



KNOWLEDGE TRANSFER AND COLLABORATION PLAN

Science and Innovation at the Service of Society



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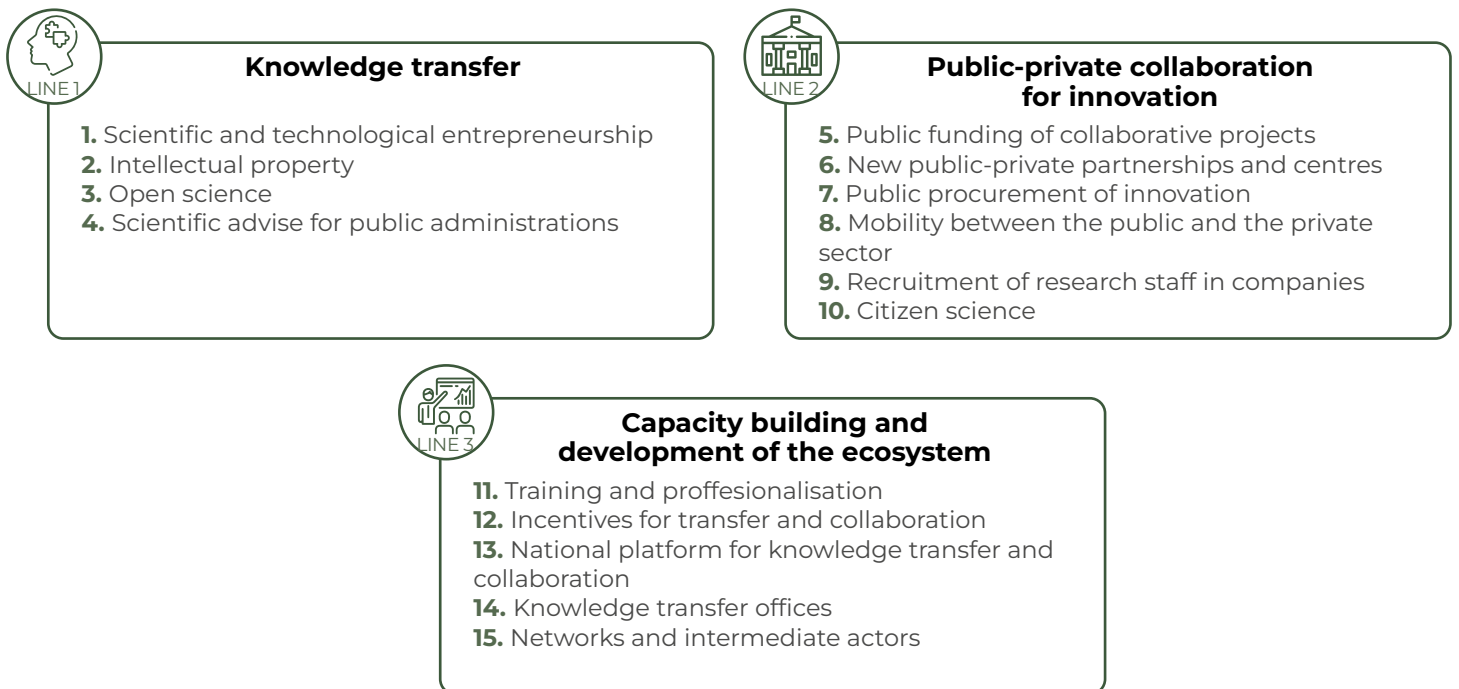


Executive Summary

This document presents the *Knowledge Transfer and Collaboration Plan: Science and Innovation at the Service of Society* (hereinafter referred to as the Plan) with the aim of strengthening the links between the public and private sectors in research, development and innovation (R&D+I) in order to increase the socioeconomic impact of public investment in research and boost the innovative capacity of Spanish companies.

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The Plan is structured around three lines of action and includes 15 measures. The first line of action focuses on the transfer of knowledge generated in the public research system to companies, the public sector and society through various channels such as the creation of new companies, patent licensing, publication dissemination, or scientific advice. The second line of action includes measures to promote collaboration between companies and universities and public research centres during the knowledge generation phase. These measures will be executed through specific R&D+I collaboration projects, new, more ambitious models of public-private partnerships, researcher mobility and citizen science. The third line of action aims to improve the training of researchers, technicians and management personnel regarding knowledge valorisation and to enhance ecosystem connections, with special attention on the role of technology centres, knowledge transfer offices and other intermediate agents and platforms that facilitate the interaction of innovation system actors. This third line of action is cross-cutting as it affects both knowledge transfer (line 1) and public-private collaboration for innovation (line 2).

The Plan proposes new initiatives and reinforces actions initiated in the last two years, many of which are part of the Recovery, Transformation and Resilience Plan (PRTR), and serves as support for regulatory reforms such as the recently approved Law on Science, Technology and Innovation (LCTI), the draft Organic Law of the University System (LOSU) and the Law to Foster the Startup Ecosystem (LFSE).

The implementation will initially be carried out in two phases. In the first phase, until the end of 2023, the essential measures of the plan will be launched, and monitoring criteria will be established. During the second phase, until 2025, all planned initiatives will be executed, additional measures will be initiated if necessary, and the results will be evaluated with the aim of introducing the necessary reforms and consolidating the most effective measures that go beyond 2025. The objective is for the spirit of this Plan to endure over time, incorporating new medium to long-term measures that contribute to achieving the established objectives. It is important to promote continuity and stability for the innovations introduced in recent years and, through this Plan, to allow for long-term planning by the different actors involved.

The measures included in this Plan mobilise a public budget of approximately 1.2 billion euros in 2023, already included in the year's general state budget. In addition, Measure 1 of the plan includes public investment in science and technology-based ventures through public venture capital funds that amount to more than 4 billion euros over the next few years. Finally, although their objectives are broader, the Strategic Projects for Economic Recovery and Transformation (PERTE), with a public budget of around 30 billion euros between 2022 and 2025, will play a fundamental role in leveraging private investment in R&D+I and intensifying public-private collaboration.



Introduction

Although Spain contributes significantly to global scientific production, its performance in innovation is modest, resulting in one of the main imbalances in the Spanish science, technology and innovation system.¹ Indeed, Spain lags behind other European countries in terms of transferring scientific knowledge to society and fostering collaboration between companies, universities and public research centres. This difficulty hampers the translation of public research outcomes into economically and socially impactful innovations.

In the first place, Spanish companies have limited capacity to absorb and apply a significant portion of the knowledge generated by scientific institutions. This can be attributed largely to the particular characteristics of the Spanish productive sector, such as the predominance of small and medium-sized enterprises (SMEs) in less knowledge-intensive sectors and the low investment of Spanish companies in R&D.² Furthermore, neither academic and scientific institutions nor intermediate agents in the science and innovation ecosystem can independently transfer the generated knowledge to the market and society or foster greater collaboration if they do not receive sufficient response from the business sector. Additionally, the incentive system that has been in place for decades in the public research sector has led researchers to focus excessively on meeting formal criteria for knowledge generation, mainly through quantifiable objectives such as the number and impact of indexed scientific publications. This has led to an increase in the number of publications but has often resulted in contributions that are disconnected from the needs of the Spanish market and society.

The objective of the *Knowledge Transfer and Collaboration Plan: Science and Innovation at the Service of Society* is to strengthen interactions and knowledge flows to achieve greater cohesion within the science and innovation ecosystem in Spain and to align objectives between the public and private sectors to achieve more ambitious goals. The Plan includes 15 measures structured around three lines of action, reinforcing existing initiatives and introducing new actions, as summarised in Annex 1. The initiatives outlined in the Plan address the priorities of public policies to eliminate barriers and create incentives to boost innovation in Spanish companies and the valorisation of scientific

1. Spain ranks 11th in the world in scientific production (absolute number of publications with authors affiliated with Spanish institutions) but 29th in the global innovation ranking. Sources: For innovation, Global Innovation Index 2022. For publications, Scopus (Scimago Country Rank). The European Innovation Scoreboard 2022 classifies Spain as a modest innovator with a score of 97.54, far from France (classified as a strong innovator) with 115.85 or Sweden (classified as a leading innovator), which heads the ranking of European countries with a score equal to 149.10.

2. Business R&D expenditure represents 55.6% of total R&D expenditure. The EU-27 average stands at 65.5% and is higher in more advanced countries such as Germany (67%), France (66%) and Ireland (73%). In Israel, it is as high as 90%, and in Japan and Korea, it is around 80%. OECD Main Science and Technology Indicators. Latest available data for 2020. Business R&D expenditure was equal to 0.79% of GDP in Spain. INE. Internal R&D expenditure in relation to GDP by year and sector of execution. Latest available data 2020.

knowledge, in line with recent European debates on science, technology and innovation policies.³

3. European Commission (2022). "Proposal for a Council Recommendation on the guiding principles for knowledge valorization".



OECD recommendations

The development of the Plan aligns with the recommendations of the project carried out by the Organisation for Economic Cooperation and Development (OECD) in 2020-2021, titled Proposals for a Roadmap for Knowledge Transfer and Collaboration between Science and Business in Spain⁴ (hereinafter referred to as the Roadmap), funded by the European Union through its Programme for Support to Structural Reforms. The OECD team collected material from multiple sources and conducted interviews and meetings with over 90 professionals and experts, taking into account the insights of a large number of stakeholders in the Spanish science and innovation ecosystem regarding the state of knowledge transfer and collaboration in R&D in Spain, its challenges, possible solutions and recommendations based on comparative analysis and international best practices.

According to the OECD's diagnostic report, these are some of the characteristics that hinder knowledge transfer and public-private collaboration in R&D in Spain:

- Innovation culture poorly integrated into business strategies.
- Low absorptive capacity of the productive system.
- Low level of trust between companies and research institutions.
- Limited knowledge of research conducted in the public research sector.
- Regulatory and bureaucratic barriers to R&D collaboration.
- Complexity of support measures for collaborative R&D activities.
- Heterogeneity of practices and regulations among system agents, leading to confusion and potential deterrents to knowledge transfer and collaboration.

Based on this diagnosis, the OECD recommends a series of measures in the Roadmap, focusing on five priority areas:

- Establishing a solid foundation in science, technology and innovation (STI) to enable effective knowledge transfer and collaboration.
- Redesigning the governance systems of universities and public research centres to increase their engagement with society.
- Rebalancing and aligning individual and institutional incentives to encourage researchers to engage in knowledge transfer and science-business collaboration.

4. 'Roadmap to foster public research - business collaboration in Spain: An OECD proposal' (OECD, July 2022), based on the diagnostic report 'Improving knowledge transfer and collaboration between science and business in Spain' (OECD, December 2021); also available in Spanish in 'Mejorar la transferencia de conocimiento y la colaboración entre ciencia y empresa en España' (OECD, July 2022).

- Facilitating and activating the roles of various intermediaries.
- Promoting and maintaining the capacity of companies to innovate and exchange knowledge.

For each of these five areas, the OECD Roadmap proposes a set of more specific recommendations. In the present Plan, the recommendations directly related to knowledge transfer and public-private collaboration and whose implementation is feasible within the time frame considered have been incorporated, with due regard to the other recommendations in the medium and long term. Annex 2 presents the correspondence between the measures of the Plan and the OECD's recommendations.



