Multiannual plan for the use of government research and development funding

PUBLICATIONS OF THE FINNISH GOVERNMENT
2024:41

FINNISH GOVERNMENT

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Multiannual plan for the use of government research and development funding

Working group appointed to draw up the plan for the use of government research and development funding

Finnish Government Helsinki 2024

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Abstract

In line with the Act on Research and Development Funding in 2024–2030 (1092/2022), the Government shall adopt a plan for the use of central government research and development funding once every electoral term. The multiannual plan presents the current state of the research, development and innovation system, the objectives of the system and the main policies for the use of R&D funding. Decisions on the actual allocation of funding are made as part of the normal budgetary process.

On 9 October 2023, the Ministry of Education and Culture and the Ministry of Economic Affairs and Employment appointed a working group to draft a proposal for the plan. The working group was responsible for drawing up the proposal for the plan and its monitoring mechanisms and for holding consultations with stakeholders. The wide-ranging group of stakeholders was tasked with supporting and monitoring the preparations, producing expert information and presenting views on the policies in the plan. The preparations were led by the Research and Innovation Council and involved extensive consultation with the stakeholders.

The main policy priorities identified in the plan involve increasing cooperation between R&D actors, promoting ambitious R&D activities in businesses, strengthening competence, improving research and technology infrastructure, deepening EU and other international cooperation and making strategic choices. The plan also describes the expected impacts and presents indicators to support monitoring.

Keywords research and development, research funding, research policy, innovation policy, innovation

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Valtion tutkimus- ja kehittämisrahoituksen käytön monivuotinen suunnitelma

Valtioneuvoston julkaisuja 2024:41

Julkaisija	Valtioneuvosto		
Yhteisötekijä	Tutkimus- ja kehittämistoiminnan rahoituksen käytön suunnitelmaa valmistellut työryhmä		
Kieli	suomi	**Sivumäärä**	55

Tiivistelmä

Valtion tutkimus- ja kehittämistoiminnan rahoitusta vuosina 2024–2030 (1092/2022) koskevan lain mukaisesti valtioneuvosto hyväksyy kerran vaalikaudessa tutkimus- ja kehittämistoiminnan rahoituksen käyttöä koskevan suunnitelman. Monivuotiseen suunnitelmaan sisältyy kuvaus tutkimus-, kehittämis- ja innovaatiojärjestelmän nykytilasta, järjestelmää koskevat tavoitteet sekä T&K-rahoituksen päälinjaukset. Varsinaiset rahoituksen kohdennukset tehdään osana normaalia talousarvioprosessia.

Opetus- ja kulttuuriministeriö ja työ- ja elinkeinoministeriö asettivat 9.10.2023 työryhmän valmistelemaan esityksen suunnitelmasta. Työryhmän tehtävänä oli antaa ehdotus suunnitelmasta ja sen seurannasta sekä kuulla sidosryhmiä. Laajan kokoonpanon tehtävänä oli tukea ja seurata valmistelua, tuottaa asiantuntijatietoa ja esittää näkemyksiä suunnitelman linjauksista. Suunnitelman valmistelua johti tutkimus- ja innovaationeuvosto. Työn aikana kuultiin sidosryhmiä laajasti.

Tunnistetut päälinjaukset koskevat T&K-toimijoiden yhteistyön lisäämistä, yritysten kunnianhimoista T&K-toimintaa, osaamista, tutkimus- ja teknologiainfrastruktuureja, EU-yhteistyötä ja muuta kansainvälistä yhteistyötä sekä strategisia valintoja. Lisäksi suunnitelmassa on kuvattu odotettua vaikuttavuutta ja esitetty mittareita seurannan tueksi.

Asiasanat	tutkimus- ja kehittämistoiminta, tutkimusrahoitus, tutkimuspolitiikka, innovaatiopolitiikka, innovaatiotoiminta

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Flerårig plan för användningen av statlig finansiering av forsknings- och utvecklingsverksamhet

Statsrådets publikationer 2024:41

Utgivare	Statsrådet		
Utarbetad av	Arbetsgrupp som tillsatts för att utarbeta en plan för användningen av statlig finansiering av forsknings- och utvecklingsverksamhet		
Språk	finska	**Sidantal**	55

Referat

Enligt lagen om statlig finansiering av forsknings- och utvecklingsverksamhet åren 2024–2030 (1092/2022) godkänner statsrådet en gång per valperiod en plan för användningen av finansieringen av forsknings- och utvecklingsverksamhet. I den fleråriga planen ingår en beskrivning av nuläget inom forsknings-, utvecklings- och innovationssystemet, målen för systemet samt de huvudsakliga riktlinjerna för finansieringen av forsknings- och utvecklingsverksamhet. De egentliga fördelningarna av finansieringen görs som en del av den normala budgetprocessen.

Den 9 oktober 2023 tillsatte undervisnings- och kulturministeriet och arbets- och näringsministeriet en arbetsgrupp för att bereda ett förslag till plan. Arbetsgruppens uppgift var att ge ett förslag till plan och uppföljning av den samt att höra intressentgrupperna. Den omfattande sammansättningen hade i uppgift att stöda och följa beredningen, producera expertinformation och framföra synpunkter på riktlinjerna i planen. Planberedningen leddes av forsknings- och innovationsrådet. Under arbetets gång hördes intressentgrupperna i stor utsträckning.

De huvudsakliga riktlinjer som identifierats gäller ökat samarbete mellan aktörer inom FoU, ambitiös FoU-verksamhet vid företag, kompetens, forsknings- och teknologiinfrastruktur, EU-samarbete och annat internationellt samarbete samt strategiska val. I planen beskrivs dessutom de förväntade effekterna och presenteras indikatorer som stöd för uppföljningen.

Nyckelord forsknings- och utvecklingsverksamhet, forskningsfinansiering, forskningspolitik, innovationspolitik, innovationsverksamhet

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FOREWORD

The Government has decided to make historically large investments in research and development (R&D) to bring our country to a new growth path. The present plan for the use of R&D funding outlines the allocation of these investments. The plan is strongly based on the agreed parliamentary approach. The public investments by the government will leverage companies' R&D investments, and this aims at creating sustainable growth in Finland.

In Sweden, research policy is outlined in research policy reports once every four years. In the United States, guidelines for the priorities of science and technology policy are drawn up annually at the federal level. Austria has already adopted its second ten-year Strategy for Research, Technology and Innovation, which outlines the most important choices. Meanwhile, Japan's Sixth Science, Technology and Innovation Basic Plan involves the most substantial and significant investments in RDI ever made in Japan's history. There are many similar examples. What all these countries have in common is that they have made significant investments in R&D funding and have also allocated R&D funding through political decisions. Each policy or report has also contributed something more to the system.

A valuable strong parliamentary consensus has been established in Finnish research, development and innovation (RDI) policy and especially in increasing R&D funding. It emphasises the role of the predictability and long-term vision, comprehensiveness, impact, cooperation and internationalisation of the RDI policy. We broadly agree on these in our society. At the same time, parliamentary work has paid attention to the need for the allocation of R&D funding to take into account the leverage of public funds to private investments, the competition of funding, scientific freedom and the quality of research, the recognition of global challengesand technology and industry neutrality.

The role of policy is to make value judgements based on extensive and thorough preparations that will drive our society forward and create future prospects. These choices are in high demand right now. The growth of the Finnish economy has deteriorated since 2008, and the development is exceptionally poor in international comparisons. We are underperforming despite our opportunities to do better. As a society and a national economy, Finland must become stronger than it currently is to take on future global challenges.

In this multiannual plan for the use of government research and development funding, we have selected means that enable boosting economic growth sustainably and strengthening research and development activities comprehensively. The aim is to create a strong Finland whose expertise and innovations are in high demand across the globe. A Finland, whose economy is so secure that every Finn can build a good life for themselves and their loved ones. Future-oriented companies that want and dare to invest in research and development to discover innovations for tomorrow play a key role in this work.

We already followed the guidelines of this plan in the decisions of the General Government Fiscal Plan of the spring of 2024 and called for stronger cooperation in the RDI sector, increased funding for companies' R&D activities, invested in strengthening careers in research and made additional investments in shared research infrastructures. With these measures, we are now changing the course of R&D policy. In the coming years, decisions on new priorities in R&D funding will be made by the Government. The Research and Innovation Council will also prepare views on the need to develop the system on a broad basis. The Council is expected to provide initiatives, policies and strategic choices to support the system. This is the direction that is also pursued in other parts of the world.

The most important and concrete policy choice is related to increases in R&D funding. I know that many countries are following our success in this. We will also monitor the impacts of funding on growth, employment and wellbeing closely at the national level. These are the greatest investments a small nation can make in its future. Increasing the resources of R&D activities is our common cause and its implementation must be promoted through extensive cooperation and mutual understanding.

Petteri Orpo
Prime Minister

June 2024

1 Introduction

As statuted in section 3 of the Act on Research and Development Funding in 2024–2030 (1092/2022), the Government approves, once a parliamentary term, a multiannual plan for the use of R&D funding,. The plan discusses the use of authorisations and appropriations intended for research and development activities in accordance with section 1 of the Act and included in the Budget in the period 2024–2030. According to section 1 (2) of the Act, research and development activities refer to activities referred to in official research and development statistics published annually by Statistics Finland (see Appendix 1).

This is the second multiannual plan for the use of government research and development funding and applies to the period 2025–2032. The first plan was published as the Parliamentary RDI Working Group's final report 2022 on 1 March 2023 (the Parliamentary RDI Working Group 2023).

The plan presents the current state of the RDI system and the objectives set for the system as well as the main guidelines for R&D funding. The actual increases and allocations of authorisations and appropriations are made as part of the normal budgetary process. The allocations included in the 2024 Budget and the 2025–2028 General Government Fiscal plan realised by the time of the completion of this plan are described in more detail in Chapter 7. Not all the annual increases required by the Act have yet been allocated and will be decided later. The plan guides the ministries to take the goals and policies presented in the plan into account in their activities and budget preparation.

The plan is part of the implementation of the Programme of Prime Minister Petteri Orpo's Government. The plan was prepared by the Ministry of Education and Culture and the Ministry of Economic Affairs and Employment in accordance with the government programme. The work to prepare the plan involved setting up a working group and consulting stakeholders representing research and economic life. The preparation of the plan was led by the Research and Innovation Council. The plan was approved at the Government plenary session on 13 June 2024. The preparation of the plan is described in more detail in Chapter 8.

2 Objectives concerning the RDI system and R&D funding

Finland's goal is to increase research and development expenditure to a four per cent share of GDP by 2030.

