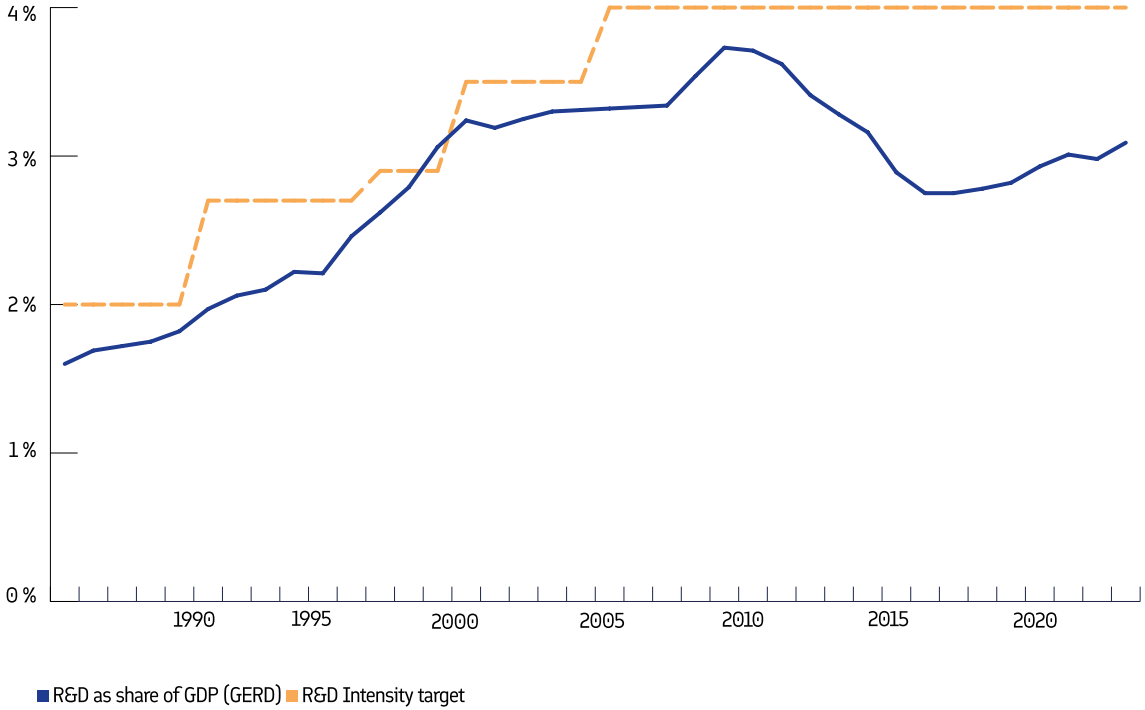


FIGURE 2-1: R&D AS SHARE OF GDP IN FINLAND AND R&D INTENSITY TARGET. SOURCE: OECD MSTI DATABASE [7], MENON ECONOMIC

5 The increase in R&D intensity from 2008 to 2009 was mainly driven by a larger fall in GDP than R&D during the financial crisis.
6 Based on the OECD-report (Deschryvere, Husso, & Suominen, 2021): "Targeting R&D intensity in Finnish innovation policy". Available **here**.
7 Available **here**.

1980s–1995: A period marked by globalisation and rapid technological progress. In Finland there was increased public investment in education and research, and business sector increased R&D spending. This was also the era of Nokia's emergence as a global technology leader.

1996–2000: The late 1990s saw the rise of the dot-com economy. Government R&D spending plateaued, while business R&D (particularly in the ICT sector) grew, becoming the largest driver of national R&D intensity.

2001–2008: Following a brief decline after the dot-com crash, R&D expenditure grew until the 2008 financial crisis. The ICT sector, led by Nokia, was the most important component in R&D spending. The ICT sector accounted for 43 percent of total expenditure in 2008, with Nokia alone representing 2.6 percent of GDP and over a third of all R&D investments (Ali-Yrkkö J. , 2010).

2009–2011: Despite the economic downturn, public R&D spending increased through counter-cyclical policies. Business R&D was reduced, but the ICT sector remained a major contributor, with Nokia still holding a leading global market position.

2012–2016: A shift away from counter-cyclical fiscal policies led to significant cuts in government R&D funding. Simultaneously, Nokia's downturn, driven by product development failures and shrinking market share, had a large impact on R&D spending. The mobile unit was sold to Microsoft in 2013. Combined with broader structural shifts, this period marked a turning point in Finland's innovation policy, as focus on R&D decreased.

2017–2023: Following a decade of decline, R&D spending increased again from 2017, driven by renewed public and mostly private investments. Despite a minor pandemic-related reduction in spending, R&D intensity surpassed 3 percent of GDP by 2021. The law on state R&D funding was further enacted in 2023. This period has also been marked by low or stagnant productivity growth, both in Finland and across Europe (Draghi, 2024). During this period, R&D as a share of GDP began to recover, driven by increased expenditure from the business enterprise sector. Initially, the growth was largely financed by foreign actors, but since 2019 it has primarily been sustained by the business enterprise sector (see Figure 23 and Figure 24).

2.2 R&D SPENDING TODAY

Finland's recent growth in R&D investments makes it one of the countries with the highest R&D intensity. With R&D expenditure reaching 3.09 percent of GDP, Finland ranks above both the OECD average of 2.7 percent and the EU27 average of 2.13 percent, see Figure 2-2. Finland also performs well on other innovation indicators. Notably, the country ranks fourth on the EU Innovation Scoreboard (European Commission, 2024).

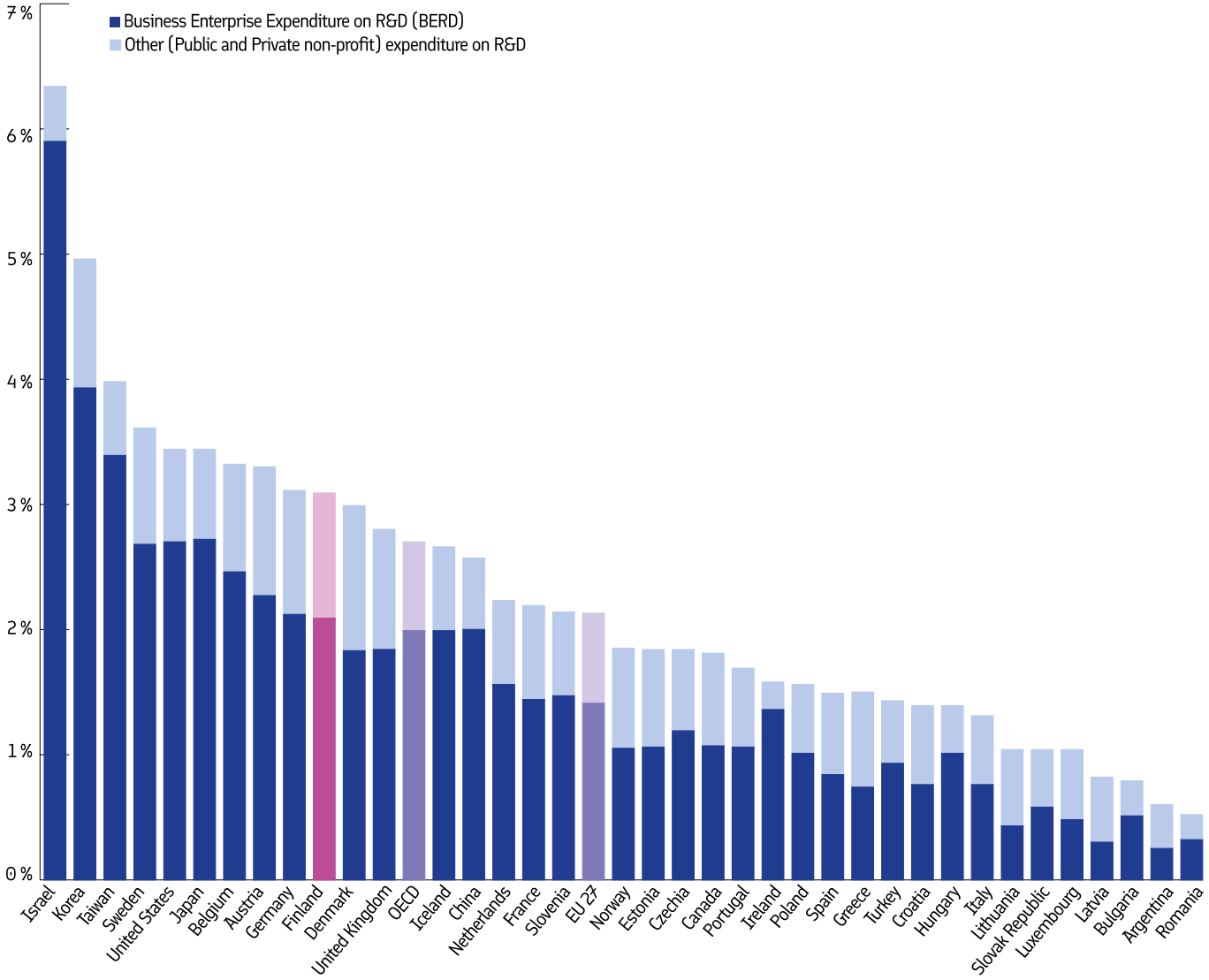


FIGURE 2-2: GROSS DOMESTIC EXPENDITURE ON R&D AS SHARE OF GDP IN 2023. SOURCE: OECD MSTI DATABASE, MENON ECONOMICS

8 Data on gross domestic expenditure on R&D as share of GDP for United Kingdom are from 2022, while data on business expenditure on R&D for United Kingdom are from 2023.

9 Available **here**.

While Finland ranks above both the EU and OECD averages, we can also see from Figure 2-2 that several countries allocate a significantly larger share of their GDP to R&D. The figure also shows that Finland's 4 percent target is ambitious in an international context. Notably, only Israel and Korea invest more than 4 percent of GDP in R&D, while Taiwan is close with 3.98.

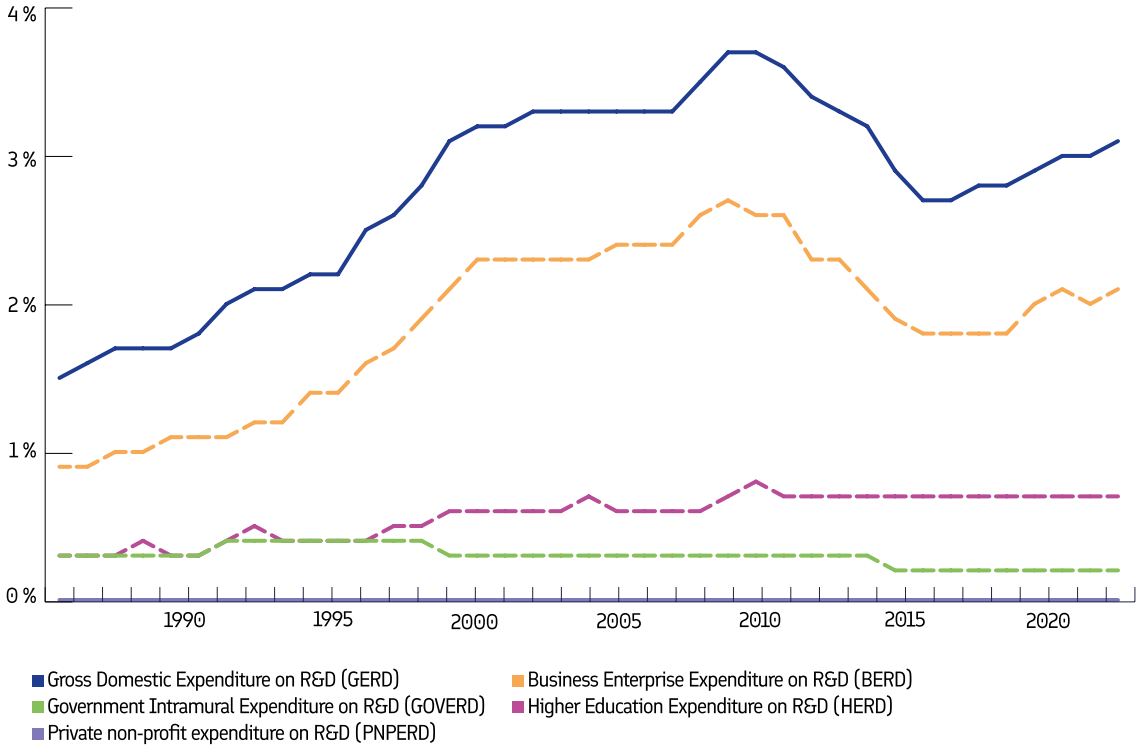


FIGURE 2-3: R&D AS SHARE OF GDP, BY SECTOR IN FINLAND. SOURCE: OECD MSTI DATABASE [10], MENON ECONOMICS

Figure 2-2 also highlights that, in most countries, a majority of R&D activity takes place within the business enterprise sector. There is a clear pattern showing that countries with high R&D intensities have a larger business sector share in total R&D. The correlation coefficient between these two measures is statistically significant and as high as 0.75.

Also in Finland the majority of R&D activity is conducted within the business enterprise sector (BERD), see Figure 2-3. In 2023, this sector accounted for 68 percent of total R&D investment which is slightly above the EU average. The contributions from other sectors have remained relatively low over time, although government intramural expenditure on R&D (GOVERD) has declined somewhat, while higher education R&D (HERD) has shown modest growth. Historically, the main driver of changes in gross domestic expenditure on R&D (GERD) has been fluctuations in BERD.

10 Available **here**.

In Figure 2-4 we examine the financing sources for R&D in Finland over time. While Figure 2-3 shows R&D by performing sector in Finland, Figure 2-4 displays the sector that finances the R&D activity. The difference is that *expenditure* refers to the sector that spends the R&D funds and thereby carries out the R&D activity, whereas the *financing sector* is the sector from which the funds originate.

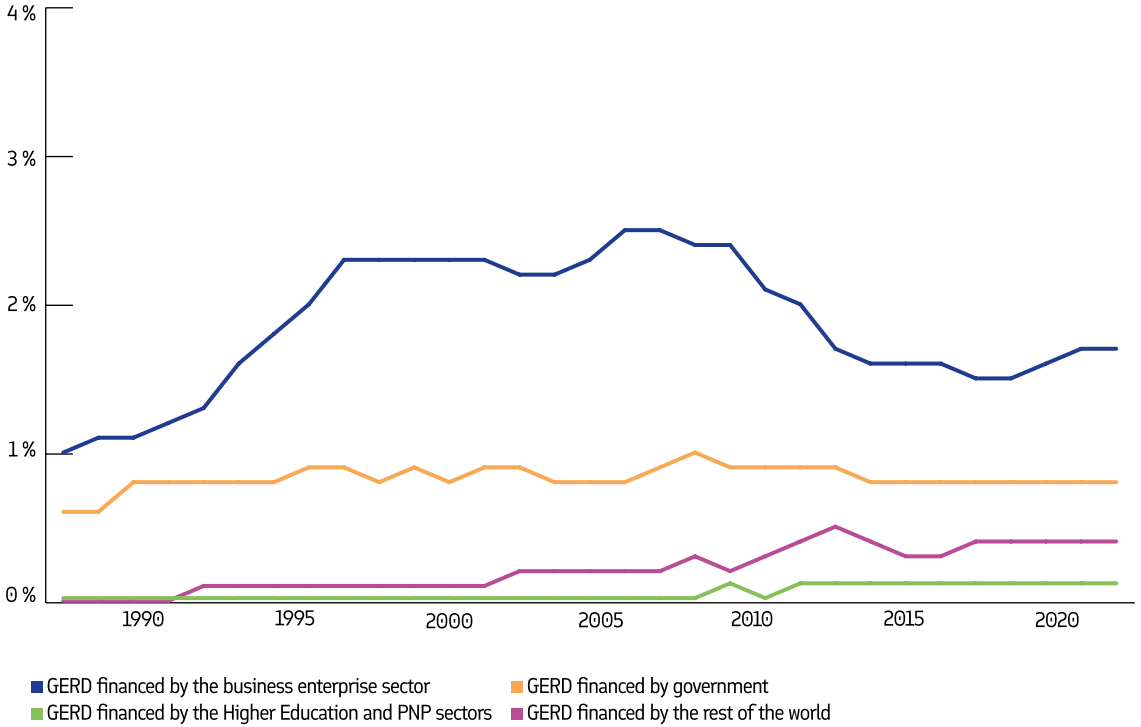


FIGURE 2-4: R&D FINANCING AS A SHARE OF GDP, BY THE FINANCING SECTOR IN FINLAND. SOURCE: OECD MSTI DATABASE [11], MENON ECONOMICS

For example, R&D expenditure in the business enterprise sector may be financed both by the sector itself and by government. Similar to R&D expenditure, the figure shows that financing of R&D in Finland is strongly linked to the business enterprise sector. In 2022, this sector accounted for 58 percent of all R&D funding. The figure further shows that private financing has largely determined the historical trajectory of national R&D spending, as other sources such as government funding have been more stable over time and represent a smaller share. The decline in gross domestic expenditure on R&D after 2009 is almost entirely explained by reduced business-sector investments, in which Nokia's downturn plays an important role.

2.3 SECTOR COMPOSITION AND R&D SPENDING

Overall, high R&D intensity can result either from an industrial structure dominated by R&D intensive sectors or from relatively high R&D intensity within individual sectors, alternatively both. In this section, we examine the extent to which Finland's industrial structure influences its R&D intensity, while the next section (2.4) examines R&D intensity within sectors - that is, R&D intensity independent of the industrial structure.

11 Available **here**. Note that data are only available for every second year up until 1997.

The composition of a country's industrial structure plays an important role in shaping its overall R&D performance. Certain sectors are inherently more R&D intensive than others, e.g. pharmaceuticals, ICT, transportation equipment (mostly motor vehicle production) and information services. In the OECD countries, these sectors account for most business R&D expenditure. Countries like Korea, Israel, Japan, and Germany would show lower overall R&D intensity if they had the same industrial structure as the OECD average OECD, 2021). In contrast, countries such as France, the UK, the Netherlands, Norway, and Australia would rank higher. Adjusting for sectoral composition would thus alter R&D rankings and reduce the observed variation across countries.

By examining the sectoral distribution of business R&D within countries, we can better understand the underlying drivers of national R&D intensity. Figure 2-5 shows business R&D expenditure by industry as a share of total business R&D across selected OECD countries.

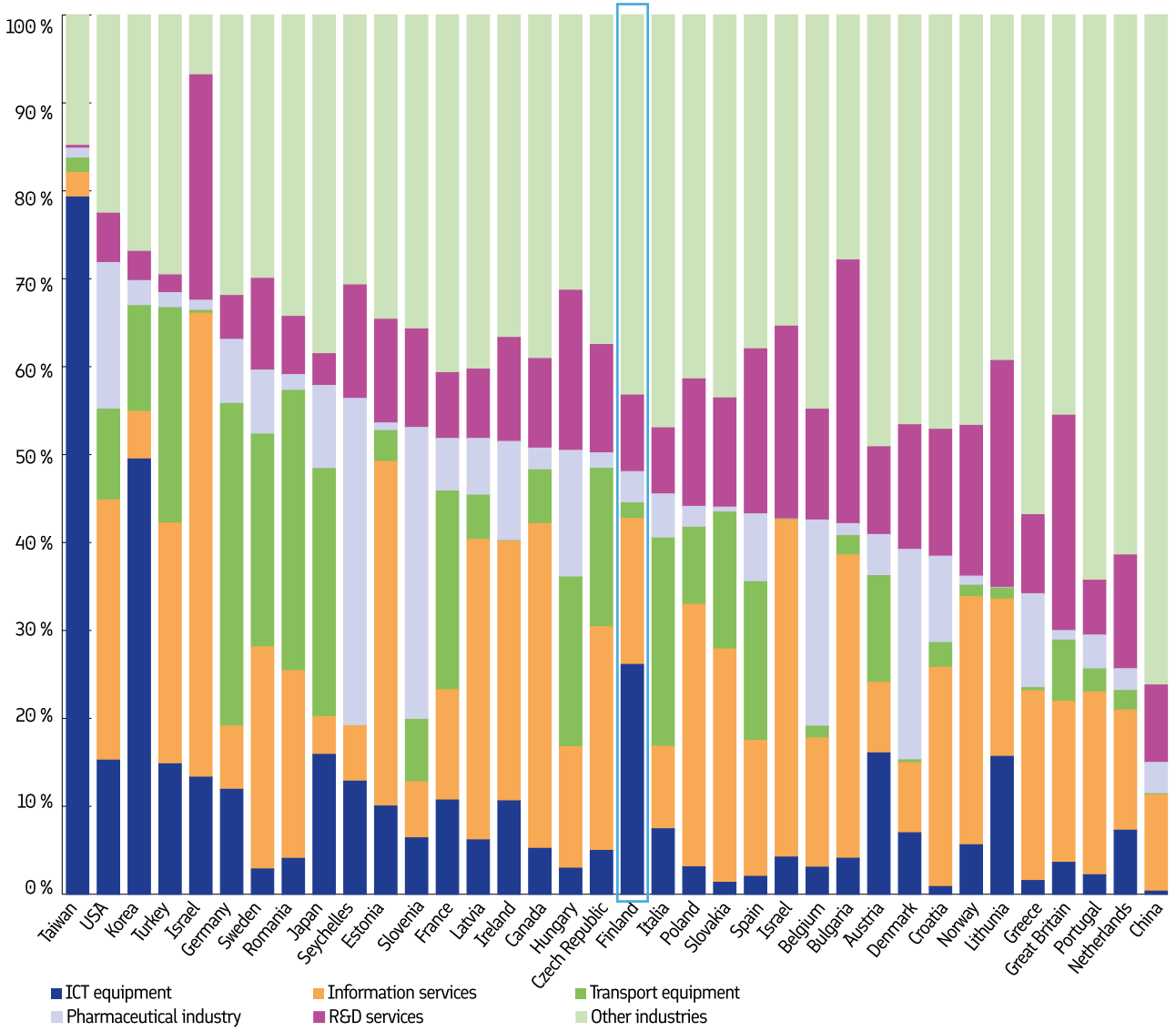


FIGURE 2-5: BUSINESS R&D EXPENDITURE BY INDUSTRY AS SHARE OF TOTAL BUSINESS R&D. 2022 OR NEWER.
SOURCE: OECD ANBERD DATABASE [12]. MENON ECONOMICS

12 The figure have been processed by the OECD (available **here**) and are based on data from the OECD ANBERD database (available **here**). ICT equipment', 'information services', 'transport equipment', 'pharmaceutical industry' and 'R&D services' refer to ISIC Rev. 4 codes 26, 58–63, 29–30, 21 and 72. For Switzerland, transport equipment is included in 'Other industries'. Data for Israel are provided by the national authorities.

In Finland, business R&D is heavily concentrated in ICT equipment and information services, which together accounted for 26 percent of total business R&D expenditure. Finland stands out from international peers particularly in the ICT equipment where only Taiwan (79 percent) and Korea (49 percent) have a larger share of business R&D concentrated in ICT. In many other countries, information services represent a more substantial component of business R&D.

Cross-country comparisons reveal that R&D activity is often concentrated in sectors where countries hold a competitive or technological specialisation. For example, Germany and Japan allocate a significant share of business R&D to transport equipment, while Denmark and Belgium have more R&D activity in pharmaceuticals and Taiwan has concentrated its R&D in ICT equipment. Other countries have a more diversified sectoral R&D profile, such as Spain and the USA.

Some of the stakeholders interviewed for this report highlighted Finland's large service sector as a structural constraint due to its generally low R&D intensity. However, in 2024, the service sector accounted for 71 percent of Finland's GDP, slightly below the EU average (74 percent) and the OECD average (73 percent).[13] This suggests that, while the sectoral composition may pose challenges, the relative size of the service economy is not markedly different from peer countries. However, countries with higher R&D intensity may have an industrial structure that is more concentrated in R&D intensive sectors than what is typical in the OECD and EU.