Governance, monitoring and time frame

The Ministry of Science and Innovation has coordinated the development of the Plan with contributions from the State Research Agency (AEI), the Centre for Technological and Industrial Development (CDTI), the Spanish Foundation for Science and Technology (FECYT), the Spanish National Research Council (CSIC), the Centre for Energy, Environmental and Technological Research (CIEMAT), the Carlos III Health Institute (ISCIII), the Spanish Metrology Centre (CEM), the Ministry of Universities, the State Secretariat for Digitisation and Artificial Intelligence of the Ministry of Economic Affairs and Digital Transformation (SEDIA), the Ministry of Labour and Social Economy, the Ministry of Industry, Trade and Tourism (SGIPYME), the General Secretariat for Economic Affairs of the Government Presidency (SGAAEE), and independent experts.

This Plan is part of the [State Plan for Scientific, Technological and Innovation Research 2021-2023](#) (PEICTI 21-23) and the [Spanish Strategy for Science, Technology and Innovation 2021-2027](#) (EECTI 21-27).⁵ It also serves as a development of some components of the [Law on Science, Technology and Innovation](#) (LCTI), which came into effect in September 2022. Additionally, the Plan incorporates some of the new legislative developments contemplated in the draft Organic Law on the University System (LOSU) and the Law on the Promotion of the Emerging Business Ecosystem (startups). The development of the Plan also takes into account and aims to complement, at the national level, the diversity of initiatives at the regional and local levels to promote knowledge transfer and public-private collaboration, which are central elements of regional smart specialisation strategies. At the European level, the Plan is consistent with the [New European Innovation Agenda](#), particularly regarding deep tech venture capital and public procurement of innovation⁶, which has recently been reflected in a recommendation on knowledge valorisation from the Council of Europe.

The implementation of the Plan will be carried out in two phases. During the first phase, until the end of 2023, the essential measures of the Plan will be implemented, and monitoring criteria will be established. In the second phase, until the end of 2025, additional measures will be initiated, planned initiatives will be executed, and the actions carried

5. The Plan especially reinforces objectives 6 and 7 of the EECTI21-27: Objective 6, 'To favour knowledge transfer and develop two-way links between science and business, through mutual understanding of needs and objectives, especially in the case of SMEs', and Objective 7, 'To promote research and innovation in the Spanish business sector, increasing its commitment to R&D+I and broadening the perimeter of innovative companies to make the business sector more competitive.'

6. According to a [policy paper by the Elcano Institute](#) (July 2022), 'Deep tech corresponds to breakthrough innovations, which are those that most "alter" the state of knowledge and generate the most significant scientific advances. These innovations are difficult for a private actor to deploy and require high costs for very uncertain chances of success. These difficulties therefore legitimise state intervention.'

out will be evaluated. The objective of the Plan is to achieve a lasting transformation of the science and innovation ecosystem in Spain, and as such, it should have a sufficiently long-term horizon. The first three years of the Plan, divided into these two phases, will serve to identify areas for improvement and design a strategy which looks beyond 2025 for monitoring, evaluating and consolidating the most effective measures.

The measures included in this Plan mobilise a public budget of approximately 1.2 billion euros in 2023 already included in the year's general state budget. In addition, Measure 1 of the Plan includes public investment in science and technology-based ventures through public venture capital funds amounting to more than 4 billion euros over the next several years. The European funds from the PRTR will contribute to the implementation of the Plan's objectives. Component 17 of the PRTR dedicates 1.5 billion euros of a total budget close to 3.4 billion euros largely to reinforcing public-private collaboration (Investment 3) and knowledge transfer (Investment 5). Furthermore, a central element of the PRTR are the *Strategic Projects for Economic Recovery and Transformation* (PERTE), a new model to promote public-private collaboration on strategic projects. To date, 11 new PERTE have been approved, with direct public funding of over 30 billion euros during the period 2021-2026. The PERTEs are included in Measure 6 of the Plan, although they represent a broader programme that is not exclusively attributable to science and innovation policies.

All measures included in the Recovery, Transformation, and Resilience Plan and referred to in this report must comply with the set of obligations and requirements imposed by national and community regulations in their implementation. They must explicitly respect the mention of identifiers and the applicable legal framework for each of their instruments, cross-cutting principles, fraud and corruption prevention, measures to avoid double financing and ensure compatibility with other EU funds when provided for in the Plan's design, or compliance with the DNSH principle. Likewise, as a general rule, actions aimed at reinforcing the actions taken within the framework of the Recovery, Transformation and Resilience Plan, as provided for in Article 24.3 of Regulation 2021/241, must not involve the revocation or reversal of measures already adopted.

In any case, it should be noted that this Plan does not contribute *per se* to the achievement of any specific milestone or objective of the Recovery, Transformation and Resilience Plan.

The execution of measures C17.I3 and C17.I5 of the Recovery, Transformation and Resilience Plan (PRTR) will take into account and explicitly state the applicable DNSH constraints for each measure, the specific content of the Council Implementing Decision (particularly in relation to R&D+I actions covered by the Plan) and the climate labels assigned to the measures, if any.

The General Secretariat for Innovation of the Ministry of Science and Innovation will be responsible for coordinating the Plan. A 'Group of Experts' will be created, with participation of representatives from the public and private sectors, and chaired by the head of

the General Secretariat for Innovation. This group will contribute to the evaluation of the different measures contained in the Plan, in close collaboration with the unit in charge from the Information System on Science, Technology and Innovation (SICTI) in the ministry. The Group of Experts will be formed under the auspices of the existing committees of the Spanish Strategy for Science, Technology and Innovation (EECTI) and the State Plan for Scientific, Technological and Innovation Research (PEICTI) and will be supported by independent evaluators to carry out the necessary external analysis and evaluation studies. In this way, the Plan integrates mechanisms for evaluating existing instruments to correct or strengthen them and provides for the evaluation of newly created instruments in line with the spirit of the [Law on institutionalising the evaluation of public policies in the General State Administration](#) approved in December 2022 and the recommendations of the OECD Roadmap, which clearly differentiate between monitoring and impact evaluation.

As for the monitoring of the Plan, Annex 3 presents a preliminary proposal of indicators that are related to the overall evolution of knowledge transfer and collaboration in Spain and are quantitative and aggregated at the national level. These indicators are part of the set of monitoring indicators of the State Plan for Scientific, Technological and Innovation Research (PEICTI) available at the SICTI. These general indicators will be complemented with qualitative information, such as interviews with stakeholders or case studies, for the preparation of more detailed annual monitoring reports that will be validated by the Group of Experts. Additionally, as mentioned earlier, impact evaluations of specific measures included in the Plan will be carried out.

In compliance with the provisions of the Recovery, Transformation and Resilience Plan, Regulation (EU) 2021/241 of the European Parliament and the Council of February 12, 2021, establishing the Recovery and Resilience Facility and its implementing regulations, particularly the Commission Communication Technical Guidance (2021/C 58/01) on the application of the principle of 'do no significant harm' as required in the Council Implementing Decision (CID) approving the evaluation of Spain's Recovery, Transformation and Resilience Plan and its annex document, and also in the Decision on Operational Agreements (OA), all actions carried out within the framework of the Recovery, Transformation and Resilience Plan (PRTR) must respect the principle of 'do no significant harm' to the environment (DNSH) and the associated climate/environmental labeling, if applicable. This includes compliance with the specific conditions assigned to Measures I3 and I5 of Component 17 related to this Plan, in terms of both the DNSH principle and climate and digital labeling, especially those which are outlined in the CID and the OA.

Furthermore, a gender perspective is common to all measures of the Plan, with the aim of contributing to achieving effective and real equality between women and men in the field of scientific research and innovation. To this end, the LCTI (Law of Science, Technology and Innovation) includes, for example, the existence and annual evaluation of equality plans and protocols against harassment (Article 4 bis 6), a balanced composition of bodies, councils and committees (Article 4 bis 2), non-discrimination in the evaluation of merits, and the expansion of rights in temporary contracts through reconciliation (Article

4 bis 5). Additionally, in the development of the measures, compliance with the regulatory framework on gender equality for entities in the private sector will be ensured. Gender impact will be included in the evaluation of the Plan for monitoring purposes.



Line 1

Knowledge transfer

The first line of action of the Plan focuses on the transfer of knowledge generated in the public research system to businesses, the public sector and society. The goal is to promote the valorisation of scientific knowledge by: first, facilitating the creation of new knowledge-based companies through public investment in research; second, promoting the transfer of knowledge generated in the public sector through intellectual property licences; third, bringing research results closer to businesses and society through increased open dissemination of scientific publications, results, data and research capabilities; and finally, enabling effective transfer of scientific knowledge to the public sector to improve the alignment of public policies.

1. SCIENTIFIC AND TECHNOLOGICAL ENTREPRENEURSHIP

Startup companies often lead the riskiest innovative activities and have driven the growth of many sectors that currently promote economic development, such as biotechnology, software and artificial intelligence. In Spain, public policies have long supported technological entrepreneurship, resulting in successful startups. However, these startups have frequently been based on incremental innovations rather than disruptive scientific and technological knowledge (deep tech). Spain has a thriving ecosystem of science, technology and innovation that needs to be further fueled with venture capital funding to achieve more ambitious goals.

The Plan includes actions to foster the creation of emerging science and technology-based companies, such as revising regulations and strengthening public venture capital funds, acceleration programmes, science and technology parks, incubators and measures to attract entrepreneurial talent, including women who are still underrepresented in the entrepreneurial ecosystem, especially in the technology field, as highlighted in the [Women and Innovation Report 2022](#). These actions demonstrate the government's support for entrepreneurship and the key role of knowledge transfer in it, including the creation of spinoffs from universities and public research centres, as reflected in the [Spain Entrepreneurial Nation Strategy](#), presented in February 2021.

The first notable legal reform is the [Law for the Promotion of the Startup Ecosystem](#) (startups), approved in December 2022. This law simplifies procedures and introduces favourable conditions for the creation of these new companies (reduced corporate tax rate of 15%, streamlined processes, improved tax treatment of stock options, more agile visa procedures for talent and digital nomads, etc.). It also envisages the creation of a Network of Entrepreneurship Support Points managed by the Ministry of Industry, Trade and Tourism and the National Entrepreneurship Office as a one-stop shop for online company registration, information and access to public support for SMEs and startups.

Secondly, the LCTI facilitates the participation of research staff in spinoffs (Article 17). It also allows public administrations to promote dependent or affiliated companies to promote transfer activities (Article 35 bis 3) and investment and co-investment actions in seed and venture capital for investment in Spanish technological and innovative companies, enabling their growth and transformation into relevant players in global markets (Article 35 bis 5).