Investments in research and development activities aim to accelerate sustainable economic growth, strengthen competitiveness and increase productivity. As a small open economy, Finland will only succeed with expertise and innovations in the future. High-quality expertise and RDI activities lay the foundation for Finland's competitiveness, productivity growth and wellbeing. Research and development investments aim at the renewal of economic life and society as well as socially, economically and ecologically sustainable growth, which will strengthen general government finances and enable the financing of the functions of the welfare society. The ultimate objective is to increase the wellbeing of society.

Finland's RDI system is developed comprehensively and in a balanced way. The aim is that the operating environment for RDI in Finland is at the top of the OECD countries and that Finland has assumed a strong position in science, technology, innovation and high-level expertise.

International competition and the geopolitical situation have intensified. Part of the tension occurs due to the intertwining of science and technology with the trade policy competition between the great powers. There is also global competition for competence. There is a need to raise the level of ambition for research and development activities in Finland and increase their volume. Finland has identified strengths in R&D activities, on which the increase in productivity and wellbeing is justifiably built. Thanks to long-term investments in scientific research and development, Finland is a world leader in those fields of research and technology for whose international leadership and control there is major competition. Our spearhead may not be wide, but it is sharp. We should build on this advantage.

Major increases in government R&D funding seek impacts that go beyond the investments. The short-term objective is that the government funding will encourage all organisations engaged in research and development to strongly increase their high-quality and ambitious R&D activities in Finland. The aim is to increase cooperation between companies and other organisations engaged in R&D activities, leverage private investments and attract R&D investments to Finland.

The longer-term objective is for the government investments to extensively produce new knowledge and high-level expertise, innovations and solutions to global societal challenges, such as climate change, biodiversity loss, pollution and social problems. This will promote exports of high added value, sustainable economic growth and improved productivity, and increase the wellbeing of society.

In the medium and long term, the implementation of the plan will be examined from different perspectives, such as economic growth, labour productivity, social and ecological sustainability and solving societal challenges.

3 Main guidelines for the use of research and development funding in the period 2025–2032

According to the Programme of Prime Minister Petteri Orpo's Government, the government funding for R&D must be allocated in a way that will achieve the desired positive effects on competence, productivity and competitiveness. This in turn will have a positive effect on long-term economic growth, which will strengthen the financial base of the welfare society. Under the government programme, additional R&D funding is used to safeguard the training of RDI experts and ensure the core funding of higher education institutions. The government programme also states that the Government will increase funding for research infrastructures (including shared infrastructures) and allocate R&D funding to basic research and applied research conducted in universities and in universities of applied sciences, research institutes, university hospitals as well as competed research funding through the Research Council of Finland and Business Finland. The national economic impact of R&D funding will be increased by targeting funding in particular to cooperation between companies and research organisations. Additionally, funding opportunities suitable for growth companies and SMEs will be further developed and sufficient national matching funds for projects receiving the EU's R&D funding will be reserved.

The government programme is strongly built on the twin transition. The twin transition must be supported by research that produces new information and solutions as well as products, technologies and services developed by companies and other R&D actors based on this research. The clean and digital transition is also strongly intertwined with the major societal challenges that concern the whole planet. Finland has excellent opportunities both to produce new knowledge and solutions to rise up to the complex challenges and to benefit from the global market opportunities related to the clean transition, digitalisation and new technologies. This requires a close link between RDI policy and other policy areas. Researched knowledge related to the twin transition is also needed when setting policy objectives and when monitoring and verifying the achievement of objectives. Solving major societal challenges requires a broad international research community, companies and ecosystems as well as their seamless collaboration.

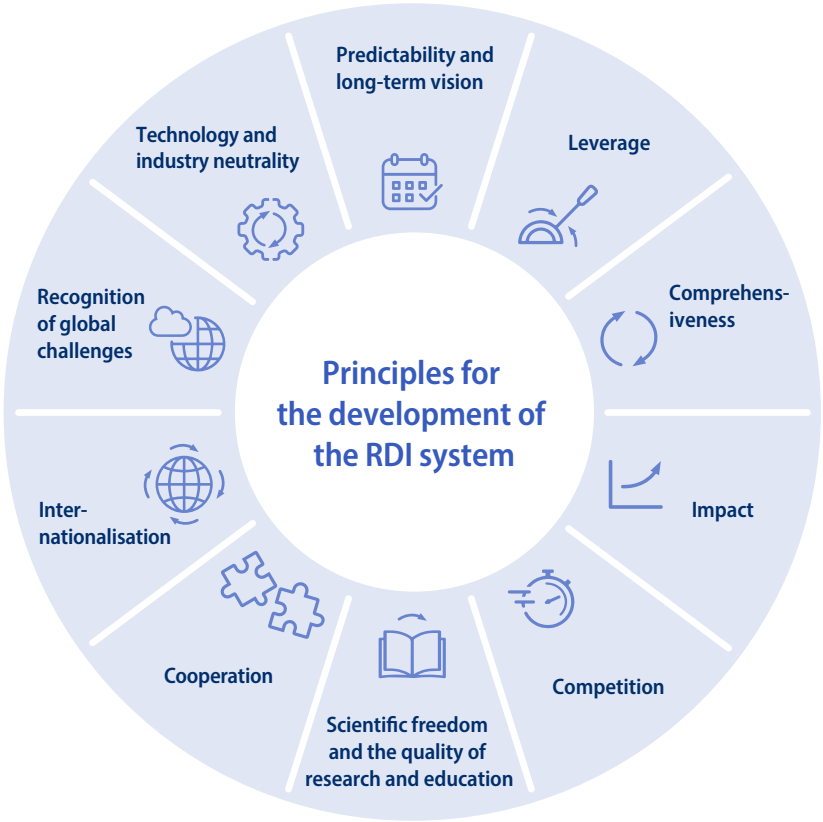
The Government has already allocated additional R&D funding to increase cooperation between private and public R&D stakeholders, leverage private investments, ensure the adequacy of R&D experts, support research and technology infrastructures and enable European and international cooperation. By funding both companies as well as those public research organisations that collaborate with them, companies are encouraged to increase their R&D investments over the long term. A more detailed description of these first-phase priorities is provided in Chapter 7.

To boost sustainable growth and achieve the four per cent target for R&D, it is essential that companies significantly increase their R&D investments and improve their ability to translate R&D activities into innovations that support sustainable development and international business. The goal is to encourage companies to increase their own investments in research and development, to encourage new companies to launch R&D activities and to attract foreign companies to invest in R&D activities in Finland or to establish some of their R&D activities in Finland.

At the same time, we need investments that enable strengthening the national competence base and capabilities. Significant innovations and new solutions are based on long-term and high-quality research and development efforts that utilise the research. While societal and at times significant economic benefits have often emerged from research unexpectedly, there is also a need to systematically create opportunities for new openings and innovations. Creating new openings that increase productivity and are of international interest is only possible when all R&D stakeholders increase the capabilities for research and development activities among their personnel. Ensuring the core funding of higher education institutions and research institutes and allocating R&D funding to this allows for ensuring the preconditions for research activities and maintaining their quality. It is important that the private sector also accumulates the most highly educated R&D personnel. Comprehensive and systemic development of the R&D system requires investments in the R&D activities of both research organisations and companies. Close cooperation between companies and other organisations engaged in research plays a key role in this context.

The implementation of the multiannual plan for the use of government research and development funding and the allocation of R&D funding follow principles agreed upon at the parliamentary level and also used internationally.

Figure 1. Principles for the development of the RDI system



The plan includes the outcomes set as the short-term targets, the medium-term impact target and the long-term impact target as well as proposals for potential indicators to be used in monitoring the implementation of the plan. The set of instruments contains both input and output metrics. In the plan, the short term refers to a time span of around three years (current government term), the medium term refers to the period determined in the Act on Research and Development Funding (until the end of 2030) and the long term refers to the impacts created after this. Chapter 6 describes the monitoring of the plan in more detail.

3.1 The strength of Finland's R&D activities lies in cooperation

Policy outline: Increasing Business Finland funding for ambitious, long-term, goal-oriented and effective cooperation in R&D activities by companies, universities, research institutes, universities of applied sciences and wellbeing services counties (incl. the City of Helsinki and HUS Group) that leverages the R&D investments of the private sector.

Policy outline: Increasing Research Council of Finland funding also for pre-commercial applied research that aims at the renewal of business and society, is based on pioneering in science and promotes extensive utilisation of research findings.

The development of the RDI system in a balanced way requires increasing and diversifying the collaboration between companies, universities, research institutes, universities of applied sciences and wellbeing services counties[1]. It is also important to promote cooperation between companies of different sizes and types. The aim is to restore cooperation between the different actors as a key strength of Finland's RDI activities and to increase the RDI activities of companies in particular, while at the same time promoting open-minded and ambitious innovation thinking and activities. By increasing the funding for cooperation, new companies are encouraged to carry out R&D activities and the integration of the most highly educated workforce into companies that do not yet have R&D personnel is promoted.

Cooperation should be increased and strengthened throughout the entire Finnish RDI system. Funding cooperation should be intensified, especially between the Research Council of Finland and Business Finland. There are grounds for continuing the efforts to diversify and develop research-driven and business-driven ecosystems. The cooperation instruments must support cooperation diversely, encourage private sector R&D investments and increase the competence of RDI stakeholders. By developing funding criteria, it will be ensured that both private and public sector actors have the necessary incentives and opportunities

1 Here and throughout the plan: incl. the City of Helsinki and HUS Group

for cooperation. The additional R&D funding allocated to Business Finland will be increasingly allocated to support cooperation in the research and development activities of companies and other research organisations, also more extensively than through subcontracting.

Comprehensive development and expanding cooperation ensure that the components of the RDI system work together in the optimal way. Cooperation between different actors supports the core of cross-disciplinary and multidisciplinary R&D activities and an open discussion culture. It is important to take into account different needs (such as those of different sectors and regions) and to strengthen the coherence of national and regional development measures. National cooperation models and ecosystems also enable access to international cooperation and attract the R&D activities and investments of foreign companies and organisations to Finland. This will strengthen internationally high-quality and attractive research environments, networks and ecosystems.

The financial instruments for applied research whose results are published must also be strengthened. Funding will also be allocated to the pre-commercial research projects of research organisations conducting public research that are networked with the business community and from which no immediate export potential is required. Cooperation between companies and research organisations creates new ideas for basic and applied research, offers companies new expertise for developing business, products, services and operating models, and promotes the extensive utilisation of research results. At the same time, it will be possible to develop brand-new innovations that contribute to changing the market, whose share is currently small in Finland according to estimates (e.g. OECD 2017).

Business Finland will strengthen funding to accelerate the commercial application of research findings and research-based ideas, and will also promote the commercial application of the research-based ideas generated in the fields of art and culture.