2.4 R&D INTENSITY IN FINLAND BY SECTOR

In addition to the industrial composition, the R&D intensity within individual industries can also influence a country's overall R&D intensity. To assess Finland's R&D performance independently of its sectoral composition, we examine R&D intensity within industries. Figure 2-6 shows R&D intensity in Finland in the most R&D intensive industries, measured as the ratio of business R&D expenditure to gross value added. The figure compares Finland's sectoral R&D intensity with two benchmarks: the OECD average, and the average of OECD countries with high business R&D intensity.[14]

13 OECD (2025): "OECD NAAG Chapter 4". Available **here**.
14 OECD countries with high business R&D intensity Is defined as countries with BERD above 2.5 percent.

Finland exhibits R&D intensity that is above or close to the OECD average across all top R&D intensive industries. However, the comparison also reveals that OECD countries with high business R&D levels do not achieve this solely due to their industrial composition, but also because they demonstrate higher R&D intensity within individual industries than OECD countries on average and notably, across a broader range of industries than Finland. OECD has demonstrated that when Finland's industrial structure is adjusted to reflect the OECD average, the country's business R&D intensity would be marginally lower than the unadjusted figure (OECD, 2021). This underscores that Finland's industry mix in R&D-intensive sectors does not differ substantially from the OECD average, nor does its within-industry R&D intensity. By contrast, countries with markedly higher R&D intensity have stronger within-industry R&D performance and/or a larger relative weight of R&D-intensive industries (like Israel, Korea and Germany).

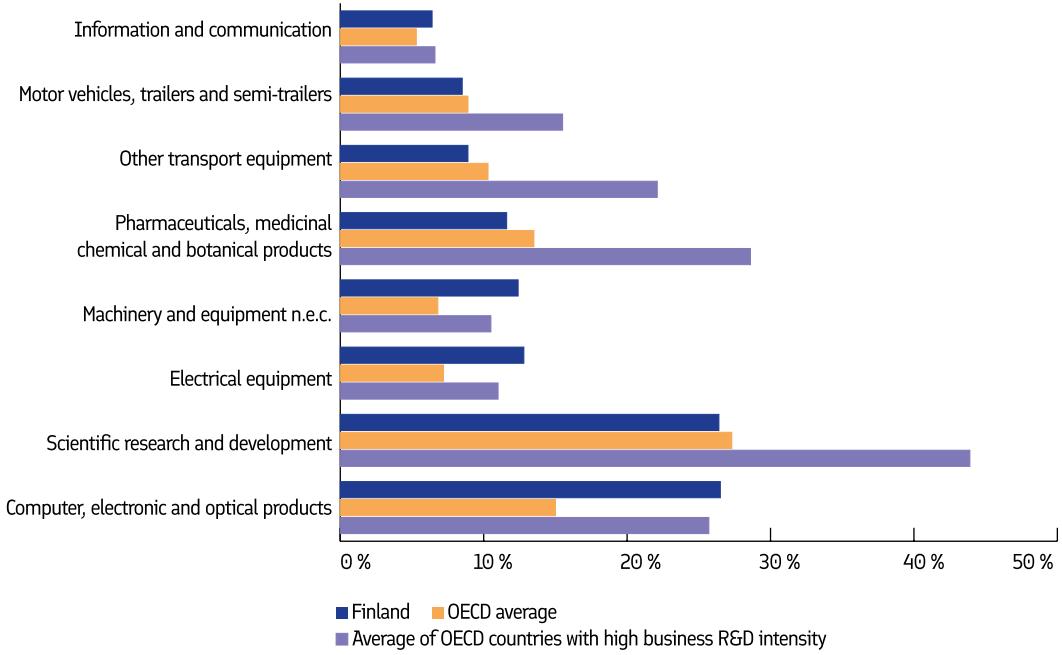


FIGURE 2-6: R&D INTENSITY IN TOP R&D INTENSIVE INDUSTRIES, MEASURED AS THE RATIO OF BUSINESS R&D EXPENDITURE TO GROSS VALUE ADDED. SOURCE: OECD ANBERD DATABASE [15], OECD NATIONAL ACCOUNTS AND THE OECD STAN DATABASE, MENON ECONOMICS

2.5 BRIEFLY ON THE GOVERNMENT'S ROLE IN THE FINNISH INNOVATION SYSTEM

The Finnish innovation system involves a large number of public sector agencies and is represented by a network of policy tools and regional players that support a relatively dispersed government support system.

The Finnish government decides national development goals and sets general guidance. R&D policy is coordinated mainly by the Ministry of Economic Affairs and Employment and the Ministry of Education and Culture, with Regional Councils playing a complementary role

15 Calculations made by OECD based on data from the OECD ANBERD Database, OECD National Accounts and the OECD STAN Database. For more information see **here**.

through EU structural funds and regional strategies. The Research and Innovation Council of Finland, chaired by the Prime Minister, provides strategic guidance and coordination for national research, development and innovation policy. Public sector agencies and players are mapped in in Figure 2-7. The lower part of the map, we find the R&D and innovation performers. The figure is from the European Commission report "*Support to Finland on Improving R&D Collaboration Between Research Organisations and the Private Sector*".

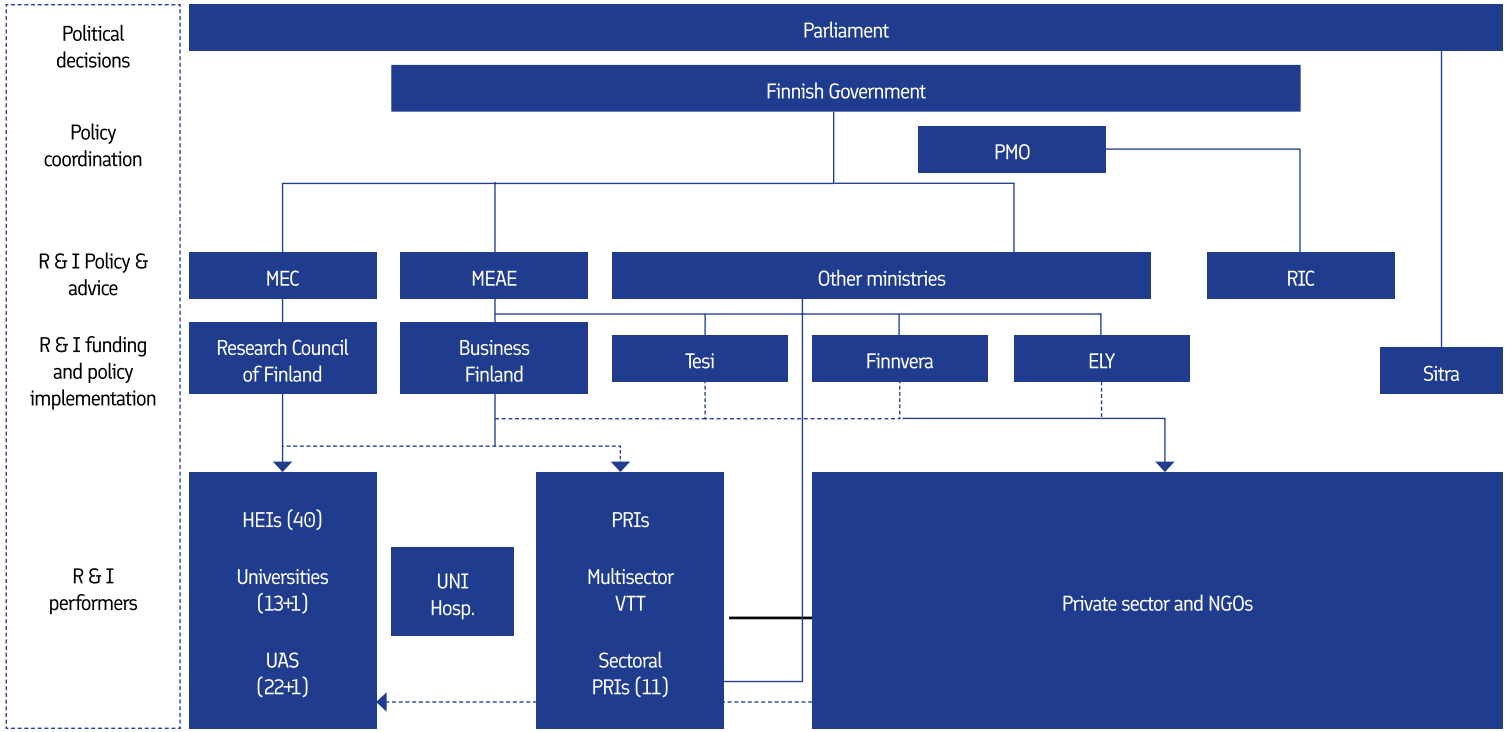


FIGURE 2-7: ILLUSTRATION OF THE R&D FUNDERS AND PERFORMERS IN FINLAND [16]. SOURCE: (EUROPEAN COMMISSION, 2025)

16 Legend: BF = Business Finland; ELY = Centres for Economic Development, Transport, and the Environment; HEI = Higher Education Institutions; MEAE = Ministry of Economic Affairs and Employment; MEC = Ministry of Education and Culture; PMO = Prime Minister's Office; PRI = Public Research Institutes; RIC = Research and Innovation Council; VTT = Technical Research Centre of Finland.

Applied research and technological development are primarily conducted by research institutes, where for instance VTT is a main actor, operating in the interface between science and application. Business Finland supports private-sector R&D through co-innovation programs and partnerships that strengthen innovation ecosystems. Sitra contributes by funding long-term projects in areas such as sustainability and digitalisation and promotes systemic innovation. Tesi (Finnish Industry Investment Ltd) is a state-owned investment company that invests on market terms both in venture capital and private equity funds, and directly in startups, scale-ups, and large industrial projects[17]. Finnvera is a state-owned Finnish export credit agency that offers loans, domestic guarantees, export credit guarantees, and other services associated with the financing of exports.

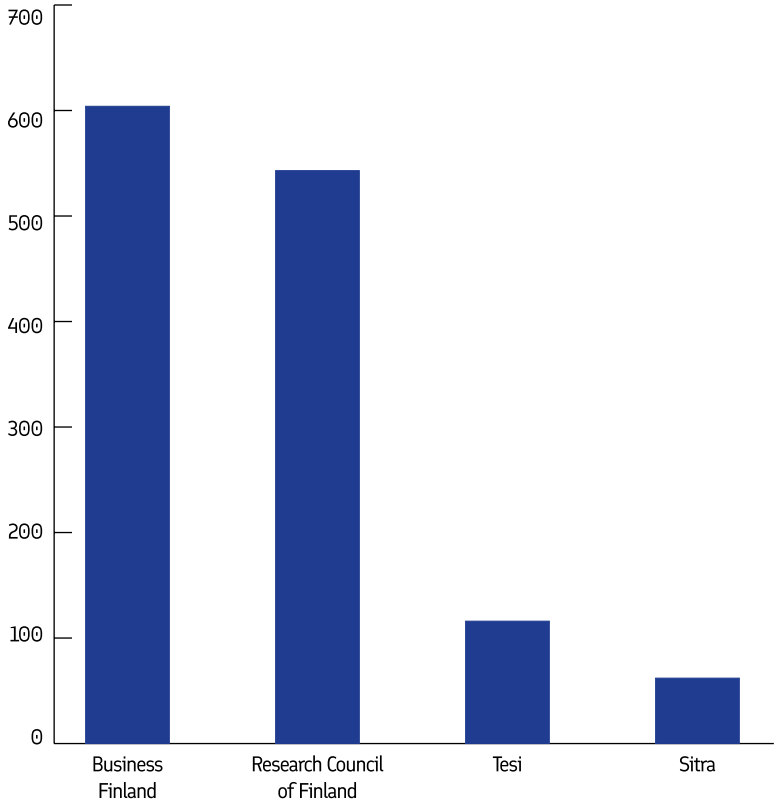


FIGURE 2-8: FUNDING FROM KEY AGENCIES IN THE FINNISH INNOVATION ECOSYSTEM IN 2024.[18] SOURCE: MENON ECONOMICS, BUSINESS FINLAND, RESEARCH COUNCIL OF FINLAND, TESI AND SITRA

In Figure 2-8, we report figures on government spending through the most important innovation focused agencies. Most funds are channelled through Business Finland, followed by the Research Council of Finland. In addition to the funds shown in Figure 28, the EU (through Horizon etc) also provides substantial funding for R&D in Finland. According to the commission, the change in cumulative distributions amounted to EUR 425 mill in 2023 and EUR 355 mill in 2024. Clearly, the Horizon program plays an important role in funding and incentivising R&D in Finland.

17 Tesi is a state-owned investment company that operates on market terms. It invests both directly in Finnish startups, scale-ups and large industrial projects, and indirectly through venture capital. Tesi's portfolio consists of EUR 2.6 billion of assets in management (Tesi, 2025). About half of its investments are in fund commitments and half are direct investments, although the balance varies with market conditions. Tesi acts as a minority investor alongside private VC and PE funds, with the explicit aim of mobilising additional private capital into Finland by reducing market gaps.

18 Figures for Business Finland is their paid funding while figures for Research Council of Finland are their funding for scientific and strategic research. Figures for Tesi is investment and commitment given that year and figures for Sitra is their new investment commitments in 2024.

2.6 THE ROLE OF BUSINESS FINLAND

Business Finland has a broad mandate. It supports Finnish companies not only through grants and loans, but also through advisory services and internationalisation support. Business Finland's services can be divided into four main categories:

- **Funding services**: A wide range of grants and loans that companies can apply for. Examples include *R&D Funding,* which supports the development of new products, services, processes or business models, and *Co-Innovation* which is funding for collaborative projects between firms and research organisations. Other funding instruments include *Tempo, NIY (Young Innovative Company), Into, Energy Aid* and others that target specific stages or types of innovation.
- **Export and Internationalisation**: Services that help companies enter global markets. Examples are Internationalisation and Global Growth Actions. In addition, Business Finland organises trade missions, provides networking opportunities, and connects Finnish firms to international financing institutions in 2025. Starting from 2026 export promotion services will be transferred to MFA.
- **Digital Services**: Online platforms and tools providing information, leads and matchmaking.
- **Programs and ecosystems**: Long-term programs, ecosystems and partnerships. The flagship example is the *Veturi* program, which supports large, globally oriented companies in building innovation ecosystems together with universities, research institutes, SMEs and startups. Ecosystem and program structures act as strategic umbrellas, defining priority areas and collaboration requirements.

Among Business Finland's instruments, the most directly targeted at increasing R&D activity are the funding services, programs, and ecosystems. The ecosystems provides platforms where companies of different sizes, universities, and research institutes can collaborate. These arenas both define Business Finland's strategic priority areas and bring together diverse actors to engage in joint R&D efforts.

While ecosystems primarily serve as networks for collaboration and innovation platforms, it is the funding services that constitute Business Finland's concrete mechanism for financing R&D activities in companies. Figure 2-9 illustrates the flow of funding through Business Finland's various funding services (funding services above EUR 5 mill.).

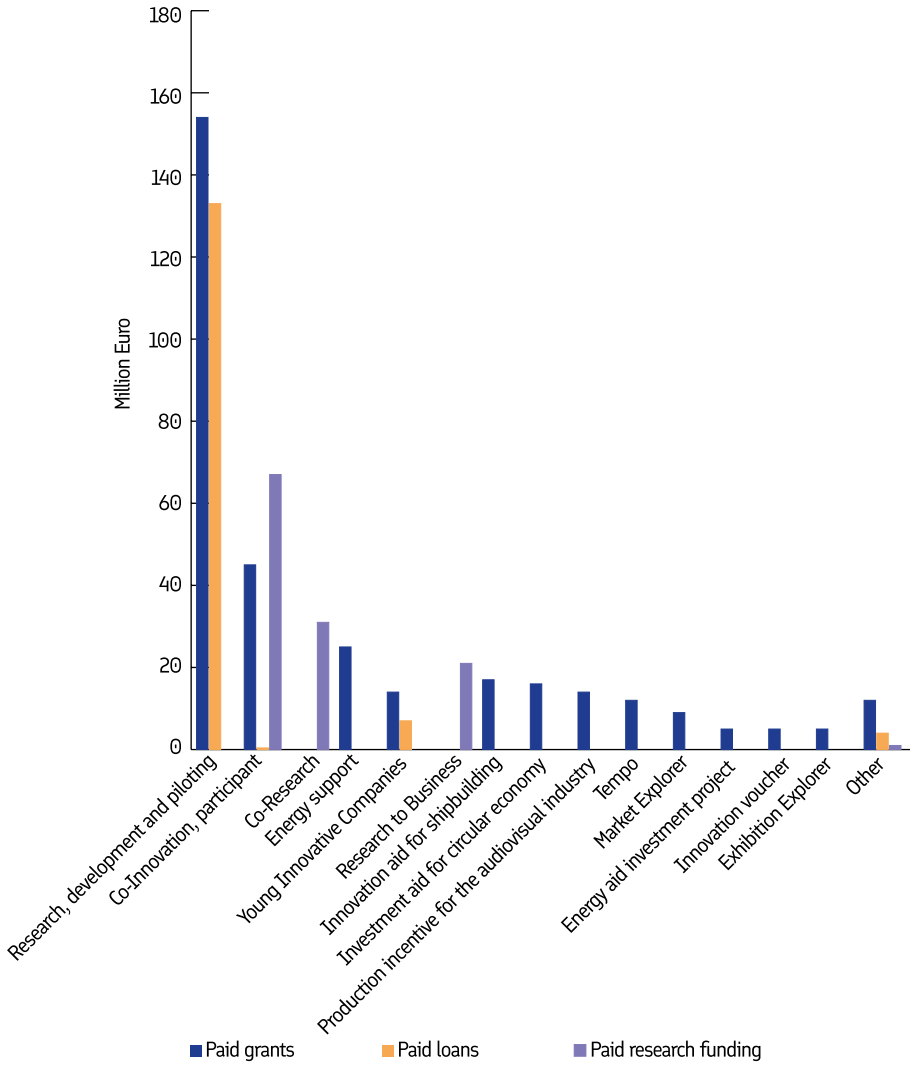


FIGURE 2-9: PAID FUNDING FROM BUSINESS FINLAND TROUGH DIFFERENT FUNDING SERVICES IN 2024. SOURCE: BUSINESS FINLAND, MENON ECONOMICS

The figure shows that the majority of Business Finland's funding is directed towards R&D, piloting activities, and various co-projects in research and innovation.

The government has committed to lift public R&D outlays to roughly 1.2 percent of GDP by 2030, and is channelling much of the increase through Business Finland. From 2019 to 2024 Business Finland's annual paid funding increased by over 30 percent, with further growth planned. The strategy is to make Business Finland the main driver of private R&D expansion by scaling up funding and targeting projects with high spillovers or risk that would not proceed without public support.

POLICIES TO INCENTIVISE BUSINESS ENTERPRISE R&D

To reach the national target of 4 percent R&D intensity, Finland must implement effective policies that incentivise greater private-sector investment in R&D. From economic theory we know that the level of business enterprise research and development is normally below the socially optimal level. This is due to the existence of positive knowledge externalities from R&D. Key private R&D barriers include: (i) low appropriability: knowledge generated by a firm's R&D can be imitated or diffused to rivals, limiting the share of returns the originator can capture; (ii) scale and demonstration risk: validating technologies

at commercial scale requires capital-intensive pilots and demonstration projects; (iii) bias against radical innovation: incremental improvements typically face lower technical and financing risk and therefore attract funding more readily; and (iv) uncertain pay-offs: long and risky development cycles weaken incentives to invest (Nemet, Zipperer, & Kraus, 2018).

A variety of policy instruments can be employed to incentivise business enterprise R&D. Figure 2-10 presents the composition of direct government funding and government tax support for business R&D as a share of GDP in 2023, highlighting the relative contributions of each support type.

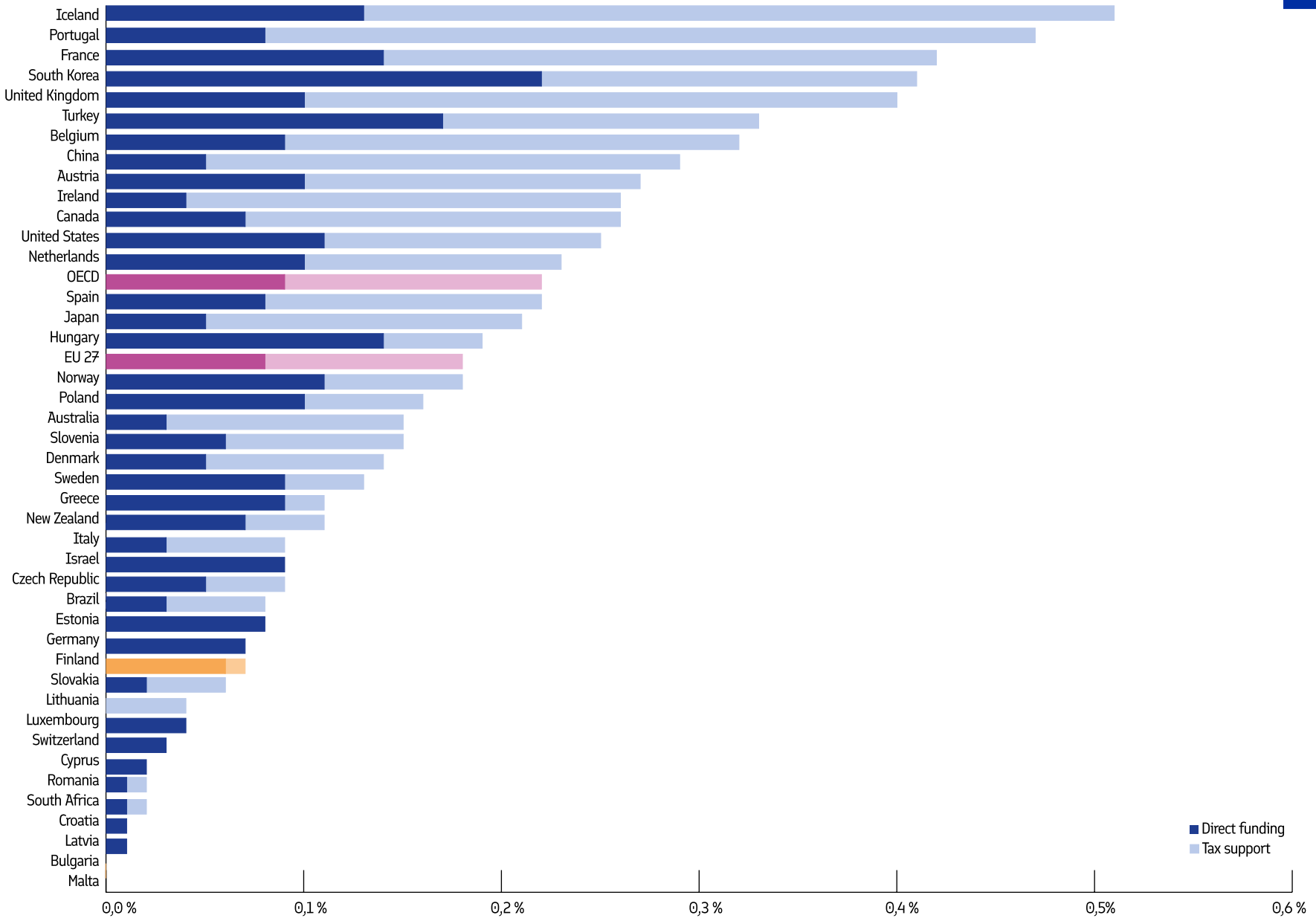


FIGURE 2-10: DIRECT GOVERNMENT FUNDING AND GOVERNMENT TAX SUPPORT FOR BUSINESS R&D AS SHARE OF GDP IN 2023 [19]. SOURCE: OECD R&D TAX INCENTIVES DATABASE [20] AND MENON ECONOMICS

19 For Austria, Bulgaria, China, Chile, Ireland, Germany, Luxembourg, the OECD-38, Portugal, Slovakia, South Africa, and the UK, the latest available data on direct and tax support for business R&D is from 2022. For Australia, the EU-27, France, Switzerland, New Zealand, and the US, data is from 2021, and for Brazil, Colombia, Denmark, and Romania, from 2020. The 2022 OECD estimate of government tax relief for R&D (GTARD) is preliminary. See OECD for details on methodology and data sources. Available here.