Regarding funding mechanisms, emerging science and technology-based companies can benefit from both grants and funding through public venture capital funds. As for grants, the CDTI's [Neotec programme](#) has been offering funding since 2002 to launch new business projects by small companies that require the use of technologies or knowledge developed through research activities and whose business strategy is based on technology development. The programme includes grants of up to 70% of the project budget, with a maximum grant amount of 325 thousand euros per beneficiary, along with specialised training, which in the 2022 call will be conducted through an agreement with the Enterprise Innovation Institute of the University of Georgia (Atlanta, USA). In the 2021 and 2022 calls, Neotec had an annual budget of around 35 million euros, a 40% increase from the 25 million in the 2019 and 2020 calls. Additionally, in line with the LCTI's promotion of programmes to foster innovative entrepreneurship among women (Article 4 ter 2c), the [Neotec Women](#) programme was launched in 2022 to contribute to bridging the gender gap in technology-based entrepreneurship initiatives. It had a budget of 5 million euros in its first call, with the final resolution taking place in November 2022.

A more recent trend is the direct investment by the government in science and technology-based entities through co-investment with previously approved private investors. This investment aims to support the scaling of these companies, which often face significant financing difficulties in the early stages. Although venture capital investment in Spain has increased significantly in recent years, it still lags behind the European Union average. The direct intervention of the government seeks to leverage private venture capital funds, enabling more ambitious investments and even obtaining returns that allow for increased investment volume over the years.

In this context, it is worth noting the creation of the INNVIERTE society by the CDTI (Centre for Industrial Technological Development) in 2012 to invest in knowledge-based companies. From October 2019 to May 2022, operations were approved in 97 companies for a total value of 168 million euros, with 83 certified private co-investors. The PRTR's European funds have allowed the CDTI to strengthen this programme and launch the new [INNVIERTE-Transfer Funds](#) modality in 2021. The objective of this initiative is to promote the capitalisation of technology-based and innovative companies located in Spain through specialised investment vehicles in technology transfer. INNVIERTE participates as an investor alongside other private investors, mobilising each selected vehicle with 40 to 80 million euros. With a leverage on public commitment of up to 120 million euros, a similar volume of private capital is expected to be mobilised, with the vehicles channeling around 240 million euros to business projects based on technologies developed from knowledge originated in Spanish research and technology centres.

In 2022, the [NEXT TECH Fund](#) of the Official Credit Institute (ICO) and the State Secretariat for Digitisation and Artificial Intelligence (SEDIA), also included in the PRTR, was established to promote the development of high-impact, innovative digital projects and investment in growing companies (scaleups) by reinforcing public financing instruments, attracting international funds and boosting the venture capital sector. NEXT TECH aims to mobilise up to 4 billion euros through public-private collaboration with the Spanish venture capital sector, taking stakes and commitments in companies or specialised funds primarily in digital and artificial intelligence sectors. Within the framework of the Plan, new coordination mechanisms will be established between INNVIERTE and NEXT TECH funds to avoid duplication and optimise the flow of financing throughout the development cycle of companies based on scientific-knowledge.

Some autonomous communities have also recently adopted this type of public venture capital financing mechanism, contributing to the objectives of the Plan. A notable example is the [Fons d'Inversió en Tecnologia Avançada](#) (FITA), a new venture capital fund created by the Government of Catalonia in late 2021 to promote scientific entrepreneurship. With an endowment of 60 million euros for the period 2022-2026, the fund will be invested in research projects of early-stage startups. This fund also aims to mobilise private capital for investment in technological development and innovation. Other examples include [Tecnalia Ventures](#) in the Basque Country and the [Tech Transfer UPV Fund](#) in Valencia.

The Plan will also support and promote international initiatives in which Spain participates, including two at the European level. The first one is led by the European Innovation Council (EIC) and includes three financing instruments: i) *EIC pathfinder*, endowed with 350 million euros, for multidisciplinary research teams with disruptive projects; ii) *EIC transition*, with 131 million euros, to convert research results into innovation opportunities (focused on EIC pathfinder and ERC proof of concept projects); iii) *EIC accelerator*, with 1.16 billion euros for startups and SMEs with high-potential market innovations. The second initiative is the InvestEU Guarantee Agreement, signed by the European Commission and the EIB Group in March 2022 to use InvestEU financial products in research, innovation and digitalisation, through which the EIB Group will allocate 5.5 billion euros until 2027. Based on a pilot project, the European Scaleup Action in Risk Capital (ESCALAR) mechanism will be expanded under InvestEU. Other international initiatives beyond Europe include the NATO Innovation Fund and the UN Sustainable Innovation Fund. To facilitate access to the *EIC Accelerator* for innovative startups in Spain, in 2022, the CDTI launched grants for companies with the EIC Seal of Excellence. In this way, Spanish SMEs that have obtained the European Seal of Excellence and do not have access to EU funding can access national financing to develop their project presented within the European framework. In 2022, the CDTI committed 20 million euros to this initiative.

2. INTELLECTUAL PROPERTY

Intellectual property rights provide exclusive rights to their owners, who can, through licencing or assignment agreements, allow their exploitation by third parties or transfer

ownership. Universities and public research centres often face difficulties in transferring research results to the market and other sectors and social agents. They need the interest and collaboration of the private sector to turn prototypes into products, subject to regulatory frameworks and the need to obtain permits and certifications, in order to scale production and achieve commercialisation and distribution.

According to the Survey on Knowledge Transfer and Innovation (ETCI) by the Ministry of Science and Innovation, in 2020, 243 exploitation agreements were signed in Spain for inventions protected by patents, utility models and plant varieties in universities and public research centres. Additionally, 484 exploitation agreements were made for industrial designs, trademarks, software and others. These 727 agreements generated revenues of 30.3 million euros. These figures are relatively low considering the magnitude of scientific and technological knowledge generated in the country compared with other countries. However, they do not reflect the entirety of knowledge exchanges because Spanish researchers often opt for research contracts and technology support agreements; that is, they choose collaboration during the knowledge generation process more frequently than intellectual property licencing of the results.⁷

The call for grants for ‘Proof of Concept’ projects by the AEI (State Research Agency), initiated in 2021, aims to finance projects that accelerate the transfer of knowledge and results generated in ongoing or recently completed research projects under the state Plan. It encompasses projects in the categories of Knowledge Generation and Research Challenges. With a budget of 40 million euros for both 2021 and 2022, the funded projects aim to enhance the value of knowledge and research results through additional activities that confirm their innovative potential and facilitate their transfer. Eligible activities include costs related to the application of intellectual property rights and other costs derived from their maintenance, and also costs related to dissemination and commercialisation.

The Law on Science, Technology and Innovation (LCTI) includes several articles to promote the transfer of results of research, development and innovation activities protected by intellectual property rights in public research entities:

- Article 35 establishes that at least one third of the minimum benefits from the exploitation of research results must be allocated to the researchers and technicians who participated in their development.
- Article 36 applies private law to the transfer of rights over research results to third parties by Public Research Organisations, public universities and entities dependent on the General State Administration. Article 36 bis also applies private law to transfers of rights over such results.
- Article 36 bis includes clauses to ensure the protection of the public interest (right of better fortune, right of reversion for cases of general interest) when transferring

7. OECD (2022), [‘Improving knowledge transfer collaboration between science and business in Spain’](#) (page 120).

rights over research results to a private entity.

- Articles 25 and 26 recognise that knowledge transfer activities should be considered an evaluative concept for remuneration and access to public employment and promotion (see also Measure 12).

Additionally, Article 36 quinquies of the LCTI refers to knowledge transfer through participation in the development of technical standards. The use of intellectual property and technical standardisation are not mutually exclusive but can often be complementary; as technical standards support the market entry of new technologies.

In its application, actions will also be encouraged to promote a greater number of women in leadership roles in intellectual property, in line with the provisions of the LCTI (Article 4b).

The implementation of these provisions will be accompanied by actions within this Plan to support the valorisation of knowledge and the dissemination of institutional technology portfolios, integrating them into the national platform (Measure 13) in accordance with the [European Commission's Guiding Principles on Knowledge Valorisation](#). These principles, to be published in the coming months, will include a Code of Practice for the Intelligent Use of Intellectual Property and a Code of Good Practices on Standardisation for research personnel.

Finally, it is worth noting that the Spanish Patent and Trademark Office (OEPM) has prioritised 'promoting research, development and technology transfer' in its [Strategic Plan 2021-2024](#). This includes increasing the use of intellectual property services and providing specialised theoretical and practical knowledge about intellectual property rights and OEPM services to researchers, entrepreneurs and intellectual property professionals.

3. OPEN SCIENCE

Publishing research results openly amplifies their dissemination and impact. Support for open science is a priority for the government, reflected in new regulatory developments and a specific strategy, confirming a trend that began years ago with the Law on Science, Technology and Innovation of 2011. This includes institutional mandates and requirements for publishing research funded with public resources. In terms of knowledge transfer and collaboration for innovation, open science is a first step in facilitating businesses' search for scientific and technological capabilities in research groups from Spanish universities, other higher education institutions and public research centres.

Both the 2022 reform of the Law on Science, Technology and Innovation (Articles 2, 37 and 38) and the draft of the Higher Education and Science Law propose promoting open science for the benefit of society. This includes initiatives aimed at facilitating free access to publications, data, codes, methodologies and research results. It also involves develop-

ing open infrastructures and platforms and encouraging the open participation of civil society in scientific processes.

In line with these objectives, the government is currently developing the National Open Science Strategy (ENCA) to guide and facilitate the implementation of open science principles in the Spanish system of science, technology and innovation during the period 2023-2027, with an expected publication date in early 2023.⁸ The ENCA will have six general objectives, which will be supported by lines of action in the areas of regulations, infrastructure, human resources, awareness, training and incentive policies:

- Ensure the existence of sufficiently robust and well-articulated interoperable digital infrastructures to absorb the impact of implementing a national open science policy. This includes facilitating integration into the international ecosystem and the European Open Science Cloud (EOSC).
- Promote proper management of research data generated by the national R&D+I system in accordance with the FAIRER principles (Findable, Accessible, Interoperable, Reusable, Ethical and Reliable). This aims to facilitate their discoverability, accessibility, interoperability and reusability.
- Achieve open access by default to scientific publications for all citizens.
- Establish new mechanisms for research evaluation and an incentive and recognition system aimed at promoting open science practices.
- Enhance the participation of our institutions and teaching and research staff in the bodies or forms established to evaluate published research.
- Provide training to researchers, managers and stakeholders responsible for funding and evaluating research activities to align their professional performance with the principles of open science.

This Plan aims to promote compliance with institutional open science mandates⁹ and support the creation and maintenance of institutional infrastructures and non-commercial academic publications. The national transfer and collaboration platform (Measure 13) will integrate this knowledge to facilitate searches and visibility of research results for all stakeholders in the Spanish system of science, technology and innovation.

4. SCIENTIFIC ADVICE TO PUBLIC ADMINISTRATIONS

In addition to promoting collaboration and knowledge transfer between the public research sector and the private sector, it is important for scientific knowledge to be dis-

8. The ENCA is currently being developed with the contributions and consensus of representatives from the Ministry of Science and Innovation, the Ministry of Universities, the AEI, the ISCIII, the CSIC, the ANECA, CRUE, SOMMa and the FECYT.