The cuts in funding and instrument reforms completed in the 2010s are among the reasons for a decline in R&D cooperation between higher education institutions, research institutes and companies. Business Finland is the provider of approximately 8% of external R&D funding for higher education institutions; this share was around 18% ten years ago (Finnish National Board of Education's statistics service Vipunen 2024 a and 2024 b). At the same time, the share funded by companies of the public research conducted in Finland is less than half of the EU and OECD average. For example, in 2022, 14% of research commissioned by companies from external research providers was commissioned from higher education institutions and research institutes (Statistics Finland 2023 a).

The opportunities of universities of applied sciences to act as R&D partners for the local business should be strengthened. To promote this, the opportunities for universities of applied sciences to obtain competed research funding through Business Finland will be improved. Business Finland will create a mechanism for also allocating funding to applied research carried out in cooperation between companies and universities of applied sciences. The applied research carried out in the competence clusters of universities of applied sciences produces new knowledge, applications, services and products for their regions. The cooperation with universities of applied sciences aims for more and more SMEs to participate and invest in R&D activities.

There is also a need for national solutions that support society and the security of supply. The partnerships also support the efforts to renew and develop the public service system (cf. e.g. national health laboratories and diagnostics targeted at the Finnish population, the National Bureau of Investigation's laboratory and identification methods developed for the Finnish environment).

Desired impacts

In the short term, the cooperation of R&D actorswill increase and diversify. Applied research will increase. The cooperation will lead to an increase in the volume of R&D activities by companies. More and more companies will launch R&D activities.

In the medium term, the cooperation of R&D actors will expand. New expertise and knowledge will emerge through closer cooperation between R&D actors. Knowledge and experts will move between R&D actors. The utilisation of research results will increase and research and innovation capacity will grow.

In the long term, business and society will renew. Competence clusters will grow stronger and new clusters will emerge and support the development of vibrant growth ecosystems. Brand new innovations will emerge, transforming the market.

Examples of indicators: Funding from the Research Council of Finland and Business Finland for R&D cooperation projects, business funding for research organisations (Statistics Finland), the share of companies engaged in innovation cooperation with higher education institutions and research institutes in companies engaged in innovation activities (Statistics Finland, CIS research).

3.2 Increase in ambitious R&D activities by companies accelerates economic growth

Increasing companies' R&D investments

Policy outline: Increasing the R&D funding for companies' R&D activities through Business Finland. Allocating funding to companies that are most capable of innovation activities, risk-taking, investing in intangible assets and utilising R&D in international business. Also allocating funding is to ambitious R&D activities that are further away from the market.

An increase in the R&D activities of companies is key to achieving the four per cent share of GDP target set for R&D expenditure. Finland must make a long-term commitment to supporting companies' R&D activities and to developing an operating environment that encourages cooperation, experts and investments. Government R&D funding aims to encourage companies to increase risk-taking and to increase the volume of their R&D activities and their own R&D investments over the long term. Business Finland funding also aims to support the growth of the most innovative SMEs and start-ups and deep tech companies.

In Finland, companies invest relatively little in the development of brand-new innovations that contribute to transforming the market. Government R&D funding is used to encourage R&D activities that are further away from the market and whose export potential cannot yet be assessed. This will accelerate the renewal and growth of companies and business life.

Finland must be an attractive target for foreign companies investing in R&D activities and looking for a location for their own R&D activities. Increasing R&D funding can contribute to Finland's attractiveness for international RDI investments and promote the competitiveness of Finnish companies in international markets.

New companies for R&D activities

Policy outline: Allocating R&D funding through Business Finland using competitive procedures to companies that are launching their R&D activities and to SMEs that commit to increasing their R&D activities over the long term. The Economic Development Centre reform includes preparing a financing mechanism to promote the creative and goal-oriented R&D activities of SMEs.

In Finland, the R&D activities of companies have focused not only on a small number of active companies but also on a handful of sectors. While large companies are responsible for half of the R&D activities in the business sector, the number of companies engaging in R&D activities is low. It is essential to attract more Finnish companies, including start-ups and micro-companies, to implement and utilise R&D activities in developing their business and competitiveness and boosting their growth. It is also important to encourage R&D activities in sectors where R&D activities are less common in Finland, such as creative industries, services or commerce, and to take into account the special features of these sectors.

The funding is used to encourage SMEs to increase their R&D intensity and ambition as well as to accumulate their R&D competence. SMEs often need a partner for R&D activities, such as a university of applied sciences.

Business Finland's additional R&D funding enables taking separate measures to increase the number of SMEs that are systematically utilising R&D in developing their competitiveness and boosting their growth. Such measures could include financial services that are targeted at new R&D actors, especially those financial services that serve the networks between higher education institutions, research institutes and SMEs, and calls for funding applications for new R&D actors linked to leading ecosystems.

The purpose of the national funding of the ELY Centres is to particularly support the new, creative and goal-oriented R&D activities of small and medium-sized enterprises, including those mainly operating in the domestic market, with potential for innovation and internationalisation.

Desired impacts

In the short term, the investments of companies in R&D activities will grow. More and more companies will engage in R&D activities.

In the medium term, the increase in R&D activities will boost companies' capacity for innovation and renewal. Companies' capability for risk-taking will improve. New forms of business are emerging.

In the long term, the international business with high added value and the value added accruing to Finland are increasing.. The business sector will renew itself and companies will become more productive. Companies and the public sector will introduce new innovations. Finland has attracted several new international R&D investments.

Examples of indicators: Business enterprise R&D expenditure by size class (Statistics Finland), number of companies engaged in R&D activities by size class (Statistics Finland), foreign direct investments/GDP (Statistics Finland), number of patent applications and joint patents by companies (Patent and Registration Office), utilisation of data and digitalisation in companies (Statistics Finland, CIS), turnover from innovations (Statistics Finland/CIS).

3.3 Increases in R&D competence and in the number of R&D experts support productivity growth

R&D activities producing new knowledge

Policy outline: Increasing R&D funding for the R&D activities of universities and universities of applied sciences, research institutes, wellbeing services counties and particularly the wellbeing services counties maintaining a university hospital (incl. the City of Helsinki and HUS Group) to strengthen the preconditions for ambitious research that produces new knowledge and expertise.

Policy outline: Increasing funding through the Research Council of Finland for high-quality research that produces new knowledge financed through competed research funding.

Policy outline: Business Finland will develop the conditions for R&D funding allocated to companies so that the funding will support companies in strengthening their R&D competence in the long term.

Successful R&D activities are based on expertise and competent people. The 4% target can only be achieved if sufficient investments are made in competence and experts. Raising the level of ambition in R&D activities requires building long-term preconditions for research, the ability to see where new research is needed and the courage to renew research without compromising quality as well as the ability to utilise research findings extensively in society, setting a frame for both research and business. Finland must develop the operating conditions for research throughout the RDI system.

Finland can only apply knowledge produced elsewhere if we also have our own R&D activities that represent a variety of fields. Maintaining an extensive and high-quality scientific knowledge base is a vital requirement both for solving societal challenges and for new innovations created through top research.

Countries investing in basic research are considered more likely to remain competitive. Basic research creates preconditions for new discoveries and breakthroughs that promote innovation, technological development, the emergence of new companies and new business activities as well as economic growth. For example, basic research and spin-offs related to quantum mechanics and cryogenics have led to the development of quantum computing in Finland. The freedom of science guaranteed by the Constitution of Finland and the preconditions for research activities are ensured comprehensively by providing a long-term and predictable entity of R&D funding that also takes into account the core funding of higher education institutions.

Raising the level of research and competence requires increasing the funding for higher education institutions allocated to R&D activities. Through their research activities, universities produce new knowledge and expertise and use these as the basis for their development efforts. Universities of applied sciences carry out applied research and development and innovation activities that contribute to renewing the economic structure and activities in their region and create preconditions for them. The R&D activities of higher education institutions benefit higher education, the wider education system as well as companies and society.

Research institutes operate at the interface between basic research and solution-oriented applied research, and through them strengthen the operating conditions of business life. Wellbeing services counties and those wellbeing services counties that maintain university hospitals integrate scientific research into practical diagnostics, nursing and social work, which may also have commercial potential. The results of the R&D activities by research institutes and other public research organisations are also channelled into public decision-making. The ability of

research organisations, wellbeing services counties and the wellbeing services counties that maintain university hospitals to support business activities in their respective sectors and resilience in society can be strengthened by increasing the government funding allocated to their R&D activities.

Higher education institutions, research institutes, wellbeing services counties and those wellbeing services counties that maintain university hospitals also need their own resources to utilise competed research funding and to support the strengthening of R&D cooperation and the utilisation of research. The share of competed research funding in the organisations' total research funding is already currently high.

The Research Council of Finland provides funding to research that produces new, high-quality knowledge and contributes to the internationalisation of the Finnish scientific community. According to an international audit of the Research Council of Finland's activities, a lot of ambitious research remains unfunded in an international comparison. Competed research funding provided by the Research Council of Finland is also used to support research-oriented applied research with public results. The aim is to obtain brand-new knowledge that will revolutionise our current ways of thinking and scientific breakthroughs through free competition. Competed research funding provides an effective way of increasing the quality of research to an internationally high level as the funding is directed to the projects assessed to be the best.

As a result of the change in the operating environment, companies will employ more workforce educated as researchers and capable of leading RDI work. The terms and conditions of Business Finland funding will be developed to strengthen companies' R&D competence. This will also continue to increase the preconditions for R&D activities after the end of the additional R&D funding period and strengthen the R&D capabilities of Finnish companies.

Strengthening researcher careers in the public and private sectors

Policy outline: Strengthening researcher careers by investing in post-doctoral education. More extensive cooperation between employers will be used to ensure that people with a doctorate have career prospects in all employer sectors.

Policy outline: Reforming doctoral education based on the doctoral education pilot launched in 2024. Utilising the best practices to develop the smoothness, quality and attractiveness of doctoral education. Another goal is for more researchers to find employment in companies.

Strengthening career prospects and cooperation between different stakeholders will promote the transfer of the latest research knowledge and the highest level of expertise to all sectors in a versatile manner, including business life and the public sector. The aim is to ensure a sufficient number of R&D personnel and their high competence and attract international R&D experts and ensure that they stay in Finland.

New practices for doctoral education will be tested in a pilot to be launched in August 2024. The pilot aims at doctoral education similar to international comparisons in terms of the scope of doctoral dissertations and the duration of the doctoral programme. The pilot also aims to increase the mobility of doctoral researchers and employees with a doctorate between universities, companies, research institutes and other organisations. The post-doctoral term that succeeds the completion of a doctoral degree is an increasingly important part of the overall education and career path of researchers. Investing in the post-doctoral research phase increases the mobility of researchers between higher education institutions, research institutes, wellbeing services counties, especially those that maintain a university hospital, companies and other organisations.