20 Available here.

Despite recent gains in R&D investment, Finland provides relatively modest levels of public support for business R&D compared to international peers. According to OECD, in 2023, government support for BERD amounted to only 0.07 percent of GDP, well below the OECD average of 0.22 percent and the EU27 average of 0.18 percent.

Finland also stands out in terms of the composition of its R&D support. In contrast to many other countries where tax incentives dominate, Finland allocates most of its support through direct funding (0.06 percent of GDP), with only a minor share (0.01 percent) delivered via tax incentives. There are two tax incentive schemes in Finland that came into force in 2024, and these are modest in volume.[21] Before these schemes, there had not been any R&D tax incentives in Finland except for a scheme that was in effect only in 2013–2014. Previous attempts to implement R&D tax incentives, in the 1980s and again in 2013–2014, were largely unsuccessful. There are claims that this was due to design flaws, administrative challenges, and limited business uptake (Deschryvere, Husso, & Suominen, 2021). Meanwhile, R&D tax incentives have become increasingly popular across OECD and EU countries over the past two decades. Government tax relief for business R&D, measured as a share of GDP, has risen from 0.02 percent to 0.10 percent in the EU27, and from 0.04 percent to 0.13 percent in the OECD between the early 2000s and 2022 (OECD, 2025). Although the financial crisis and the COVID-19 pandemic briefly interrupted this growth, tax incentives have emerged as a popular policy tool particularly in the OECD and EU area.

21 https://stip.oecd.org/innotax/countries/Finland

3 LESSONS FROM OTHER COUNTRIES

To identify successful R&D policies, we examine countries with strong business R&D performance, rapid growth in R&D intensity, or ambitious national strategies. Evidence shows that growth is almost always driven by the business enterprise sector, though the balance between public and private financing varies. Israel and South Korea have large-scale private investment, Belgium and Iceland rely more on tax incentives, while the Netherlands and the United Kingdom use mission-oriented strategies.

To identify successful R&D policies, we in this chapter examine countries with strong R&D growth, to gain insights into the policy instruments they have employed. We focus on countries that exhibit a consistently high share of R&D investment relative to GDP, that have demonstrated a rapid increase in R&D intensity over a defined period, pursue ambitious national R&D strategies, or share structural and societal similarities with Finland as advanced economies. In assessing these countries' R&D performance, we place emphasis on business enterprise R&D expenditure. Based on country R&D performance over the last years, further discussed in chapter 3.1, as well as discussions

with Business Finland regarding countries with noteworthy R&D policy approaches, we have selected the following countries for closer examination:

- South Korea
- Israel
- The Netherlands
- Belgium
- Iceland
- Denmark
- United Kingdom

In chapter 3.1, we identify countries with high growth in R&D. In the remainder of this chapter, we examine how R&D policy has been designed in the selected countries and how these policy frameworks have contributed to their observed R&D performance.

3.1 COUNTRIES WITH HIGH GROWTH IN R&D

Finland has experienced a decline in BERD intensity over the past decade. However, the past five years have marked a notable recovery, with an increase of 0.27 percentage points, exceeding the OECD and the EU27 averages, see Figure 3-1. The OECD and EU averages in the figure are marked in red, while Finland is marked in yellow.

At the same time, Finland's recent growth remains well below that of the countries with the most significant increases over the past five and ten years. To reach its national R&D intensity target of 4 percent by 2030, Finland must increase its R&D to GDP ratio by 0.91 percentage points from the 2023 level within just seven years. This represents a substantial increase that few other countries have achieved within such a short period. This is illustrated in Figure 3-2, which shows OECD countries' growth in gross domestic expenditure on R&D (GERD) as a share of GDP in recent years. Among OECD and partner economies, only Israel has achieved such growth in GERD as share of GDP over the last five-year period, while Israel, Korea, United Kingdom, Belgium, Taiwan and Iceland have all recorded increases larger than this magnitude over the past decade.[22] It should be noted that Iceland's growth in R&D over the past ten years is almost entirely a rebound following a substantial decline after the financial crisis.

22 Between 2013 and 2023, Israel increased R&D expenditure as a share of GDP by 2.24 percentage points, while Korea recorded an increase of 1.18 percentage, Belgium 1.00, Taiwan 0.98, and Iceland 0.96 percentage points. United Kingdom recorded an increase of 1.22 percentage points from 2012 to 2022.

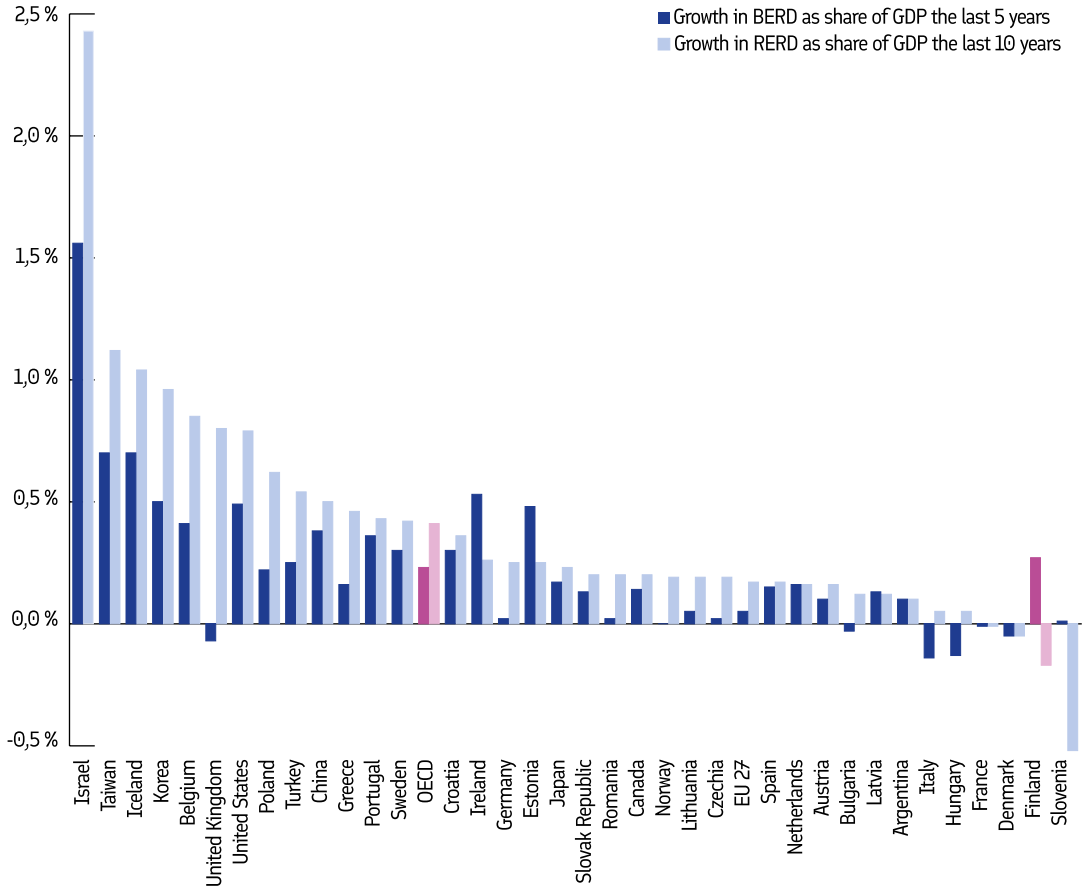
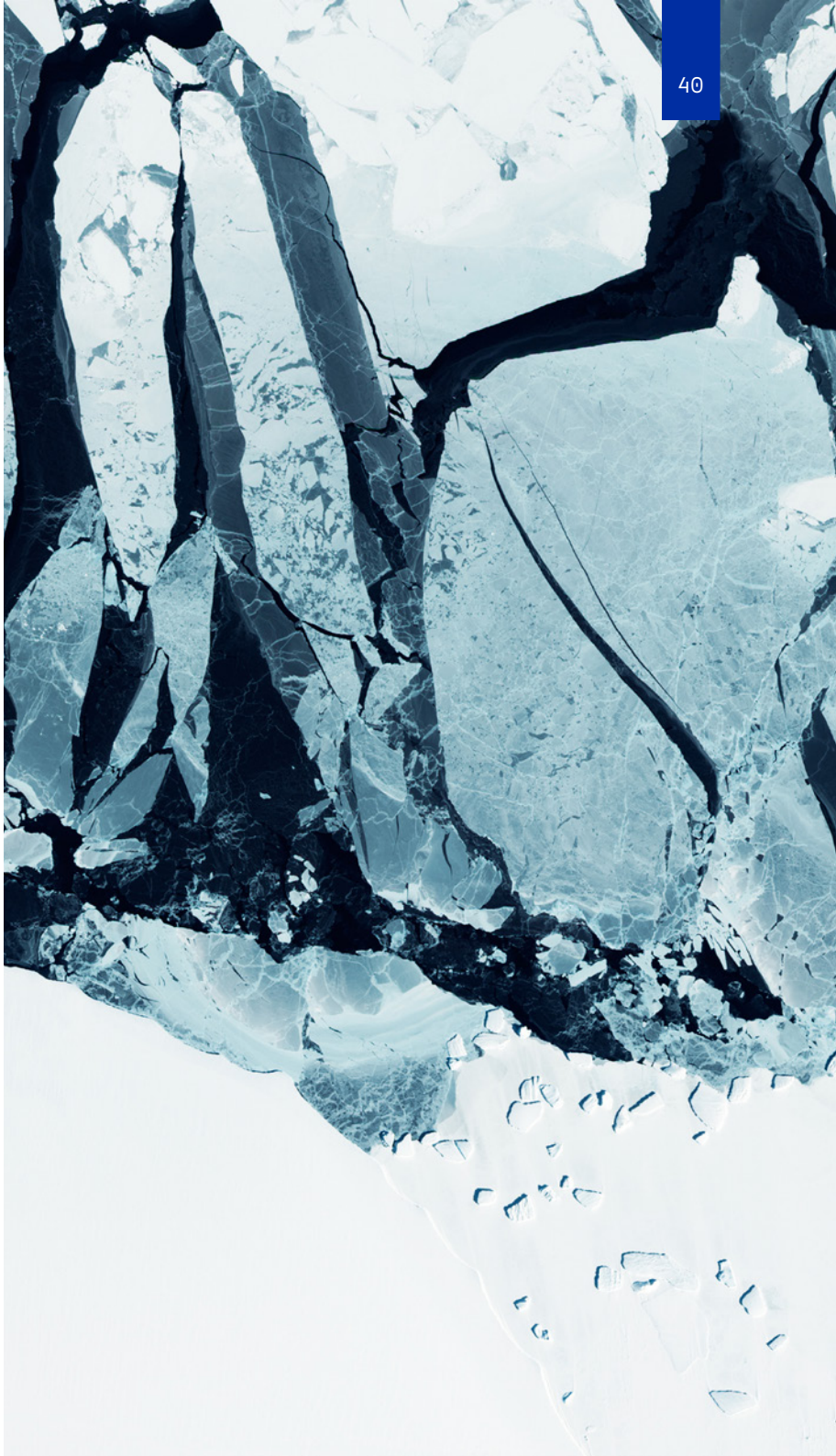


FIGURE 3-1: GROWTH IN BUSINESS ENTERPRISE EXPENDITURE IN R&D (BERD) AS SHARE OF GDP (IN PERCENTAGE POINTS). SOURCE: OECD MSTI DATABASE [23] , MENON ECONOMICS

23 Available here.



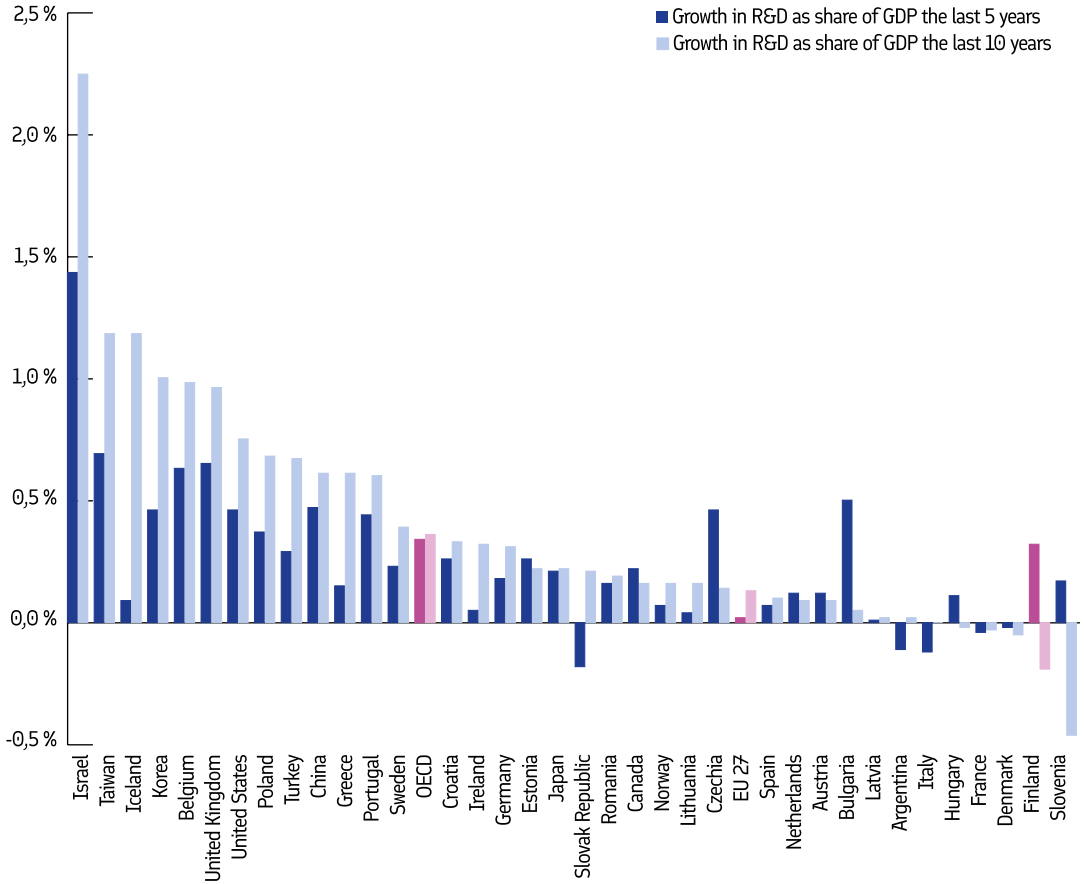


FIGURE 3-2: GROWTH IN GROSS DOMESTIC EXPENDITURE ON R&D (GERD) AS SHARE OF GDP (IN PERCENTAGE POINTS) [24]. SOURCE: OECD MSTI DATABASE [25], MENON ECONOMICS

We can see that countries that have experienced strong growth (more than 1 percentage point increase in GERD the last 10 years) have achieved this primarily through growth in the business enterprise sector (BERD), see Figure 3-3.[26] Compared with Finland's development since 2016, it is evident that if Finland is to achieve the same increase in R&D as these countries, it will be dependent on further growth in R&D investments within the business enterprise sector.

24 Data on gross domestic expenditure on R&D as share of GDP for United Kingdom are from 2022. We therefore show growth over last 4 and 9 years with available data for the United Kingdom.
25 Available **here**.
26 This is compared with Finland's growth from 2016, which marks the point at which R&D investments began to increase following a prolonged period of decline.

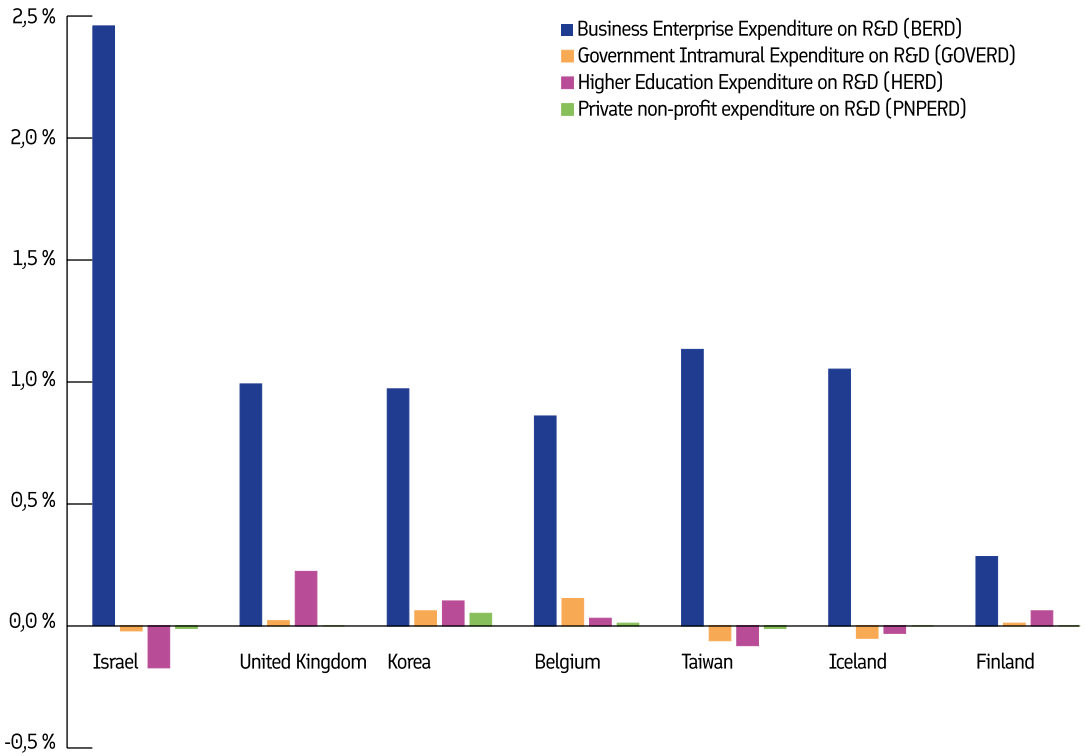


FIGURE 3-3: INCREASE IN R&D AS A SHARE OF GDP (PERCENTAGE POINTS), BY PREFORMING SECTOR, OVER THE PAST TEN YEARS (2016-2023 FOR FINLAND) [27]. SOURCE: OECD MSTI DATABASE [28], MENON ECONOMICS

While the growth likely must be carried out by the business enterprise sector, its financing may come from different sources: either from the business enterprise sector itself or from the public sector (GOVERD) through various policies targeting business R&D. It is hence relevant to examine whether the countries that have experienced a substantial increase in GERD have achieved this through public funding or through private sector investment in R&D.

The majority of financing for R&D growth in the countries with the highest increase the last 10 years has come from the business enterprise sector, see Figure 3-4. The expansion in R&D financing from the business enterprise sector in these countries also far exceeds what Finland has achieved since 2016. Israel stands out from the other countries by recording substantial growth in financing from the rest of the world. This reflects targeted policy measures aimed at attracting investments and R&D units of large international companies (see Chapter 3.3).

27 The figure presents the increase in percentage points for all countries from 2013 to 2023, except for Finland, where the growth is shown from 2016 to 2023. This adjustment is made because Finland's increase in R&D investments began around 2016/2017. And for United Kingdom, where the growth is shown from 2012 to 2022, since we have no data from 2023.

28 Available here.

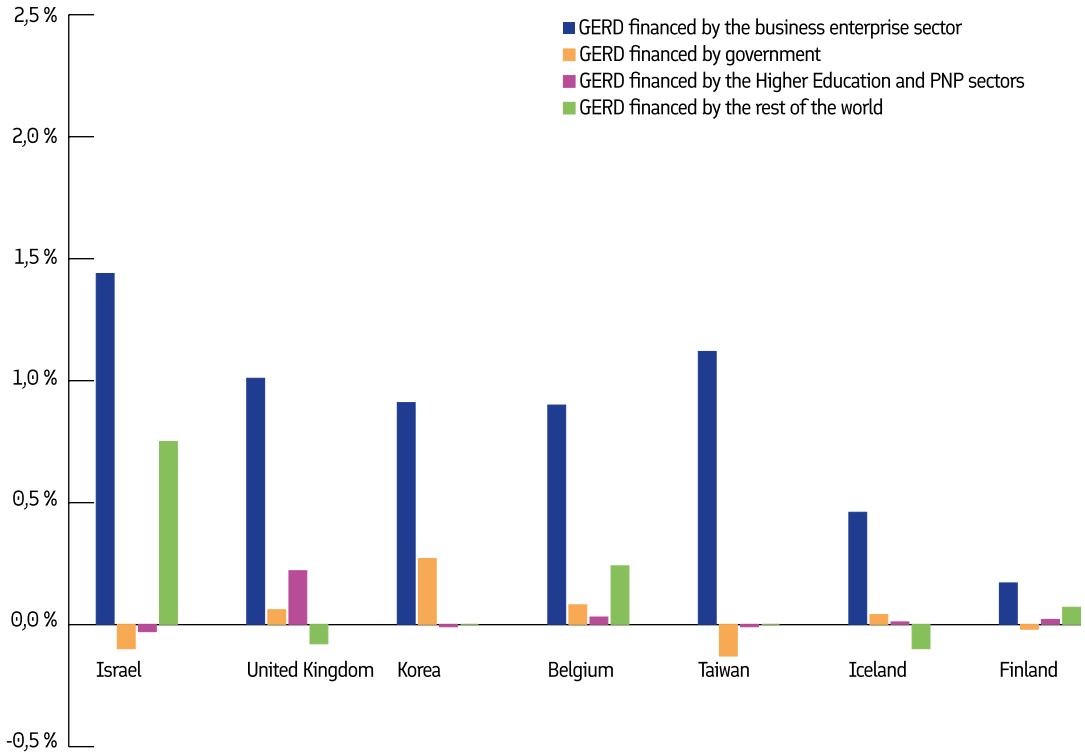


FIGURE 3-4: INCREASE IN R&D FINANCING AS A SHARE OF GDP (PERCENTAGE POINTS), BY THE FINANCING SECTOR, DURING THE MOST RECENT GROWTH PERIOD[29]. SOURCE: OECD MSTI DATABASE [30] , MENON ECONOMICS

3.2 SOUTH KOREA

South Korea has one of the highest gross domestic R&D expenditures in the OECD, amounting to nearly 5 percent of GDP, and have also had a rapid increase the last years. In Korea, the business enterprise sector has played a significant role in the country's overall R&D and has accounted for the majority of growth. The sector's contribution to R&D financing has increased from the equivalent of 1.48 percent of GDP in 2000 to 3.77 percent in 2023. Innovation activity and productivity gains are especially high in ICT manufacturing, in which South Korea is a global leader, e.g. measured in terms of patent output. Most R&D investments are made by large conglomerates, particularly within the ICT sector. SMEs and other sectors play a less important role, but South Korea maintains a vibrant startup ecosystem. Large firms are quick to adopt and industrialise new technologies. The country is also investing heavily in digital infrastructure and technologies to support digital transformation (OECD, 2021).

Although large firms are important for private R&D, public support has targeted a broader mix of actors, including SMEs, ventures and startups. Since 2008, when South Korea set its national R&D intensity target at 5 percent of

29 The data contain several breaks in time series, which makes it difficult to compare growth over the past ten years directly. We have therefore selected periods that are as close as possible to this timeframe while still corresponding to when each country actually experienced growth. For Iceland we use 2015–2022; for Israel 2013–2022; for ; for United Kingdom 2012–2022; Korea 2013–2023; for Belgium 2011–2021; for Taiwan 2013–2023; and for Finland 2016–2022.

