

2022

ANNUAL REPORT

Research, Development, and Innovation
(RDI) activities and indicators

Research, Development
and Innovation Area



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

Contents

3

Presentation

5

RDI at UPC

8

2022 Summary

15

Indicators

42

Projects

54

**Communication
and Participation**

58

Future

61

Glossary

Check all **interactive graphics** on the memory website:
<https://rdi.upc.edu/ca/memoria/2022>



Introduction

Leaders in key areas for the advancement of society

Thanks to the work done by the team involved in RDI production and management, 2022 was a record year for project funding and contract revenue.



A year of achievements in RDI

2022 was a record year for project funding and contract revenue. This was possible thanks to the work of the professors, research staff and others who make up the UPC's Research, Development and Innovation Area, and all the units and services that work closely with them.

In 2022, the UPC almost doubled its contract revenue from RDI activities and projects, reaching 121.97 million euros. Of particular note is the UPC's participation in 70 Horizon Europe projects, 12 of which it led; its participation in 227 national projects; and the signing of 478 contracts with companies and institutions.

Intensive work was done in 2022 to develop the pillars of the UPC's strategic RDI plan, which promotes open science and citizen science, increases participation in international RDI projects and promotes RDI projects with a high territorial impact. Thanks to these efforts, the UPC continues to be an example to be followed in key fields for the advancement of society.

We invite you to learn more about the activities that put the UPC at the forefront of scientific and technical progress in 2022.

"The funding received has made it possible to generate knowledge and real solutions to social and economic challenges"

"The UPC was the leading university in Spain in terms of attracting funding from the Horizon Europe framework programme in 2022"



Jordi Llorca

Vice-rector for Research



Climent Molins

Vice-rector for Transfer, Innovation and Entrepreneurship

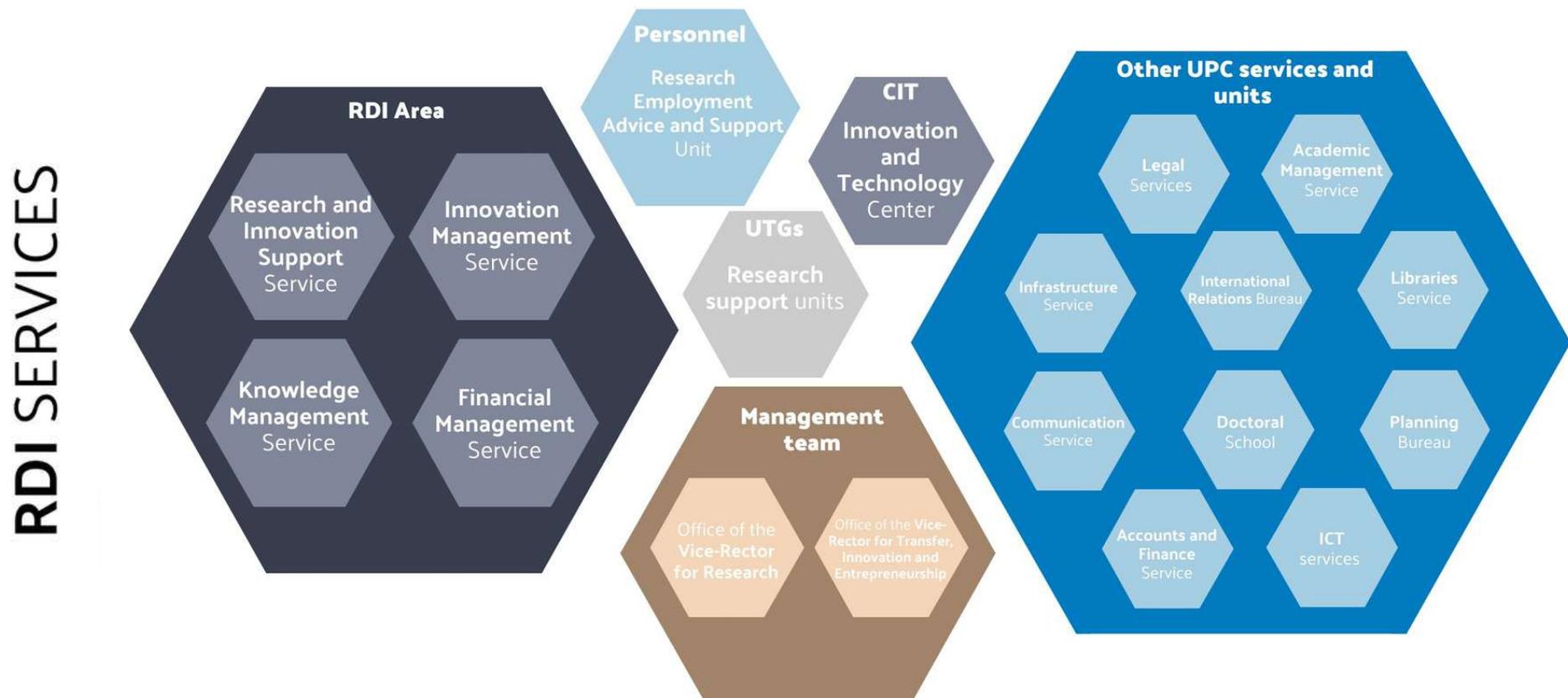
RDI at the UPC

A common goal

The Research, Development and Innovation Area works with all UPC teams to deliver value and advance RDI in accordance with the guidelines of the Office of the Vice-Rector for Research and the Office of the Vice-Rector for Transfer, Innovation and Entrepreneurship.