Effective use of increased R&D funding requires a significant increase in R&D personnel. Compared to other countries, even large Finnish companies employ fewer people with a doctorate or a master's degree. The difference with other countries is even greater among R&D personnel (Ahtonen 2019). According to the OECD, the most productive companies utilise clearly more highly educated labour

force than other companies. In particular, the share of R&D personnel who have completed researcher training in companies must increase closer to the 15% target set by the Research and Innovation Council in 2017 (7.3% in 2022) (Statistics Finland 2023b). With the decisions made in 2023, the additional appropriations under the Act on Research and Development Funding have been allocated to the doctoral education pilot implemented in the period 2024–2027. In education services, government funding under the Act on Research and Development Funding may only be used for education leading to a doctoral degree and for post-doctoral research careers.

Desired impacts

In the short term, the aim is to strengthen R&D competence throughout the RDI system. The mobility of experts between sectors will increase. The prerequisites for companies' RDI activities will be strengthened, and they will attract R&D competence and experts. Internationally attractive competence clusters will be strengthened and new clusters will emerge.

In the medium term, the careers of doctoral researchers will become increasingly diverse. R&D competence will be strengthened across the RDI system. The foundation of national research activities will be strengthened. The utilisation of research will increase. More researchers are being employed by companies.

In the long term, the quality of research and education will improve. Opportunities for significant scientific breakthroughs will increase. Finland will be attractive to foreign experts and investors. New innovations will emerge.

Examples of indicators: Number of R&D personnel, years of research and level of education by sector (Finnish National Board of Education's statistics service Vipunen), number of people with a doctorate and share of R&D personnel by sector (Statistics Finland, Finnish National Board of Education's statistics service Vipunen), number of foreign researchers (Finnish National Board of Education's statistics service Vipunen), R&D expenditure of public research organisations (Statistics Finland).

3.4 High-quality research and technology infrastructures increase Finland's attractiveness

Infrastructures that support strategic strengths

Policy outline: Increasing R&D funding to maintain the level of internationally high-quality, shared research and technology infrastructures in areas of strength.

R&D activities must be supported with up-to-date research infrastructures that broadly serve the needs of those involved in the RDI system. Staying at the top internationally and developing areas of strength require investments in high-quality, shared research and technology infrastructures. There is also a need to invest in strengthening competence and research capacity in research organisations and companies. Keeping an advantage requires updating and maintaining infrastructures to ensure that they allow for generating new and radical research ideas and scaling technologies. In addition, international networks must be established with the parties developing, maintaining and funding infrastructures.

High-quality research infrastructures lay the foundation for effective RDI activities. They enable renewal of science, support competitiveness and produce new expertise and solutions for industry and other businesses. They are also significant in attracting new experts and RDI investments. Cooperation between companies and higher education institutions and research institutes is often implemented through infrastructures. Cooperation is also needed between higher education institutions, research institutes, wellbeing services counties and those wellbeing services counties that maintain university hospitals, and the private sector. There is also a need for the joint use of infrastructures as well as companies that can utilise new knowledge in their business operations. The Research Council of Finland's funding calls take into account how shared research infrastructures encourage R&D actors to cooperate and promote the creation of new innovations. The shared use of research and technology infrastructures in both the public and private sectors enhances the effectiveness of the investments made in them and strengthens the utilisation of research findings and expertise between business life and research organisations. Shared R&D environments are also a prerequisite for companies' regenerative R&D activities and support the development of new growth-oriented

companies. It is important that government-funded research and technology infrastructures have operating principles that enable all user groups of the RDI system to make use of their services.

Updating high-performance computing capacity

Policy outline: Maintaining the high-performance computing capacity at high global level by participating in European funding competition. Enhancing the ability of companies to utilise high-performance computing.

Maintaining Finland's position as a world leader in AI development and the data economy requires replacing the LUMI supercomputer with a new, more efficient supercomputer as technologies develop an – The increase in data intensity and the opportunities it creates require up-to-date high-performance computing capacity as well as data processing capacity. The development of artificial intelligence methods and the increasing role of data and computing will result in major changes in all fields of science and throughout the RDI system. Finland has decided on significant investments in the development of quantum technology. The high-performance computer is also essential for the development of quantum computing. Finland's leading position in AI research is based on both our long scientific traditions as well as the performance of our world-class high-performance computing. The LUMI supercomputer has helped build high-performance computing capabilities in Finland, opened up access to international research communities and research projects for Finns, and made Finland a more attractive country for companies from the perspective of R&D activities.

The LUMI supercomputer is a general purpose research and technology infrastructure, whose capacity can be utilised by higher education institutions, research institutes, companies and other R&D actors regardless of their sector or field of science. A stronger ecosystem will be created around the successor of the LUMI supercomputer to provide services, software development and training to support all R&D stakeholders.

Desired impacts

In the short term, the preconditions for R&D activities will improve and the business and shared use of research and technology infrastructures will increase. The number of international cooperation projects will increase. Computing resources will be widely available and utilised by different actors.

In the medium term, research and technology infrastructures will support the formation of internationally attractive competence clusters.

In the long term, the level of research will increase and Finland will be attractive to foreign experts and investors.

Examples of indicators: Number of high-performance computing projects in higher education institutions, research institutes and companies as well as their sectors (CSC).

3.5 Increasing international cooperation strengthens the quality of research and the competitiveness of companies

R&D cooperation at the EU level

Policy outline: Gradually increasing the national matching funding for the EU's R&D funding for research organisations and developing it to encourage stakeholders to apply for EU funding more actively. Ensuring the capacity of funding providers to implement and participate in the preparation of joint partnership programmes. Activate new actors, especially companies, to apply for the EU's R&D funding.

The significance of the EU's R&D cooperation for Finnish RDI stakeholders is constantly increasing. Solving societal challenges and the twin transition requires international partnerships. The partnerships result in an increase in research cooperation, higher quality of research and more investments in R&D by companies, which will lead to economic growth and better competitiveness.

The objective of doubling the received EU's R&D funding to Finland requires sufficient national matching funding for Finland's participation in European partnerships and for covering the self-financing share of public research organisations.

Co-financed European partnerships require national matching funding. The national matching funds required for the partnerships are mainly provided by Business Finland and the Research Council of Finland. Sectoral ministries can also allocate funding to partnerships. Strategic choices made at the national level must be taken into account when participating in partnerships.

Matching funding from public research organisations encourages research organisations to participate more extensively in the EU's R&D projects, which provide Finnish stakeholders access to the better utilisation of European networks and the expertise generated in them. The participation of research organisations in EU programmes also promotes companies' access to EU networks. Companies will be activated to increase their EU-funded R&D activities and to participate in research organisations' projects as well as the utilisation of instruments specifically aimed at companies.

Qualitative and quantitative objectives set for participation in EU programmes and access to funding promote ambitious R&D cooperation.

Other international R&D cooperation

Policy outline: Strengthening the capacity of Finnish RDI stakeholders to engage in R&D cooperation with key partner countries and international companies and organisations will be strengthened, and enhancing the use of international R&D funding extensively. Continuing the allocation of funding from Business Finland and the Research Council of Finland to international R&D cooperation.

Justifications: International R&D cooperation promotes the growth of companies' business operations, increases their innovation and competitiveness, and opens up new markets and export opportunities. International research cooperation also strengthens the quality and effectiveness of science and research. Companies' understanding of global development trends and markets is increasing, which helps to develop new technologies, products and services. The aim is to increase the quantity and quality of international RDI activities carried out in Finland and to attract R&D activities and projects of foreign companies to Finland.

In addition to the EU's R&D programmes, there is a growing number of other international R&D funding and cooperation opportunities that companies and other research organisations could make more use of. There are also plenty of opportunities for R&D cooperation with other Nordic countries. The international operating environment, which is undergoing a transformation, requires a strategic review of the key partner countries and organisations with which Finland aims to engage in closer R&D cooperation. For example, Finland's NATO membership provides Finns with new access to international networks, opportunities and funding channels, such as the federal financing instruments of the United States. International R&D cooperation must ensure that the intellectual property rights created in the cooperation benefit Finnish business life, companies and other parts of society.

The R&D funding of international organisations (e.g. the European Space Agency ESA) and foundations and the utilisation of large international research and technology infrastructures provide significant opportunities to participate in international top-level cooperation and global value networks. Finnish RDI actors must seize these opportunities increasingly frequently.

Desired impacts

In the short term, the acquisition of the EU's R&D funding and international R&D funding will increase among Finnish RDI actors. R&D intensity will increase in Finland. RDI actors will be more closely integrated into EU-level and global RDI networks and ecosystems. The number of stakeholders receiving the EU's R&D funding will increase.

In the medium term, increased international cooperation will improve the quality and effectiveness of research. Companies will have better export opportunities, high added value exports and international business.

In the long term, Finland will play an important role in creating solutions to global societal problems and dual-use technologies. Companies will have better export opportunities, high added value exports and international business and the quality of research will improve. New experts and R&D actors will move to Finland.

Examples of indicators: EU's R&D funding allocated through the Horizon programme (EUTI, Statistics Finland, Finnish National Board of Education's statistics service Vipunen), other foreign R&D funding by sector (Finnish National Board of Education's statistics service Vipunen), international joint publications (Finnish National Board of Education's statistics service Vipunen), government R&D funding allocated to international cooperation (Business Finland and Research Council of Finland), international RDI cooperation between companies, share of companies (Statistics Finland, CIS).

3.6 Strategic choices in R&D activities contribute to Finland's future success

Policy outline: In R&D and the direction of R&D activities, recognising global and national societal challenges and the opportunities these create for RDI stakeholders, taking Finland's strengths into account. Under the leadership of the Research and Innovation Council, identifying strategic choices in an inclusive and open process.

Under the leadership of the Research and Innovation Council, launching a process to identify strategic choices that engages a wide range of stakeholders. This plan contains policy outlines on the allocation of government R&D funding.

Strategic choices create preconditions for proactive, long-term and determined national development measures. The choices bring together public and private resources and support RDI system actors in directing their activities.

Selection criteria are defined as the basis for identifying the choices. The choices must be based on research knowledge and an up-to-date, updated knowledge base collected systematically and extensively. It is important to ensure the commitment of business life and other actors to the choices. Choices based on a shared view are promising growth areas, and worthy of consideration for Finland

from the perspectives of competence, global demand, competition factors and/or societal significance. When identifying choices, attention is paid to the opportunities for growth and business, technological development and its link to safety and security, societal challenges and significant sustainability transitions as well as high competence and related clusters. Crossing the boundaries of fields of science and research and also the important role of humanities, social sciences and creative industries in developing and introducing technologies and innovations are common, especially when solving major societal challenges. Moreover, attention is paid to changes in the operating environment, links between different policy sectors and policies made in other key national or EU strategy processes.

The changing national and international operating environment and unpredictable new challenges and opportunities require that, after making the choices, there must also be room for unexpected new openings beyond the choices. The RDI system's flexibility and capability to respond to rapidly changing needs are essential for also ensuring the resilience of society and the wellbeing of citizens in the future.