30 Available **here**.

GDP, the government has pursued strategies to enhance R&D performance through (Han & Lee, 2021):

- Expanding R&D investments and their efficiency and increased investments in human capital (mostly STEM).
- Improving the research environment by reorganising the management system, e.g. through encouraging the shared use of research facilities and maintenance and promoting collaboration with research institutes abroad.
- Enhanced regional science and technology capabilities to reduce R&D gaps across regions and supported the spread of science and technology culture.

According to Han & Lee (2021), the main driver behind the rise in national R&D intensity has been increased private-sector investment. The top 100 companies alone accounted for 63.7 percent of total R&D spending by 2017, up from 61.7 percent in 2013. While government support for large firms grew until 2012, it has declined since. Thus, the increase in R&D intensity among large firms does not seem to be a direct response to policy measures, but rather to other factors, like boosting competitiveness.

Despite world-leading R&D input levels, including the highest share of tertiary graduates in STEM among OECD countries, key performance goals remain unmet in South Korea. These include top-tier rankings in highly cited publications, SME technological competitiveness, and industrial value-added per capita. The OECD publication highlights that ecosystem development and capacity-building policies have underperformed, underscoring the persistent challenge of converting high R&D intensity into broader innovation outcomes (Han & Lee, 2021).

3.3 ISRAEL[31]

Israel leads the world in R&D intensity, investing 6.35 percent of its GDP in research and development, by far the highest rate globally. Over the past decade, there has been a growth of 2.34 percentage points, including 1.43 points in the last five years.

Israel stands out in an international context not only for the substantial role of its business enterprise sector (financing 2.92 percent of GDP) but particularly for the exceptionally high share of R&D financing from abroad (2.8 percent of GDP). By comparison, other countries recorded an average of only 0.28 percent of GDP[32]. Much of the business enterprise investments are in high-technology indus-

31 Israel is currently engaged in a war on Palestinian territories that violates international law. A significant share of Israel's R&D activity is closely tied to the operations of the IDF and may therefore directly and indirectly contribute to such breaches of international law. The inclusion of Israel as a case does not in any way indicate approval of these actions. The country is presented here solely because its public governance model has proven effective in fostering high national R&D activity.

32 An average of the countries reporting this figure to the OECD in 2022

tries such as software, telecommunications, energy, and advanced manufacturing. The high share of foreign investment reflects a deliberate strategy to attract R&D activities and subsidiaries from large international companies. Israel's innovation ecosystem is characterized by its strong integration into global R&D networks. The country has positioned itself as a hub for international R&D, attracting over 350 foreign companies, many of them Fortune 500 firms, to establish development centres in Israel (IVC, GNY & KPMG, 2023). Multinational giants such as Intel, Microsoft, Cisco, IBM, and Broadcom maintain major R&D operations in Israel (Israel Innovation Authority, 2025). This international orientation is further supported by bilateral cooperation programs like the BIRD Foundation with the United States and other R&D partnership agreements.

Israel also has one of the strongest venture capital (VC) markets among OECD countries, largely driven by the foreign investors in its national VC ecosystem (OECD, 2025). Cybersecurity and fintech are the primary recipients of venture capital, followed by sectors such as IoT, food-tech, and automotive technologies. U.S.-based investors play a large role in funding high-tech start-ups.

Defence-related R&D is a large part of Israels R&D system. The government allocates substantial funding to military technology. Companies such as IAI, Rafael, and IMI, three of the largest players in Israel's defence industry, are state-owned and important to national R&D capacity (UNESCO, 2016).

In Israel, the Innovation Authority coordinates innovation policy. Its strategy emphasises direct support for R&D through conditional grants and matched funding, fostering ecosystems in cutting-edge areas like quantum computing, AI, bio-convergence, climate tech, and advanced manufacturing.

Israel's venture capital landscape was originally shaped by the Yozma Program, which in the 1990s was important for establishing public-private partnerships and risk-sharing with foreign investors. The updated Yozma 2.0 initiative continues this legacy, offering public co-investment equal to 30 percent of institutional investments in innovative ventures, with a focus on Israeli startup companies (Israel Innovation Authority, 2025). Tax policy is another key pillar of Israel's innovation strategy, designed to attract foreign R&D activity and position the country as one of the most attractive global locations for conducting R&D. Key tax incentives include deductions for investments in high-tech companies, capital gains deferrals or reductions for qualifying investors, and specific tax benefits for foreign acquirers of Israeli tech firms. Additionally, Israel's Preferred Technological Enterprise (PTE) regime offers significantly reduced corporate tax rates and lower withholding taxes on dividends and royalties for companies generating eligible IP-based income developed in Israel (PWC, 2024). Overall, Israel's innovation model is built on a mix of strong public investment, international linkages, targeted support for cutting-edge sectors, and a competitive tax framework. This combination has made Israel a global leader in R&D intensity and attractive for both domestic and foreign innovation activity. Nevertheless, Israel's case must be interpreted with caution. At first glance, Israel appears to be a natural benchmark for Finland: both are small, open economies with strong ICT industries. However, the ICT sector has been closely tied to defence and security technologies,[33] and the country has benefited from a special strategic relationship with the United States, which has strongly influenced international investment flows. Further, Israel is currently engaged in a war on Palestinian territories that violates international law, and a significant share of Israel's R&D activity is closely tied to the operations of the IDF and may therefore directly and indirectly contribute to such breaches of international law. For these reasons, it is uncertain whether Finland should, or indeed could, draw direct lessons from Israel's experience.

3.4 THE NETHERLANDS

The Netherlands invests 2.23 percent of its GDP in R&D, which is slightly below both Finland and the OECD average. Despite modest R&D intensity, Dutch firms are con-

33 R&D intensive firms in Israel within defence and security technologies include (among others): Elbit Systems, Israel Aerospace Industries (IAI), Rafael Advanced Defense Systems, ELTA Systems, RADA Electronic Industries and mPrest Systems.

sidered highly innovative. This is especially true in sectors where innovation takes place outside traditional R&D metrics, such as service innovation, digital transformation, and investments in intangible assets. The Netherlands also performs strongly in niche areas such as agriculture and semiconductors.

A defining feature of Dutch innovation policy is its recent shift toward mission-oriented innovation, in similarity to the EU. Since 2018, the Netherlands has implemented a mission-based policy aimed at aligning R&D efforts with key societal challenges. These include energy transition and sustainability, agriculture and food systems, health and healthcare, and security (Ministry of Economic Affairs and Climate Policy, 2019). The policy seeks to foster collaboration between academia, industry, and government, particularly through key enabling technologies[34] and regional innovation clusters.

In terms of financial instruments, the Netherlands relies on two major tax incentives in addition to direct funding to stimulate business R&D:

- WBSO (Research and Development Promotion Act): A wage-based tax credit that reduces payroll taxes for R&D staff and associated costs.
- Innovation Box: An income-based tax incentive that applies a lower corporate tax rate to profits derived from eligible innovation activities.

Evaluations confirm that WBSO has high effectiveness (Teurlinx & Donselaar, 2021). The Innovation Box also contributes significantly, though with a stronger focus on rewarding outcomes rather than incentivising additional R&D activity. Beyond tax incentives, the National Growth Fund was launched in 2021 to support long-term economic growth through investments in three pillars: human capital, R&D and innovation, and physical infrastructure. Large-scale projects under this fund are expected to further strengthen the Netherlands' innovation capabilities.

Overall, the Dutch innovation system demonstrates strong R&D performance despite relatively modest R&D intensity. The Netherlands is also an interesting example of a more missions-oriented innovation approach. However, this approach also poses challenges e.g. in measuring impact, as the goal is not only to raise R&D but also other societal goals.

3.5 BELGIUM

Belgium has made significant steps in research and development investment, with gross R&D expenditure reaching 3.32 percent of GDP, an increase of 1 percentage point over the last decade and 0.46 points in the past five years, ranking third among OECD countries for R&D growth. The

34 Enabling technologies are technologies that provide the foundation for new products, processes, or services across multiple sectors. They often have broad applicability and drive innovation and productivity growth. Examples include artificial intelligence, nanotechnology, and advanced materials.

growth has primarily come from the business enterprise sector, which increased by 1 percentage point of GDP over this ten-year period. The country is now classified as a "strong innovator," nearing the top-tier "innovation leader" category on the EU Innovation Scoreboard (European Commission, 2024).

A key factor behind Belgium's R&D effort is its comprehensive tax incentive system, which accounted for 72 percent of public business R&D support in 2022, or 0.23 percent of GDP (among the highest in the OECD). The national approach centres on stimulating private R&D and attracting knowledge-intensive activity, primarily through tax-friendly policies, complemented by strong public research institutions and academia–industry collaboration. Belgium's R&D tax package includes:[35]

- Partial payroll tax exemption for researchers: Companies can retain 80 percent of the withholding tax/social security contributions on wages paid to R&D staff (proportional to their R&D time). Significantly reduces labor costs for R&D-active firms.
- R&D investment deduction: Firms can deduct qualified R&D capital expenses (e.g. equipment, facilities, IP) from their taxable base.
- R&D tax credit: Alternatively, to the investment deduction, firms can opt for a tax credit. If unused, it can be carried forward and becomes refundable in cash after five years (earlier under certain conditions from 2025).
- Innovation income deduction ("patent box"): Since 2016, 85 percent of net income from patents, software, and qualifying IP is excluded from the corporate tax base, resulting in an effective tax rate of about 3–4 percent.
- Tax-free innovation bonus for employees: Companies may grant tax-exempt bonuses to employees who develop or improve products/processes, encouraging individual innovation.
- Special tax regime for inbound researchers/experts: Foreign R&D specialists temporarily working in Belgium benefit from reduced taxation on salary and allowances.
- Accelerated depreciation for R&D assets: Available since 1992, allowing faster write-off of capital investments in R&D.
- Tax exemption for public R&D grants: Subsidies from regional or EU sources are not taxed, ensuring full value is available for R&D activities.

These incentives lower the cost of investing in R&D and reward successful outputs, covering the full innovation lifecycle. Regional governments (Flanders, Wallonia, and Brussels) complement national incentives with grants,

35 Based on: (EY, 2022); (PWC, 2025); (Federal Public Service Finance, 2024).

loans, cluster initiatives, and strategic research centres such as imec and VIB.

While business R&D intensity is high, it remains concentrated in a few large, often multinational-owned firms (OECD, 2020). The EU Commission in a country report highlights that Belgium's R&D spending is heavily concentrated in a few high-tech industries (namely pharmaceuticals, electronics, and IT services) which receive the majority of total R&D investment and that innovation diffusion is low (European Commission, 2025). As a result, Belgium's generous tax incentives tend to disproportionately benefit a small number of large firms. This imbalance suggests that tax relief measures often fail to reach firms with the highest growth potential, namely start-ups and SMEs.

Both the EU and OECD recommend reforming Belgium's policy framework to improve its efficiency and impact. Suggestions include shifting resources from tax relief toward direct funding instruments and introducing caps on corporate tax support to prevent excessive concentration of benefits among large incumbents. They also recommend a refundable tax credit that could be targeting young and innovative firms (OECD, 2020). A reform in 2025 will improve refundability of the R&D tax credit for start-ups, addressing one such concern.

In sum, Belgium's policy mix has achieved impressive growth in R&D spending and remains a strong R&D performer. Belgium benefits form a good science-business linkage and business R&D investments. However, the benefits from the tax incentive scheme have so far been concentrated to a small number of large firms, instead of being evenly spread in firms of different sizes.

3.6 ICELAND

Iceland currently invests 2.65 percent of GDP in R&D, slightly below Finland. Over the past decade, R&D intensity has nevertheless grown rapidly: by 0.96 percentage points, including 0.65 points in the last five years. This makes Iceland one of the fastest-growing OECD countries in R&D spending last five years, surpassed only by Korea and Israel. Iceland's growth in R&D investments can nevertheless also be seen as a rebound from a substantial decline following the financial crisis. For example, in 2006 Iceland's R&D intensity was higher (2.85 percent of GDP) than in 2023. Even so, business enterprise expenditure has reached a historic peak in recent years, amounting to 1.99 percent of GDP in 2023.

This growth has been driven primarily by the introduction and expansion of R&D tax incentives. The Act on Support for Innovative Enterprises (152/2009), introduced in response to the downfall after global financial crisis (Islandic Goverment, 2009). In 2010, Iceland launched a refundable, volume-based R&D tax credit scheme, allowing

companies to deduct a portion of their R&D expenditures from corporate income tax. No R&D tax incentives existed prior to this reform.

By 2023, Iceland's public support for business R&D through tax incentives amounted to 0.38 percent of GDP, one of the highest levels in the OECD, exceeded only by Portugal. The scheme primarily benefits firms in the information and communication sector and has become increasingly generous over time.

OECD evaluations indicate strong input and output additionality from the tax credit (OECD, 2023). The tax credit has contributed to increased R&D investment, particularly among micro firms, and has had measurable positive effects on firm-level sales, employment, and wages. However, the structure of the scheme has allowed for disproportionate uptake by larger firms. Recent reforms have introduced differential rates for SMEs and larger firms, but further adjustments, such as exclusive refundability for small and young firms, may improve the scheme's targeting and cost-effectiveness.

Beyond fiscal measures, Iceland also focuses on strengthening human resources by improving the quality of higher education, increasing university funding, simplifying work permit processes for non-EEA specialists, and boosting skills in the labour market (Goverment of Iceland, 2020).

3.7 DENMARK

Denmark consistently invests close to 3 percent of GDP on R&D over time (2.99 percent in 2023). Business R&D is high in absolute terms, but highly concentrated in a few large firms, especially in pharmaceuticals and renewable energy (European Commission, 2023). In 2021, companies within the Novo Nordisk Foundation Group[36] accounted for an estimated 23 percent of all private-sector R&D expenditure in Denmark, corresponding to 0.42 percent of national GDP in that year (Novo Nordisk Foundation, 2022). Denmark has deliberately focused its innovation policy on strong sectors such as pharmaceuticals and wind energy. Small and medium-sized enterprises contribute only modestly to Business R&D.

To strengthen business R&D, the Danish government combines direct funding and tax incentives. In 2020, Denmark allocated 0.05 percent of GDP to direct government funding for business R&D and 0.09 percent through R&D tax support. The Innovation Fund Denmark provides competitive grants for high-risk, high-potential projects in priority areas like green technologies and health (Innovation Fund Denmark, 2022). Several schemes promote industrial PhDs, pilot projects, and university–industry collaboration, though public–private knowledge transfer remains below the OECD average (OECD, 2021).

36 The Novo Nordisk Foundation Group consists primarily of Novo Nordisk and Novozymes (now part of Novonesis), two globally leading life science companies. Together with the Novo Nordisk Foundation as the main owner, the group combines commercial activities with significant investments in research, innovation, and societal initiatives.

Tax-based R&D support has historically been limited but is expanding. A super-deduction for R&D costs is being phased in: from 101.5 percent in 2018 to 120 percent by 2028 (PWC Denmark, 2025). A refundable tax credit allows loss-making firms to receive up to DKK 5.5 million in cash per year for R&D-related losses, targeting early-stage and scaling firms. Though these incentives were modest (0.02 percent of GDP), recent reforms aim to broaden private-sector participation (OECD, 2022).

Denmark also faces some challenges: business R&D growth remains below pre-financial crisis levels, R&D activity is highly concentrated, and the commercialisation of publicly funded research is limited (Research and Innovation Policy Review Panel, 2019). At the same time, strong R&D performers such as Novo Nordisk have significantly increased their research investments, particularly in recent years.

3.8 UNITED KINGDOM

The United Kingdom invested 2.8 percent of GDP in R&D in 2022, which is above the EU and OECD averages but slightly below Finland. Since 2013, the UK's R&D intensity has risen by 1.18 percentage points, a rate exceeded only by Korea and Israel. However, growth has been just 0.09 percentage points since 2018, suggesting that the R&D-to-GDP ratio has stabilised in recent years. Private R&D is highly concentrated by sector and region. Pharmaceuticals account for the largest product group with 17.4 percent of BERD in 2023 (Office for National Statistics, 2024), with activity clustered in London, the East of England, and the South East. Country-specific factors that contribute to BERD include strong universities and a big financial sector, meaning there is easier access to capital.

The UK's business R&D policy mixes broad instruments with targeted technology missions:

- In 2022, the United Kingdom provided direct public funding for business R&D equivalent to 0.1 percent of GDP and tax support for business R&D equivalent to 0.3 percent of GDP.
- The government's Science and Technology Framework identifies five critical technologies (AI[37], quantum, engineering biology, semiconductors and future telecoms) and commits regulatory, finance and infrastructure levers to crowd in private investment around these priorities (Department for Science, Innovation & Technology, 2025).
- UK also has a dense cluster architecture (Catapults, Launchpads, Innovation Accelerators, Investment Zones). The Catapult Network provides shared facilities and applied R&D capacity in nine centres (e.g., High Value Manufacturing, Medicines Discovery,

37 The AI push is anchored in the national AI Research Resource (AIRR) AI-optimised supercomputers at Bristol (Isambard-AI) and Cambridge (Dawn) (Department for Science, Innovation & Technology, 2025)

Digital, Offshore Renewable Energy), de-risking private R&D and supporting commercialisation (UK Research and Innovation, 2024). UK Launchpads channel competitive support into SME clusters, while Investment Zones combine R&D-oriented programme funding with time-limited tax reliefs and university anchoring in priority sectors (advanced manufacturing, life sciences, green industries, digital/tech, creative) (UK Reaserch and Innovation, 2024).

3.9 KEY INTERNATIONAL LESSONS ON R&D

Based on the experiences from other countries, we can see that different policy mixes can produce similar/high R&D levels. Tax-centred approaches, as in Iceland and Belgium, has evidently raised BERD quickly, but benefits have been concentrated to larger firms. Further, in Iceland, the increase has been from a low-level following a significant reduction during the financial crisis, and it is not certain that replicating the scheme in Finland will have similar effects. FDI- and MNE-led strategies, as in Israel and Ireland, attract large international private R&D yet need policies that ensure domestic supply chains also benefit. Conglomerate-led models, as in South Korea, mobilise scale but require policies to create ecosystems around

the starting firm. Mission-oriented frameworks, as in the Netherlands and the EU, work best when missions are clear and linked to growing demand.

It is also important to note that high R&D inputs do not automatically yield strong innovation outcomes. Several countries with high R&D intensity perform no better than Finland on the EU Innovation Scoreboard (where Finland is in 4th place among the EU countries). It is also not evident that countries with higher R&D intensity have achieved greater output additionality or broader social welfare gains, such as increased productivity, reduced inequality, or other societal goals of interest to Finland.

However, the country analysis offers several concrete lessons for Finland. Finland provides relatively modest levels of public support for business R&D compared to international peers, well below the EU and OECD averages as well as key benchmark countries (see Figure 210). An increase in public support would, in itself, raise Finland's R&D activity, including within the business enterprise sector, in addition to hopefully inducing more R&D than the direct support.

International and domestic investment in R&D could be strengthened by generous tax incentives, as seen especially in Israel. Nevertheless, Israel is as mentioned previously not necessarily that comparable to Finland, and the ties to the US both financially and militarily are unique. Lessons from Korea indicate that focusing on large companies can drive R&D growth, a pattern Finland has previously experienced through Nokia. However, creating new large R&D intensive companies requires today's investments to target smaller firms with significant growth potential, since Finland currently has relatively few such major players (even though large firms still account for a considerable share of R&D today).

To identify the most relevant lessons for Finland, it is likely more fruitful to examine countries closer to Finland, even though European countries generally have lower R&D levels than Korea and Israel. Our analysis suggests that Finland could benefit from adopting tax incentives that have proven effective in Iceland and Belgium, instruments that are increasingly used across EU and OECD countries but remain underutilised in Finland.

Broad and rapid R&D schemes, combined with more targeted initiatives such as mission-oriented frameworks seen in the Netherlands and at the EU level could provide a promising path. At the same time, experiences from the United Kingdom and Denmark show that building strong innovation ecosystems and supporting specific sectors can also be advantageous.

4 MAPPING OF PERSPECTIVES ON ACHIEVING 4 PERCENT

This chapter presents findings from expert interviews and existing literature on how Finland could reach the target of 4 percent R&D investment relative to GDP by 2030. The evidence highlights the need for a policy mix tailored to firm size, sector, and stage of innovation. Direct funding and risk capital are most effective for early-stage and small firms, while tax incentives are better suited for near-market R&D and for attracting foreign investment. Grants are most relevant in high-risk, knowledge-intensive phases, shifting toward loans, guarantees, and co-investment as technologies mature and scale. Since large companies account for most R&D but smaller firms often generate higher additionality, policy design must balance sustaining incumbents with supporting the growth of start-ups and SMEs. Public support should be aligned with the stages of the innovation process, with scaling identified as Finland's main bottleneck. Strategic concentration of resources, rather than broad dispersion, has been highlighted as particularly relevant for a small country, with defence, space, energy, climate, pharmaceuticals, biotechnology, services, and artificial intelligence noted as priority

areas. Finally, stronger business–academia collaboration, underpinned by coordinated instruments and clearer incentives, is emphasized as important for translating research into economic and societal outcomes.

In this chapter, we present and discuss different takes on how Finland could reach 4 percent R&D of GDP in 2030. The chapter is based on literature review of effectiveness of different types of policy instruments, in addition to expert interviews. We have only included policy instruments that are directed to boosting private sector R&D directly. Hence, we have not commented on factors such as the access to human capital, either through the Finnish universities or by attracting foreign researchers.

In general, research shows that access to human capital is an important factor for R&D spending and innovation (Lee & Sun-Moon, 2024), yet there is good reason to expect that the effect on business sector R&D will materialise after a longer time. Further, this issue was also raised in many of the interviews we have conducted during this assessment, and it is also an issue raised recently by a Sitra report, that emphasises that enhancing corporate R&D investment hinges not only on increased funding but also on improving access to skilled personnel. Of the company representatives in Sitra's study, 53 percent said that recruiting R&D professionals is somewhat or very difficult. Respondents also indicated that availability of talent is the most important factor for where to place R&D functions (Sitra, 2024).

Further the European Commission report highlights a shortage of PhD-trained researchers in industry, limiting firms' access to global knowledge networks and weakening collaboration (European Commission, 2025). Despite unemployment among some PhD holders in Finland, companies still face recruitment challenges, underscoring the need for universities to expand the supply of highly trained graduates and for firms to upskill existing staff. Greater mobility between academia and business, as well as attracting international talent, are seen as essential to strengthen Finland's research and innovation system (European Commission, 2025). While the composition of the workforce is important for R&D spending, policy instruments targeting this are not a part of Business Finland's toolkit. Further, these tools are only indirectly related to private additionality of public R&D spending and may take time to materialise.

In mapping how to reach the 4 percent target, this chapter focuses on input additionality, the most direct lever for raising R&D activity and the main scope of our analysis. We therefore emphasize measures to increase private R&D investments, where most R&D takes place, while giving less attention to how these investments translate into societal impacts. In the longer run, however, output or impact additionality and wider economic benefits will matter more for Finland's growth and will gradually strengthen incentives for further R&D. This feedback is important but slow and unlikely to boost R&D spending before 2030.

4.1 DIRECT FUNDING OR TAX INCENTIVES - TARGETED OR BROAD ACCESS

Tax incentives are accessible to all firms that meet set criteria, offering broad-based support through reduced tax liability. This approach allows firms flexibility in how they invest in R&D, though its effectiveness depends on existing innovation capacity and internal management. The indirect nature of this support means there is limited control over how funds are used, which may reduce its impact on targeted innovation outcomes. However, it gives firms greater freedom and flexibility to select areas they believe have the greatest potential.

Direct funding, in contrast, enables governments to steer innovation toward specific industries, technologies, or societal needs. By targeting clearly defined projects, this instrument fosters strategic alignment and ensures stronger accountability. It is particularly useful to target areas with high additionality, where market forces alone may not drive sufficient R&D. Direct funding also helps firms overcome financial barriers, signals political priority, and lowers investment risks, thereby encouraging private co-investment. It can support organisational restructuring and workforce development aligned with innovation strategies.