9. For example, the [CSIC institutional mandate for open science](#) came into force on 1 April 2019.

seminated within public institutions so that policy decisions, public policy articulation and legislative and regulatory production take into consideration the elements provided by such knowledge. This is particularly relevant in the face of the need to react more quickly and effectively to major social challenges such as health crises, climate change and demographic challenges. The accelerated pace of technological progress, growing political polarization and the risk of misinformation that characterise contemporary society make it more necessary than ever to have socially impactful initiatives based on robust institutions that ensure scientific knowledge is properly synthesised, transferred and integrated into the policymaking process.

Spain has taken important steps in this regard with the creation of the [Office of Science and Technology of the Congress](#) (Office C) in March 2022 through an agreement between the Congress and the FECYT. Office C has an annual budget of around 325 thousand euros, and its objective is to incorporate the practice of scientific advice into the Spanish parliamentary culture and contribute to informed decision-making and the development of public policies based on scientific knowledge. This is achieved through the production of reports on various subjects and complementary activities for both the dissemination and discussion of these reports and connecting the scientific community with members of the Congress and society.

Within the framework of this plan, the activities of Office C will continue to receive support, and new avenues for scientific advice to the public sector will be explored. In this regard, there are plans to expand the Office C model to other areas of public administrations and branches of government beyond the Congress; and to improve scientific advisory systems in crisis situations outlined in the National Security Strategy. Additionally, new complementary mechanisms for formal and informal scientific advice are expected to be introduced.



Line 2

Public-private partnerships for innovation

The low level of public-private collaboration is one of the weaknesses of the Spanish science and innovation system. The Plan aims to address this challenge by first promoting public funding for collaborative projects. Second, it seeks to drive the creation of partnerships and new public-private R&D centres. Third, it emphasises the use of public procurement of innovation. Fourth, it aims to facilitate mobility between the public and private sectors for research personnel. Fifth, it incentivises the hiring of research staff in companies. Lastly, it encourages the collaboration of civil society in R&D through citizen science.

5. PUBLIC FUNDING OF COLLABORATIVE PROJECTS

Since 2019, the Ministry of Science and Innovation has launched new calls for proposals that define intervention instruments for promoting science-business collaboration and knowledge transfer. Some of the highlighted initiatives are as follows¹⁰:

[Science and Innovation Missions Programme](#) (CDTI, since 2020): This programme provides high-intensity grants for industrial research and experimental development projects in priority areas carried out by consortia of companies (3+), with the minimum participation of SMEs and subcontracting to knowledge-generating centres (universities, public research organisations, technological centres). In the period 2020-2021, grants amounting to 203 million euros were awarded, and the budget for 2022 was set at 125 million euros.

[Cervera R&D Transfer Projects](#) (CDTI, since 2019): These grants support collaborative R&D projects between companies and technological centres, with special attention on SMEs. The budget allocated for 2019-2021 amounted to 119 million euros. As part of a reform process, the programme will expand its scope to include other knowledge-generating centres beyond technological centres, and it will be renamed 'Cervera R&D Transfer Consortia.' The new call is expected to be published in late 2022 or early 2023.

[R&D+I Projects in Strategic Lines](#) (AEI, since 2021): These projects involve consortia of universities or research centres and companies to carry out high-risk applied R&D in priority areas. The budget for 2022 was 70 million euros.

10. This is in addition to other pre-existing programmes of the Ministry of Science and Innovation to fund different types of collaborative R&D+I projects such as [Public-Private Collaboration Projects](#) (formerly Retos-Colaboración, AEI, since 2014), [Technological Development Projects in Health](#) (ISCIII, since 2014) and [CIEN Strategic Projects](#) (CDTI, since 2014), along with other relevant calls from the autonomous communities.

In addition to the CDTI Science and Innovation Missions Programme, two separate calls were launched in 2022, focusing on specific missions: cutting-edge health and the transformation of the aeronautical sector. The transformation of the aeronautical sector is addressed through the [Aeronautical Technological Programme](#) (PTA), which had a budget of 80 million euros in 2022 to fund R&D projects by consortia of companies that subcontract universities and research centres. And, in September 2022, the first joint call between the ISCIII and the CDTI was published to finance [collaborative projects in personalised medicine and advanced therapies](#) with a budget of 55 million euros (10 million ISCIII + 45 million CDTI). This collaboration between the two funding agencies multiplies the impact of the grants, avoids the need for partners to respond subsidiarily and ensures fund synchronisation. For the first time, this call combines grants governed by private law (the CDTI grants to companies) with subsidies governed by public law (the ISCIII grants to hospitals and research centres). This funding scheme allows universities and public research centres to participate in mission-oriented projects on equal terms with companies rather than solely as subcontractors, as is the case in the CDTI's Science and Innovation Missions call.

The Plan aims to promote joint calls between R&D+I funding agencies, incorporating the State Research Agency (AEI), with a new funding model for transfer missions known as 'Trans-Missions.' This new model recognises that improving collaboration between companies and the public research sector also requires better coordination among funding agencies that have traditionally focused on either companies (CDTI) or universities and public research centres (AEI, ISCIII). The Trans-Missions programme is allocated a budget of 150 million euros in 2023.

Efforts are being made to integrate SMEs into these collaborative project calls. The [Cervera R&D Transfer Projects programme](#) specifically aims to strengthen the technological capabilities of this group of companies. The 2022 call for [Science and Innovation Missions](#) includes two project categories ('Large Companies Missions' and 'SME Missions') and stipulates that at least 20 million euros should be allocated to SME Missions, while 'Large Companies Missions' must consist of three to eight companies, with at least one being an SME.

The Plan aims to boost R&D+I activities of foreign multinational companies in Spain through collaboration with Spanish universities, public research centres and technology centres. Subsidiaries of foreign multinationals represent around one third of the expenditure on business R&D in Spain, contributing to the creation of highly qualified jobs, talent attraction and the development of globally relevant technologies. Spain aims to become a central node in the global innovation networks of multinational companies, attracting not only production and commercial activities but also regional R&D+I centres. Although international competition to attract these centres is fierce, Spain is developing new technological capabilities and policies to enhance its competitive position in the European and international context. Collaboration with the public research system represents a key factor in attracting new R&D+I centres of multinationals and expanding the innovative activities of existing ones.

In addition to the general programmes to promote transfer and public-private collaboration outlined in this Plan, the Ministry of Industry, Trade and Tourism, through *Invest in Spain*, offers specific support for R&D+I projects of foreign multinational companies, including financing for collaboration with Spanish universities and public innovation centres through the Innova Invest calls (funded with 10 million euros from the PRTR for 2022-2024) and the Foreign Company Investments in R&D activities programme (Intelligent Technology Fund) (budgeted with 2 million euros from European Regional Development Funds in the 2022 call). International promotion of Spain as a destination for R&D+I investments will also be intensified, highlighting the strengths of the public research system, and cooperation with existing innovative multinationals in the country and their representative associations, such as the I+E Foundation, will be strengthened.

Knowledge transfer and collaboration in R&D+I require a comprehensive approach, so coordination with other ministries is a fundamental part of the Plan, particularly those with programmes to promote sectoral innovation through support for transfer and collaboration. Examples of these ministries include:

- Ministry of Industry, Trade and Tourism (MINCOTUR): Grants for industrial research, development and innovation projects in the manufacturing industry.
- Ministry of Agriculture, Fisheries and Food (MAPA): Grants for implementing innovation projects of general interest through supraregional operational groups.
- Ministry of Education and Vocational Training (EDUCACION y FP): Projects for applied innovation, research transfer and knowledge transfer in vocational training.

To achieve a comprehensive approach, existing instruments will be reviewed to simplify and reduce the number of calls (merging some whenever possible, such as through the Trans-Missions model mentioned earlier) and ensure their early publication and improved dissemination. The proliferation of instruments and calls can lead to fragmentation of the grant portfolio, making it more difficult for actors to identify the most suitable options for their needs and increasing bureaucratic management costs. Efforts will also be made to reduce regulatory barriers and bureaucratic burdens that hinder collaboration between companies and universities or public research centres, particularly those that may discourage participation in publicly funded collaborative research projects. The regulatory development of the Law on Science, Technology and Innovation (LCTI) will help progress in this regard, and additional actions will be considered in the context of monitoring the Plan and evaluating the impact of specific measures.

6. NEW PUBLIC-PRIVATE PARTNERSHIPS

Among the actions to support transfer and collaboration, the LCTI (Article 33) includes the establishment of mechanisms for public-private collaboration in stable projects of scientific research, development and innovation. It also includes measures to promote investment in research, development and innovation activities and to stimulate cooper-

ation among companies and between companies and research organisations through legal forms of cooperation such as economic interest groupings and temporary business associations where collaborators share investment, project execution, or exploitation of research results. In line with these objectives of the LCTI, the Plan aims to support the creation of joint laboratories and public-private partnerships to facilitate long-term collaboration in R&D+I beyond collaborative projects of determined duration. International examples of this include Research Campuses in Germany and Collaborative Laboratories (CoLABs) in Portugal.

Given their importance and ambition, the [Strategic Projects for Economic Recovery and Transformation](#) (PERTE) are central to achieving this goal. These projects are co-financed by European funds from the Plan for Recovery, Transformation and Resilience (PRTR). PERTE projects have significant potential to drive economic growth, employment and competitiveness of the Spanish economy. They have a high level of public-private collaboration and span different administrations. They are a new initiative designed to be a permanent mechanism for boosting and coordinating priority projects, especially those that involve complex issues, significant market failures, important externalities, or insufficient private sector investment or initiative. The objective is to contribute to agile and efficient fund management and to reinforce projects that clearly contribute to the transformation of the Spanish economy. To date, 11 new PERTE projects have been approved, with direct public funding of over 30 billion euros during the period 2021-2026, which is expected to mobilise private investment exceeding 36 billion euros. The Plan aims to promote the creation of new companies and public-private centres through PERTE for the joint development of research and innovation activities that endure beyond the temporary scope of the PRTR.

Furthermore, in recent years, many universities have established University-Business Chairs with funding from companies, laying the foundations for more enduring collaborative relationships that go beyond individual projects. The government aims to support these types of instruments from the public sector as well. In this regard, the recent creation of the [Artificial Intelligence Chairs Programme](#), led by the Ministry of Economic Affairs and Digital Transformation within the framework of the National Artificial Intelligence Strategy, is noteworthy. The programme involves providing funding to existing or newly created university chairs dedicated to research, dissemination, teaching and innovation in artificial intelligence. There are also plans to support models similar to University-Business Chairs for research institution-business relationships focused on research, innovation, dissemination, training, and professional development.

Additionally, within the framework of the Plan, greater visibility will be given to regional initiatives aimed at developing public-private partnerships for R&D+I, and the exchange of experiences and information among different autonomous communities will be promoted through the national platform for knowledge transfer and collaboration (Measure 13). The Plan also aims to support institutional initiatives such as CSIC [Interdisciplinary Thematic Platforms](#) (PTI). PTIs are goal-oriented research and innovation instruments created in 2018 within the CSIC (Spanish National Research Council) to address multi-

disciplinary challenges with high scientific, economic and social impact. They are composed of research groups from different CSIC centres and are open to the participation of companies, administrations, other institutions, and social agents. PTIs have gained momentum with European funds from the PRTR, and the objective is to consolidate them over time with institutional support.