Societal challenges create global demand for new expertise and new solutions, which can open up significant business opportunities and enhance other functions of society, also through non-commercial solutions. Emphasis is put on a more competent workforce and high-quality research and innovation activities. In addition, national, regional and other development measures are essential for making use of the opportunities arising from global transformations. They must enable anticipation and utilisation of global changes and market demand as well as the systematic construction of the different phases of the innovation cycle.

The role of new technologies and high competence in sustainable growth and competitiveness has increased in recent years. Technologies and the expertise that is associated with and complements them also play an important role in solving major societal challenges and ensuring safety and the security of supply. Geopolitical tensions and intensifying competition in critical technologies mean that strategic perspectives on new and emerging technologies are becoming more important. These developments challenge not only research and innovation policy but also business and industrial policy.

It is important for Finland to stay at the forefront in the fields relevant to the twin transition and disruptive technologies and strengthen RDI related to dual-use technologies. As a result of the current security policy situation, security solutions and security of supply gain more importance. Dual-use technologies support the development of R&D activities in the defence industry in Finland. Finland has world-leading expertise in some areas of the twin transition which involves digitalisation

and clean transition, such as in the bioeconomy and climate economy, as well as in key disruptive technologies. There is currently global competition for the leading position in the latter. Some choices have also already been made, including in quantum technology, high-performance computing and microelectronics.

Finland has a need for more and broader competence clusters that are effective and of high quality at the international level. The development and creation of the clusters require both broad-based expertise as well as making choices. They will also support Finland's opportunities for cooperation in the European Union and globally. Competitive funding supports the R&D initiatives arising from research organisations and companies, and the projects funded by it form a significant part of the choices. In competitive funding, choices are based on the criteria of the given funding instrument and an assessment carried out based on the criteria.

Desired impacts:

In the short term, the process of identifying strategic choices has been implemented. The choices will support strengthening internationally strong competence centres and innovation and business ecosystems in selected areas.

In the medium term, Finland will be able to produce new solutions in selected fields and export them to international markets.

In the long term, sustainable economic growth and competitiveness will be strengthened, sustainability transitions will progress and Finland's country brand will become brighter. Finland will play an important role in creating solutions to global societal problems.

Examples of indicators: government R&D funding allocated to strategic choices.

4 Monitoring the implementation of the plan

The Government monitors the impact of government R&D funding. A timetable and monitoring structures will be drawn up for monitoring the impact of funding. Impacts and effectiveness will be monitored both at the level of the plan as a whole as well as the individual measures. To enable impact assessment, the planning of grants and measures must, as far as possible, pay attention to the needs for a scientific evaluation study based on a reliable research design.

The Research and Innovation Council will prepare a monitoring and evaluation plan together with the ministries. The impact assessment of the plan is designed and implemented in cooperation with scientific organisations as well as parties such as the Data Room.

The Government will monitor the development of public and private R&D expenditure in euros as a part of the General Government Fiscal Plans for the coming years. This monitoring will be based on the annual statistics on research and development activities of Statistics Finland. The monitoring involves examining the data from the three most recent annual statistics. In addition, the rationale for the budget proposals includes a summary describing government R&D funding as a whole.

The parliamentary RDI monitoring group will also monitor the implementation of the multiannual plan for the use of government research and development funding in accordance with its tasks.

A significant increase in funding in the coming years and the needs of renewing research and innovation policy sufficient investments in monitoring and measuring the impact and effectiveness of public R&D activities and funding. The evaluation and measurement of the impacts of R&D activities are used to investigate the benefits of government R&D funding for companies, research, education, the national economy and society.

The impact of government R&D funding on the progress of objectives cannot always be measured directly or immediately, as the impact and effectiveness of R&D activities are reflected in society, the environment and the economy in many different ways andin different time frames. Impact refers to the long-term objectives. The indicators used in monitoring the plan will be later supplemented.

5 Developing the operating environment for RDI in Finland

In addition to R&D funding, achieving the objectives set for R&D activities will particularly require education and innovation policy measures as well as other policy measures and the development of the operating environment.

At the Government level, it is important to strengthen cross-administrative cooperation and the flow of information to effectively implement RDI policy measures and to take R&D objectives and policies into account in sectoral and field-specific strategies. The Government's RDI policy network will be established in connection with the Research and Innovation Council. There is also a need for cross-cutting cooperation at the regional and local levels, including regional councils and cities' development companies. Concrete actions include ecosystem agreements between the government and university cities, their efficient and productive implementation, and smart specialisation strategies.

To develop and strengthen a research and innovation-friendly operating environment, it is necessary to identify and dismantle obstacles to R&D cooperation and create incentives for it. This is also important from the viewpoint of attracting international R&D investments. For example, as a result of increasing technological development and utilisation of data and the significance of artificial intelligence, regulation has become more important as part of an encouraging innovation environment. Any ambiguous areas in regulation related to new business areas must be identified and efforts must be made to specify them efficiently and in a timely manner. Through innovation-friendly regulation, it is possible, on the one hand, to secure conditions for research and, on the other hand, promote the roll-out of innovations.

In strengthening the RDI operating environment, it is important to take into account the connections to other measures taken under the government programme to promote sustainable growth and to ensure that they are aligned with the RDI policy measures. For example, in the current geopolitical situation and the changed conditions for government support in the EU, competition for industrial investments has accelerated. The Government will respond to this by drawing up an industrial policy strategy and establishing a new state-owned venture capital company. The achievement of the objectives set for R&D activities

will also require educational policy measures, such as raising the overall level of competence and particularly the share of those with higher education in the younger age group.

Intellectual property rights help companies and other actors to manage their intellectual property and exploit it commercially. Intellectual property is a key success factor, especially for growth-oriented companies. A well-functioning intellectual property rights system is an essential part of a well-functioning innovation environment. Measures in accordance with the national strategy on intellectual property rights support the increase of R&D investments in accordance with the national objective (Government 2022).

The full economic and social benefits of increasing R&D inputs must be secured. The aim is to strengthen the capacity of the innovation system, accelerate the growth of companies and ensure that the added value stays in Finland. The development and innovation activities closer to the market must be supported by competence and measures to ensure the rapid commercial application and wide spread of new technologies, ideas and solutions, including various trial and testing environments. There is also a need for expertise related to commercial application, scaling, internationalisation, standardisation and regulation, for instance.

Finland is a member of several large international research infrastructures. In addition to enabling high-quality research, part of them offer cooperation and business opportunities for Finnish companies, including R&D procurement from companies. The utilisation of international infrastructures in companies could be improved by providing centralised business advice services similar to those available in Denmark and Sweden, where the output of such R&D procurements is clearly higher than in Finland.

6 The current situation of the RDI system

6.1 The international operating environment is changing rapidly

The reasons for the change in the international operating environment include the coronavirus pandemic, the Russian war of aggression in Ukraine and other geopolitical tensions, the intensification of strategic competition and global societal challenges. The digital and clean transition and the rapid development of many technologies that enable it will change the operating environment and require new kinds of competence. In international cooperation, the importance of security is emphasised and partly challenges the openness of cooperation.

There is a growing need to promote the access of Finnish RDI stakeholders to new markets and opportunities to diversify value-added chains. For example, in the near future, Ukraine will be the most significant subject for Finland's development cooperation. The expertise of Finnish R&D actors and companies can be utilised in the reconstruction of Ukraine.

The changed geopolitical situation and competition for experts, critical technology and raw materials increase uncertainty in international markets and the RDI operating environment. Science, technology, the economy, trade, development and security are increasingly closely interlinked. Scientific research and technological development are at the core of the competition between the great powers. China has emerged as a major challenger to the United States and Europe in many areas (OECD 2023a, 49). At the same time, the BRICS alliance, which wishes to become a counterpower to the West, is expanding and its importance is growing in a divided world. The role of both Africa and the Arctic is increasing. China and the United States as well as the European Union and many of its Member States have taken steps to strengthen their RDI capabilities and reduce dependencies. For example, the United States has rediscovered the recipe for boosting its economic growth and the success of innovations, i.e. investing in basic research.

The vulnerabilities and geopolitical tensions in supply chains related to China's rapid rise and the coronavirus pandemic have highlighted the role of the pursuit of technological self-sufficiency. The joint publications of Chinese and US researchers, especially in the fields of science and technology, have declined rapidly since 2020 (OECD 2023a, 53), and the cooperation between the countries has started to focus on social sciences and humanities. Western research institutes and RDI actors have mostly ceased cooperation with Russia. While there continues to be a need for expertise on Russia in the future, the challenge is to ensure its continuity and credibility in the current conditions.

Combating climate change and biodiversity loss and adapting to climate change require investments in clean technology and infrastructure, which can create new economic opportunities but also put pressure on traditional industries. At the same time, technologies and natural resources associated with the clean and digital transition are at the core of the accelerating competition. Solving global challenges requires global research and business cooperation. RDI systems play a key role in solving these challenges, starting with the collaboration needed to produce the knowledge base.

International cooperation plays an essential role and is often a prerequisite for effective R&D activities, especially for small, competence-based open economies such as Finland. Countries use their RDI policy to position themselves in the competition between the superpowers, for example by selecting strategic partners. In the current situation, we must be able to strengthen our existing partnerships and build new ones. Tools for this include EU cooperation, Nordic cooperation and bilateral cooperation with partners that share our approaches and values. Finland's NATO membership links Finland to western structures and provides Finns with new opportunities for cooperation. Several countries have taken steps to improve the security of cooperation between companies and other stakeholders in research as part of so-called responsible internationalisation. They also continue to highlight the standards and practices of good scientific practice.