The key people driving RDI activity

The UPC's **Research, Development and Innovation Area** has a staff of more than eighty people, distributed among the four main services. The management team defines the next actions to be taken, which are implemented in close collaboration with the UPC's units and services. **Management and support units (UTGs)** are the teams in charge of interacting directly with teaching staff in schools (front office). The **Personnel Service**, working closely with the **Research Employment Advice and Support Unit**, plays a key role. For its part, the **Technological Innovation Centre (CIT)** plays an important role in promotion, with the aim of raising awareness of RDI activities and attracting companies operating in the surrounding area.



The methodology of RDI teams

Transforming knowledge into high-value RDI results for society, the productive fabric and the academic community

With a clear focus on impact, we're firmly committed to turning knowledge into high-value results that deliver **significant improvements for society, the productive fabric and the academic community.**

To achieve this goal with excellence, we focus our efforts on the four stages of the RDI management **value chain:**

"The various stages of the RDI management value chain make this transformation into value possible"



2022 summary

A close-up photograph of a laboratory pipette tip dispensing a small amount of pink liquid into one of the wells of a clear plastic multi-well plate. The background is a blurred laboratory setting with blue lighting.

A year of achievements in RDI

Over the course of 2022, actions were carried out in all key stages of research and innovation, fostering creativity and value creation. In this report, we present the main results in relation to the UPC's strategic objectives in the field of RDI.



2022 summary

Participation in research and transfer calls

International calls

Horizon Europe programme

70 projects approved, 12 led, €47 m.

Noteworthy in this programme:

- Global Challenges and European Industrial Competitiveness pillar:
 - Digital Cluster: 19 projects, €10 m
 - Climate, Energy and Mobility cluster: 13 projects, €6.6 m
- Excellent Science pillar
 - 4 ERC grants, €5 m
 - 9 MSCA grants

Erasmus+ programme

- Unite! €14.4 m
- University Partnership for Acceleration of European Universities (aUPaEu) €600,000 for the UPC
- Erasmus+ proposals: 11 projects approved

National calls

State Research Agency

- €12.6 m awarded

Ministry of Economic Affairs and Digital Transformation

- €1.2 m in Cloud Computing
- €3 m UNICO 6G R&D programme

Government of Catalonia calls

- Xartec Salut (Health Technologies) and BlueNetCat (Maritime), with total funding of €2 m
- Participation in the AGAUR call for SGR grants: 204 projects awarded a total of €15.6 m

Tenders

Tenders in which the UPC participated within the framework of a temporary consortium:

- Environmental monitoring of the Bilbao Port Authority's sand extraction project. Contract value: €3 m, of which €0.5 m will go to the UPC

"General increase in participation in RDI calls in all areas"

2022 summary

Development of the pillars of the RDI strategic plan

Increase research output and dissemination of results

- Call for AGRUPS grants, €1.3 m allocated
- Training in agreements and contracts
Participation in ACCIÓ working sessions
- UPC Knowledge web project
- New procedure to maximise the success rate in calls in which institutions may only submit one proposal
- Support in the preparation of a newsletter on research in the field of artificial intelligence

Promote RDI projects with a high territorial impact

- Presentation of expressions of interest in the RIS3CAT 2030 Knowledge Regions Programme
- Participation in projects of the Catalan Energy Institute (ICAEN)
- Participation in the National Neurotechnology Centre proposal
- Participation in the Digital Innovation Hub of Catalonia (DIH4CAT)
- Participation in the Digital Impulse Hub
- Participation in the PERTE project to develop electric and connected vehicles

Increase participation in international and national RDI projects

- Award and launch of the Prometheus project
- Participation in information days on national and international calls
- Mapping of UPC participation in 170 networks and consortia
- Award of 16 grants to fund participation in national/international networks and consortia
- Joined the EIT Manufacturing community

2022 summary

Development of the pillars of the RDI strategic plan

Increase the number of academic staff involved in RDI

- Organisation of information and promotion sessions on SGR calls (AGAUR) and RDI projects (State Research Agency, AEI)
- Presentation of a series of short information videos: "Advice on how to tackle a research and innovation project"

Promote open science and citizen science

- Compilation of experiences on the UPC Citizen Science Portal
- Promotion of citizen science within the framework of the Third Open Science Day at the UPC
- Participation in the UPC Social Engagement Day to coordinate joint actions in the field of RDI and citizen participation

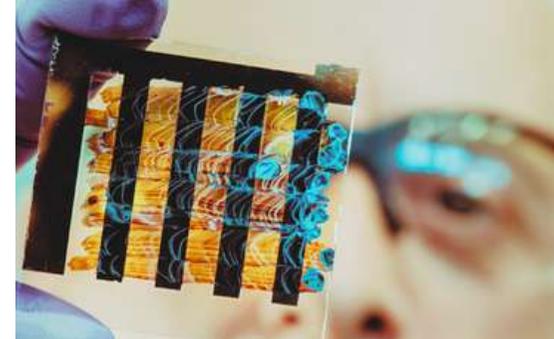
Increase the number of doctoral networks

- Organisation of a working session on Horizon Europe Marie Skłodowska-Curie Actions
- Organisation of the sessions "Starting Grant call: in-depth analysis" and "ERC Starting Grants: call for proposals, best practices"
- Organisation of the session "Consolidator Grant call: in-depth analysis" and review of proposals