Scientific research shows considerable variation in the observed input additionality effects of both direct funding and tax incentives. The literature also does not find evidence to support that neither instrument systematically outperforms the other (Dimos, Pugh, Hisarciklilar, Talam, & Jackson, 2022). An OECD report estimates an overall input additionality of approximately 1.4 for both tax incentives and direct funding, suggesting that these instruments are broadly comparable in their effectiveness (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023). The findings also point to potential complementarities between direct and indirect support measures, indicating that a balanced mix may enhance overall impact. Evidence from Belgium, Ireland, and cross-country surveys shows that a mix of direct funding and tax relief increases additionality compared to using only one instrument (Nana-Cheraa, 2023). The effectiveness depends on how the policy is designed and implemented. The studies highlight that well-targeted direct funding and carefully structured tax incentives can “crowd in” private R&D investment, whereas poorly designed schemes may displace private spending, reducing the net impact.

The effectiveness of tax incentives and direct funding in stimulating additional business R&D investment is not uniform across firms or contexts. Their relative advantages depend on several factors, including firm size, innovation phase, and sectoral characteristics.

Empirical evidence suggests that tax incentives yield higher additionality among small and medium-sized

enterprises (SMEs) than among large firms. For instance, responsiveness to tax support is significantly greater among small firms and medium-sized firms, compared to large firms, largely due to lower baseline R&D intensity rather than firm size per se (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023). Large firms may also capture a substantial share of tax relief for R&D activities they would have undertaken regardless of public support, thereby limiting the additionality of such measures. However, many micro and small firms struggle to fully benefit from tax incentives due to limited taxable income, weakening their effective impact (Dimos, Pugh, Hisarciklilar, Talam, & Jackson, 2022).

Direct funding appears to be more effective than tax incentives for smaller firms with low or no tax base, particularly in the early stages of innovation where financial risk is higher (Ravšelj & Aristovnik, 2020). For these firms, grants can unlock risk-taking and enable experimentation that would not occur otherwise. Conversely, large firms which already invest heavily in R&D, tend to exhibit lower additionality from both forms of support. The administrative complexity is also often more comprehensive for direct funding, which can favour larger firms with more resources to manage application processes.

The type and maturity of innovation activity also influence which support instrument is more appropriate. Tax incentives are generally more suited to R&D activities closer to commercialisation, where firms generate revenue and thus benefit from tax relief. Refundable or payroll-linked tax credits can mitigate this limitation, but they come with higher fiscal costs (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023). In contrast, direct funding is more conducive to early-stage or high-risk research, where outcomes are uncertain and returns are long-term.

Sectoral dynamics also shape the relative effectiveness of instruments. Subsidies are often more effective in manufacturing sectors, where capital intensity and project scale justify targeted support. However, they are not necessarily more effective for high-tech sectors, where firms may already benefit from a range of public and private financing mechanisms (Dimos, Pugh, Hisarciklilar, Talam, & Jackson, 2022). Tax incentives, especially when designed as incremental schemes, tend to perform better in balanced policy environments, where complementary instruments mitigate their limitations.

Informants consulted have highlighted that R&D tax incentives can be an effective tool for attracting foreign R&D investment, as they improve the relative cost competitiveness of conducting R&D in Finland compared to other countries. One example is Israel, which offers generous tax-based schemes to draw in the R&D divisions of large international tech firms (see chapter 3.3). At the same time, it was noted that Finland has a large number of small, early-stage firms that have emerged from R&D

activity but have yet to scale. These firms often lack a substantial tax base, limiting their ability to benefit from tax incentives. Moreover, several informants have noted that many of these companies face challenges in taking the necessary risks to scale up and expand internationally. In such cases, direct funding and risk capital can be more effective policy instruments to lower risk thresholds and encourage growth-oriented investment.

Across both instruments, policy design is critical for maximising additionality. For tax incentives, features such as refundability during loss years and payroll-based redemption significantly enhance firm responsiveness (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023). However, these features increase government costs and require careful targeting. Similarly, direct funding must avoid overreach or excessive generosity, which can lead to substitution effects, particularly among large incumbents.

A growing body of evidence highlights the value of complementarity between tax incentives and direct funding. When combined effectively, they can reinforce each other's strengths: flexibility and scale from tax incentives, and directionality and accountability from grants. For example, case studies from Belgium and Ireland show that a mixed policy approach enhances additionality more than relying solely on one instrument (Nana-Cheraa, 2023).

4.2 DIRECT FUNDING: GRANTS OR LOANS?

According to our informants, designing direct funding to raise private R&D with high additionality requires matching the instrument to project risk and stage. Grants are best suited to early-stage research with long horizons and large knowledge spillovers, where private finance is scarce. Loans and guarantees are more appropriate once technical risk falls and commercial prospects improve, typically in demonstration and scaling.

The trade-off is higher fiscal cost but greater incentives to invest in R&D with grants versus lower fiscal costs and higher reach (as loans can be used to multiply the available capital) but potentially reduced incentives to invest in R&D. Grants can lower entry barriers for loss-making start-ups and SMEs. Loans, repayable advances, and guarantees stretch government budgets and reuire commercial viability, making them well suited to pilots, first deployments, and scale-up investment. Their limitations are lower uptake among risk-averse companies. This can still be alleviated by flexible terms: subordinated or revenue-based repayment, grace periods, and partial forgiveness when projects fail for technological (not managerial) reasons.

For Finland, where many small firms lack a tax base and risk appetite, grants can be more effective in early stage of the innovation process and for first-of-a-kind deploy-

ments. Combining matched grants with soft loans/guarantees and public co-investment that shares downside risk while crowding in private capital, can on the other hand be more optimal for achieving scaling.

Grants form the largest share of direct government funding for innovation in Finland today. Several public organisations provide direct funding for business R&D in Finland, though a large share is channelled through Business Finland. Figure 4-1 shows how Business Finland's disbursed direct funding has evolved by instrument in recent years.[38] Since 2016, the share of Business Finland's funding going to grants has increased. Paid grants rose markedly after the pandemic with a Covid 19-related spike in 2020, and remain above pre-pandemic levels. Loans have on the other hand remained relatively stable, with research funding has decreased slightly over the period.

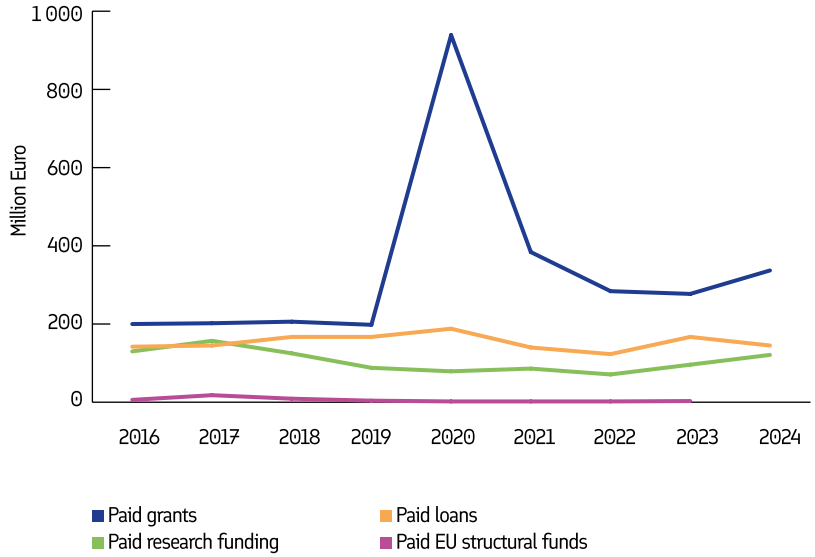


FIGURE 4-1: PAID DIRECT FUNDING FROM BUSINESS FINLAND. SOURCE: BUSINESS FINLAND, MENON ECONOMICS

4.3 INSTRUMENTS THAT TARGET FIRMS OF DIFFERENT SIZES

Firm size is an important consideration in the design of R&D policy, both in selecting appropriate instruments and in determining whether to target small or large companies to maximise additionality and overall R&D investment. Size often correlates with a firm's position in the innovation process: start-ups and small firms are typically in early stages, while larger firms are more likely to operate in mature phases. However, this is not absolute: large firms may also engage in early-stage innovation, while small firms can work on more advanced or market-ready technologies.

In Finland, large firms play a central role in R&D investment with global firms like Nokia and Wärtsilä. The business enterprise sector performs the majority of total R&D

38 Note that these amounts also include direct funding for activities that may not qualify as R&D.

and most of this activity is concentrated in large companies. In 2021, firms with more than 250 employees accounted for approximately 65 percent of total BERD (se Figure 4-2). However, this concentration is not unusual in an international context. Also the development of BERD in Finland has been highly dependent on large firms. The decline in business R&D in Finland from its peak in 2008–2011 was almost entirely driven by Nokia, which in 2008 accounted for around 37 percent of all R&D investments in Finland (Ali-Yrkkö J. , 2010). The figure also shows that the increase in R&D since the 2016 low point has been largely driven by rising R&D investment among large firms. At the same time, companies of all sizes have increased their R&D activity in recent years.

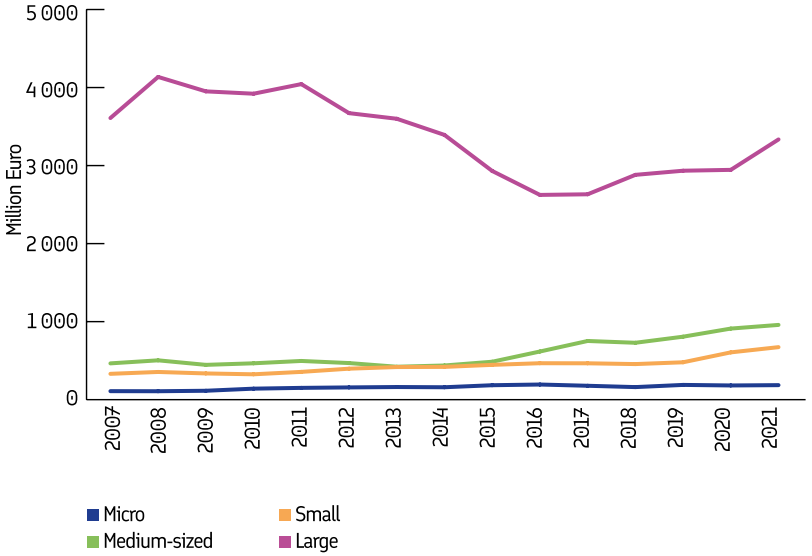


FIGURE 4-2: BUSINESS R&D PERFORMED BY FIRM SIZE IN FINLAND [39]. SOURCE: OECD RESEARCH AND DEVELOPMENT STATISTICS DATABASE [40], MENON ECONOMICS

Large companies also receive a majority of public funding, see Figure 4-3. The figure shows that large firms received EUR 332 mill. or 55 percent of Business Finland's total funding in 2024, up from 43 percent in 2019, with the exception of a temporary pandemic-related increase that mainly targeted micro and small sized companies. Excluding this period, the post-pandemic rise in Business Finland's funding has primarily benefited larger companies. Micro firms account for the second largest share of funding (21 percent), reflecting Business Finland's emphasis on supporting start-ups.

39 Firm size categories are defined by number of employees: micro (1–9 employees), small (10–49), medium-sized (50–249), and large (250 or more)
40 Available **here**.

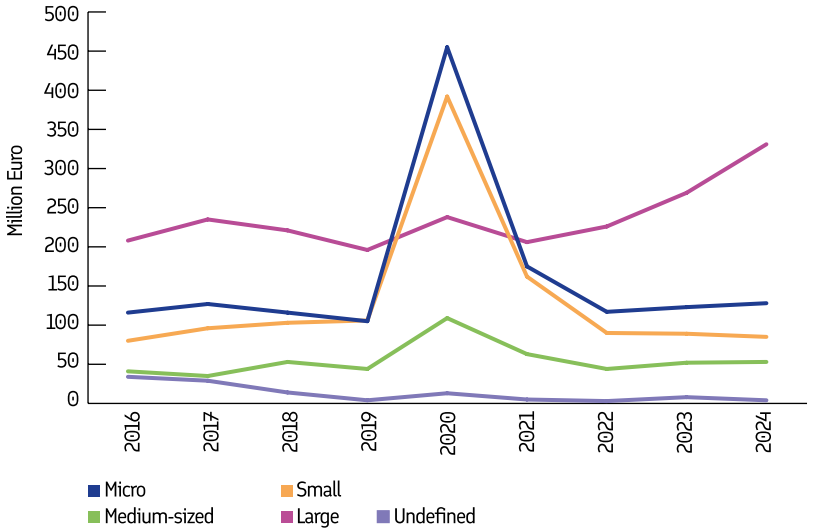


FIGURE 4-3: DISTRIBUTION OF BUSINESS FINLAND'S PAID FUNDING BY FIRM SIZE [41].
SOURCE: BUSINESS FINLAND, MENON ECONOMICS

Large firms and multinationals typically invest more in R&D than SMEs (OECD, 2021). Some studies suggest that firm size helps explain the R&D intensity gap between the EU and the US, independently of sectoral structure (Ortega-Argilés & Brandsma, 2009). Several countries have pursued R&D policies targeting large firms with success. Examples include South Korea's focus on conglomerates and Israel's strategy to attract multinational tech companies (see chapter 2.5). Multinational enterprises also have greater flexibility to relocate R&D activities across borders in response to policy incentives or cost considerations. In the Netherlands, for instance, foreign firms operating locally often conduct R&D elsewhere, while Dutch multinationals perform their R&D abroad. In smaller countries, national R&D intensity can become dependent on a few large firms, as illustrated by Finland's reliance on Nokia.

Although large firms tend to have high R&D intensity and account for the majority of national R&D expenditure, this does not necessarily make them the optimal target for public support. If such firms would have carried out the same R&D activities in the absence of support, the additionality of the funding is limited. Supporting smaller and mid-sized firms may, in many cases, yield greater long-term benefits by enabling them to scale and eventually become significant contributors to R&D, employment, and value creation. Another strategy is to attract R&D activity from large multinational companies. However, such firms do not base their location decisions solely on the level of government support for R&D. They also take into account the availability of skilled human capital and proximity to leading centers of research excellence (Siedschlag, Smith, Turcu, & Zhang, 2013).

Several informants have in the interviews highlighted Finland's need for additional large companies with strong internal R&D capabilities. One suggestion was to

41 Firm size categories are defined by number of employees: micro (1–9 employees), small (10–49), medium-sized (50–249), and large (250 or more)

strengthen the focus on scaling and commercialisation of startups, already a national priority, as a pathway to develop future large R&D intensive firms. Others pointed to untapped potential in large companies that generate promising ideas outside their core business areas. These ideas are often not pursued internally but could be spun off into new startups. Business Finland was encouraged to consider incentives for such spin-off activity.

Scaling support was repeatedly emphasised by several informants. Interviewees noted that companies in the scaling phase often have the highest growth potential, yet face barriers not primarily linked to capital availability, but to risk perception. Some mid-sized firms hesitate to scale due to low risk tolerance, despite having access to financial resources. The recent inclusion of mid-sized companies in the Veturi program was seen as a positive development in this regard. See textbox below about the Veturi program.

BOX 4-1: ABOUT THE VETURI PROGRAM FROM BUSINESS FINLAND[42]

The Veturi programme is one of Business Finland's flagship instruments for mobilising large-scale R&D investment and strengthening innovation ecosystems in Finland. In the program, globally leading or internationally ambitious companies commit to significant R&D growth in Finland while opening their research to collaboration with universities, research institutes, SMEs, and startups. In return, firms may receive up to EUR 20 mill. in funding, but the main effect lies in the much larger private investments and spillovers generated. By 2025, more than twenty Veturi ecosystems has been launched. Examples include Valio's Food 2.0, which combines around EUR 100 mill. in R&D with major export growth ambitions; KONE's Flow of Urban Life, engaging over 200 partners and leading to more than 100 patent applications; and Nokia's Competitive Edge project, which mobilised EUR 230 mill. in R&D investments, recruited more than 200 new R&D professionals in Finland, and involved 233 ecosystem partners across 18 projects. Most recently, AMD and Silo AI received Veturi funding to coordinate a national AI ecosystem and strengthen Finland's position in advanced computing. Through these initiatives, the Veturi programme has become a cornerstone of Finland's R&D policy, anchoring the activities of large firms while creating broad spillovers to the wider economy, thereby supporting the national goal of raising R&D expenditure to 4 percent of GDP by 2030.

42 Source: (Business Finland, 2024), (Business Finland, 2024), (Business Finland, 2025) and (Business Finland, 2025).

At the same time, several informants recognised the value of supporting large companies, both to sustain their global competitiveness and to enable them to anchor ecosystems through collaboration with smaller firms. The Veturi program was widely viewed as a successful instrument in encouraging large firms to invest in R&D and build partnerships. However, concerns were raised about whether some of these companies would have carried out their investments regardless of support, suggesting limited additionality.

Startups, particularly in technology-intensive fields, were seen as offering the highest potential for additionality, especially in areas where private investment is scarce. However, a number of informants expressed concern over the limited emergence of startups focused on breakthrough innovations. Public funding was regarded as essential for supporting such firms, especially in early phases.

Finally, several interviewees pointed to challenges that SMEs face in accessing support. Existing public support schemes and tax incentives were perceived as overly bureaucratic, standardized, and not well suited to the operational realities of smaller firms. Some SMEs are excluded because their R&D does not fit into pre-defined categories, and the administrative burden of applying for support can be disproportionately high relative to the funds that can be received.

When designing R&D policy based on firm size, section 4.1 showed that direct funding is generally more appropriate for small firms and start-ups, which often lack taxable income and may require support to take greater risks. Several Finnish stakeholders noted that early-stage firms are often risk-averse when it comes to scaling and growth. For larger firms, both tax incentives and direct funding can be relevant. Tax incentives provide flexibility for firms to pursue their own priorities, while direct funding allows policymakers to target specific sectors or societal challenges.

4.4 SUPPORT FOR THE DIFFERENT STAGES OF THE INNOVATION PROCESS

Public funding for R&D can target different stages of innovation. The goal is to maximise additionality by matching instruments to the dominant market failure at each stage of the innovation process. We present an illustration of the innovation process below.

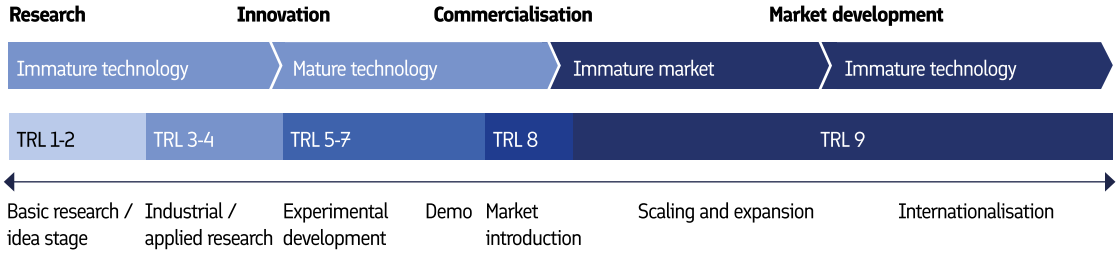


FIGURE 4-4 ILLUSTRATION OF THE INNOVATION PROCESS

In the early phase of innovation, risk is high, and payoffs are distant because projects remain far from the market. This creates a risk for underinvestment from the private sector. Public instruments such as grants for basic research, collaborative industry–academia projects, and shared research facilities can yield large social returns by supporting technologies that would otherwise receive insufficient private financing.

As projects move into demonstration, information asymmetries make external finance costly as developers hold superior information about commercial viability relative to potential financiers. Additionality is typically highest for instruments that reduce uncertainty and align incentives like matched grants, milestone-based contracts or procurement, testbeds, regulatory sandboxes, and public co-investment that shares downside risk.

During commercialisation and scaling, private capital is usually easier to access as uncertainty falls and the time to market is shorter. Nevertheless, many firms encounter a "valley of scale" arising from large fixed costs and coordination needs. Interview evidence from Finland indicates that commercialisation and especially scaling constitutes an important bottleneck. Informants point to a need for targeted direct funding for first-of-a-kind deployments and more risk capital for scale-ups. They also note a limited risk appetite among Finnish firms. Despite a large base of start-ups and SMEs, relatively few choose to scale. Challenges in the scale-up phase are highlighted in a recent EU report (European Commission, 2025).

The challenges related to scaling occur despite a venture capital market that has expanded markedly over the past decade and now supports R&D spending at 150.6 percent of the EU average (European Commission, 2024). On the public side, Tesi is also an important investor, addressing market gaps and mobilising private capital. Nevertheless, domestic investment capacity appears to remain insuffi-

cient to finance later-stage growth at the scale required for international competitiveness. As a result of limited access to capital, high-potential firms are more likely to be acquired by foreign investors, with associated risks of losing headquarters functions, key personnel and intellectual property.

More broadly, the EU report points to a degree of risk aversion in Finland (European Commission, 2025), which is consistent with the evidence reported by our informants for this project and with the Draghi report's diagnosis of a European "middle-technology trap", in which limited ambition constrains innovation, productivity and growth (Draghi, 2024). While Finland performs relatively well compared with many EU Member States, it is experiencing weak productivity growth and R&D investment levels that lag those of leading global competitors.

4.5 GETTING NEW SECTORS AND A BROADER SET OF BUSINESSES TO ENGAGE IN R&D ACTIVITIES

For a small country like Finland, dispersing resources across many fields may be ineffective, making strategic concentration more relevant than pursuing leadership across the full technological spectrum. Experiences abroad suggest that well-defined missions can align academia, industry, and public agencies, and many informants

stressed the value of clearer priorities to ensure complementary use of resources. Sectoral choices may build on Finland's comparative advantages, potential for societal returns, or areas where public intervention can address market failures. Since R&D intensity varies across industries and large firms drive overall performance, developing more R&D-intensive sectors may be necessary.
Based on discussions with stakeholders in Finland and abroad, the following areas appear particularly relevant for future prioritisation:

- **Defence and space technologies:** Geopolitical instability, the war in Ukraine, and increased global defence spending are generating demand for defence systems and technologies. Finland's NATO membership also provides improved market access and opportunities for international cooperation. EU and NATO funding represent additional sources of capital, and Finland's own defence budget expansion creates scope for supporting domestic producers. The country's ICT and software expertise, built up during the Nokia era, provides a competitive foundation for developing advanced defence technologies. Defence industries are closely linked with the rapidly commercialising space sector, where Business Finland already had initiatives such as the New Space Economy program and an emerging ecosystem of start-ups and others like satellite component manufacturers.
- **Climate and energy technologies:** The global transition to low-carbon energy systems is creating demand for renewable energy solutions and climate-related technologies. Europe in particular needs to accelerate its replacement of fossil energy sources. Finland has already invested significantly in clean energy and can further strengthen its role as a supplier of climate technologies. In Finland's ambitious Net-Zero roadmap, public procurement is highlighted as a tool to become more innovative, functional, impactful and sustainable (Minestry of Finance, Finland, 2023). Similarly, the Government Resolution on the Strategic Programme for the Circular Economy underlines Finland's traditional strengths in research, innovation and development, stating that funding will be strengthened for RDI and ecosystem activities that support a low-carbon circular economy, as well as for demonstration projects and facility investments (Ministry of Employment and the Economy, 2021).
- **Pharmaceuticals and biotechnology:** Pharma and biotech are characterised by high R&D intensity and strong growth potential. The sector can also yield high social impact, particularly in light of Finland's ageing population. This sector is strategically important both for health resilience and for economic growth, though it requires long-term investment

and strong linkages between universities, research institutes and industry. Finland has previously had its own roadmap 2020–2023 for R&D investments within the health care sector (Valtioneuvosto, 2020).