6.2 National RDI system

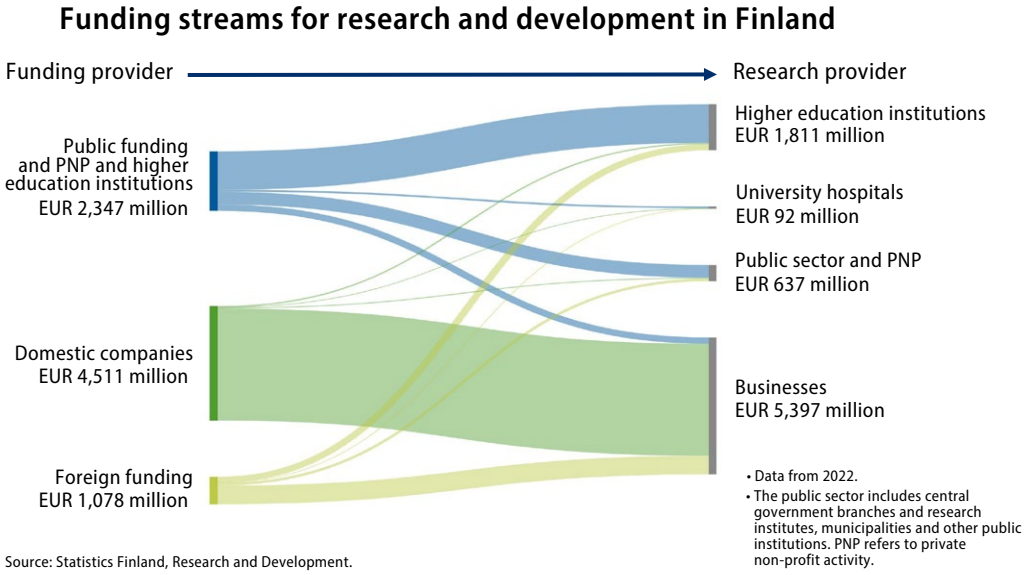
Finland has good prerequisites for expanding its RDI activities and raising its level of ambition. Finland ranks in the top positions in international innovation ratings. For example, in the European Innovation Scoreboard in 2023, Finland is defined as an Innovation Director (European Commission 2023). However, this innovation leadership is not based on results, but on investments. In a recent World Economic Forum ranking on the conditions of the economy, Finland places third overall but is

only tenth in the area of innovativeness (World Economic Forum 2024). In science, Finland is above the world average, but lagging behind key reference countries (Research Council of Finland 2023).

Finland's R&D expenditure remains at a good level in international comparisons, but it decreased significantly in the 2010s. At the same time, there has been an increase in investments in many of Finland's key reference countries. Since 2008, labour productivity has only slightly increased in Finland, largely due to a decrease in R&D investments and other intangible investments. Finland's national product is also lagging behind other Nordic countries.

In 2022, Finland's R&D expenditure accounted for 2.95% of GDP. Companies account for about two thirds of R&D funding and the public sector for one third. Less than 13% of the total R&D funding comes from foreign sources. Expenditure on R&D activities is incurred in higher education institutions, research institutes, other public and private non-profit sector organisations, such as wellbeing services counties, and companies. (Figure 2).

Figure 2. Funding streams for research and development in Finland in 2022.



The emphasis of direct business subsidies in Finland is on preservative subsidies. The government subsidies for companies' R&D activities and the share of R&D grants in all direct business subsidies are lower than in the OECD and EU countries (European Commission 2024). With regard to indirect R&D subsidies, two tax incentives in the form of additional deductions for research and development activities are currently in force in Finland: the so-called additional deduction for R&D co-operation, which is valid for a fixed term, and the so-called combined deduction for R&D which is valid until further notice. The additional deduction for R&D co-operation is valid for the tax years 2021–2027. A tax deduction may be made for subcontracting costs invoiced by an acceptable research organisation. Meanwhile, the combined deduction consists of two separate additional deductions: a general additional reduction based on the amount of research and development costs that are the basis for the deduction, and an additional deduction based on an increase in the amount of research and development activities. The additional deductions of the combined deduction are calculated on the basis of the salaries of research and development activities and the total amount of research and development services purchased by the taxpayer. The combined deduction has been in force since 2023, and the section on the general additional deduction has been applied from this point on. For its part, the additional deduction will only apply for the first time to taxation submitted for the year 2024. The objective of the 1.2% government R&D funding applies to direct R&D funding, which does not include R&D tax incentives or deductions according to international standards. Statistics Finland does also not include R&D tax subsidies in public R&D funding.

From the perspective of increasing the level of ambition and intensity of R&D activities, Finland's greatest challenges include the shortage of cross-sectoral cooperation, the low number of companies engaged in R&D activities and R&D intensive sectors, the shortage of experts and the supply of experts in different sectors of society, and the emphasis on top research and competence clusters in a handful of fields (such as wireless data networks).

A decline in collaboration between companies and other research organisations has been identified as one of the challenges faced by the Finnish RDI system. Cooperation, which has traditionally been one of Finland's strengths, has declined based on funding streams and statistics on joint publications. For example, Business Finland's funding for higher education institutions has dropped in half in the 2010s. Funding from companies to higher education institutions is also around half of the average for both EU and OECD countries. The limited funding of companies for higher education institutions and the small share of R&D personnel who have completed researcher training in the business sector indicate that there is little cooperation. In recent years, Business Finland and the Research Council of

Finland have established instruments and programmes that aim at strengthening intersectoral cooperation and increasing the impacts of RDI activities. (incl. Proof of Concept, Co-research, leading companies and flagship programme).

Companies' R&D activities rely on a narrow group of companies, and export companies have focused on relatively few sectors. Large companies act as drivers of the business community's R&D activities. They account for more than half of companies' R&D expenditure. The share of SMEs engaged in R&D activities remains relatively low (11 per cent of SMEs with more than 10 people) and SMEs' R&D expenditure has decreased in recent years (2021–2022) The number of established start-ups has also taken a downward turn in recent years (Kotiranta 2023). 7% of Finnish companies employ more than 10 people. The majority of Finnish companies are micro-companies with fewer than 10 employees, and in 2022, they accounted for less than 3% of companies' R&D expenditure. (Statistics Finland 2023 a).

Although the growth in companies' R&D expenditure since 2016 has been divided into several sectors, the majority of companies' R&D expenditure continues to target only a few sectors, such as electronics, computers and electrical equipment, as well as information and communications.

Some of the growth in Finnish companies' R&D expenditure and its impact may take place abroad. Companies' decisions on the location of their R&D activities are influenced by the availability and costs of R&D personnel, R&D subsidies and the proximity of the company's other units and clients. Sweden, the Baltic countries and Germany are the most important competitors as countries where R&D is located. A good operating environment, strong ecosystems, high expertise and a long-term R&D funding strategy will continue to be key attraction factors for Finland in the future.

The level of education of the global population has been on the rise for a long time. Both developed and developing countries are making strong investments in education, as competence is a key factor in productivity growth and the utilisation of technological development. Finland's level of education is lagging behind other OECD countries where the share of young people who have completed a higher education degree has increased. Finland has the largest shortage of highly educated workers in the OECD countries. Finland loses to key reference countries in attracting foreign, highly educated workers (OECD 2023 b).

The shortage of experts reduces the opportunities for carrying out RDI activities in all parts of the system. Growth in productivity and the creation of innovations require employing highly skilled people in the right tasks. Raising the level of R&D funding requires increasing the number of experts with the highest level of education.

The most productive companies have more highly educated employees than other companies (Criscuolo et al. 2021). In Finland, only one out of five R&D employees and only 7.3% of R&D employees in the business sector have a doctoral degree (Statistics Finland 2023 b). Increasing R&D expenditure and achieving the desired productivity growth and other impacts will require boosting the R&D activities carried out in companies and expanding the group of companies engaged in RDI activities. The importance of the security of supply of expertise is growing as a result of strategic competition, and international RDI cooperation will play an increasingly important role in solving global challenges.

The clean and digital transition and the rapid development of many technologies that enable it will change the operating environment and require new kinds of competence in all sectors of society and the economy. This requires not only raising the level of competence but also qualitative changes and new competence.

A R&D funding authorisations increase, a growing challenge emerges due to the lack of human resources at Business Finland and the Research Council of Finland.

7 Deciding on the allocation of increases in government R&D funding

Decisions on the allocation of government R&D funding will be made in connection with budgets and General Government Fiscal Plans. In connection with the preparation of the 2024 budget proposal, Prime Minister Petteri Orpo's Government also updated the General Government Fiscal plan for 2024–2027 in the autumn of 2023 and included allocations for the increases in government R&D funding in the General Government Fiscal Plan 2025–2028 in the spring of 2024. Not all increases under the Act on Research and Development Funding for the period 2025–2028 were yet allocated by means of these decisions. Instead, the decisions have left room for the needs of R&D funding in the coming years. For the period 2025–2027, a so-called spending limit provision has been used to prepare for additional R&D funding. From 2028 onwards, additional decisions will be made in the next parliamentary term.

The decisions made in connection with the 2024 government budget session and the General Government Fiscal Plan 2025–2028 will also affect the level of the increase in R&D funding to be decided in the coming years. Table 1 below shows a preliminary calculation of the level of funding to be decided in the coming years. The starting point for the calculation is that each year, government R&D funding will increase by EUR 280 million compared to the previous year.

Under section 2 (2) of the Act on Research and Development Funding, instead of reducing the annual increase in R&D funding, the funding for R&D activities could be reallocated if private R&D expenditure did not develop as intended. Reallocation could be appropriate if it justifiably enabled activating private R&D investments or removing barriers related to private R&D investments. Instead of reducing the increase, funding could also be allocated to public R&D activities if it was estimated that the preconditions for private R&D investments could be promoted most effectively by investing in public sector R&D activities or cooperation between companies and research organisations. Under section 3 (1) of the Act on Research and Development Funding, the Government may, if necessary, revise the plan if the amount of government funding for research and development is substantially reduced or substantially reallocated under section 2 (2).

Table 1. Preliminary calculation of the level of government R&D funding to be decided in the coming years

EUR billion	2023 Statistics Finland projection	2024 Budget proposal estimation	2025	2026	2027	2028	2029	2030
Level according to the Act on Research and Development Funding	2.35	2.63	2.91	3.19	3.47	3.75	4.03	4.31
Previously decided funding	-	2.37	2.37	2.39	2.41	2.46	2.46	2.46
2024 Budget proposal decisions	-	0.26	0.33	0.35	0.27	0.19	0.19	0.19
General Government Fiscal Plan 2025–2028 decisions	-	-	0.19	0.37	0.59	0.56	0.50	0.50
Funding to be decided later	-	-	0.02	0.09	0.20	0.54	0.88	1.16

The calculations for the period 2029–2030 are preliminary. They do not take into account factors such as the index increases of higher education institutions.

The number of new funding decisions needed in the coming years will be significantly affected by previous decisions. The second row of the table describes the amount of R&D funding that would be implemented based on previous decisions. The third row describes the impact of the decisions made in autumn 2023 and in the fourth row the decisions made in spring 2024 on the amount of R&D funding. The final row describes the number of new R&D funding decisions required later.

R&D funding decisions can be either permanent increases in funding or fixed-term project funding, which will continue to affect the decisions needed in the coming years. The figures in the table contain uncertainties, and the amount of funding to be decided later will also be updated as a result of changes to the financial forecasts.

7.1 Allocations of R&D funding in the 2024 budget proposal

The Act on Research and Development Funding (1092/2022) entered into force at the beginning of 2023. The first allocations of R&D funding in accordance with the Act were made in connection with the 2024 budget proposal. In the 2024 budget proposal, government R&D funding totals approximately EUR 2.6 billion. This means an increase of approximately EUR 280 million compared to the total amount budgeted for 2023.