Lastly, the applicable rules for scientific and innovation patronage will be reviewed to promote collaboration between entities and the orientation of scientific knowledge towards solving societal problems. In the short term, the celebration of the ‘Santiago Ramón y Cajal Research Year 2022-2025’ is considered an event of exceptional public interest, in accordance with the 69th additional provision of the General State Budget Law for the year 2022. This allows donations made to finance the event to enjoy tax incentives for patronage, including activities related to Unique Scientific and Technical Infrastructures (ICTS), those aimed at solving challenges identified in the Spanish Strategy for Science, Technology and Innovation, and those carried out by the FECYT, the AEI, CIBER and CIBERNED.

7. PUBLIC PROCUREMENT OF INNOVATION

Public procurement of innovation (PPI) represents a unique form of knowledge transfer. While traditional knowledge transfer involves generating knowledge and then seeking practical and marketable applications for it, PPI originates from an unsatisfied need in the realm of public services. The promoting administration acts as the first user or ‘launching customer’ of the innovative solution. PPI also encourages collaboration and alliances between the public research sector and companies in the proposal submission of bidding companies.

Entities or organisations within the public sector that act as contracting authorities and provide public services can be promoters of a PPI process. They identify a need that is not met by the products and services available in the market at a given time. The objectives of PPI are i) to enhance public services through the incorporation of innovative goods or services; ii) to promote business innovation and consequently economic growth; iii) to drive the commercialisation of innovation by utilising public administrations as the launch or reference customer.

The Ministry of Science and Innovation has two instruments to promote PPI, which will be enhanced and expanded in the coming years. First, the FID (Promotion of Innovation from Demand) programme, managed by the General Secretariat for Innovation, provides co-financing from the European Regional Development Fund (ERDF) for PPI projects regardless of whether they fall under the category of Pre-Commercial Public Procurement (PCP) or Public Procurement of Innovative Technology (PIT), categories determined based on the Technology Readiness Level (TRL) at which the innovative solution will be developed. The projects co-financed through the FID programme consist of two phases:

- Phase I: R&D+I (co-financed by ERDF through the FID programme), where eligible

costs include all those related to the preparation, management, evaluation, etc., of the tenders, and also the development and validation of innovative solutions.

- Phase II: Implementation/deployment (fully financed by the beneficiaries' budget).

For the ERDF 2021-2027 programming period, this Plan aims to simplify procedures and shorten the total duration of the project selection process along with the formalisation of selection and the granting of co-financing. The current process is carried out through an agreement between the Ministry of Science and Innovation and the public entity that receives the funding, but it will be replaced by an administrative resolution within the framework of the procedure regulated by the General Subsidies Law of 2003.

For its part, in November 2018, the CDTI (Centre for the Development of Industrial Technology) established the [Office of Innovative Public Procurement](#) (OCPI), which is co-financed with European funds, to promote PCP. Through this instrument, the CDTI acquires R&D services that can result in prototypes of first products or technologically innovative services that meet public needs. The developed prototype is transferred to the Spanish public administration that is interested in it and can provide the proper environment to validate the proposed technology without subsequent commercial purposes. Bids worth 45 million euros have been tendered so far, with delivery scheduled for the next six months, and the budget for this activity in 2022-2023 is 190 million euros.

Plans are in place to include a PPI module in the national platform for knowledge transfer and collaboration (Measure 13), which will offer centralised information about different challenges and open tenders by administrations, among other things.

8. MOBILITY BETWEEN THE PUBLIC AND PRIVATE SECTORS

There have been no adequate gateways for private sector researchers to move into the public sector, and vice versa. The incompatibility law for research and teaching civil servants in universities and public research centres has hindered part-time assignments and mobility. Additionally, the lack of specific incentives and recognition for knowledge transfer activities in selection and promotion processes has diminished the ability to attract more profiles oriented towards transfer and collaboration.

To facilitate the mobility of research personnel between the public and private sectors, a study on existing regulations and institutional procedures will be conducted with the aim of reducing existing barriers, including a gender approach, and promoting their consideration in the evaluation of merits for hiring and promotion in the public sector at the state and institutional levels (Measure 12). In the context of legal reforms, the LCTI (Article 17) promotes part-time assignments and mobility, and also their recognition in selection and promotion processes for research personnel in the public sector. The LCTI also facilitates the participation of public sector researchers in scientific-based ventures (Measure 1).

Mobility between the public and private sectors will also benefit from greater flexibility in public sector contracting to facilitate mobility from the private sector to the public sector. The LCTI introduces a new type of employment contract, the scientific-technical activities contract, which allows universities and public research centres to hire personnel from the private sector. This scientific-technical activities contract allows research groups to indefinitely hire research, technical, or management personnel that do not necessarily require a Ph.D. and are linked to lines of research or scientific-technical service. These contracts do not require prior authorisation when they have external funding, either through competitive public funding for research projects or private funding, for example, through technical advisory contracts or sponsorship chairs. Additionally, the distinguished researcher contract, also included in the LCTI, allows the hiring of highly regarded individuals to lead human teams as a head researcher or to direct research or knowledge transfer and innovation centres or unique science and technology facilities and programmes. This contractual modality enables the hiring of prestigious research personnel from the private sector.

The LOSU project proposes to review the figure of associate professor to restore its original purpose and allow the inclusion of professionals with relevant experience with specific subjects to teach a maximum of 120 hours per academic year. Interacting with professionals from the private sector during the training stage, whether as mentors or teachers, brings knowledge of other R&D+I career models, possibilities of mobility between the public and private sectors and other professional opportunities.

Also to be funded are accompanying measures such as dissemination actions, training, and mentoring to raise awareness of mobility opportunities between the public and private sectors and the possibilities of developing R&D+I careers in both. Initiatives will be promoted to give greater visibility to these opportunities in our country, particularly as a means to attract talent. For example, the FECYT [Researchers Beyond Academia](#) (REBECA) mentoring programme mentees to be more aware of their competencies and skills transferable to various sectors. The programme has had a high percentage of participating researchers and mentors who reside outside Spain, coming from 18 different countries. Another example of such initiatives is the CSIC [CAMINO mentoring programme](#).

9. RECRUITMENT OF RESEARCH STAFF IN COMPANIES

The percentage of research personnel employed in companies is much lower in Spain (38%) than the EU average (55%).¹¹ This Plan aims to substantially increase support for companies to hire doctoral researchers. The Torres Quevedo programme, initiated in 2001, provides three-year grants to companies, state-level technological centres, state-level technological innovation support centres, business associations; and science and technology parks for the employment of doctoral researchers engaged in industrial research projects, experimental development, or prior feasibility studies. This is done to promote

11. Cruz-Castro et al. (2022), [Human resources for research in Spain and Portugal](#), XI Dossier of the Social Observatory of the La Caixa Foundation.

the professional careers of research personnel, stimulate the demand for adequately trained personnel in the private sector to undertake R&D plans and projects, and help consolidate recently created technology companies. Furthermore, within the framework of this Plan, a new model of support for the hiring of research personnel by companies that have previously received public funding for R&D projects, whether through calls from the CDTI, the AEI, or the ISCIII, will be promoted. The 2022 call for the Torres Quevedo programme will be published separately as before in 2023, with a budget of 18 million euros (compared with 15 million in 2022), but from then on, it will be integrated with other R&D project calls.

The Plan also aims to promote industrial doctorates to facilitate the employment of research personnel in companies from the early stages of their careers. First, an increase in funds for the AEI's [Industrial Doctorate programme](#) is foreseen.¹² The grants aim to train doctoral researchers in companies by co-financing their employment contracts while they participate in a company R&D+I project which will be the framework for their doctoral thesis. In addition to this, the ISCIII has a specific call in which part of the doctorate degree course can be carried out in a biomedical sector company. Furthermore, the autonomous communities also have industrial doctorate programmes, sometimes of greater scope than the national programme, so collaboration and exchange of experiences between the AEI and the regional governments will be key to expanding the scope of this measure.

It is also worth noting that, currently, there is an incentive for hiring research personnel outlined in Royal Decree 475/2014, of June 13, on Social Security contribution deductions for research personnel. In 2021, this incentive reached 5,210 companies, 96,405 contracted employees, and a total cost of over 223 million euros. Although the overall incentive system is currently under regulatory review, it is expected that this Royal Decree will remain in force with some adjustments regarding hiring and increased promotion of hiring young researchers and women. Similarly, the new hiring incentive regulations maintain the bonuses for hiring predoctoral research personnel.

Another relevant initiative is the 'Investigo' Programme of the Ministry of Labour and Social Economy. Framed within the PRTR, it is conceived to improve the employability of young people aged 16 to 30 years old who are legally unemployed and registered as job seekers with the corresponding public employment service before starting the employment relationship. The contracts will have a duration of between 12 and 24 months, must be full-time, and must be made under any of the existing contracts. The hiring will be carried out in activities related to research, new technologies, research support; and any profile related to R&D+I. Beneficiary entities will receive a subsidy amount depending on the requested module according to the profiles presented in the memorandum, which will specify the requested positions and the tasks to be carried out by the young individuals. The first call was opened in December 2021, the second in April 2022, the third in November 2022 and the fourth in February 2023.

12. Sixty-one contracts were awarded in the 2019 call, 61 in 2020 and 62 in 2021. The allocation for the last [annual calls](#) of the programme (2019-2022) has been 4 million euros each year.

Another significant initiative is the new call for ‘Digital Generation - Talent Attraction and Retention,’ by the State Secretariat for Digitalisation and Artificial Intelligence (SEDIA) This call, which is planned to be launched in 2023 under the PRTR, will provide grants for the hiring of doctors, graduates and professionals with knowledge of or demonstrated experience in digital fields and specialised profiles for the development of digital innovation projects in the applicant entities.

10. CITIZEN SCIENCE

Another aspect that is expected to continue to be promoted within the framework of the Plan is so-called ‘citizen science,’ which allows the public not only to have access to research resources and data but also actively participate in defining research agendas, collecting data, and even developing and evaluating projects.

Between 2018 and 2021, the Spanish Foundation for Science and Technology (FECYT), under the Ministry of Science and Innovation, funded [70 citizen science initiatives](#) with a contribution of approximately 1.3 million euros in its regular calls for proposals. In July 2022, the Ministry of Universities announced an additional contribution of 400 thousand euros to the call by the FECYT for grants to promote scientific, technological and innovative culture in order to reinforce citizen science actions. Part of this Plan is to continue and strengthen these types of calls for proposals.

In broader terms, the Plan will promote the professionalisation of scientific communication in universities, research centres and technological centres with the aim of increasing mechanisms to bring scientific and technological progress closer to society. In particular, initiatives of citizen science and scientific communication aimed at young people will be promoted; in order to contribute to ongoing efforts to promote scientific vocations and interest in STEAM disciplines (science, technology, engineering, art and mathematics), especially among girls.