- **Service sector:** The service sector is rarely in the focus for R&D policy, despite accounting for a large share of value creation in Finland. Innovation in services is often overlooked because it involves the application of existing technologies, such as AI and digitalisation. A European Commission report state that innovation in Finland's service sector remains underdeveloped, as existing policy instruments are still geared towards hardware and extractive industries. Yet services are becoming a key arena for R&D, particularly in FinTech, LegalTech and InsuranceTech, with AI and data analytics driving new opportunities for growth and public sector productivity. Cultural and creative industries have also been overlooked, but recent steps such as a EUR 9 mill. allocation for R&D mark a recognition of their potential. Strengthening support for these sectors could both diversify Finland's innovation base and help address structural weaknesses revealed by earlier industrial challenges (European Commission, 2025). According to "The Economic Opportunity of Generative AI in Finland," an Implement Consulting Group study commissioned by Google, 75 percent of generative AI's economic potential is concentrated in the service sector (Implement Consulting Group, 2024).
- **Artificial intelligence:** Generative AI and large language models are likely to become key enablers of future productivity growth, yet current support schemes for AI adoption remain limited. This is a concern by some informants, as Finland risks falling behind international competitors. Finland also have a significant potential in quantum technologies according to our informants. The country already has a strong R&D base in this field, and increasing investments will be important to fully capture the benefits of quantum technology for Finland (The Finnish Quantum Institute, 2023).

4.6 FOSTERING MORE COLLABORATION BETWEEN PRIVATE SECTOR AND ACADEMIA

Collaboration between business and academia is important for achieving significant levels of R&D. Universities supply highly skilled R&D personnel and human capital to the private sector, while also carrying out basic, industrial and applied research that generates ideas, solutions, technologies and new products. At the same time, academia depends on the business enterprise sector to commercialise these technologies and solutions, thereby ensuring that research outcomes translate into societal benefits in

the form of value creation, employment and productivity growth. Cooperation between academia and business is also one of the issues most frequently raised by our informants and Finnish stakeholders as a priority area for improvement. The challenge of overcoming barriers to successful collaboration between public research and industry has also been acknowledged by the Finnish authorities.[43] According to both our informants and the EU report, the difficulties are the result of several long-term developments: years of underinvestment in R&D, a cultural shift from trust-based partnerships between academia and private sector towards more transactional relations and substantial restructuring of Finland's public R&D institutions, including the merger of Tekes and Finpro into Business Finland (European Commission, 2025). Today, the innovation system is divided between the academic and business sectors. On one side, the Research Council of Finland, universities and research institutes are primarily engaged in early-stage research, academic publishing and PhD training. On the other side, Business Finland and other industry-oriented institutions provide support for R&D and innovation in private firms. Several informants described this structure as generating silos that limit collaboration across the two domains.

43 Horizon Europe study, "Support to Finland on Improving R&D Collaboration between Research Organisations and the Private Sector" (2025)

At the same time, this trend is relatively new, and many stakeholders noted that greater awareness of the problem has already contributed to improvements. There are now more examples of collaboration between academia and private enterprise. Several stakeholders also emphasized that it would not be beneficial to alter the current structure, given that significant structural reforms have already been undertaken. An optimal configuration, however, would involve closing structural gaps, minimising unnecessary overlaps and ensuring that institutions complement one another while jointly advancing R&D and innovation in the same strategic direction. The EU report also highlights the need to strengthen synergies between Business Finland, the Research Council of Finland and the ELY Centres (currently under reform), and to better align their policy instruments in order to avoid funding gaps.

The EU report stresses that enhanced collaboration can be achieved by increasing both the quantity and quality of interactions between public research and business, and by targeting these interactions more strategically towards solving major societal challenges and transitions (such as the green transition and digitalisation) and developing transformative technologies. This can be facilitated through missions or other cross-sectoral strategies that align institutions and create strong incentives for cooperation.

Both our own findings and those of the EU-report point to persistent barriers in university–industry collaboration. Universities tend to be better equipped to work with large firms engaged in advanced technologies, which benefit from access to cutting-edge research and recruitment of highly skilled graduates. They also provide valuable support for high-tech SMEs, including start-ups, spin-outs, and companies dependent on specialised research facilities. However, many firms, especially smaller ones, find academic partnerships difficult to navigate. A further limitation is that too few firms conduct their own R&D, which constrains their ability to benefit from collaboration with the public research sector and to translate research outcomes into economic growth.

The EU report identifies a set of barriers between academia and the private sector similar to those found internationally: differences in time horizons, funding procedures and project execution; changes in company strategy during research projects; concerns over confidentiality and intellectual property rights; disputes over costs and pricing; and a lack of mutual understanding of strategic priorities. Long-term strategic partnerships are seen as a key mechanism for reducing such barriers. The report also argues that in areas of sustained demand, universities should not rely solely on project-based funding but require stable base funding, particularly for researcher salaries, to ensure the capacity for flexible engagement with industry.

Our informants also stressed that current funding models and academic incentives remain strongly oriented towards international publications. Yet for society, tech-

nological development and welfare gains, collaboration with business and the development of commercialisable ideas may be just as important. The EU report makes similar observations, recommending that science–business engagement be made an explicit part of university funding models, even if this requires legislative change. It also suggests creating a dedicated funding stream based on performance in knowledge transfer, with resources earmarked for reinvestment in collaboration activities.

Finally, the report notes that stronger personal incentives could be introduced for individual researchers. While societal impact is already included as a criterion in academic promotion procedures at some Finnish universities (e.g. Helsinki and Aalto), such contributions should be given equal weight with research and teaching. This would motivate researchers to engage more actively in business collaboration and entrepreneurial activities as a recognised path to career advancement.

5 FIVE POLICY SCENARIOS

Business Finland is given a central role in the plan for reaching 4 percent by 2030. The budget has been increased by 32 percent over the last five years, and based on the General Government Fiscal Plan (2025–2028) a further increase of close to EUR 300 mill. per year will be provided for grant funding through Business Finland towards 2028. In light of these changes, a key question arises: What tools should Business Finland apply to speed up overall business R&D spending most efficiently? And moreover, should other tools be applied, that not necessarily enter the fiscal plan or belong to the Business Finland portfolio of innovation and R&D tools? Economists label this kind of policy efficiency with the word “additionality”: How many euros in private R&D spending will one euro in support from the government provide? Clearly, this is not only relevant for policy schemes managed by Business Finland. Hence we also discuss the additionality of alternative policy reforms in this chapter.

Alltough it is uncertain whether an optimal composition of grants offered by Business Finland will be enough to reach the 4 percent target, these policy measures will on

their own represent a large increase in the public resources targeting private sector R&D. Hence, a relevant strategu is to first test out these measures before trying other measures.Notice that in order to reach the 4 percent target, the annual total spending on R&D has to grow from approximately EUR 8 bn today to more than 12 bn in 2030. Hence, policy must be scaled and designed to raise private sector R&D investments substantially.

In the policy scenarios below, we sketch out five policy packages that partly describe a sound strategy for offering grants through Business Finland, and other relatively radical strategies that utilise innovation loans, tax incentives and other measures that may increase policy additionality further. These scenarios are based on insights from other countries with a strong growth in the R&D share of GDP over the last decades described in chapter 3, policy suggestions in chapter 4, as well as a set of assessment criteria outlined below. Together, these scenarios provide complementary perspectives on how Finland can achieve 4 percent R&D to GDP by 2030. At the end og the chapter, we also summarize our recommended policy combination based on the scenario analysis.

A. **Changes to Business Finland's R&D strategy**, further developing existing funding mechanisms,
B. **Expanding ecosystem financing**, deepening collaborative innovation platforms around leading companies,
C. **A large expansion of tax incentives**, expanding broad-based fiscal support for R&D,
D. **A more proactive venture model**, strengthening the supply of risk-capital for scaling R&D intensive firms,
E. **Mission based innovative procurement**, using public demand to create markets for new technologies and solutions.

We have summarised the scenarios in the table below, while we in the following chapters describe the scenarios in detail.

SCENARIO	CURRENT SITUATION	POLICY MOVE	PROS & CONS
Scenario A: Changes to Business Finland's R&D strategy	BF funding increased 32 percent last 5 years. More focus on SMEs, more grants vs loans, some shift to early TRL.	More mature and international grant funding. Expand Young Innovative Company grants, fund first-of-a-kind demos, broaden to new sectors, allow funding for collaboration. Scale up risk loans and introduce hybrids.	**Speed:** Medium-fast. BF can scale quickly but firms need absorptive capacity. **Additionality:** High if well-targeted, loans less additional than grants and evaluations is needed. **Reach:** Broad. Can target SMEs, large firms, new sectors, and international actors. **Long-term effects:** Strengthens BF as main engine and builds sustainable ecosystems.
Scenario B: Expanding ecosystem financing	R&D support dominated by direct funding (0.06% GDP); tax incentives very small (<0.01% GDP) and only recently reintroduced.	Expand tax credits to 0.25–0.35% GDP by 2030, design wage-based refundable credits for SMEs, incremental credits for large firms, broaden eligibility to software/services and add evaluation clause.	**Speed:** Fastest. Automatic uptake once legislated and immediate broad reach. **Additionality:** Mixed. Comparable to grants (~1.4 input additionality); higher for SMEs if refundable. **Reach:** Very broad. Applies to all firms but risk of concentration in large incumbents if poorly designed. **Long-term effects:** Helps attract foreign R&D and scale BERD but long-term impact depends on complementarity with other policies.
Scenario C: Large expansion of tax incentives	R&D support dominated by direct funding (0.06% GDP); tax incentives very small (<0.01% GDP) and only recently reintroduced.	Expand tax credits to 0.25–0.35% GDP by 2030, design wage-based refundable credits for SMEs, incremental credits for large firms, broaden eligibility to software/services and add evaluation clause.	**Speed:** Fastest. Automatic uptake once legislated and immediate broad reach. **Additionality:** Mixed. Comparable to grants (~1.4 input additionality); higher for SMEs if refundable. **Reach:** Very broad. Applies to all firms but risk of concentration in large incumbents if poorly designed. **Long-term effects:** Helps attract foreign R&D and scale BERD but long-term impact depends on complementarity with other policies.

Scenario D: Proactive venture model	Finland faces scaling bottleneck. VC market expanded but still insufficient for late-stage growth.	Triple the state venture funding via Tesi, use public co-investment to crowd in private VC, anchor late-stage, R&D-intensive firms in Finland and focus on scaling deep-tech firms.	**Speed:** Slower. requires fund setup and capital deployment. **Additionality:** High in scaling phase if de-risking works but limited if firms already attractive to private VC. **Reach:** Selective. Focuses on scaling R&D-intensive firms but impact depends on size of VC market. **Long-term effects:** Anchors new R&D-intensive companies in Finland and large effects beyond 2030.
Scenario E: Mission-based innovative procurement	Finland already has 10% innovative procurement goal, Hilma portal, and BF grants with R&D requirements, but procurement still generic rather than mission-based.	Strengthen the mission-based procurement portfolios (defence, climate, health etc.). enlarge BF grants supporting innovative government procurement contracts.	**Speed:** Medium. Can scale quickly by repurposing budgets, but institutional upgrades slow initial impact. **Additionality:** Lower short-term, procurement unlikely to induce much new R&D before 2030. **Reach:** Broad across sectors, but depends on demand aggregation and buyer coordination. **Long-term effects:** Improves link between public demand and innovation and spillovers possible but effects slow.

TABLE 5-1: SUMMARY OF POLICY SCENARIOS

5.1 THE ASSESSMENT CRITERIA

We have, through our work with this assessment and dialogue with Business Finland, identified four characteristics as particularly relevant in assessing whether policies will help achieve the 4 percent target by 2030: (1) speed of impact, (2) additionality, (3) reach, and (4) long-term effects on productivity and growth. These categories matter because:

6. *Speed* is critical given the 2030 deadline. Instruments that deliver rapid increases in private R&D may be necessary in the short run, even if they are less transformative over time.
7. *Additionality* addresses the key policy question: would firms have invested in R&D anyway? High additionality ensures that every euro of public support generates new, rather than substituted, private R&D-investments.
8. *Reach* matter because an instrument's aggregate effect depends on how many firms and sectors it mobilises. A tool with high additionality but limited uptake will shift national R&D intensity less than a tool with medium additionality but potentially broad reach. .
9. *Long-term effects* remind us that higher R&D spending is not the ultimate objective. The purpose is to generate innovation, productivity, competitiveness, and welfare.

5.2 SCENARIO A – CHANGES TO BUSINESS FINLAND'S R&D STRATEGY

BF has played a pivotal role in the funding of RD&I in Finland and over the last years. Recently, the agency has experienced large increases in funds allocated from the government as well as structural changes in priorities and strategies. A key question is whether these changes are to be considered as efficient tools to stimulate more R&D investments in the business sector. We claim that this to a large extent is true, but we also argue that to propel private funds for R&D-activities sufficiently to reach the 4 percent goal in 2030, you need tools (grants and innovation loans) that trigger larger scale R&D-projects combined with a high degree of additionality.

5.2.1 CURRENT SITUATION (RECENT CHANGES)

BF has faced a 32 percent increase in paid funding over the last 5-years. As far as we can see, the following structural changes has found place:

- Significantly more resources have been devoted to the SME segment. Most studies tend to show that R&D-subsidies propel more private funds when they are directed to smaller and younger firms. On the other hand, government support to each project becomes more limited in size, merely due to the scale of the projects.

- We observe a larger share of R&D-funding channelled through grants, rather than loans. Clearly, for each euro, an R&D grant is more desirable than a loan. On the other hand, repayments allow for more funding for each euro. Hence, both the number and size of projects may be increased significantly by shifting from grants to loans. Moreover, there are ways to design hybrids that may be viewed as significantly more attractive than regular risk loans.
- We claim to observe a slight shift towards funding of projects in the earlier stages (lower TRL-levels), but there is no clear and lasting shift in the TRL-weighting. Innovation projects operating in the higher TRL-levels tend to be larger, as piloting and market testing tends to be capital intensive.

A key insight from stakeholder input is that scaling up R&D in Finland will require engaging more companies and new sectors and overcoming a "valley of scale" in commercialisation. Many Finnish start-ups and SMEs are innovation-active but struggle to become larger R&D performers due to risk aversion and financing hurdles. Thus, some argue that the strategic focus of BF should be two-fold: (1) rapidly boost R&D activity by established firms (2) broaden the base of R&D-performing companies and fields. The key question is how to design policy instruments and partnerships that can achieve this dual objective efficiently.

5.2.2 THE POLICY MOVE (2026–2030)

Notice that BF holds a portfolio of several instruments with a wide variety of functions and characteristics. The aim of this report is to provide *radical proposals* on how to reach the 4 percent target. This implies that smaller alterations of existing strategies and tools are not part of our mandate. Notice also, as we have mentioned earlier, that reaching 4 percent requires a high degree of additionality. On this background we present the following radical suggestions:

Strengthen the ecosystem directed grants further
This strategy is more thoroughly described in Scenario B.

Increase grants supporting government sector innovative procurements.
This strategy is more thoroughly described in Scenario E.

Broadening sectoral reach and thematic targeting
With more resources, Business Finland can extend its support through grants into underrepresented and emerging sectors that are crucial for future growth. A concrete example is the creative industries: the government has already earmarked EUR 9 mill. of BF's 2025 authorisation to bolster R&D in creative fields and creative–tech crossovers. Similarly, there is a need for thinking innovation within services for health and well-being. The goal is to encourage R&D investment in parts of the economy that have

historically invested less in formal R&D but hold potential for innovation.

More focus on international collaboration

The world of R&D spending is large and among larger player, this field is highly globalized. All countries should realize that international R&D cooperation will be important for successful innovation in the years to come. BF can use its funding toolkit to stimulate multinational companies and foreign research-intensive firms to expand their R&D collaboration with players in Finland. Here, we explicitly believe that by financing innovation projects that are partly conducted abroad, you stimulate to stronger ties between firms in Finland and firms abroad. Through such ties you open windows for more R&D in Finland in consecutive projects. Today, there is an opening for financing subcontractors that supply an R&D project with foreign R&D-services. We believe that regulations governing such purchases should also apply to more pure cooperations. BF could step up such efforts, marketing Finland as an attractive R&D location with generous support available for projects that involve foreign R&D-activities too. By 2030 this could significantly contribute to the 4 percent GDP target. It would also enhance international knowledge flows into Finland's innovation ecosystems.

Moreover, as stated in the Multiannual plan for the use of government research and development funding, the

government has only suggested EUR 25 mill. in increased support to matching for EU funding. Such matching is designed to increase the attractiveness of applying for EU funds. Although Finland scores high on success rates for applications, one could raise the volumes of applications further. Business Finland could be given a role in such matching, especially for projects that are more mature and closer to market.

Larger and more favourable risk loans – linking grants and loans more actively

BF's R&D loan and guarantee programs can be scaled up significantly and made more flexible. Innovation loans are not a part of the Government fiscal plan for reaching the 4 percent target. We argue that it should be. Innovation or risk loans are closely linked to grants, and in some countries the same budget supports both grants as well as loss funds and interest rate subsidies associated with innovation loans. There are broadly speaking three alternatives to choose from in this respect:

- Lower the interest rates (below the running market rates),
- Provide banks (including Business Finland as a bank) with larger loss guarantees (share of capital) through a larger loss fund, and
- Provide large conditional grants, that will be converted into loans if projects are successful within a given time period.

We argue that BF should design and market risk alleviating products using all these three strategies within the maximum limits set by the EU regulation on state subsidies. This is opening for a larger risk on BFs hand, while the expected funding costs will shrink extensively as grants are shifted into highly attractive risk loans and guarantees, where the repayment rates are substantial. This strategic move will allow BF to reach a larger R&D spending without necessarily requiring large hikes in government expenditures over time. Loans and convertible grants are especially relevant for projects that operate in the later TRL-levels. As mentioned the R&D-projects are typically much larger at this stage. Additionality is probably somewhat lower, but project size matters a lot for total R&D spending.

We are aware that there are limits to the subsidy component in risk loans, due to EU state aid rules, yet we see a significant potential for providing more favourable loans to firms running RD&I-projects.

Nevertheless, some grant schemes have a potential for covering the same needs as the loans we discuss above. For example, Finland's *Young Innovative Company* grant scheme (which provides milestone-based funding to promising start-ups) could be enlarged to reach more firms or higher amounts per firm in the scaleup phase. At the next stage, BF can introduce dedicated funding for "first-of-a-kind" demonstrations and scaling projects, essentially bridging the gap between prototyping and commercialisation that many tech-oriented SMEs face.

5.2.3 PROS AND CONS

Speed: Augmenting BF's budget can translate into on-the-ground R&D activity relatively quickly. Because BF's funding programs are established and staff are in place, additional calls and larger grant rounds can be rolled out within a short time frame (the agency has already shown agility in launching new funding calls aligned with the 4 percent goal). If new initiatives (like shared infrastructure or new partnership models) are created, they may take time to set up before effects materialize. Absorptive capacity is another concern: companies need to hire researchers and organize projects to use the funds, which could bottleneck the speed of impact. Thus, while reasonably fast, this approach may see a one- to two-year lead time for strong effects to be realized.

Additionality: When well-targeted, expanded BF funding can achieve high additionality, although you cannot expect a similarly high degree of additionality for loans as for grants. Strong project assessment and periodic evaluations are needed to keep additionality high as the funding scales up and unsuccessful funding services or programs should be terminated immediately.

Attractiveness and reach: A major advantage of this strategic shift is that it may activate large new groups, and provide more favourable funding for larger projects. Thus, attractiveness and reach is increased. BF's expanded pro-

grams can be designed to appeal to different firm sizes and industries, from manufacturing to services, from start-ups to multinationals.

5.2.4 SUMMARY

Business Finland (BF) has become central to Finland's innovation system, but reaching the 4 percent R&D target by 2030 requires bold measures that trigger large projects with high additionality. Incremental changes will not suffice.

BF should strengthen and scale up its grant programs. The Young Innovative Company scheme has proven successful and should be enlarged to reach more firms with higher amounts. Dedicated funding for "first-of-a-kind" demonstrations and scale-up projects is also needed to bridge the persistent gap between prototyping and commercialization. This would directly address the "valley of scale" where many Finnish SMEs currently stall.

Another recommendation is to broaden the sectoral reach of R&D support. While manufacturing and tech-heavy fields dominate, underrepresented sectors such as creative industries and health and well-being services hold strong but untapped innovation potential. Tailored funding would activate these industries and expand Finland's base of R&D-performing firms.

A key recommendation is to expand and redesign BF's loan and guarantee instruments. Risk loans remain underused, yet they are highly effective in leveraging private investment. By lowering interest rates, providing banks with more generous loss guarantees, and introducing conditional grants that convert into loans if projects succeed, BF can offer more attractive financing while containing long-term public costs. This shift would allow larger, capital-intensive projects at higher TRL levels to proceed without relying solely on grants.

Finally, Finland should intensify international collaboration. BF should allow funding for projects partly conducted abroad, building stronger ties with global firms and research partners. This would attract multinational R&D to Finland, stimulate knowledge flows, and embed Finnish companies more firmly in global innovation networks.

Additionally, the ecosystem directed grants should be further strengthened and there should be increased grants supporting government sector innovative procurements. These policy measures are further described in Scenario B and E.

These measures can be rolled out quickly through BF's established mechanisms, while rigorous project assessments will maintain high additionality. Together, they expand attractiveness, and mobilize new firms and sectors.

5.3 SCENARIO B – EXPANDING ECOSYSTEM FINANCING

5.3.1 CURRENT SITUATION

Finland's innovation system includes a number of strong cluster initiatives, most notably the ecosystems supported by Business Finland, like the Leading Company Initiative (Veturi). In addition there are clusters and ecosystems outside Business Finland, like the Research Council of Finland's Flagship Programme. Much of the government's targeted innovation support for private industry is channelled through these ecosystems, which are typically thematic or sector-focused but provide a broad portfolio of services. They range from networking activities, grants and loans, and collaborative projects involving academia, to access to testing infrastructure and export promotion through international delegations. While these ecosystems create important arenas for collaboration, our analysis shows that cooperation between firms, universities, and public actors to a large degree remain fragmented in Finland. Large incumbents continue to dominate R&D activity, while many SMEs and service firms are still weakly integrated into ecosystem structures.

The two largest ecosystem instruments (BF and RCF flagship program) both represent long-term efforts that target thematic challenges. Veturi is business-driven, designed to mobilise ecosystems around leading firms, while the Flagships provide critical mass in public research addressing societal challenges and creating new business opportunities, with engagement from corporate partners. Veturi not only funds the lead company but also its partners through Co-Innovation projects tied to a joint roadmap. Each initiative is well-financed to deliver on specific, complex objectives, and in doing so builds an ecosystem around that mission. Evaluations, including the 2025 mid-term review (VTT & MDI, 2024), have been positive for Veturi, highlighting strengthened collaboration between firms and public research organisations. The evaluation also highlighted that a more mission-driven approach to Leading Company Initiative collaboration is becoming evident and could be further strengthened. Such collaboration will be crucial for mobilising resources and fostering close partnerships between businesses and research organisations and will be decisive for Finland in reaching its 4-percent target, according to the evaluation (VTT & MDI, 2024). The Veturi initiative also has considerable potential to make established firms more innovative by pushing them toward transformational change. At the same time, by design it tends to favour incumbents over scaling challengers, raising questions about whether the model sufficiently supports new entrants with high growth potential (European Commission, 2025).

5.3.2 THE POLICY MOVE (2026–2030)

In the coming years, Finland should focus on expanding and strengthening its innovation ecosystems to mobilise broader private R&D investment. The Veturi programme has demonstrated its ability to anchor large-scale projects, but it could be widened to include more mid-sized firms and new sectoral consortia, while also supporting the development of entirely new ecosystems in emerging fields. A key improvement would be to deepen cooperation with academia and research institutions, ensuring that ecosystems become stronger channels for knowledge creation, researcher mobility, and joint development of technologies. To support this, Finland could invest more systematically in shared infrastructures, such as test environments and pilot facilities, that enable smaller firms to participate in R&D projects alongside larger actors. At the same time, large companies receiving ecosystem support should be incentivised to act as true hubs by opening their projects to SMEs and ensuring active knowledge transfer across the network. Finally, regional innovation platforms should be reinforced to spread ecosystem activity beyond the Helsinki area and better connect to industrial strengths across Finland.