In 2024, additional funding will be allocated especially to the doctoral education pilot, support for companies' R&D activities through Business Finland, the Research Council of Finland's research project authorisation and national matching funding for EU projects. The table below describes the decisions concerning R&D funding for the autumn of 2023. The Government submitted proposals on both permanent increases and fixed-term increases in funding. The fixed-term increases are mainly allocated to multi-annual projects for the period 2024–2027, and will therefore be subsequently released for reallocation. The permanent increases will amount to EUR 187 million in 2027.

Table 2. Increases in R&D funding (Budget Proposal 2024 and General Government Fiscal Plan 2024–2027) – changes in relation to the General Government Fiscal plan of spring 2023.

EUR million	2024	2025	2026	2027
Permanent increases in funding				
Business Finland's authorisation to support R&D activities	92	92	92	92
Business Finland's loan funding authorisation to R&D activities	10	10	10	10
National matching funding of EU projects for higher education institutions and state research institutes	35	35	35	35
The Research Council of Finland research project authorisation	55	45	45	45
Government funding for health care units for university-level research and university-level research in social work	5	5	5	5

EUR million	2024	2025	2026	2027
Fixed-term funding				
Researcher education pilot (2024–2027)	40	86	86	50
VTT Technical Research Centre of Finland, pilot environment for microelectronics and quantum technology (2024–2027)	5.3	11.2	45	17.5
VTT, quantum computer (2024–2027)	5	25	25	15
VTT Technical Research Centre of Finland, development of small modular reactor projects (2025–2027)	-	2.12	2	0.38
REPowerEU, clean energy and material flow R&D project (2024–2026)	16.5	19	4.3	-
Funding decisions under the 2024 Budget proposal	**264**	**330**	**349**	**270**

7.2 Allocation of R&D funding in the General Government Fiscal Plan 2025–2028

In the spring of 2024, R&D funding will be allocated particularly to the grant authorisations of Business Finland and the Research Council of Finland and to new research infrastructure funding. Preparations will be made to replace the supercomputer EuroHPC LUMI with a new supercomputer. The level of EU matching funding will also be raised and a post-doc programme of public research institutes will be launched. The table below describes the decisions concerning R&D funding for the spring of 2024. The Government submitted proposals on both permanent increases and fixed-term increases in funding. The fixed-term increases are mainly allocated to the period 2025– 2028, and will therefore be subsequently released for reallocation. The permanent increases will amount to EUR 504 million in 2027.

Table 3. Increases in R&D funding (General Government Fiscal Plan 2025–2028): changes in relation to the updated spending limits of the autumn of 2023

EUR million	2025	2026	2027	2028
Permanent increases in funding				
Business Finland, grants to companies	45	130	230	230
Business Finland, grants for research	40	70	130	130
The Researcj Council of Finland, increasing research project funding	15	15	45	45
The Research Council of Finland, thematic research infrastructure calls for applications	15	15	15	15
The Research Council of Finland, shared research infrastructures (incl. testing platforms)	-	20	50	50
EU matching funds for higher education institutions and research organisations	15	20	25	25
Government funding for health care units for university-level research and university-level research in social work	5	5	5	5
Supporting bioeconomy R&D activities	4	4	4	4
Fixed-term funding				
Replacing the EuroHPC LUMI with a new supercomputer (2025–2028, total EUR 250 million)	50	75	75	50
Post-doc programme for research institutes (2025–2028, a total of EUR 40 million)	4.9	13.3	13.3	8.4
Total	**194**	**367**	**592**	**562**

8 Preparation of the plan

Mandate and term of the working group

On 6 October 2023, Minister of Science and Culture Sari Multala and Minister of Economic Affairs Wille Rydman appointed a working group for the preparation of a plan for the use of research and development funding. In accordance with the appointment decision, the working group must submit a proposal for a plan for R&D funding whose duration exceeds the budget planning period to the Research and Innovation Council. The work prepared by the working group is based on the Act on Research and Development Funding, the entries concerning RDI activities in the Programme of Prime Minister Petteri Orpo's Government and the policy outlines of the parliamentary RDI working group. The working group must consult stakeholders and the necessary experts during its work. The preparation of the plan is regularly discussed in the extended composition of the working group, and the draft plan is also discussed at the meeting of the Permanent Secretaries of the Ministries. The working group must prepare a proposal on the monitoring of the plan and the needs for information it requires.

The working group assembles in a restricted and extended composition. The task of the extended composition of the working group is to support and monitor the preparation of the plan, produce expert information to support the preparation, assess and present views on the policies of the plan during its preparation, and support the implementation of the policy outlines presented in the plan.

Composition and work of the working group

The working group consisted of 23 members representing ministries, R&D funding organisations and public and private RDI actors.

The limited composition of the working group consisted of representatives of the Ministry of Education and Culture, the Ministry of Economic Affairs and Employment, the Prime Minister's Office and the Ministry of Finance.

The extended composition of the working group also included representatives from the Ministry for Foreign Affairs, the Ministry of the Interior, the Ministry of Defence, the Ministry of Agriculture and Forestry, the Ministry of Transport and Communications, the Ministry of Social Affairs and Health, the Ministry of the Environment, Business Finland, the Research Council of Finland, the Rectors' Conference of Finnish Universities of Applied Sciences Arene, Finnish Research Institute Partnership Tulanet, the Council of Rectors of Finnish Universities Unifi, the Confederation of Finnish Industries, Technology Industries of Finland and the Suomen Yrittäjät.

The secretariat of the working group consisted of officials from the Ministry of Education and Culture, the Ministry of Economic Affairs and Employment, the Ministry of Finance and the Prime Minister's Office.

The term of the working group was from 9 October 2023 to 30 May 2024. During its term, the working group met 6 times in the extended and 19 times in the limited composition.

The public meeting documents of the working group are available in the Government Project Register Hankeikkuna (https://okm.fi/hanke?tunnus=OKM028:00/2023). Information about the different phases of preparing the plan was also provided by the ministries and online (Multiannual plan for research and development funding – MinEdu – Ministry of Education and Culture).

Research and Innovation Council and parliamentary RDI monitoring group

The Research and Innovation Council discussed the plan for the use of government research and development funding four times in its meetings. In addition, the plan was discussed at three meetings of the preparatory composition of the Research and Innovation Council.

On 29 February 2024, the Government appointed a parliamentary RDI monitoring group. The parliamentary RDI monitoring group discussed the draft plan twice in its meetings. Prime Minister Petteri Orpo will submit a notification of the plan to Parliament.

Consultation of stakeholders and specialists

The Ministry of Education and Culture and the Ministry of Economic Affairs and Employment organised a stakeholder event on 15 November 2023. At the event, the chairpersons of the working group presented the starting points for preparing the plan, and the topics of increasing the ambition of R&D activities and strengthening R&D cooperation were also discussed in two panels. The panellists were Professor Jani Erola, University of Turku, Head of Green Electrification Simo Säynevirta, ABB, Chief Researcher Elias Einiö, VATT, Research Director Heli Koski, ETLA, Vice President Mari Vuolteenaho, Laurea University of Applied Sciences, Professor Tuukka Petäjä, University of Helsinki, Chief Economist Youssef Zad, Finnish Startup Community and RDI Director Johan Sanmark, Western Uusimaa Wellbeing Services County. The panels were facilitated by Risto Alatarvas, Senior Specialist at the Prime Minister's Office. Approximately 160 participants attended the event on-site or remotely.

In addition, an open online consultation (8–22 November 2023) was organised during the initial phase of the preparation in the otakantaa.fi service. At the online consultation, participants were requested to particularly provide their views on the issues that should be taken into account in the plan, key measures to improve competence levels, increasing the level of ambition of RDI activities and strengthening the collaboration between companies and research organisations. Views on the temporal prioritisation of the increases and other necessary policy measures were also requested.

The online consultation resulted in a total of 47 responses. The respondents represented ministries, research institutes, higher education institutions and the scientific community, companies, interest groups, regional stakeholders and private individuals. The responses highlighted the importance of competence and education as well as the strategic and long-term nature of the plan and support for competence clusters. Increasing doctoral education was considered important and an impact-based post-doc programme was proposed. The need to increase cooperation between companies and research organisations was strongly highlighted. Several parties mentioned the development of funding structures and the examination of criteria. The principles of the parliamentary RDI working group were considered a good starting point for drawing up the plan. At the same time, however, a concern was expressed that the decisions on the 2024 Budget proposal did not fully comply with the principles.

Business Finland also organised a roundtable event for companies on 21 November 2023 and the Research Council of Finland organised a hearing for its stakeholders on 23 November to support the preparation of the plan. 30 companies participated in the Business Finland event and about 100 participants took part in the Research Council of Finland event.

The chairpersons and secretary-generals of the working group have also presented the plan and discussed its contents in different working groups and with stakeholders as follows: 30 October 2023 Regional Council of Uusimaa, 6 November 2023 Arene, 28 November VTT, 30 November 2023 Tulanet, 8 December 2023 City of Tampere, 11 December 2023 Finnish Textile & Fashion, 18 December 2023 National evaluation group for health research, 18 December 2023 Akava Innovations and Growth Committee, 19 January 2024 University of Tampere, 31 January 2024 Veturivarikko even with Finnish Flagships, Tampere, 6 February 2024 Chemical Union, 12 February 2024 HealthtechFI regional working group, 16 February 2024 Finnish Education Employers, 7 March 2024 SAK ry, 7 March 2024 Suomen Yrittäjät, 14 March 2024 Finnish Forest Industries, 18 March 2024 Advisory Council on Regional Renewal, 16 April 2024 Meeting of the universities' vice rectors for research, 19 April 2024 Palta, 25 April 2024 Kasvuryhmä – Heli Hytönen. In addition, meetings were held with several foreign parties and delegations, and work was carried out in the EU or international groups to which the topic was presented. The plan was also discussed in the working groups of a study carried out at Sitra's initiative.