2022 summary

Development of the pillars of the RDI strategic plan



Promote multidisciplinary in RDI and growth in strategic areas

- Participation in projects related to the EIT Urban Mobility, EIT Raw Materials and EIT InnoEnergy KICs
- Creation of multidisciplinary research centres:
 - CER Hydrogen (CER-H2)
 - CER Agrotech
- Creation and publication of the Sports Technologies, Landscape Architecture and Circular Economy portfolios
- Design of an energy and ecological transition (EET) roadmap
- Work on the EET portal as a one-stop shop for projects
- Coordination and management of the emerging Looming Factory cluster

Increment de la col·laboració universitat-empresa

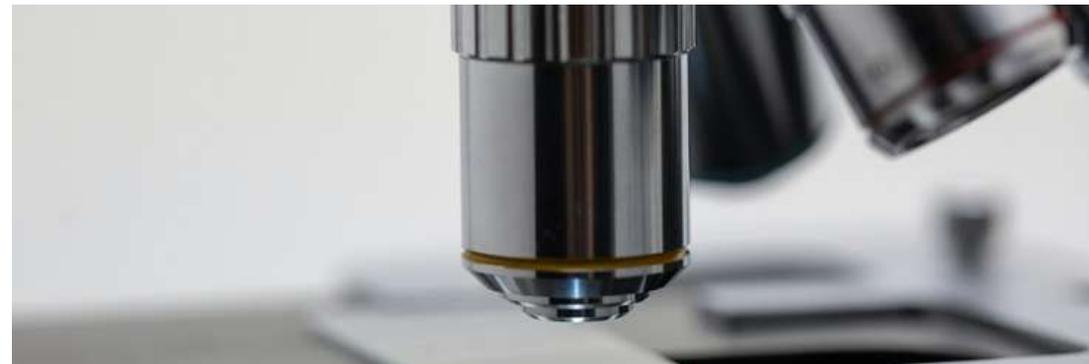
- Scientific and technical services:
 - Addition of new services and design of a communication and promotion action plan
 - New proposal for the structure of the website
 - Audit of internal fees
 - Proposal of UPC infrastructure that could be added to the ESFRI roadmap
- Creation of the Fractus-UPC Deep Tech Hub
- Advisory support to academic staff for various technological valorisation calls: Proof of concept (AEI), The Collider, CaixaImpulse Validate, CIMTI Innovation Call, Knowledge Industry, Llabor, Llabor UPC
- Management of intellectual and industrial property:
 - Submission of 14 priority applications, 11 PCT applications
 - Approval, updating and assessment of transfer activities: PAR and PATT
 - Modification of UPC regulations on industrial and intellectual property rights
 - Signing of 14 technology licences and nine co-ownership agreements
- Valorisation of research:
 - Portfolio of 41 spin-offs
 - Mentoring and support for a number of technology-based companies
 - Fourth edition of the “From Science to the Market” programme to valorise doctoral thesis work
 - Primer programme to create a new training programme on industrial tech pre-acceleration
 - Participation in leading RDI networks: XaFIR, Xartec and BlueNetCat

2022 summary

Development of the pillars of the RDI strategic plan

Foster entrepreneurial culture and innovation

- Emprèn UPC entrepreneurship programme:
 - Mentoring of projects and support in the incorporation of companies
 - Support in more advanced stages of development
 - Closing of financing rounds
 - Mentoring, student training and participation in entrepreneurial ecosystem events
 - Participation in events within entrepreneurial ecosystem
 - Promotion of entrepreneurial idea competitions (Explorer) and support for various hackathons
 - UPC Impuls grants
- Incubation:
 - Addition of new companies to UPC spaces
 - Organisation of seminars and participation in events
 - Sectoral acceleration: future establishment of ESA BIC and unified batch development of the EIT Urban Mobility accelerator
- Innovation hubs:
 - Consolidation of Huawei, Damm and Port of Barcelona hubs
 - Creation of Fractus-UPC Deep Tech
 - Cannabis Hub
- Unique transfer, entrepreneurship and innovation projects in the region:
 - BCN Deep Tech Node
 - University Entrepreneurship Network (XEU)
 - Mobile World Congress 4YFN
 - International innovation networks
 - CESAER network of universities of science and technology



2022 summary

Development of the pillars of the RDI strategic plan

RDI knowledge management

- RDI information systems:
 - Training and tailored pathways for information systems (tools): eTramita, Timesheets and gRDI
 - Time and economic forecasting for delivery notes and revenue in gRDI
 - Management of the RDI space
 - Adaptation of changes in the research travel database
- ICT projects managed in 2022:
 - Management of requests and dossiers for the assessment and evaluation of the ethical component of projects
 - Improvements to the Timesheets tool
 - Substantiation of costs incurred for national and international research projects in 2021
 - Development of the FLUX 2 2023, gRDI and project manager tools, with improvements and integration
 - New accounts receivable intranet
 - IDEAS: creation of a tool for managing intellectual and industrial property
 - SPENT: monitoring of expenditure on research projects
 - CRM: new research project (customer management; new project partners; contacts from marketing actions and research suppliers; parameterisation and classification of suppliers by expertise, activities and applications; exploitation of integrated business intelligence [BI] information, and internal and external promotion)