5.3.3 PROS AND CONS

Speed: Ecosystem expansion can mobilise existing actors relatively quickly when funding and governance structures are in place, particularly by leveraging ongoing Veturi networks. However, building new facilities or organisational frameworks may slow the impact, meaning that short-term results will depend largely on scaling up existing instruments rather than creating new ones.

Additionality: The potential for additionality is high when ecosystems succeed in integrating SMEs and mid-sized firms that otherwise lack access to advanced R&D environments. The additionality is lower when funds primarily reinforce large incumbent partnerships, which may have taken place even without public support. Policy design should therefore emphasise SME inclusion, spin-offs, and academic engagement as conditions for ecosystem funding. According to reports so far, government Veturi related spending of EUR 200 – 300 mill. has propelled approximately EUR 1,5 bn in business sector investments. It is hard to verify these figures and they are not representing pure additionality, but the figures are still high.

Reach: Ecosystem expansion broadens R&D activity beyond ICT and large manufacturing firms, creating opportunities in services, green industries, defence and health technologies. It can also mobilise regional actors, but there is a risk that benefits remain concentrated in a handful of strong ecosystems, leaving weaker sectors and regions behind.

BUSINESS FINLAND'S ROLE IN THE SCENARIO

Business Finland can be the central actor of expanded ecosystem financing by scaling up its Veturi programme and other ecosystems, in addition to related co-innovation instruments and funding services. Through targeted grants and R&D funding, Business Finland can increase direct funding for R&D for firms participating in ecosystems. Business Finland can also incentivise large firms to open their projects for SMEs and research partners, ensuring spillovers across the economy. Increased authorizations for R&D grants in 2026–2030 can be directed toward shared infrastructures (pilot plants, testbeds) that lower barriers for smaller firms to join ecosystems and to funding of R&D projects and co-innovation project. Business Finland can also require explicit SME participation and academic collaboration as conditions for funding, thereby raising additionality. With its established networks and platforms, Business Finland is well placed to accelerate ecosystem expansion and ensure that public funding translates into broader private R&D investment.

Ensuring balanced geographic and sectoral coverage will be critical.

Long-term effects: Ecosystems contribute to a more resilient innovation system by embedding spillovers across firms, universities, and regions. They can strengthen Finland's innovation fabric by building collaborative platforms that persist beyond individual projects. At the same time, sustained coordination, long-term funding, and clear division of institutional responsibilities are necessary to avoid duplication and ensure durable impact.

5.3.4 SUMMARY

Expanding ecosystems can crowd in a wider set of firms and research actors, thereby increasing both the scale and diversity of R&D activity in Finland. This scenario delivers medium speed but high long-term impact, provided ecosystem support is tied to SME inclusion, shared infrastructure, and clear missions. In this scenario, the ecosystem-based support schemes are expanded and widened in scope from less than EUR 300 mill. over the first five years to EUR 600 mill. the next five years. This is a large increase, but in our view it till not be feasible to reach the 4 percent goal solely using these instruments. Business Finland plays a central role in this scenario, which is further outlined in the box below.

SCENARIO C – A LARGE EXPANSION OF TAX INCENTIVES

5.4.1 CURRENT SITUATION

Finland's support for business R&D is still dominated by direct funding (0.06 percent of GDP), with only a minor tax component (below 0.01 percent of GDP), amounting to approximately EUR 100 mill. in government expenditure in 2024. R&D tax incentives were only reintroduced in 2024, following limited and short-lived trials in 2013–2014. In other words, tax incentives for R&D in Finland starts from a very low base. Meanwhile, over the past two decades, R&D tax incentives have become increasingly popular across OECD and EU countries. Government tax relief for business R&D, measured as a share of GDP, has risen from 0.02 percent to 0.10 percent in the EU27, and from 0.04 percent to 0.13 percent in the OECD between the early 2000s and 2022 (OECD, 2025). Although the financial crisis and the COVID-19 pandemic briefly interrupted this growth, tax incentives have emerged as a central policy tool.

Some countries have built their R&D policy mix primarily around tax incentives. Notable examples are Iceland and Belgium, both of which have experienced strong growth in R&D following the introduction of such schemes. In both countries, R&D expenditure as a share of GDP has increased by more than one percentage point over the past decade,

with the growth driven largely by higher investments from the business enterprise sector. It is worth noticing, that Norway has run a wide-reaching tax deduction R&D scheme for many years, yet the degree of additionality has been questioned by several experts.

5.4.2 THE POLICY MOVE (2026–2030)

In this scenario, the objective is to scale tax-based support for business R&D from today's modest level (below 0.01 percent of GDP) to about 0.25–0.35 percent by 2030, placing Finland in the upper tier of the OECD. The design should prioritise simplicity, predictability, and measurable additionality, while focusing the highest support where responsiveness is greatest (SMEs, young firms) and limiting concentration among large incumbents. It is further important to note, that in this scenario, the scale-up of tax incentives comes in addition to the existing grants already provided by Business Finland today.

One way of implementing the enhanced tax incentive model, is a wage-based R&D credit, which reduces payroll taxes or offers a refundable credit for R&D staff costs. OECD evidence shows that payroll-linked and refundable schemes are widely used, improve access for firms without a tax base, and increase uptake and impact of the scheme (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023, OECD, 2023).

To raise additionality, the model in this scenario is two-tiered: SMEs and young firms receive higher, refundable rates, while large firms get lower, incremental credits. The OECD evaluation of Iceland shows that such differentiation improves targeting and prevents a few large firms from capturing most benefits, like in Belgium, with micro and small firms showing the strongest responses in Iceland (OECD, 2023).

Implementing annual firm-level caps and declining rates at higher volumes should also limit fiscal costs and avoid concentration. OECD's Iceland study underlines that ceiling design and aggregation rules shape who benefits, underscoring the value of calibrated caps (OECD, 2023). Eligibility should extend beyond manufacturing to include software, AI, and service innovation, with clear guidance. OECD highlights the need for clarity on software and IP costs to increase predictability (OECD, 2023). An "Innovation Box" could be added as a complement, not the core, since it rewards outcomes rather than inducing new R&D. It is also important that the guidelines are made clearer than for the current Finnish tax incentive scheme, as several of the informants we have interviewed point out that they are perceived as difficult to understand and unpredictable in practice, with some firms not getting benefits even if they thought they have met all the eligibility criteria.

To illustrate the potential future development of R&D intensity under a scenario of a large expansion in tax incentives, we have produced projections of Finland's R&D intensity in different scenarios. These projections compare to

a scenario where Finland continues its recent trajectory (since 2017) with alternative scenarios in which Finland succeeds in replicating the growth achieved in Iceland or Belgium through their respective growth periods from 2013 to 2023. The results are presented in Figure 5-1.[44]

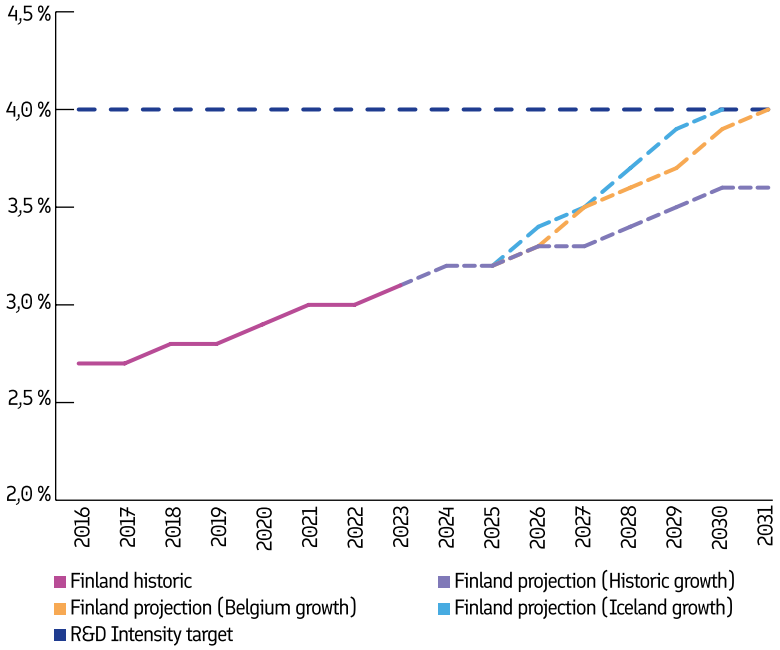


FIGURE 5-1: PROJECTION OF R&D AS SHARE OF GDP IN FINLAND WITH LARGE EXPANSION OF TAX INCENTIVES. SOURCE: OECD MSTI DATABASE, MENON ECONOMICS

The figure illustrates that if Finland maintains the growth trajectory observed since 2017, the national R&D intensity target will only be reached in 2036, six years later than planned. By contrast, if Finland were to replicate the growth achieved in Belgium over the past decade, the target would be reached around 2031. If Finland were to match Iceland's historical growth, the target would instead be met by 2030.

5.4.3 PROS AND CONS

Speed: Tax incentives are among the most fastest policy instruments to scale up. Once legislated, they apply automatically to all eligible firms, providing immediate cost relief and stimulating R&D activity across sectors. In contrast to direct funding, which requires application procedures, project spending time and more bureaucracy. The main limitation in terms of speed is that administrative systems must be established, and firms may need a year of adjustment before uptake reaches full effect.

Additionality: As shown in chapter 4.1, the research literature on the additionality of R&D tax incentives is mixed, while OECD evidence suggests an additionality effect comparable to grants. At the same time, Finland currently makes limited use of tax incentives, which indicates potentially high benefits of introducing them now, especially if

44 In the scenario where Finland's R&D intensity continues along its historical trend, we base the projection on Finland's annualised growth from 2017 to 2023. In the scenario where Finland reaches Belgium's growth path, we use Belgium's annualised growth from 2013 to 2023. In the scenario where Finland reaches Iceland's growth path, we use Iceland's annualised growth from 2013 to 2023.

different policy instruments exhibit diminishing marginal returns. However, a well-designed tax incentives can generate significant additional R&D investment, especially when structured as payroll-based and refundable credits. SMEs and young firms are the most responsive, as long as the scheme allows for refund for firms that have no taxable revenues. Without refundability or incremental rates, the overall additionality may be modest. Complementarity with direct funding is therefore important to ensure a high net impact. OECD show that tax incentives has similar additionality to direct funding of about 1.4 (Appelt, Bajgar, Criscuolo, & Galindo-Rueda, 2023).

Reach: Tax incentives are broadly accessible and flexible, allowing firms to decide how and where to invest. Wage-based credits expand eligibility to service innovation, software, and AI, broadening reach beyond traditional manufacturing. With a broad scope, it can be difficult to delimit and define R&D and innovation expenditures, particularly in service sectors where innovation is closely integrated with market operations.

Long-term effects: Generous tax incentives can help attract foreign R&D investment and crowd in private finance at scale, as shown in countries such as Israel and Belgium. Yet tax incentives alone do not guarantee productivity growth or innovation diffusion. Evidence indicate that their long-term impact depends on integration with complementary policies such as missions, procurement, and ecosystem programmes, that channel R&D toward strategic priorities and ensure knowledge spillovers.

5.4.4 GUARDRAILS

Our review of the literature shows that tax incentives largely benefit large companies with substantial tax bases. This can draw innovators and researchers away from start-ups toward established firms. Evidence from Akcigit and Ates (2022) indicates that such moves often reduce overall innovation output, as mature firms tend to use this talent less effectively while generating higher private earnings but lower returns to society. Further, the country comparison also shows that a large share of tax incentives often go to a few, large companies.

To maximise effectiveness and ensure fiscal sustainability, the expansion of tax incentives should be accompanied by clear guardrails. First, refundability should be targeted towards SMEs and young firms, where responsiveness and additionality are highest, while large firms should receive incremental credits at lower rates. Firm-level caps and declining marginal deduction rates are recommended to avoid excessive concentration of benefits among a few incumbents. Having said that, caps and deduction rates must be regarded as far more attractive than the tax deduction scheme of today.

Finally, the scheme could also include a five-year sunset clause with mandatory evaluation. This review would assess measured additionality, fiscal costs, and distributional outcomes, and provide the basis for redesigning rates, caps, or eligibility to strengthen long-term impact. To evaluate the introduction og tax incentives, it is also possible to increase the reach of the scheme yearly. This makes it possible to evaluate which firms receive the public funding, and study the development of their R&D spending. However, there will be a trade-off here between fiscal control and implementation speed: to reach 4 percent faster, it will be better to introduce a generous scheme from the start.

5.4.5 SUMMARY

A drastic expansion of tax incentives can rapidly lift business R&D expenditure before 2030. If carefully designed, it scores high on speed and reach, delivers relatively good additionality, and may support long-term growth, provided it is combined with complementary instruments such as missions, procurement, and collaboration platforms. International experiences (Belgium, Iceland, Netherlands, UK) demonstrate both the potential gains and the risks, underscoring the importance of caps, refundability for SMEs, and strong evaluation mechanisms. In this scenario where the scheme is expanded and reformed substantially, propelling deductions to 0.25 percent of GDP, international experience shows that Finland can reach 3.75 percent within 2030.

It is worth noting that the law on public R&D funding does not include tax incentives, and hence they could be difficult to implement in practise in the upcoming years. The direct role of Business Finland is further limited in this scenario, but Business Finland still plays an important complementary and enabling role. This is further explained in the following box.

BUSINESS FINLAND'S ROLE IN THE SCENARIO

Business Finland does not play a central role in the existing tax credit scheme. Yet, through its advisory services and networks, Business Finland can help SMEs to navigate tax schemes and combine them with grants or co-innovation projects, ensuring that firms make full use of available instruments. Business Finland's expanded grant authorizations for 2026–2030 should be targeted where tax incentives have limited reach, such as high-risk early-stage R&D, scaling projects without taxable income, and collaborative efforts between firms and research organisations. In this way, BF maintains the strategic priorities of the innovation system while tax incentives drive broad volume. Moreover, Business Finland's ecosystem programmes can channel tax-supported R&D into larger collaborative initiatives, ensuring spillovers and societal returns. Thus, while the fiscal system provides scale, Business Finland remains central in shaping direction, addressing gaps, and mobilising collaboration across the innovation system.

5.5 SCENARIO D – A MORE PROACTIVE VENTURE MODEL

5.5.1 CURRENT SITUATION

Finland has a relatively well functioning venture capital sector for early-stage investments, but the availability of capital and risk appetite at the late-stage venture and scale-up stages remains limited. Tesi plays an important role as fund-of-funds investors and co-investors, but the overall volume is still low in light of the needs of deep-tech and capital-intensive ventures. Evidence from interviews and EU reports points to commercialisation and especially scaling as the main bottleneck in Finland's innovation system, with a risk that high-potential firms are acquired by foreign investors before they reach maturity. Scaling is costly. If scaling is R&D intensive, one should expect private R&D spending to grow fast given that the government provides larger funds for such investments.

5.5.2 THE POLICY MOVE (2026–2030)

In this scenario, the objective is to establish government investment vehicles that provide substantially more risk capital for scaling R&D intensive firms. The model could include a significant capital expansion of Tesi, or the establishment of parallel agencies running dedicated funds earmarked for scale-up and deep-tech financing. Alternatively,

one could argue that it is productive to run two or three government funded investment vehicles in parallel, in order to establish competition among agencies.

Our suggested policy move would involve public co-investment in venture funds, conditional on private co-financing, in order to ensure that public money leverages additional private resources. In addition, selective guarantee schemes and loss-sharing mechanisms would be introduced to lower the risks associated with large pilot and demonstration projects. Finally, the model would be closely aligned with EU-level instruments such as InvestEU and the EIC Fund, thereby leveraging additional external capital and embedding Finland more deeply in European risk-capital markets.

International experiences illustrate how public involvement can help build strong venture ecosystems. Israel's Yozma programme, introduced in the 1990s, laid the foundation for Israel's venture capital sector through public–private risk-sharing. In Denmark and Sweden, state-backed funds and matching models have supported venture activity in sectors such as energy and life sciences.

5.5.3 PROS AND CONS

Speed: Money channelled through a more proactive model with more capital available through investment funds, traditionally takes time to distribute. Hence, speed is not the strongest characteristic of this strategy. Cases must be identified, and deals have to be closed. Thereafter, expanded R&D strategies are to be developed and implemented. This takes time. Furthermore, the potential establishment of new professional fund management capacity may delay the mobilisation process further.

Additionality: By sharing risks with private investors, public capital can unlock private financing that would otherwise not materialise. Here we are especially interested in raising foreign investments in such venture cases. At the same time, there is a risk of crowding out if the state assumes too dominant a role or supports projects of low quality that private investors would have avoided. Once again, a strong focus on co-investments with foreign investors may reduce this crowding out effect. Private venture capitalists contribute not only capital but also expertise, networks, and strategic guidance. They support startups in addressing operational challenges and, when necessary, in adjusting or pivoting their business models, generating broader spillover effects.

Reach: The model would allow Finland to channel capital towards sectors and phases of the innovation process where both public and private financing is currently scarce, such as scale-up funding for deep-tech and green technologies. Yet there is a risk of high concentration, as large sums may flow into only a limited number of capital-intensive pro-

jects, thereby reducing the breadth of the model's impact. Also, the venture model is mostly designed for scalable tech-driven cases, not allowing for R&D-investments in more labour-intensive ventures like healthcare, personal services, tourism etc. These are sectors that tend to grow fast and need R&D-driven innovation.

Long-term effects: Over time, a state-driven venture model could strengthen Finland's venture ecosystem, enabling more firms to grow into large R&D intensive companies that remain anchored in the country. This would increase the resilience of the national innovation system and broaden the base of firms contributing to aggregate R&D intensity. The long-term effects, however, will depend on continuity, professional governance, and the ability to avoid politicisation of investment decisions.

5.5.4 SUMMARY

This scenario illustrates how Finland could address the current bottleneck in scaling by providing more risk capital through a state-driven venture model. By lowering risk thresholds and attracting private co-financing, it could enable more firms to expand their R&D activities from early-stage projects to large-scale deployments. If implemented at scale, the model could contribute significantly to growth in business R&D expenditure, but mostly after 2030. In this scenario where we allow the total capital allo-

cated through Tesi to triple (from around EUR 2.6 bn to EUR 7.5 bn over the next five years) we expect a potential for reaching an R&D intensity of 3.5 percent within 2030, but climbing further in the years following 2030. Summing up: Large increases in government backed venture capital is not sufficient to reach the 4 percent target. Such a large expansion in government backed investment funds will necessarily affect return on invested capital. Nevertheless, in the long run investments may provide social returns that justify such investments. The role of Business Finland in this scenario is explained in the following box.

BUSINESS FINLAND'S ROLE IN THE SCENARIO

Business Finland does not provide risk capital in the form of equity anymore. Nevertheless, portfolio companies in venture funds are highly dependent on soft funding. Traditionally, such funding is mostly directed towards the earlies stages, like pre-seed and seed. With our suggestions in Scenario A and B, we pave the way for grants and soft funding directed towards more mature projects, that you normally find in later stage venture cases. Hence, Business Finland may play a catalytic and enabling role. Through its grants and loan instruments, Business Finland can help scale-ups.

Expanded grant authorizations for 2026–2030 can be targeted to high-risk pilot projects. Business Finland reduces by this the "valley of scale" and ensures that venture capital and Tesi's co-investments can crowd in at a later stage. Business Finland can also channel grants into thematic areas with high growth potential but low private risk tolerance, such as green transition, AI and quantum technologies. In parallel, Business Finland's ecosystem programmes, such as Veturi, connect young firms with larger companies, research institutions, and international partners, while its internationalisation services support access to global markets, a decisive factor for many venture investors. In sum, Business Finland complements private capital with risk-sharing, capabilities and networks, thereby expanding the supply of investable firms and enhancing the long term impact of venture investments.

5.6 SCENARIO E - MISSION BASED INNOVATIVE PROCUREMENT

5.6.1 CURRENT SITUATION

Finland has had a national target since 2019 that 10 percent of all public procurement should be classified as innovative, a goal that was reaffirmed after the 2023 change of government (PWC, 2024). A KEINO survey from 2022 estimated that around 11 percent of published tenders qualified as innovative, with notable use in health, transport, energy, and environmental sectors (KEINO, 2023). Finland is also the top performer in the EU's Innovation Procurement Scoreboard among the EU countries (PWC, 2024). The procurement system builds on Hilma, the national procurement portal managed by Hansel under the Ministry of Finance.

Business Finland provides grants covering parts of project costs, conditional on at least 80 percent being R&D-related (Business Finland, 2025). Business Finland paid only EUR 1.4 mill. in funding for innovative public procurement in 2024, down from EUR 2,4 mill. in 2023.

A European Commission report highlights that Finland ranks high among EU countries in innovation procurement, yet demand-side tools remain underused to stimulate research and create lead markets. Defence is a sector where procurement is essential. While procurement processes can be slow in this sector, emerging fields such as cybersecurity, quantum tech, and drones offer faster opportunities for R&D based innovation. The country review expert panel (European Commission, 2025) recommends that Finland "exploit the potential of innovative public procurement for stimulating business R&D even further, for example for defence".

Finland's strong performance and established systems in innovative procurement represent a significant strength for future policy development, particularly when combined with a more mission-oriented strategy. A stronger shift toward mission-based innovative procurement could unlock greater R&D investment, including the private sector. Being the EU's top performer in innovation procurement is not necessarily a constraint: several non-EU countries, such as the United States, have demonstrated highly successful approaches, for instance with defence and space procurement serving as long-standing drivers of innovation.

5.6.2 THE POLICY MOVE (2026–2030)

Finland can build on its strong procurement framework by shifting from general innovation procurement targets toward a more mission-based strategy and leverage public demand to accelerate innovation in targeted areas. By anchoring innovative procurement in national priorities such as defence and space, climate and energy, digital/AI services, and health, public demand can be used more stra-

tegically to create lead markets, and stimulate private R&D investment. The public procurement is by virtue a demand side tool. Grants that support R&D activities in such procurement contracts are relevant supply side tools. We claim that coordination of supply and demand side initiatives for more R&D is highly effective way to raise innovative activities. In most OECD-countries, government agencies are normally quite reluctant to take innovation risk. A combination of requirements and subsidies will remove much of this reluctance. This fits well with the strategic choices specified in the governments multiannual plan for R&D funding (Valtioneuvosto, Valtion tutkimus- ja kehittämisrahoituksen käytön monivuotinen suunnitelma, 2024). Business Finland's role in the scenario is outlined in the box below.

BUSINESS FINLAND'S ROLE IN THE SCENARIO

Business Finland can support mission-based procurement by expanding existing public procurement funding and funding for the upstream R&D that suppliers need to respond to public tenders. Its grants (2026–2030) can be channelled into pre-commercial R&D, feasibility studies, and collaborative projects that align with mission priorities such as defence, climate technologies, or health. Today, Business Finland provides grants for innovative procurements, but the total supply of grants amounts to no more than 1.4 mill euros. Compared to the innovation contract tools provided in Norway, this amount is miniscule. Through stronger organisational ties between Business Finland and public sector entities (ministries most importantly), there is a large potential for stimulating private R&D spending through such contracts. Business Finland can also act as a broker between procuring authorities and the innovation ecosystems, ensuring that missions translate into scalable R&D activity across sectors.

Finland's next step is not simply to increase the share of innovative procurement, but to make it mission driven. By aligning demand with societal challenges and providing predictable lead markets, mission-based procurement can mobilise private R&D at scale and become a key driver of progress toward the 4 percent target by 2030.