Line 3

Capacity building and ecosystem development

To achieve a lasting transformation of the science, technology and innovation system in Spain, it is necessary to invest in training and contribute to the professionalisation of the R&D+I ecosystem, and also improve incentives for research personnel to engage in transfer and collaboration activities. It is also important to strengthen the role of intermediary agents, who play a decisive role in the knowledge transfer and collaboration process between companies and the research base. These intermediaries facilitate the connection between agents and enable knowledge exchange processes that result in mutual benefits, overcoming barriers that separate the scientific and business worlds driven by different interests, incentives, and modes of operation. In Spain, there is a great diversity of intermediary agents, with different geographical and sectoral scopes, including technological centres, science and technology parks, business associations and clusters, technology platforms and knowledge transfer offices (KTOs) within universities and public research centres. However, these intermediary agents often act independently; without leveraging their potential synergies, which reduces their ability to offer high-value-added services and attract the interest of companies.

11. TRAINING AND PROFESSIONALISATION

Knowledge transfer managers and professionals require, on one hand, training that includes scientific and technological knowledge, legal competencies in both public and private law, intellectual property and business, and on the other hand, some experience in the private sector. It is challenging to find these types of profiles and even more difficult to attract and retain them in the public sector. Professionalisation and reducing staff turnover are key to achieving more efficient transfer and collaboration management. It is also crucial to improve the training of research personnel to increase their involvement.

In June 2022, the Ministry of Science and Innovation launched the [Programme for Dynamisation and Training on Knowledge Exchange and Transfer Processes](#) (DINA-ITC) with a budget of 800 thousand euros. It is aimed at executive personnel from the public sector, universities, research and technology organisations, science and technology parks, technology platforms, knowledge exchange and transfer technicians and managers, institutes, companies, professors, and both senior and junior research personnel, along with professionals from the private sector. The programme aims to promote a cultural change in the scientific system and its relationship with innovation, contributing to its dynamism and increasing the involvement of research and teaching staff in knowledge exchange and transfer processes with social agents. The DINA-ITC also seeks to support institutions in implementing active strategies to promote knowledge exchange and transfer processes and improve the management of the different means to carry them out. Financed by the PRTR (Component 17), the [DINA-ITC programme](#) is led by INGENIO, a joint

centre of the Spanish National Research Council (CSIC) and the Polytechnic University of Valencia (UPV). It also involves the participation of the International Menéndez Pelayo University (UIMP) in organising the planned courses and meetings and the collaboration of a team of teachers and professionals with knowledge and experience in ITC processes, along with the entities APTE, FEDIT, Red OTRI CRUE and Redtransfer. The DINA-ITC programme will also promote and facilitate the obtaining of international certifications for transfer professionals, such as the Registered Technology Transfer Professional (RTTP) from the Alliance of Technology Transfer Professionals (ATTP).

In support of professionalisation, legislative reforms are being carried out to improve the professional careers of technical and management personnel in R&D+I. The LCTI includes provisions for technical personnel in Public Research Organisations to have professional mobility, temporary training stays and collaboration in companies. It also introduces the scientific-technical activities contract, which, in addition to the indefinite hiring of research personnel, allows the integration of transfer management personnel within research groups. It is financed by research groups' funding and is not subject to public employment offers, replacement rates, salary masses, or prior authorisation when funded by external funds (see also Measure 8).

The role of vocational training in knowledge and innovation transfer processes should also be highlighted, and it will continue to be strengthened with the development of Organic Law 3/2022, of March 31, on the organisation and integration of vocational training, which devotes Title VIII to innovation, applied research, and entrepreneurship, and also through other recent initiatives such as the [state network of vocational training centres of excellence](#), launched in July 2022 with a budget of 50 million euros.

12. INCENTIVES FOR TRANSFER AND COLLABORATION

Both the LCTI reform (Articles 25 and 26) and the LOSU project recognise that knowledge transfer activities should be considered a concept to be assessed for remuneration purposes, access to public employment and promotion.

After the approval of the LCTI, the *knowledge transfer sexennium* is officially recognised as an incentive for faculty and research staff engaged in transfer activities. The first pilot call for this sexennium was initiated in 2018 and received a positive response with nearly 17,000 applications, highlighting the quantity and diversity of transfer activities carried out by Spanish faculty and research staff. To continue the pilot call, it was necessary to provide the appropriate legal support through the reform of the LCTI. Subsequently, a Royal Decree will be required to amend Royal Decrees 310/2019 of April 26, which regulates the remuneration regime for scientific scale research staff in Public Research Organisations of the General State Administration, and establishes the Evaluating Commission for Scientific-Technological Activity Performance, and 1086/1989 of August 28, which addresses the remuneration of university professors. The Royal Decree 1312/2007 of October 5, which establishes national accreditation for access to university teaching positions, will also be revised to explicitly include knowledge transfer along with research

activity in the evaluation of merits for accreditation. It is expected that these reforms will be completed so that the second call for the knowledge transfer sexennium can be published during the first quarter of 2023.

In addition to the economic incentive, it is important to highlight that engaging in knowledge transfer activities, particularly those recognised by obtaining the knowledge transfer sexennium, will be taken into account in access processes for teaching positions and research staff, and also in internal promotion processes, on par with research activities. Knowledge transfer and innovation activities should also be given greater consideration in merit assessment systems for the awarding of competitive research projects.

The knowledge transfer sexennium is an addition to existing incentives, such as the possibility for faculty and research staff to generate additional personal income through contracted research with private entities, patent commercialisation¹³ and participation in spinoffs. However, there are limitations in this regard for research staff in public research organisations. As part of this plan, reforms will be promoted to ensure that research staff in public research organisations can benefit from these economic incentives on a basis comparable to university faculty when appropriate for the nature of the activities they generate.

The lack of institutional incentives and the prevalence of individual incentives (participation in income from contracts, knowledge transfer sexennium, merit evaluation for hiring and promotion, etc.) can have an unintended effect, resulting in uncoordinated activities, excessive individualism over group or institutional interests, and inefficiencies and conflicts in achieving strategic objectives. Institutional financing mechanisms partially linked to the achievement of results, consistent with institutional missions and strategic objectives, contribute to the ability of institutions to allocate additional income to improve support services, hire technicians and acquire equipment.

In this regard, one of the [final recommendations of the OECD Roadmap](#) published in June 2022 is to implement a system of institutional incentives in stages over a period of 2-3 years. The first step would involve collecting quantitative and qualitative indicators of institutional transfer and collaboration, developing instructions and creating a working group for the development of a pilot exercise. Significant progress has already been made in the development of quantitative indicators at the institutional level within the framework of the SICTI (Information System on Science, Technology, and Innovation), and also qualitative indicators thanks to the DINA-ITC programme (Measure 11). This information could be complemented by the data collected through the upcoming call for the knowledge transfer sexennium.

13. As a novelty, the LCTI establishes that the participation of public sector researchers in the profits derived from the exploitation of the results of research, development and innovation activities will amount to at least one third (Article 35.3), something that had already been common practice in many institutions.

In the second phase, new funding systems based on objectives that incentivise institutional knowledge transfer activities will be introduced. The Ministry of Science and Innovation will promote a reform of the financing systems for public research organisations to introduce new incentives for knowledge transfer activities. In addition, the LOSU project proposes a new funding model for universities with a component based on results, within which knowledge transfer and innovation activities will be taken into account. Catalonia and the Basque Country have already developed institutional incentive systems in recent years, which might inspire the operational mechanisms of these reforms at the national level.

Overall, the full integration of knowledge transfer into the missions and strategic plans of entities will be encouraged, along with the allocation of increased institutional resources (financial and personnel) for its implementation. The digitalisation and improvement of institutional information systems for monitoring, management and evaluation of transfer and collaboration activities in public research entities will also be promoted in coordination with the Science, Technology and Innovation Information System (SICTI).

Positive changes can already be observed in this regard, such as the creation of specific vice-rectorates for transfer at several universities and a new Vice Presidency for Innovation and Knowledge Transfer at the CSIC (Spanish National Research Council). This change elevates the level of the previous Vice Adjunct Presidency for Knowledge Transfer, which was under the Vice Presidency for Research. Another interesting example is the promotion of the establishment of [knowledge transfer groups](#) at the University of Murcia through a new registry parallel to the traditional research groups at universities. These groups can then receive support grants from the university to assist in their establishment and initiation of activities.

13. NATIONAL PLATFORM FOR TRANSFER AND COLLABORATION

One of the priority reforms proposed by the OECD Roadmap is to facilitate and coordinate the functioning of various intermediary agents, a recommendation already included in the LCTI (Art. 29 1d) which states that 'digital platforms and tools that allow the articulation of challenges, citizen participation, competitions, and, in general, better coordination between supply and demand of knowledge will be utilised.'

In line with these objectives, the Ministry of Science and Innovation will develop the *National Platform for Knowledge Transfer and Collaboration: INNOVA-ITC* (with an estimated public budget of 1 million euros for 2023) as a showcase of technological solutions for companies, with the following lines of action:

- (1) Improving the visibility of research results, prototypes, innovative products; and services selected for their potential and availability for transfer.
- (2) Providing centralised information and tools to establish connections between Spanish universities or research centres and national and international companies.

(3) Promoting cooperation i) among intermediary agents in the ecosystem and the exchange of best practices; and ii) with other stakeholders in the Spanish science, technology and innovation system.

The platform will initially be based on a website that integrates currently disjointed information. It will have a national scope with inclusive and long-lasting ambition to generate synergies and enable coordination with existing initiatives promoted by various institutions, sectors and autonomous communities¹⁴. This follows the recommendations of the OECD Roadmap, which suggests examining 'the potential of open innovation platforms to accelerate the matching and interaction between different actors, while avoiding a supply-side perspective and the excessive proliferation of non-interoperable and hardly sustainable platforms over time' (OECD, 2022, p. 48).

The Platform will include search tools that are oriented to the articulation of technological supply and demand and linked to the capability map, other resources being developed within the framework of the SICTI and other available databases. The initial development phase of the platform will include an analysis of available tools and similar international experiences, such as [Startup Nation Central](#) in Israel or the [Government Office for Technology Transfer](#) in the United Kingdom. In this regard, the European project [science2society](#) (S2S), completed in 2019, offers a guide to tools and international best practices. Links will also be established with international platforms (such as [InnoCentive](#) or [IdeaConnection](#)) to promote the dissemination and international transfer of technologies developed in Spain when appropriate.

The Platform will be coordinated with the DINA-ITC programme (Measure 11) and will draw on the content and tools generated within that programme and other similar experiences in different contexts and countries. In this way, the platform will offer resources that facilitate knowledge transfer and collaboration ranging from audiovisual content and online training seminars to reports, guidelines and model contracts for collaboration agreements or intellectual property licenses.¹⁵ New content and featured news will be developed periodically with the support of the Science Information and News Service (SINC) and the Science Media Centre (SMC) of the FECYT. Accompaniment and facilitation activities developed within the platform or by third parties will also be highlighted to facilitate contacts and personalised support in matchmaking and networking events.

In addition to the development of the website, a second phase will involve the formation of a working team at the CDTI composed of specialists in mobilising collaboration and knowledge transfer. This will enable the provision of high-value-added services in legal aspects of knowledge transfer and valorisation, partner search and funding for spinoffs, or market exploration and instruments for transfer. Specialised counselling will also be sought when it can be most effective, for example, regarding legal aspects related to the

14. For example, the CERCA centres have developed two platforms of interest: [Gínjol Patent Fund](#) and [Flintbox](#).

15. For example, the model contracts available at the OEPM.

protection of results, their evaluation, or regulatory aspects in making them available to society and markets.