RDI activity indicators

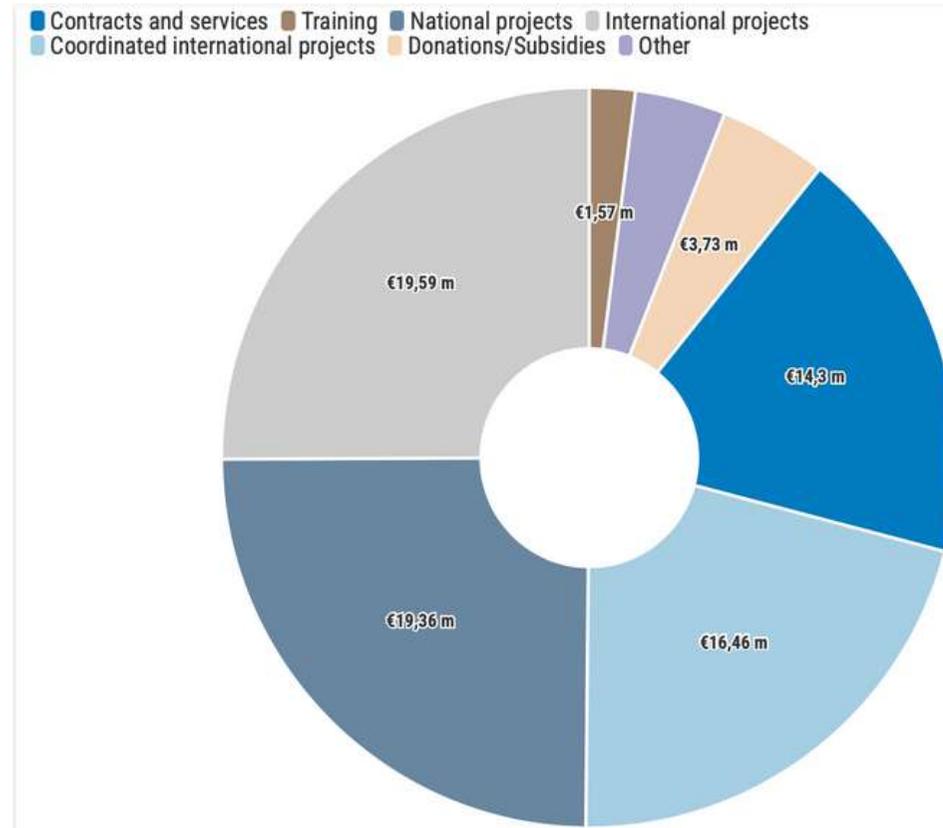
A historic financial year

2022 was a record year for revenue from project contracts, which was nearly double the amount for 2021.



Revenue

2022 Revenue



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Record year for revenue from RDI projects

In 2022, the UPC's **research and innovation** activity generated 78.1 million euros in revenue, of which **36.05 million euros from international projects**(including 16.46 million euros from coordinated projects), **22.57 million euros from collaborations with companies** and **19.36 million euros from national projects**.

Total revenue 2022

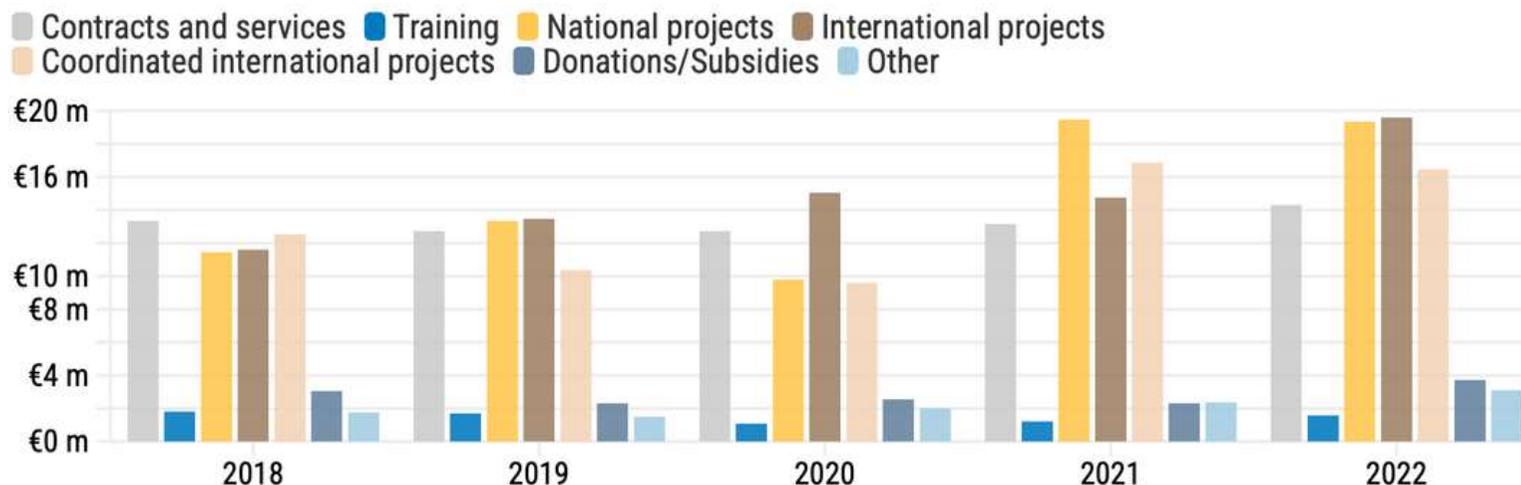
€78.1 m

Revenue

Annual revenue, 2018–2022

34.3% more revenue from international projects and an 11.31% increase in overall revenue compared to 2021.

Revenue from collaborations with companies was also up 8.67% compared to 2021. Overall, revenue was €7.93 million higher than in the previous year.