5.6.3 PROS AND CONS

Speed: A mission-anchored approach can be scaled relatively quickly by repurposing existing procurement budgets. Finland already has the institutional processes (Hilma, eForms, and Business Finland's grant schemes) that can be leveraged from the outset. The main limitation is that buyer capability and contract reform remain preconditions, meaning some organisational reform (stronger ties) and capacity building will be required before large-scale deployment. However, it usually takes time before government procurements lead to R&D activity in the private sector.

Additionality: Instruments such as pre-commercial procurement (PCP) and first-of-a-kind (FOAK) deployments directly purchase R&D and reduce demand risk, while Business Finland's requirement of at least 80 percent R&D expenditure ensures measurable input effects. The risk, however, is that additionality weakens if instruments are used mainly for incremental upgrades rather than genuine mission-oriented projects with broad spillovers. One should reconsider the 80 percent requirements if they tend to reduce the willingness to apply for grants.

Attractiveness and reach: Mission-based procurement has a wide potential reach across sectors, and buyer groups led by ministries and municipalities can further broaden participation and scale. Yet SMEs may still encounter administrative burdens unless simplified templates, fast-track processes, and standardised rules are consistently applied. At the same time, missions are by design a selective strategy: choosing certain priority areas also means that others are left aside. Moreover, not all companies operate in markets where government is a relevant buyer. Firms outside these domains will inevitably remain beyond the reach of mission-based procurement.

A key challenge is that, according to our informants, there has been relatively low demand for Business Finland's scheme for innovative public procurement. If this trend continues, the policy's reach will remain limited, and an expansion of the scheme is unlikely to generate significant additional private R&D investment. At the same time, the European Commission highlights that demand-side instruments are generally underused, suggesting that a stronger emphasis on innovation driven by the public sector could be part of the solution.

Long-term effects: By creating government customers and early lead markets, mission-anchored procurement can anchor ecosystems around national priorities. The downside is a risk of technological lock-in if specifications are too narrow or prescriptive, or using government money on a sector that in the end is not viable for long-term, commercial investments. The recent examples on battery manufacturing in Sweden and Norway serve as a cautionary tale in this regard. To avoid this, periodic mission reviews and independent outcome audits will be needed to ensure flexibility and continued relevance. Nevertheless, with government lead missions that aim to achieve something that private capital is not interested in investing in today, there is always a risk of guessing wrong and not achieving the hoped additionality or long-term effects.

5.6.4 SUMMARY

This scenario builds on Finland's strong position in innovative public procurement but shifts from general targets to a more mission-oriented approach. By linking procurement to national priorities such as defence, climate and energy, digitalisation, and health, public budgets can be used strategically to create lead markets and mobilise private R&D. The model offers potential for rapid scaling and long-term impact but requires stronger buyer capabilities and carries a risk of lock-in if missions are defined too narrowly. However, we believe that it is not realistic for innovative procurement to lead to a large increase in R&D activity in the short run, and not before 2030. Mission based innovative procurement should nevertheless be a part of the policy strategy.

5.7 THE RECOMMENDED POLICY COMBINATION

Over the past decade Finland has introduced or expanded several tools for stimulating business R&D. Tax incentives were reintroduced in 2024. Business Finland has scaled up its direct funding through grants and loans, while also creating ecosystem programmes that mobilise collaboration across sectors. In parallel, Finland has established itself as one of Europe's top performers in innovative public procurement, with a system already in place to leverage demand-side tools. At the international level, Finnish firms participate in EU programmes such as Horizon Europe, but national instruments have so far been less explicitly geared towards supporting cross-border R&D collaboration.

Despite this progress, gaps remain. The Finnish tax incentive system is still modest compared to international peers such as Belgium or Iceland. Risk loans and guarantees are underused, in part because of limited attractiveness relative to grants. Procurement, although strong in aggregate, has not yet been fully exploited in areas with large potential like defence or green technologies. Also, while international collaboration has been growing, Finland does not yet systematically deploy its domestic funding to co-finance multinational R&D projects or to anchor foreign partners in its ecosystems.

Given the size of the gap to the 4 percent target, no single instrument will be sufficient to reach it by 2030.

Instead, Finland must combine the most effective elements from the different scenarios into a balanced mix that maximises speed, additionality, reach, and long-term impact. This will be obtained through a combination of grants and loans provided by Business Finland and a significantly more attractive and relevant tax incentive scheme. In scenario A, B and E, we have outlined the following suggestions for what types of grants Business Finland should devote more resources to:

- Grants focusing on projects in the later TRL-stages, implying larger grants to each projects, potentially applying a milestone structured grant financing.
- More resources devoted to ecosystem funding to ensure spillovers and activation of business linkages both at home and abroad.
- More resources devoted to grants that support innovative contracts associated with government procurements. One could follow a mission-based procurement strategy focusing on defence and green challenges. By linking procurement more explicitly to national missions (such as defence and security technologies, green transition, renewable energy, and health-related services) public demand can be used more strategically to create lead markets.

Even if it is uncertain whether the measures listed above will be enough to reach the 4 percent targe, these policy measures will on their own represent a large increase in the public resources targeting private sector R&D. Hence, one option is to first test out these strategies before trying other measures. If one wants to proceed with other measures, outside of the current R&D law, we recommend the following for highest additionality:

First, generous and well-designed tax incentives. The current scheme should be scaled up significantly to reach levels closer to leading OECD peers. Refundability must be targeted to SMEs and younger firms, where responsiveness is highest, while large companies should receive incremental credits at lower rates. Firm-level caps and declining marginal rates are recommended to prevent excessive concentration of benefits among a handful of incumbents, but deductions must remain substantially more attractive than today. Eligibility rules should explicitly include not only traditional manufacturing but also other areas, like service innovation, AI, and software development. A five-year sunset clause with mandatory evaluation would help ensure fiscal sustainability and allow adjustments if costs escalate or additionality proves weaker than expected.

Second, more attractive risk loans and hybrid instruments. Business Finland's loan and guarantee instruments should be scaled up and made more favourable. We are aware of the fact that such tools are not a part of the government plan today, but they should be. This move could include lowering interest rates below market levels, pro-

viding banks with more generous loss-sharing arrangements, and offering conditional grants that convert into loans if projects succeed. Such hybrids would strike a balance between risk-sharing and fiscal prudence, making loans a more appealing alternative to grants. Larger R&D projects at higher TRL levels, where costs are greatest, would particularly benefit from this shift. Over time, this move would allow Finland to finance a greater number of large projects without requiring proportionally larger government outlays.

Third, expanded international cooperation and stronger ecosystems. In today's globalised innovation landscape, no country can achieve high R&D intensity without good connections to international networks. Finland should therefore allow Business Finland and other agencies to co-finance projects that are partly conducted abroad, provided that they strengthen the capacity of Finnish firms and ecosystems. This could include joint projects with multinational companies, co-development with foreign research organisations, or even financing international subcontractors when strategically justified. The key is to anchor foreign firms and capital in Finland's ecosystems, ensuring that international knowledge flows translate into domestic spillovers and subsequent domestic R&D investments.

REFERENCES

Akcigit, U., & Ates, S. T. (2022). *New Insights for Innovation Policy.*

Ali-Yrkkö, J. (2010). *Nokia and Finland in a Sea of Change.* ETLA B Series 244.

Ali-Yrkkö, J. (2010). *Nokia and Finland in a Sea of Change.* Helsinki: ETLA – Research Institute of the Finnish Economy. Retrieved from https://www.etla.fi/wp-content/uploads/2012/09/B244.pdf

Appelt, S., Bajgar, M., Criscuolo, C., & Galindo-Rueda, F. (2023). *The Impact of R&D Tax Incentives: Results from the OECD microBeRD+ Project.* OECD Science, Technology and Industry Policy Papers. Retrieved from https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/10/the-impact-of-r-d-tax-incentives_bc42ab-04/1937ac6b-en.pdf

Bloch, C., & Sørensen, M. P. (n.d.). *The Impact of Public R&D Funding on Private R&D – Evidence from Danish Firms.* Retrieved from https://www.econstor.eu/handle/10419/191436

Business Finland. (2024, October 31). *KONE's Veturi Program: Building a Sustainable Urban Future*. Retrieved from https://futuremobilityfinland.fi/kones-veturi-program-building-a-sustainable-urban-future/

Business Finland. (2024, Mai 22). *Lots of things going on in Veturi ecosystems*. Retrieved from https://www.businessfinland.fi/en/whats-new/news/2024/lots-of-things-going-on-in-veturi-ecosystems

Business Finland. (2025, April 12). *Business Finland awards Veturi funding to AMD Silo AI to strengthen Finland's position in the global AI market*. Retrieved from https://www.businessfinland.fi/en/whats-new/news/cision-releases/2025/business-finland-awards-veturi-funding-to-amd-silo-ai

Business Finland. (2025, May 10). *Nokia's Veturi Project strengthened the position of Finnish companies as pioneers in edge computing*. Retrieved from https://www.businessfinland.fi/en/whats-new/news/cision-releases/2025/nokias-veturi-project-strengthened-the-position-of-finnish-companies-as-pioneers-in-edge-computing

Business Finland. (2025, August). *Reform services and operations*. Retrieved from https://www.businessfinland.fi/en/for-finnish-customers/services/funding/research-and-development/innovative-public-procurement

Danmarks Erhvervsfremmebestyrelse. (2023). *Evaluering af skattekreditordningen for forskning og udvikling*. Retrieved from https://erhvervsfremmebestyrelsen.dk/indsigter/evaluering-af-skattekreditordningen

Department for Science, Innovation & Technology. (2025, July 17). *AIRR advanced supercomputers for the UK*. Retrieved from gov.uk: https://www.gov.uk/government/publications/ai-research-resource/airr-advanced-supercomputers-for-the-uk

Department for Science, Innovation & Technology. (2025, April 28). *Science and Technology Framework*. Retrieved from gov.uk: https://www.gov.uk/government/publications/science-and-technology-framework/science-and-technology-framework

Deschryvere, M., Husso, K., & Suominen, A. (2021). *Fostering R&D intensity in Finland: policy experience and lessons learned*. Country case study contribution to the OECD TIP project on R&D intensity. Retrieved from https://one-communities.oecd.org/community/cstp/tip/rdintensity/SitePages/Home.aspx

Deschryvere, M., Husso, K., & Suominen, A. (2021). *Targeting R&D intensity in Finnish innovation policy*. OECD Science, Technology and Industry Working Papers. Retrieved from https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/06/targeting-r-d-intensity-in-finnish-innovation-policy_2642b895/51c767c9-en.pdf

Dimos, C., Pugh, G., Hisarciklilar, M., Talam, E., & Jackson, I. (2022). The relative effectiveness of R&D tax credits and R&D subsidies: A comparative meta-regression analysis. *Technovation, 115*, p. 102450. doi:https://doi.org/10.1016/j.technovation.2021.102450

Draghi, M. (2024). *The future of European competitiveness*. European Commission. Retrieved from https://commission.europa.eu/document/download/97e481fd-2dc3-412d-be4c-f152a8232961_en?filename=The%20future%20of%20European%20competitiveness%20_%20A%20competitiveness%20strategy%20for%20Europe.pdf

European Commission. (2023). *European Innovation Scoreboard – Denmark country profile*. Retrieved from https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard/eis-2023_en

European Commission. (2024). *European Innovation Scoreboard 2024 – Country profile Belgium.* Brussels: European Commission.

European Commission. (2024). *European Innovation Scoreboard 2024, Country Profile Finland.* European Commission. Retrieved from https://ec.europa.eu/assets/rtd/eis/2024/ec_rtd_eis-country-profile-fi.pdf

European Commission. (2025). *Belgium 2025 Country Report.* Brussels: European Commission. Retrieved from https://economy-finance.ec.europa.eu/document/download/db66340f-3711-4f6e-aadd-81528e029de8_en?filename=BE_CR_SWD_2025_201_1_EN_autre_document_travail_service_part1_v5.pdf

European Commission. (2025). *Support to Finland on improving R&D collaberation betweeen research organisations and the private sector.* Brussels: Directorate-General for Research and Innovation Horizon Europe Policu Support Facility.

EY. (2022). *New limitation for the Belgian R&D tax credit*. Retrieved from ey.com: https://www.ey.com/en_be/technical/tax/tax-alerts/2022/new-limitation-for-the-belgian-r-and-d-tax-credit

Federal Public Service Finance. (2024). *Tax Incentives for Research & Development & Innovation.* Brussels: FPS Finance - Fiscal Department for Foreign Investments. Retrieved from https://finance.belgium.be/sites/default/files/Brochure%20RD_Tax%20incentives_2024_ENG_A5_MRitondo.pdf

Goverment of Iceland. (2020). *Science and Technology Policy 2020–2022.* The Prime Minister's Ofce. Retrieved from https://www.government.is/library/01-Ministries/Prime-Ministrers-Office/Science%20and%20Technology%20Policy%202020%E2%80%932022.pdf

Griffith, R., Redding, S., & Reenen, J. (2004). Mapping the Two Faces of R&D: Productivity Growth in a Panel of OECD Industries. *The Review of Economics and Statistics, 4,* pp. 883–895. doi:https://doi.org/10.1162/0034653043125194

Han, H., & Lee, Y. (2021). Fostering R&D intensity in Korea: Policy experience and lessons learned. *OECD: Country case study contribution to the OECD TIP project on R&D intensity*. Retrieved from https://one-communities.oecd.org/community/cstp/tip/rdintensity/_layouts/15/WopiFrame.aspx?sourcedoc=%7B8BE7119F-A480-4589-84A2-A72E14CC8D5C%7D&file=uploaded-file-344626.pdf&action=default

Horizon Europe. (2025). *List of Participating Countries in Horizon Europe.* Retrieved from https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-euratom_en.pdf

Implement Consulting Group. (2024). *The economic opportunity of generative AI in Finland.* Google. Retrieved from https://implementconsultinggroup.com/article/the-economic-opportunity-of-generative-ai-in-finland?

Innovation Fund Denmark. (2022). *Årsrapport.* Retrieved from https://innovationsfonden.dk/da/publikationer

Islandic Goverment. (2009). *Act No. 152/2009.* Retrieved from https://www.government.is/media/fjarmalaraduneyti-media/media/log-reglur/Act_No_152_2009.pdf

Israel Innovation Authority. (2025, June). *Strategy and Policy*. Retrieved from innovationisrael.org: https://innovationisrael.org.il/en/strategy-and-policy/

Israel Innovation Authority. (2025, June). *Yozma Fund 2.0*. Retrieved from innovationisrael.org: https://innovationisrael.org.il/en/programs/yozma-fund/#about_route

IVC, GNY & KPMG. (2023). IVC-GNY-KPMG Investors Report. *Israel Innovation Authority*. Retrieved from https://innovationisrael.org.il/wp-content/uploads/2024/03/INVESTORS-REPORT-2023.pdf

KEINO. (2023). *Innovatiiviset ja kestävät julkiset Hankinnat Suomessa 2022.* Retrieved from https://hankintakeino.fi/sites/default/files/media/file/innovatiiviset_ja_kestavat_julkiset_hankinnat_2022.pdf

Khan, M., Luintel, K., & Theodoris, K. (2011). How Robust is the R&D - Productivity Relationship? Evidence from OECD Countries. *Economic Research Working Paper*. doi:https://doi.org/10.34667/tind.28864

Lee, S.-T., & Sun-Moon, J. (2024). Overcoming Financial Constraints on Firm Innovation: The Role of R&D Human Capital. *International Journal of Financial Studies*, 109. Retrieved from https://doi.org/10.3390/ijfs12040109

Mathieu, A., & van Pottelsberghe de la Potterie, B. (2010). A Note on the Drivers of R&D Intensity. *Research in World Economy*. doi:https://doi.org/10.5430/rwe.v1n1p56

Minestry of Finance, Finland. (2023). *Net-Zero Government Initiative Finland.* Retrieved from https://www.sustainability.gov/pdfs/finland-nzgi-roadmap.pdf

Ministry of Economic Affairs and Climate Policy. (2019). *Dutch missions for grand challanges.*

Ministry of Employment and the Economy. (2021). *Goverment Resolution on the Strategic Programme for Circular Economy.* Retrieved from https://ym.fi/documents/1410903/42733297/Nana-Cheraa, R. (2023). *R&D tax credits verses R&D grants: effectiveness for R&D investmant.* Enterprise Reasarch Centre. Retrieved from https://www.enterpriseresearch.ac.uk/wp-content/uploads/2023/12/SOTA59-RD-tax-credits-verses-RD-grants-Nana-Cheraa-1.pdf

Nemet, G. F., Zipperer, V., & Kraus, M. (2018). The valley of death, the technology pork barrel, and public support for large demonstration projects. *Energy Policy*(119), 154–167.

Novo Nordisk Foundation. (2022). *Societal impact of the Novo Nordisk Foundation 2021.* Retrieved from https://novonordiskfonden.dk/app/uploads/Annual_Impact_Report_2021.pdf

OECD. (2020). *OECD Economic Surveys: Belgium.* Paris: OECD Publishing. doi:https://doi.org/10.1787/1327040c-en

OECD. (2021). *OECD Review of Innovation Policy: Denmark.* Retrieved from https://www.oecd.org/denmark/oecd-reviews-of-innovation-policy-denmark-2021-0f4d331d-en.htm

OECD. (2021). *R&D Intensity as a Policy Target: Lessons from 11 International Case Studies.*

OECD. (2022). *R&D Tax Incentive Indicators: Denmark.* Retrieved from https://www.oecd.org/sti/rd-tax-stats-denmark.pdf

OECD. (2023). *Evaluating the effects of the R&D tax credit in Iceland.* OECD Economics Department (ECO) and the OECD Directorate for Science, Technology. Retrieved from https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/economic-surveillance/oecd-iceland-tax-credit-evaluation-2023.pdf

OECD. (2025). *BENCHMARKING GOVERNMENT SUPPORT FOR VENTURE CAPITAL – COUNTRY NOTES: ISRAEL.* OECD. Retrieved from https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/06/benchmarking-government-support-for-venture-capital-country-notes_2cacbf3f/israel_e79663e4/b5c8c-c2e-en.pdf

OECD. (2025). *R&D tax incentives*. Retrieved from OECD.org: https://www.oecd.org/en/topics/sub-issues/rd-tax-incentives.html

Office for National Statistics. (2024, December 11). *ONS website, statistical bulletin.* Retrieved from https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businesenterpriseresearchanddevelopment/2023

Ortega-Argilés, R., & Brandsma, A. (2009). *"EU-US differences in the size of R&D intensive .* JRC Working Papers on Corporate R&D and Innovation.

PWC. (2024). *Finland: COUNTRY PROFILE – Benchmarking of national policy frameworks for innovation procurement.* European Commission, Directorate-General for Research & Innovation. Retrieved from https://ec.europa.eu/assets/rtd/innovation-procurement/country-report-2024-policy-benchm-finland.pdf

PWC. (2024, August). *Israel - Corporate - Tax credits and incentives*. Retrieved from taxsummaries.pwc.com: https://taxsummaries.pwc.com/israel/corporate/tax-credits-and-incentives

PWC. (2025, June). *Belgium - Corporate - Tax credits and incentives*. Retrieved from taxsummaries.pwc.com: https://taxsummaries.pwc.com/belgium/corporate/tax-credits-and-incentives

PWC Denmark. (2025). *Corporate - Tax credits and incentives.* Retrieved from https://taxsummaries.pwc.com/denmark/corporate/tax-credits-and-incentives

Ravšelj, D., & Aristovnik, A. (2020). The Impact of Public R&D Subsidies and Tax Incentives on Business R&D Expenditures. *International Journal of Economics and Businees Administration, 8*(1), pp. 160–179.

Research and Innovation Policy Review Panel. (2019). *Peer Review of the Danish Innovation System.*

Siedschlag, I., Smith, D., Turcu, C., & Zhang, X. (2013). Research Policy. 42(8), pp. 1420-1430. doi:https://doi.org/10.1016/j.respol.2013.06.003

Sitra. (2024). *Yritysten T&K-hankkeet, Tutkimusraportti.* Taloustutkimus Oy. Retrieved from https://www.sitra.fi/app/uploads/2024/08/sitran-tutkimus-yritysten-investoinneista-tk-toimintaan_tutkimusraportti_14.8.2024.pdf

Tesi. (2025). *Our investments*. Retrieved from https://tesi.fi/en/portfolio/

Teurlinx, J., & Donselaar, P. (2021). *Fostering R&D intensity in the Netherlands: Policy experience and lessons learned.* Case study contribution to the OECD TIP project on R&D intensity. Retrieved from https://one-communities.oecd.org/community/cstp/tip/rdintensity/_layouts/15/WopiFrame.aspx?sourcedoc=%7B8C4AD-BEF-DB60-4FD6-AEF0-3AA874D0B93D%7D&file=uploaded-file-344961.pdf&action=default

The Finnish Quantum Institute. (2023). *Finnish Quantum Agenda.* Retrieved from https://instituteq.fi/wp-content/uploads/2023/02/FQA-February-2023.pdf

Uddannelses- og Forskningsministeriet. (2023). *Forskningsbarometeret 2023.* Retrieved from https://ufm.dk/publikationer/2023/forskningsbarometeret-2023

UK Reaserch and Innovation. (2024, April 9). *Business-led schemes set to boost growth all over the UK*. Retrieved from ukri.org: https://www.ukri.org/news/business-led-schemes-set-to-boost-growth-all-over-the-uk/

UK Research and Innovation. (2024, January 23). *Access to facilities and infrastructure.* Retrieved from ukri.org: https://www.ukri.org/what-we-do/commercialisation/access-to-facilities-and-infrastructure/

UNESCO. (2016). *Mapping Research and Innovation in the State of Israel.* Paris: SPIN Country Profiles in Science, Technology and Innovation Policy, Nations Educational, Scientific and Cultural Organization:. Retrieved from https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000244059&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_f771e9c9-c489-49ff-a047-bd2f-f1a8c336%3F_%3D244059eng.pdf

Valtioneuvosto. (2020). *Tiekartta 2020–2023 : Terveysalan tutkimus- ja innovaatiotoiminnan kasvustrategia.*

Valtioneuvosto. (2024). *Valtion tutkimus- ja kehittämisrahoituksen käytön monivuotinen suunnitelma.* Helsinki: Valtioneuvosto.

VTT & MDI. (2024). *Mid-term Evaluation of the Leading Company Initiative (LCI) Pertnerships - Final Report.* Business Finland. Retrieved from https://www.businessfinland.fi/495d09/globalassets/julkaisut/business-finland/vaikuttavuus/mid-term-evaluation-lci-3_25.pdf

APPENDIX – LIST OF INFORMANTS

We conducted a series of interviews for this project with stakeholders in Finland's R&D ecosystem as well as international experts offering radical perspectives on how to strengthen R&D performance. The Finnish stakeholders included representatives from Business Finland, industry, universities, the Research Council of Finland, relevant ministries, and other policy organisations. The international experts, primarily academics and researchers, were selected for their ability to provide alternative viewpoints and propose novel approaches to R&D policy. In total, we collected insights from 17 informants, of whom four were representatives from Business Finland. The table below lists the remaining 13 interviewees from outside Business Finland.

NAME	ORGANIZATION
Anonymous	University of Helsinki
Maija Lönnqvist	Ministry of Economic Affairs and Employment
Harri Länsipuro	Research and Innovation Council
Antti Pelkonen	Science specialist, Prime Minister's Office
Jussi Alho	Research and Innovation Council
Johanna Moisio	Research and Innovation Council
Keith Bonnici	Tesi
Petri Malinen	Head of Economic Policy and Sustainable Growth at the Federation of Finnish Enterprises
Mikko Särelä	Academic Engineers and Architects in Finland
Jari Antero Konttinen	Senior Advisor of Industrial Policy in Palta
Fulvio Castellacci	Professor at Centre for Technology, Innovation and Culture at University of Oslo
Reinhilde Veugelers	KULeuven
Riikka Heikinheimo	Director, Confederation of Finnish Industries

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