The INNOVA-ITC Platform will also serve to disseminate and help organisations become aware of and implement the Guiding Principles on Knowledge Valorisation from the European Commission, which will be published in the coming months. It will include a code of practice for the management of intellectual assets for knowledge valorisation and a code of practice for standardisation for researchers, providing more detailed guidance on how to apply certain aspects of knowledge valorisation. The Guiding Principles also recommend ‘taking measures to raise awareness among universities, research organisations, public authorities and companies about the importance of managing intellectual assets in an international environment,’ and also initiatives aimed at ‘promoting and supporting national and transnational peer learning processes to disseminate and encourage the sharing of best practices, case studies, reference models and lessons learned, along with developing common specifications for the valorisation of knowledge.’

14. KNOWLEDGE TRANSFER OFFICES

It has been observed that, currently, the majority of Knowledge Transfer Offices (KTOs) in our country concentrate a significant portion of their activities and efforts on administrative tasks, which reduces the time and dedication available for higher value-added activities related to commercialisation, research result valorisation, scientific management, dissemination and fostering long-lasting collaborative relationships with companies and their ecosystems. This plan includes accompanying measures to promote the development of KTOs through greater market orientation and increased interinstitutional cooperation.

The plan envisages the introduction of new regulations governing the Registry of Knowledge Transfer Offices (KTOs) of the Ministry of Science and Innovation (Royal Decree 984/2022, November 22) in order to update the registration requirements, establish the activities considered fundamental or essential in the field of knowledge transfer, regulate the registration procedure for applying entities and stipulate the obligation to maintain and update their data in the registry. The evaluation of applying entities for the purpose of determining compliance with the requirements established in the regulations for registration will be based on a set of indicators provided by the entities through annual surveys within the framework of the SICTI. This will enable monitoring of KTO activity and highlight the work of the most successful KTOs through a distinction (or seal of excellence). The aim is to institutionalise public recognition of the efforts made by KTOs, facilitate the dissemination of their good management practices; and promote their interaction with other sectors and social agents.

The regulations governing the KTO Registry provide for the possibility for organisations to register if they assume the knowledge transfer management of one or more knowledge-generating entities that, because of their smaller size, may not have a sufficiently specialised workforce or sufficient resources to perform this function on their own. In this

regard, one of the priority actions of the plan is to promote dialogue and exchange of experiences with autonomous communities where processes of transformation, alliances and pooling of services of university and public research centre KTOs are taking place, such as Innotransfer in Valencia.¹⁶ These types of initiatives also become interesting as an entry point to the different autonomous communities from the national platform for knowledge transfer and collaboration (Measure 13).

Furthermore, with the aim of reducing administrative obstacles and improving the institutional framework of KTOs, the LCTI (Article 36 bis 3) establishes that public executing agents will promote efficient structures dedicated to facilitating and promoting transfer activity, which can be carried out through dependent or affiliated entities, including commercial companies and other public business entities, for reasons of economic advantage, management, or social impact and dissemination as advised.

15. NETWORKS AND INTERMEDIATE ACTORS

As mentioned earlier, the R&D+I ecosystem in Spain is characterised by great heterogeneity. Alongside the support and promotion of KTOs (Measure 14), the Plan also includes initiatives that target technology centres, science and technology parks, business clusters, technology platforms and other intermediate or facilitating agents. One of the objectives of the plan is to contribute to increasing visibility and facilitating cooperation and coordination among the different intermediate agents, networks and connections within the science and innovation ecosystem.

Technology centres carry out applied research projects and provide technological services to companies in their surroundings. They are a key component of the R&D+I ecosystem and comprise a highly heterogeneous group of non-profit organisations (associations or private foundations) that rely heavily on regional funding support and revenue from contracts with companies; in addition to an increasing amount of competitive funding at regional, national and European levels. Many of these centres are sector-specific, while others are not. As a general rule, they are highly connected with industry and universities at a regional level and represent an important resource for innovative SMEs.

This Plan aims to promote greater collaboration among technology centres to avoid duplication and offer technologies and services of higher value to companies. This includes cooperation among technology centres located within the same autonomous community (building on existing experiences of integrating technology centres such as TECNALIA in the Basque Country, EURECAT in Catalonia, or ADITECH in Navarra) and collaboration between technology centres located in different autonomous communities, often sharing objectives but lacking sufficient communication with each other. To achieve this goal, in 2019, the CDTI initiated the Red Cervera programme for tech-

16. There are relevant international examples such as the case of France, which has earmarked 900 million euros for the creation of 14 Technology Transfer Acceleration Companies (SATT) in its various regions.

nology centres, which provides grants for the development of R&D+I programmes in strategic technologies by consortia consisting of three to five technology centres. This programme encourages the establishment of alliances among centres from different autonomous communities working in similar fields. The programme, with a budget of 20 million euros in the 2019 call and 35 million euros in the 2020 call, finances projects ranging from 2 to 4 million euros over a period of 3 years.

Furthermore, the Plan also aims to promote the internationalisation of technology centres and adopt best international practices in this field. This may include actions to incentivise the internationalisation of Spanish technology centres and attract internationally renowned technology centres to establish themselves in Spain.

The access of companies to and their collaboration with Singular Scientific and Technical Infrastructures (ICTS)¹⁷ and the European Research Infrastructure Consortium (ERIC) are also ways to promote public-private collaboration, which should be further encouraged in the coming years. The Barcelona Supercomputing Centre (BSC) is a notable example in this regard as it has numerous collaboration agreements for the use of its facilities by large innovative companies, contributing to attracting international talent and investments to Spain. The plan aims to move towards new governance models for ICTS that explicitly incorporate knowledge transfer and collaboration with the private sector as integral parts of their missions and strategies. In general, it will facilitate not only the utilisation of ICTS but also other types of infrastructures, laboratories and scientific equipment by other research groups and companies to a greater extent, thereby contributing to the valorisation of public investment in R&D.

The Plan also aims to strengthen support for other intermediate agents and networks such as technological platforms (AEI), the CIBER programme¹⁸ and the ITEMAS platform¹⁹, Innovative Business Associations (MINCOTUR, since 2007), the Spanish Federation of Technology Centres (FEDIT) and science and technology parks distributed throughout Spanish territory.²⁰

17. Singular Scientific and Technical Infrastructures are exceptional facilities of a strategic nature with a high maintenance cost. There are currently 29 ICTS in Spain, with 62 infrastructures throughout Spain.

18. The CIBER programme is a public consortium of the ISCIII to promote research excellence in biomedicine and health sciences in Spain, the collaboration between basic and clinical researchers and the transfer of research from the laboratory to the patient, with 11 thematic areas and presence in almost all the autonomous communities. By means of networking, it has transferred research results to industry and society for more than 10 years.

19. The Platform for Innovation in Medical and Health Technologies (ITEMAS) is a support structure for healthcare innovation promoted by the ISCIII as one of its technological platforms. Its objective is to facilitate the innovative ideas of healthcare professionals to generate value for the system by favouring technology transfer, the culture of innovation and communication with the rest of society. The main tool of ITEMAS is the creation of Innovation Support Units (ISU) in hospitals.


20. The Spanish association of science and technology parks, APTE, integrates most of the parks.


The diversity of initiatives carried out at the regional level for the development of innovation networks and ecosystems, which are not detailed in this document, should also be valued as they undoubtedly complement and contribute to the objectives of the Knowledge Transfer and Collaboration Plan. The Transfer and Collaboration Platform (Measure 13) will provide information on the diversity of regional networks and intermediate agents with the aim of promoting the exchange of experiences and showcasing their activities in promoting knowledge transfer and collaboration for innovation. To promote initiatives for knowledge transfer and innovation at the local level, the Innpulso Network of Cities of Science and Innovation, under the Ministry of Science and Innovation, should be highlighted. A new call, with a budget of 6.7 million euros, will also be launched to promote innovation ecosystems with a thematic perspective in line with the actions carried out by the European Innovation Council.


Connecting with European networks and infrastructures is essential for the cohesion and internationalisation of the ecosystem. In this regard, efforts will continue to promote Spanish integration into European programmes of the European Institute of Innovation and Technology (EIT), such as co-location centres and knowledge and innovation communities (KIC). Digital Innovation Hubs (DIH), promoted by the Ministry of Industry, Commerce and Tourism in relation to the European Industrial Digitalisation initiative, also deserve mention as a one-stop shop where industrial companies, especially SMEs, startups and medium-sized enterprises can obtain assistance in improving their businesses, production processes, products and services through digital technology.



Annex 1. Summary of lines of action and measures of the Plan

LINES OF ACTION OF THE PLAN	REVIEW AND REINFORCEMENT OF EXISTING MEASURES	NEW MEASURES (FROM 2022)
 <p>Knowledge Transfer</p>	1. Scientific and technological entrepreneurship	
	<p>Spain Entrepreneurial Nation Strategy, 2021.</p> <p>More subsidies and technical support for science-based entrepreneurship (e.g. reinforcement of CDTI's NEOTEC Programme and international training module).</p> <p>Expansion of public venture capital funds to co-invest in science-based ventures (e.g. CDTI's INNVIERTE Programme).</p>	<p>Simplification of administrative procedures and new tax incentives for science-based startups (e.g. reduced rate of 15% for companies, law to promote the startup ecosystem).</p> <p>Facilities for the participation of research staff in spinoffs and the institutional promotion of spinoffs and startups (Law on Science, Technology and Innovation, LCTI).</p> <p>New public venture capital funds to co-invest in science-based ventures (e.g. INNVIERTE-Transfer Funds and ICO-SEDIA NEXT TECH Fund).</p> <p>New initiatives to support scientific and technological entrepreneurship (e.g. CDTI's Neotec Women Programme).</p> <p>Visibility and support for international, regional and local measures to promote science and technology-based entrepreneurship.</p>
	2. Intellectual property	
	<p>Support for the valorisation of knowledge and results of research projects (e.g. funding, application costs, renewal of intellectual property rights in grants for 'Proof of Concept' projects of the AEI).</p>	<p>Promotion of knowledge transfer protected by intellectual property titles generated in universities and public research centres (Law on Science, Technology and Innovation, LCTI).</p> <p>Actions to support the valorisation of knowledge and the dissemination of technology portfolios of universities and public research centres in accordance with the European Commission's Guiding Principles on the valorisation of knowledge.</p>
	3. Open science	
	<p>Support for the promotion of open science from the Spanish Foundation for Science and Technology, FECYT.</p> <p>Promotion of institutional open science repositories and development of the national platform for aggregating repositories (Recolecta).</p>	<p>Facilitate free access to publications, data, codes, methodologies and results generated by research, develop open infrastructures and platforms and foster open participation of civil society in scientific processes (Law on Science, Technology and Innovation, LCTI, and LOSU project).</p> <p>Launch of the National Open Science Strategy, ENCA.</p>
4. Scientific advice to public administrations		
	<p>Strengthen the Congressional Office of Science and Technology (Office C).</p> <p>Extend the Office C model to other public administrations, including other branches of government.</p>	