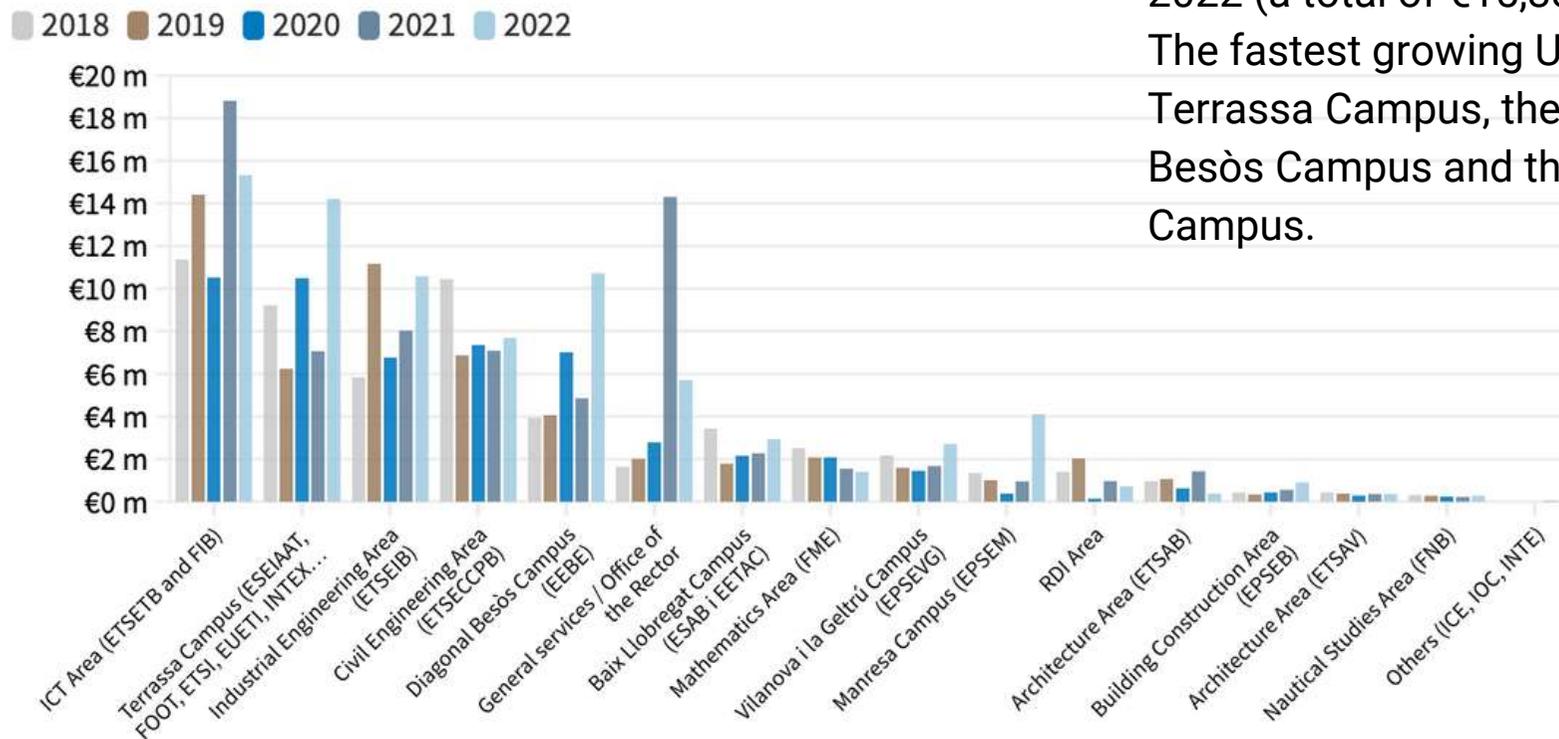
You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Total revenue 2018–2022

€312.2 m

Revenue

Annual revenue, 2018–2022, by UTG



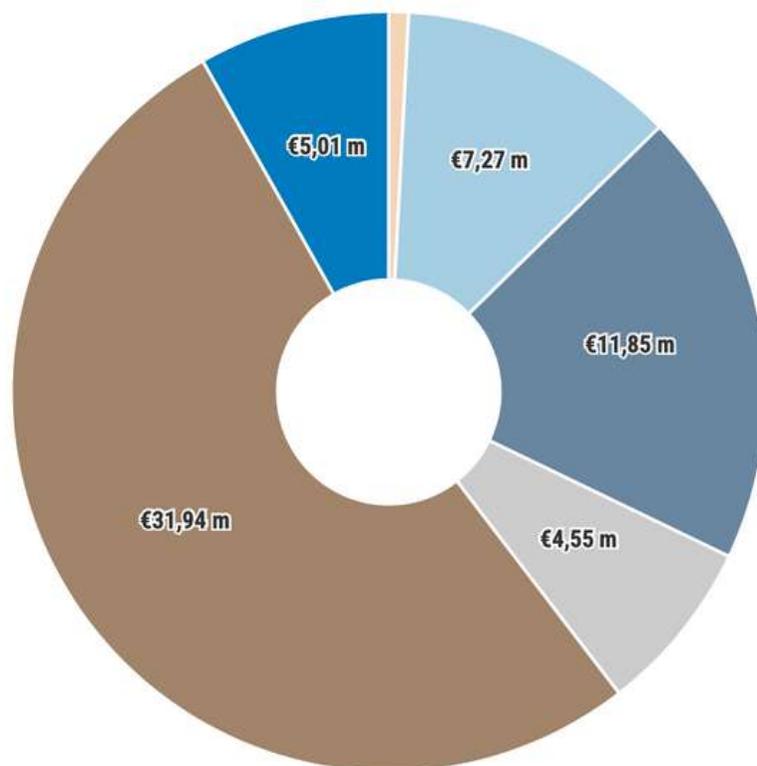
The ICT area (ETSETB and FIB) once again generated the most revenue in 2022 (a total of €15,338,535.00). The fastest growing UTGs were the Terrassa Campus, the Diagonal-Besòs Campus and the Manresa Campus.