The multiannual plan for the use of government research and development funding was circulated for comments from 8 to 24 May 2024. In total, 130 statements were issued. The following organisations issued statements. Aalto University, Ab Yrkeshögskolan vid Åbo Akademi Novia, Akava ry, Rectors' Conference of Finnish Universities of Applied Sciences Arene, Trade Union Pro ry, Finnish Association for the Development of Vocational Education and Training AMKE, Avate Audiovisual Authors and Performers in Finland, Bayer Nordic SE, Biocenter Finland, Finnish Biobanks – FINBB, CSC – Finnish IT Centre for Science Ltd, Demos Helsinki, the Conferation of Finnish Industries EK, City of Espoo, Regional Council of South Karelia, Wellbeing Services County of South Ostrobothnia, Regional Council of South Ostrobothnia, Regional Council of South Savo, Forum Artis, Geological Survey of Finland GTK, Globe Art Point r.y. Hanken Svenska handelshögskolan, City of Helsinki, University of Helsinki, Häme University of Applied Sciences Ltd, Finnish Meteorological Institute, Business Finland, Union of Professional Engineers in Finland, University of Eastern Finland, University of Jyväskylä, Wellbeing Services County of Kainuu, Wellbeing Services County of Central Finland, Central Organization for Finnish Culture and Arts Associations KULTA, Rehabilitation

Foundation, Lapland University of Applied Sciences, Wellbeing Services County of Lapland, Regional Council of Lapland, University of Lapland, Laurea University of Applied Sciences, Ministry of Transport and Communications, Union of Professionals in Natural, Environmental and Forestry Sciences Loimu, Natural Resources Institute Finland, Creative workers and entrepreneurs' association Luovat, Western Uusimaa Wellbeing Services County, Pharma Industry Finland, Ministry of Agriculture and Forestry, Central Union of Agricultural Producers and Forest Owners, Natural Resources Institute Finland, Finnish Forest Industries, Motiva Oy, Neurocenter Finland, University of Eastern Finland, Trade Union of Education OAJ, City of Oulu, University of Oulu, University of Oulu Kerttu Saalasti Institute, Vaasa University of Applied Sciences, Service Sector Employers Palta, Pirkanmaa ELY Centre (joint statement by all ELY Centres), Wellbeing Services County of Pirkanmaa, Wellbeing Services County of North Karelia – Siun sote, Regional Council of North Karelia, Wellbeing Services County of North Savo, Regional Council of North Savo, Finnish Union of University Professors, Finnish Defence and Aerospace Industries – PIA, Wellbeing Services County of Päijät-Häme, Regional Council of Päijät-Häme, the Confederation of Finnish Construction Industries RT, Sailab – MedTech Finland, Wellbeing Services County of Satakunta, Satakuntaliitto, Savonia University of Applied Sciences, Finnish Education Employers, Ministry of Social Affairs and Health, Steel-Invest Oy, STTK ry, Finnish Academy of Science and Letters, The Research Council of Finland, Central Organisation of Finnish Trade Unions SAK, Finnish Nature Panel, Finnish Olympic Committee, National Union of Students in Finnish Universities of Applied Sciences – SAMOK, Bank of Finland, Finnish Startup Community, Finnish Textile & Fashion, the Council of Rectors of Finnish Universities UNIFI, Finnish Environment Institute SYKE, Suomen Yrittäjät, University of the Arts Helsinki, Tampere University of Applied Sciences, Tampere Chamber of Commerce, City of Tampere, Tampere University, Council for Gender Equality, Academic Engineers and Architects in Finland TEK, Technology Academy Finland, VTT Technical Research Center, Technology Industries of Finland, Finnish Institute for Health and Welfare, Federation of Finnish Learned Societies, TopLine Media Oy, Turku University of Applied Sciences Ltd, University of Turku, Finnish Research Institute Partnership Tulanet, Finnish Institute of Occupational Health, UltraLeanBusiness Oy Ltd, Regional Council of Uusimaa, City of Vaasa, University of Vaasa, Finnish Research Impact Foundation, Valmet Oy, VATT Institute for Economic Research, Government, Wellbeing Services County of Vantaa and Kerava, Wellbeing Services County of Southwest Finland, Regional Council of Southwest Finland, Ministry of the Environment, Yrkeshögskolan Arcada, Regional Council of Ostrobothnia. In addition, three private persons issued their statements: Matias Mäkynen, Otto Toivanen and Jukka Westermarck.

Based on the feedback received, the plan is considered to be in the right direction. The plan identifies the right main policy outlines and issues. The parties issuing statements considered the plan to be significant and stated that would direct the activities of the organisations. They considered that the plan had recognised the right objectives (economic growth, productivity growth, wellbeing, competence growth). The statements highlighted that the plan was technology-oriented and that not enough attention was paid to R&D activities aimed at developing basic research or society and increasing wellbeing. The main policy outlines of the plan were considered entirely worth supporting. All the main policy outlines of the plan are considered worthwhile. The measures to strengthen cooperation between R&D actors were considered essential.

The commentators made critical observations related to the core funding of higher education institutions and other public research organisations. No additions to the core funding has been included to the decisions made so far according to the Act on Research and Development Funding. Many of the statements paid attention to the need to balance the entries concerning wellbeing services counties. In connection to the strategic choices, the statements included conflicting remarks. While there was extensive support for making choices, some had critical views regarding making of the choices in a central-government-led manner. It was widely considered that the plan should pay more attention to the objectives of raising the level of competence and education as well as innovation activities (including commercial application), even though these are (mainly) not included within the scope of government R&D funding. Several statements commented on a need for regulation that is supportive of R&D activities. The statements identified perspectives and priorities that the plan should take better into account, including the role of regional and local stakeholders.

As a result of the consultation round, the plan was revised to include basic research and the core funding of higher education institutions and the sections concerning the wellbeing services counties were harmonised and extended to apply to all wellbeing services counties. The text of the plan was specified in several parts, including in the context of companies in the creative industry, regional and local stakeholders, indirect government R&D subsidies, societal goals and challenges, and Nordic R&D cooperation.

A more extensive summary (in Finnish) of the statements will be published on the working group's page in the Hankeikkuna service.

Appendices

Appendix 1.

Research and development activities cover

Basic research, characterised by the pursuit of new knowledge without immediate practical application. Examples of basic research include the analysis of properties, structures and cause-and-effect relationships with the aim of generating, proving and explaining new hypotheses, theories and regularities.

Applied research, where the aim is to make a practical application realised with the aid of new knowledge. The goal may be, for example, to find applications for the results of basic research or to create new methods and tools to solve a particular problem.

Development work, which is the use of knowledge gained through research and/or practical experience to create new products, processes or methods or to substantially improve existing ones.

All research and development activities share the following characteristics: R&D activities are new-knowledge-seeking, creative, uncertain of success, systematic and transferable and/or replicable in terms of results. Official Statistics of Finland (OSF) 2024.

References

Ahtonen, Hanna, Jokimäki, Hanna ja Nurmi, Satu 2019. Osaavatko Suomen huippuviejät hyödyntää korkeimmin koulutettua työvoimaa? Tieto & trendit. 18 December 2019. Statistics Finland. Available at: https://www2.tilastokeskus.fi/tietotrendit/artikkelit/2019/osaavatko-suomen-huippuviejat-hyodyntaa-korkeimmin-koulutettua-tyovoimaa/. Referenced: 09 May 2024

Criscuolo, Chiara, Gal, Peter, Leidecker, Timo ja Nicoletti, Giuseppe 2021. The human side of productivity: uncovering the role of skills and diversity for firm productivity. OECD Productivity working papers, December 2021, No. 29. Available at: https://doi.org/10.1787/5f391ba9-en. Referenced: 15 April 2024

European Commission 2024. State-aid Scoreboard 2023. Available at: https://competition-policy.ec.europa.eu/document/download/0b2037c5-c43f-4917-b654-f48f74444015_en?filename=state_aid_scoreboard_note_2023.pdf Viitattu: 09 May 2024

European Commission 2023. European Innovation Scoreboard 2023. Publications Office of the European Union. Available at: https://data.europa.eu/doi/10.2777/309907. Referenced: 29 February 2024

Kotiranta, Annu 2023. Start up-yritystuen määrä laskussa – pitääkö olla huolissaan? Business Finland blog text 31 March 2023. Available at: https://www.businessfinland.fi/ajankohtaista/blogit/2023/startup-yritysten-maara-laskussa--pitaako-olla-huolissaan. Referenced on 11 April 2024.

OECD 2023 a. Science, Technology and Innovation Outlook 2023: Enabling Transitions in Times of Disruption. Available at: https://doi.org/10.1787/0b55736e-en. Referenced: 29 February 2024

OECD 2023 b. What is the best country for global talents in the OECD? Migration Policy Debates no 29. OECD Available at https://web-archive.oecd.org/2023-03-09/652850-What-is-the-best-country-for-global-talents-in-the-OECD-Migration-Policy-Debates-March-2023.pdf. Referenced: 30 April 2024

Opetushallinnon tilastopalvelu Vipunen 2024 a. Korkeakoulujen ulkopuolinen tutkimusrahoitus-Yliopisto-Tilastovuosi. Available at: https://vipunen.fi/fi-fi/_layouts/15/xlviewer.aspx?id=/fi-fi/Raportit/Korkeakoulujen%20ulkopuolinen%20tutkimusrahoitus%20-%20Yliopisto%20-%20Tilastovuosi.xlsb. Referenced: 15 April 2024

Opetushallinnon tilastopalvelu Vipunen 2024 b. Korkeakoulujen ulkopuolinen tutkimusrahoitus-Ammattikorkeakoulu-Tilastovuosi. Available at: https://vipunen.fi/fi-fi/_layouts/15/xlviewer.aspx?id=/fi-fi/Raportit/Korkeakoulujen%20ulkopuolinen%20tutkimusrahoitus%20-%20Ammattikorkeakoulu%20-%20Tilastovuosi.xlsb. Referenced: 15 April 2024

Parlamentaarinen TKI työryhmä 2023. Tutkimus- ja kehittämistoiminnan rahoituksen käyttöä koskeva monivuotinen suunnitelma. Parlamentaarisen TKI-työryhmän 2022 loppuraportti. Publications of the Finnish Government 2023: 13. Prime Minister's Office, Helsinki 2023 Available at: http://urn.fi/URN:ISBN:978-952-383-978-6. Referenced: 15 April 2024

The Research Council of Finland 2023. Tieteen tila tilastot: Tieteellinen julkaisutoiminta. Available at: https://www.aka.fi/globalassets/2-suomen-akatemian-toiminta/2-tietoaineistot/tieteellinen-julkaisutoiminta-2023.pdf. Referenced: 29 February 2024

Tilastokeskus 2023 a. Tutkimus- ja kehittämistoiminta / 139c – Yrityksen tai organisaation ulkopuolelta tilattu tutkimus- ja kehittämistoiminta, 2017-2022. Available at: https://stat.fi/tilasto/tkke. Referenced: 15 April 2024

Tilastokeskus 2023 b. Tutkimus- ja kehittämistoiminta / 11sn – Yritysten T&K-henkilöstö ja T&K-työvuodet tehtävän mukaan henkilöstön suuruusluokittain, 2004-2022. Available at: https://stat.fi/tilasto/tkke. Referenced: 15 April 2024

Valtioneuvosto 2022. Valtioneuvoston periaatepäätös IPR-Strategiasta 24.3.2022 Available at: https://julkaisut.valtioneuvosto.fi/handle/10024/164519 Referenced: 29 February 2024

World Economic Forum 2024. The Future of Growth Report. Insight report. Available at: https://www3.weforum.org/docs/WEF_Future_of_Growth_Report_2024.pdf. Referenced: 29 February 2024

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