LINES OF ACTION OF THE PLAN	REVIEW AND REINFORCEMENT OF EXISTING MEASURES	NEW MEASURES (FROM 2022)
 Public-private collaboration	5. Public funding of collaborative projects	
	<p>Reinforcement of calls for projects to encourage public-private collaboration (CDTI, AEI, ISCIII).</p> <p>Consolidation of the promotion of R&D+I activities by foreign multinationals in Spain through their collaboration with Spanish universities, public research centres and technology centres (e.g. Invest in Spain).</p>	<p>New joint call for R&D+I funding agencies (CDTI, AEI, ISCIII) to promote science-business collaboration in strategic mission-oriented projects (Trans-Missions programme).</p> <p>New programmes for universities, research centres and technology centres to collaborate in R&D+I projects with SMEs (e.g. Cervera Transfer R&D Consortia).</p> <p>Review of existing instruments to simplify, combine calls for proposals, streamline application and evaluation procedures and reduce regulatory barriers and bureaucratic burdens that hinder science-business collaboration.</p> <p>Global approach to knowledge transfer policies, coordination and visibility of ministerial programmes to foster sectoral innovation (e.g. MINCOTUR, MAPA, EDUCACION and FP).</p>
	6. New public-private partnerships and centres	
	<p>Promotion of university-industry chairs (e.g. Artificial Intelligence) and extension to research centres.</p> <p>Support for institutional initiatives (e.g. CSIC interdisciplinary thematic platforms).</p>	<p>Foster a new, more ambitious model of public-private collaboration through new strategic alliances and long-term public-private centres.</p> <p>Exploit the potential of PERTEs to leverage private investment in R&D+I and intensify public-private collaboration.</p> <p>Revise the rules applicable to scientific and innovation sponsorship to encourage collaboration between entities and the orientation of scientific knowledge to solving societal problems. Tax incentives for sponsorship and patronage in the framework of the Santiago Ramón y Cajal Research Year 2022-2025.</p>
	7. Public procurement for innovation	
	<p>Expand and reform existing programmes to improve their efficiency, in particular the FID (Fomento de la Innovación desde la Demanda) and the OCPI (Oficina de Compra Pública Innovadora).</p>	<p>Promote public procurement of innovation to stimulate the innovative activity of companies and improve public services, mobilising, making visible and supporting the actions of all public administrations.</p>
	8. Mobility between the public and private sectors	
		<p>Reduce legal obstacles to the mobility of research personnel between the public and private sectors (LCTI and LOSU project).</p> <p>Value temporary mobility in the private sector in merit assessment systems for the recruitment and promotion of research personnel in the public sector.</p> <p>Encourage the incorporation of private sector professionals in public sector research groups through new contractual figures introduced in the Law on Science, Technology and Innovation (contract for scientific-technical activities and distinguished researcher contract).</p> <p>Support for dissemination, training and mentoring actions to raise awareness of mobility opportunities between the public and private sectors.</p>
	9. Recruitment of research staff in companies	
	<p>Support programmes for the recruitment of research personnel in companies (e.g. Torres Quevedo Programme of the AEI).</p>	<p>New aid model for the recruitment of research personnel by companies integrated into existing calls for R&D+I project funding.</p>
10. Citizen science		
	<p>Strengthening of grants for citizen science projects (specific FECYT calls reinforced with additional contribution from the Ministry of Universities).</p>	

LINES OF ACTION OF THE PLAN	REVIEW AND REINFORCEMENT OF EXISTING MEASURES	NEW MEASURES (FROM 2022)
 <p>Capacity building and ecosystem development</p>	11. Training and professionalisation	
		<p>New dynamisation and training programme for research, technical and management staff (DINA-ITC).</p> <p>Support for obtaining international certifications for transfer professionals (e.g. Registered Technology Transfer Professional, RTTP).</p> <p>Improvement of the professional career of R&D+I technical and management staff (Law on Science, Technology and Innovation, LCTI).</p> <p>Promotion of professional training in knowledge transfer and innovation processes (Organic Law 3/2022).</p>
	12. Incentives for transfer and collaboration	
	<p>Consideration of experience in transfer and collaboration in ANECA accreditations and merit assessment.</p>	<p>Institutionalise the new six-year period for knowledge transfer, with annual calls for proposals (individual incentives).</p> <p>Promote new objective-based funding systems for universities and public research centres that take into account knowledge transfer activities and collaboration for innovation (institutional incentives).</p> <p>Promote greater integration of knowledge transfer in the missions and strategic plans of universities and public research centres (Science, Technology and Innovation Act and LOSU project).</p>
	13. National Platform for Knowledge Transfer and Collaboration	
		<p>Develop and launch the new digital platform INNOVA-ITC to centrally offer information and tools to facilitate companies' search for technological solutions and facilitate their collaboration with universities and public research centres.</p> <p>Create a team of specialists linked to the Platform that can provide high added value services in legal aspects of knowledge transfer and valorisation and search for partners and funding for spinoffs, among others.</p>
	14. Knowledge transfer offices	
	<p>Review of the registration process of Knowledge Transfer Offices (KTOs).</p>	<p>Encourage processes of transformation, alliances and pooling of TCO services at either the territorial level (e.g. in cities or ACs) or the sectoral level (e.g. in specific technologies or industries).</p>
15. Networks and intermediate actors		
<p>Promotion of collaboration between technology centres in different regions through the Cervera Network programme (CDTI) and other actions.</p> <p>Support of other intermediate actors such as science and technology parks, business groups and clusters, technology platforms, Knowledge and Innovation Communities (KICs) and other entities and programmes with similar objectives.</p>	<p>New measures to promote the internationalisation of technology centres, both to encourage the internationalisation of Spanish technology centres and to attract international technology centres of recognised prestige to set up in Spain.</p> <p>New call for innovation ecosystems.</p>	

Annex 2. Correspondence with the OECD Roadmap

OECD PRIORITY AREA	OECD RECOMMENDATIONS	OECD VIEW ON EASE OF LEMENTATION	LINES OF ACTION OF THE PLAN
1. Put in place sound STI policy foundations for KTC to be possible and effective	1.1. Multi-partisan 'new deal' for STI with binding elements	Medium challenge	
	1.2. Whole of government approach. STI innovation proofing of policies	High challenge	1
	1.3. Openness to independent external influences on STI governance	Medium challenge	1
	1.4. Priority absorption of structural funds with private co-financing	High challenge	2
	1.5. STI domain reforms and assessment of general legal framework impacts on PSR	Medium challenge	1
	1.6. Progressive evolution towards principles-based system for STI policy and governance	High challenge	
	1.7. STI data capacities	Within close reach	3
	1.8. Culture of public policy evaluation	Medium challenge	1
2. Redesign the governance systems of universities and PROs to increase their engagement with society	2.1. Revise the governance and funding arrangements of universities and PROs to increase their institutional autonomy (especially linked to human resources) and accountability for outcomes	High challenge	1, 2, 3
	2.2. Nominate a group of experts to undertake an independent review of the PRO and publicly supported technology centres sector, analysing their alignment with the government's strategy and the needs of the Spanish STI system	Within close reach	1, 3
	2.3. Provide sufficient flexibility to implement experimental governance approaches at the regional and institutional levels	Medium challenge	3
3. Rebalance and align individual and institutional incentive mechanisms for researchers to engage in KTC	3.1. Establish KTC incentive mechanisms at the institutional level	High challenge	3
	3.2. Increase the individual recognition of knowledge transfer merits	Medium challenge	2, 3
	3.3. Monitor unintended effects of incentive systems	Within close reach	3
4. Facilitate and activate the operation of diverse knowledge intermediation agents	4.1. Conditions to increase funding for KTOs, e.g. connected to KTC performance-related funding streams for universities and PROs	High challenge	3
	4.2. Promote the widespread professionalisation of TTO services	Medium challenge	3
	4.3. Explore mutualisation of TTO services, starting with interinstitutional and interregional alliances	Medium challenge	3
	4.4. Develop an interactive map of the intermediation ecosystem	Medium challenge	3
	4.5. Decentralise policy programmes targeting independent knowledge intermediaries	Medium challenge	3
	4.6. Introduce scientific product managers that work alongside research directors in universities and PROs	Medium challenge	3
5. Promote and sustain business capacities to innovate and exchange knowledge	5.1. Adapt public support instruments for innovation to enhance the capacity of knowledge absorption and generation in firms	High challenge	1, 2
	5.2. Prioritise intersectoral talent mobility and co-development at all levels, including doctoral students and graduates	Medium challenge	2
	5.3. Explore and experiment with policies to strengthen innovation support networks and platforms. Support the establishment of mixed public-private centres for collaboration and co-creation, and also demonstration facilities open to businesses (incl. SMEs)	Medium challenge	2, 3

Annex 3. Preliminary proposal of monitoring indicators for the Plan

The table presents a selection of indicators related to the overall evolution of knowledge transfer and collaboration in Spain with a quantitative and aggregated nature at the national level. These indicators are part of the set of monitoring indicators of the State Plan for Scientific and Technological Research and Innovation (PEICTI), available in the Information System on Science, Technology and Innovation (SICTI).

Indicator	Source
Percentage of public sector R&D expenditure financed by the private sector	INE
Distribution of business expenditure on external R&D by supplier	INE
Distribution of public sector expenditure on external R&D by supplier	INE
Percentage of enterprises that cooperated in innovative activities	INE
Percentage of enterprises cooperating in R&D activities	INE
Percentage of enterprises that cooperated in other innovative activities (excluding R&D)	INE
Percentage of enterprises that cooperated with universities and other higher education institutions in innovative activities (including R&D) as a percentage of total enterprises	INE
Percentage of enterprises that cooperated with the public sector (public administration or public research institutes) in innovative activities (including R&D) as a percentage of total enterprises	INE
Percentage of publications in public-private collaboration	FECYT
Percentage of patents, utility models and plant varieties of public research institutions in joint ownership with enterprises	SICTI
Number of spinoff companies created in the last 5 years in the public research sector	SICTI
Number of public research sector patents licensed per million inhabitants	SICTI
Annual income from agreements for the exploitation of inventions by public research institutions and technology centres	SICTI
Exploitation of inventions agreements signed in the year by public research institutions and technology centres	SICTI
Contracts signed in the year with companies to carry out R&D+I activities by public research institutions and technology centres	SICTI
Annual revenues from contracts signed for R&D+I activities by public research institutions and technology centres	SICTI
Competitively funded collaborative projects awarded in the year to public research institutions and technology centres	SICTI
Contracts and collaboration agreements signed in the year to carry out R&D+I activities by public research institutions and technology centres	SICTI

INE: Instituto Nacional de Estadística / National Statistical Institute, <https://www.ine.es/en/index.htm>

FECYT: Fundación Española para la Ciencia y la Tecnología / Spanish Foundation for Science and Technology, <https://www.fecyt.es/en>

SICTI: Sistema de Información sobre Ciencia, Tecnología e Innovación / Spanish Science, Technology and Innovation System, <https://www.ciencia.gob.es/en/Estrategias-y-Planes/Sistema-de-Informacion-sobre-Ciencia--Tecnologia-e-Innovacion--SICTI-.html>



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