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Expenditure

Expenditure 2022

■ Purchases
 ■ Staff
 ■ External services
 ■ Transfers and ordinary subsidies
 ■ Net overhead
 ■ Other expenses



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Expenditure increased by 1.6 million euros compared to 2021.

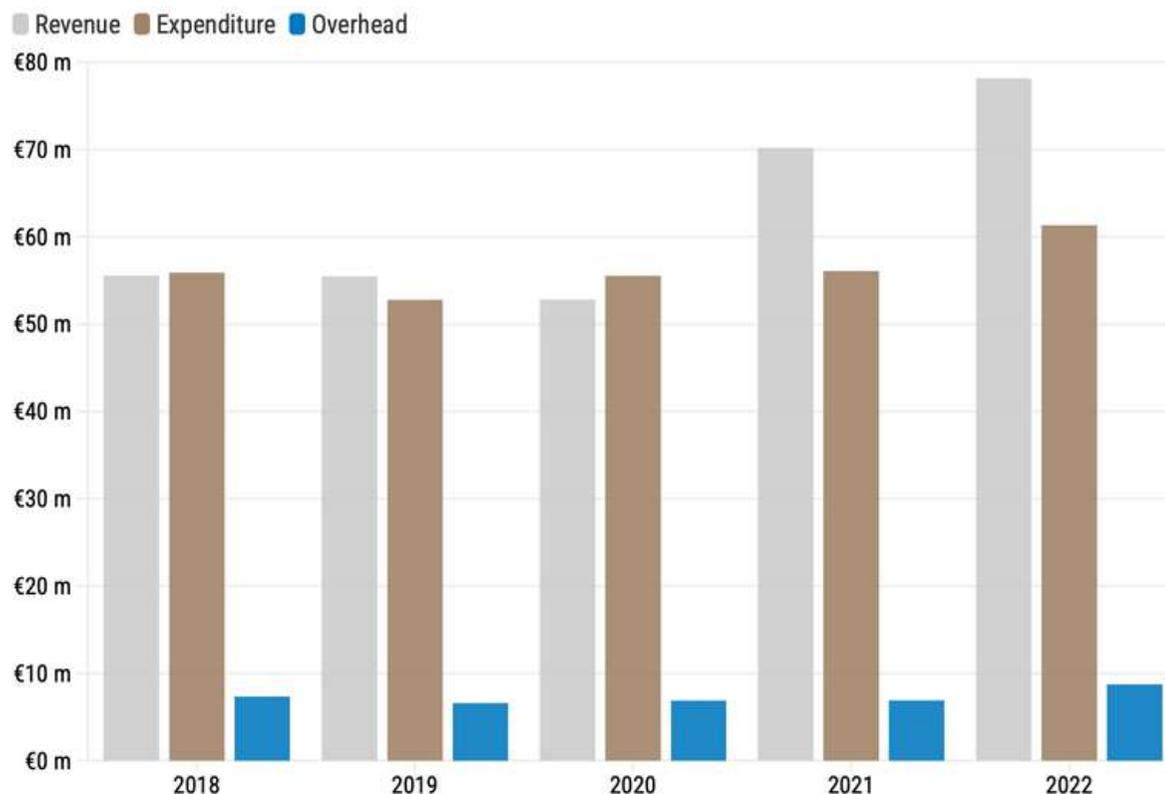
Transfers for coordinated projects, where money is received by the UPC and distributed among partners without any expenditure, are not included in the figures shown on the chart.

Total expenditure 2022

€61.1 m

Revenue and expenditure

Revenue and expenditure, 2018–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The surplus in 2022 was more than double that for 2021.

A difference of €9,595,597 compared to the previous year. Investment in human capital also increased by €3.54 million, as did expenditure on external services, which was €432,691 more than in 2021.

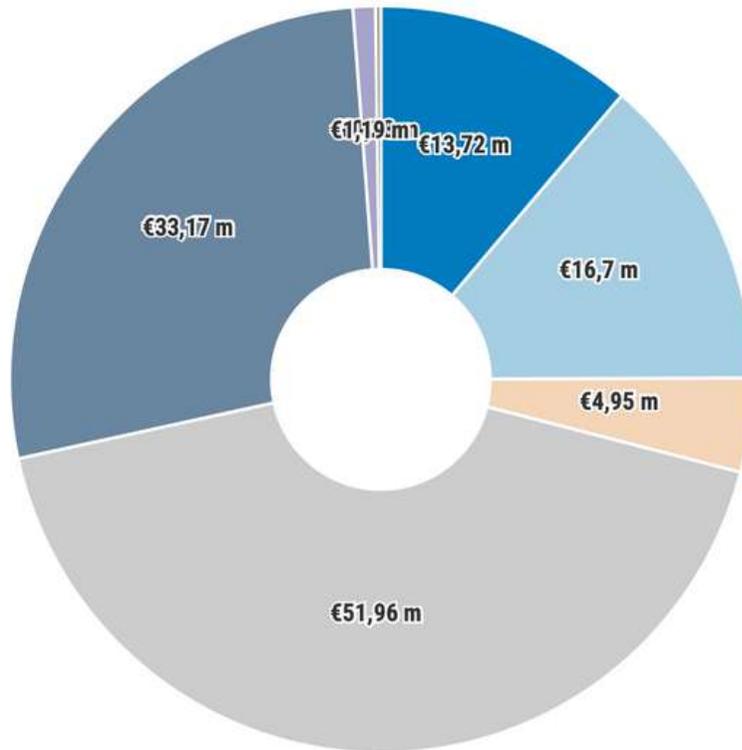
Overhead 2022

€8.74 m

Contract revenue

2022 contract revenue

■ Contracts and services
 ■ Training
 ■ National projects
 ■ International projects
■ Coordinated international projects
 ■ Donations/Subsidies
 ■ Other



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Historic year for revenue from project contracts.

With record figures that are almost double those for 2021.

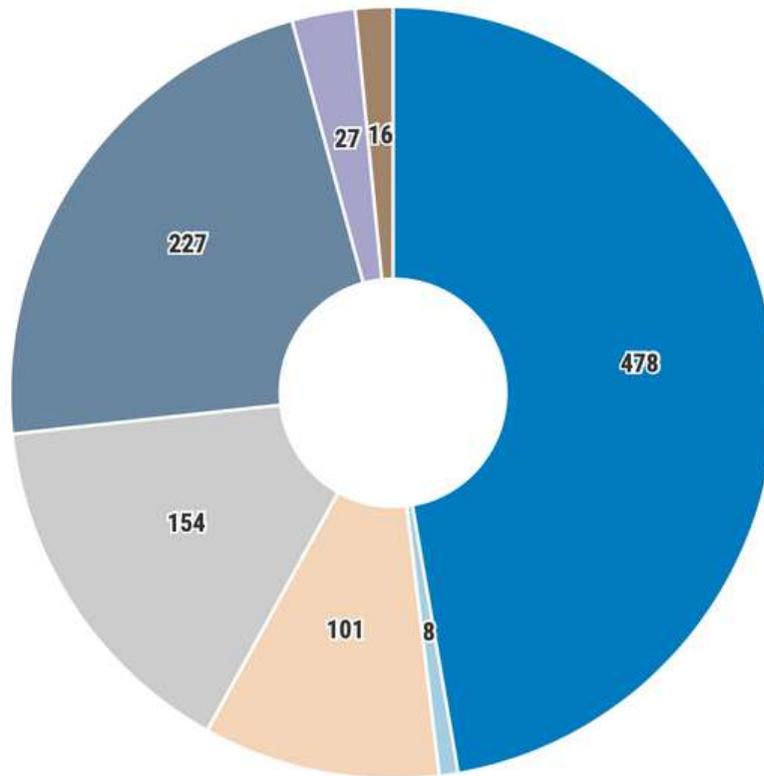
Total 2022 contract revenue

€121.9 m

Contract revenue

Number of projects 2022

■ Contracts and services
 ■ Training
 ■ National projects
 ■ International projects
■ Coordinated international projects
 ■ Donations/Subsidies
 ■ Other



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Contracts with companies accounted for 47% of the total number.

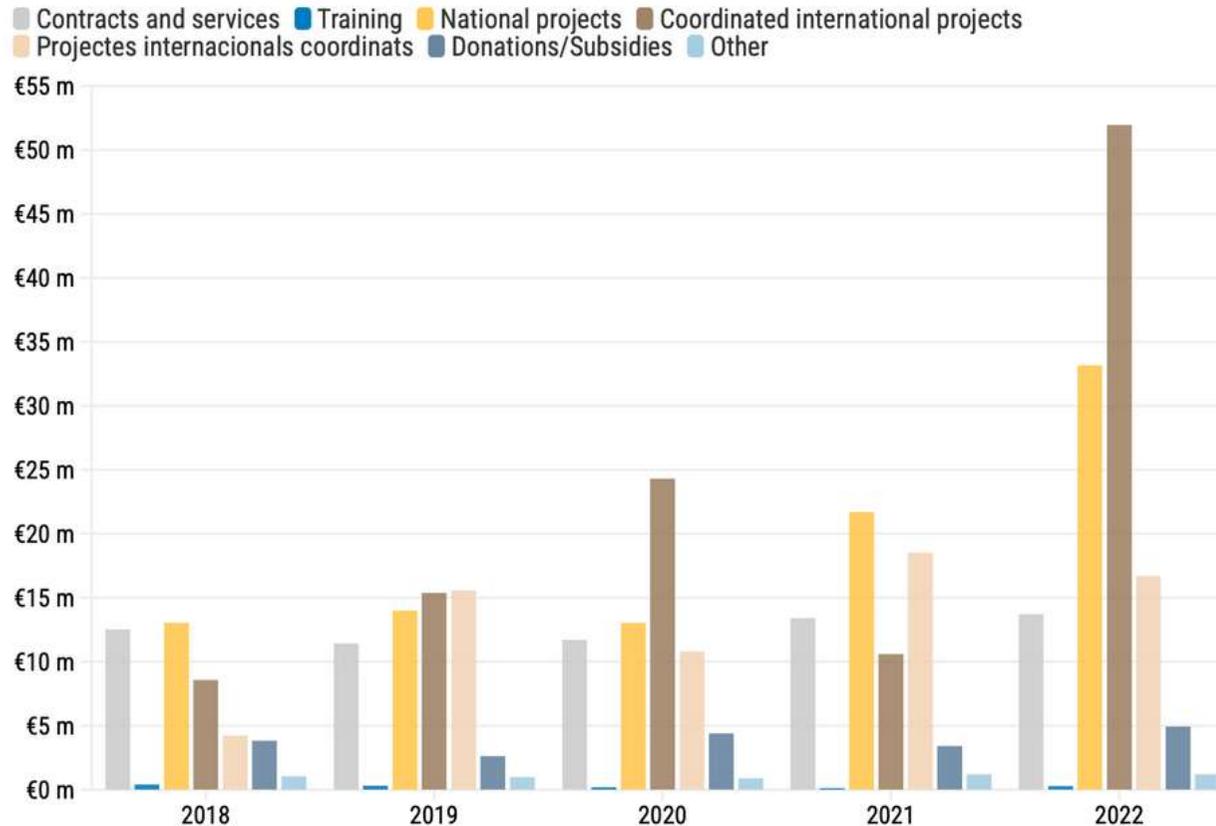
National and international projects totalled 389.

Total projects 2022

1.011

Contract revenue

Evolució anual de la contractació 2018-2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

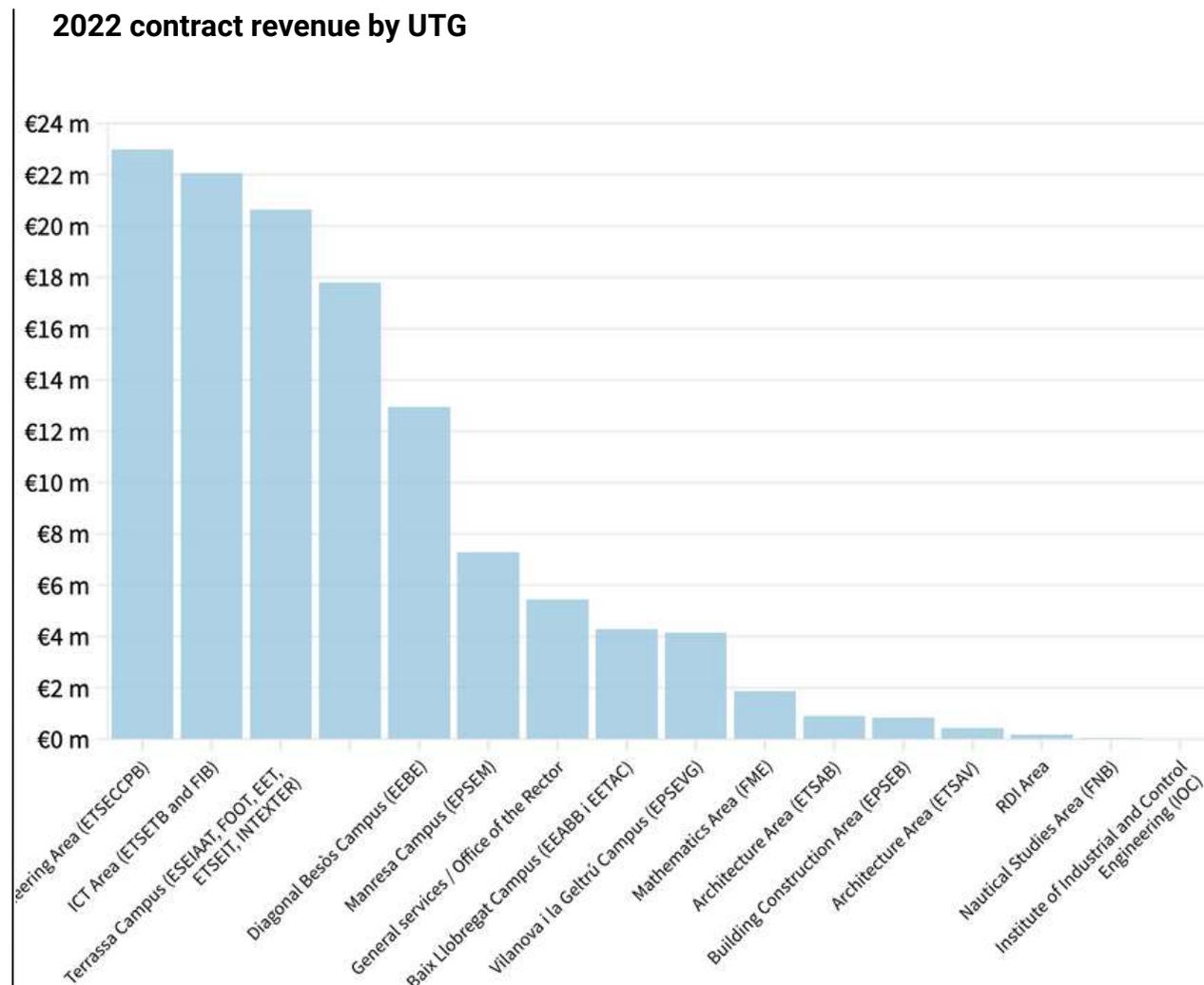
Increase of 53 million euros in contract revenue compared to 2021.

68 million euros from international projects and 33.1 million euros from national projects. In total, the figures were 76% higher than the previous year.

Total contract revenue 2018–2022

€360.4 m

Contract revenue



The Civil Engineering UTG generated the most contract revenue, a total of 22.9 million euros.

The Civil Engineering, Terrassa Campus and Industrial Engineering UTGs had the largest increases over 2021; all of them saw an increase of 13 million euros.

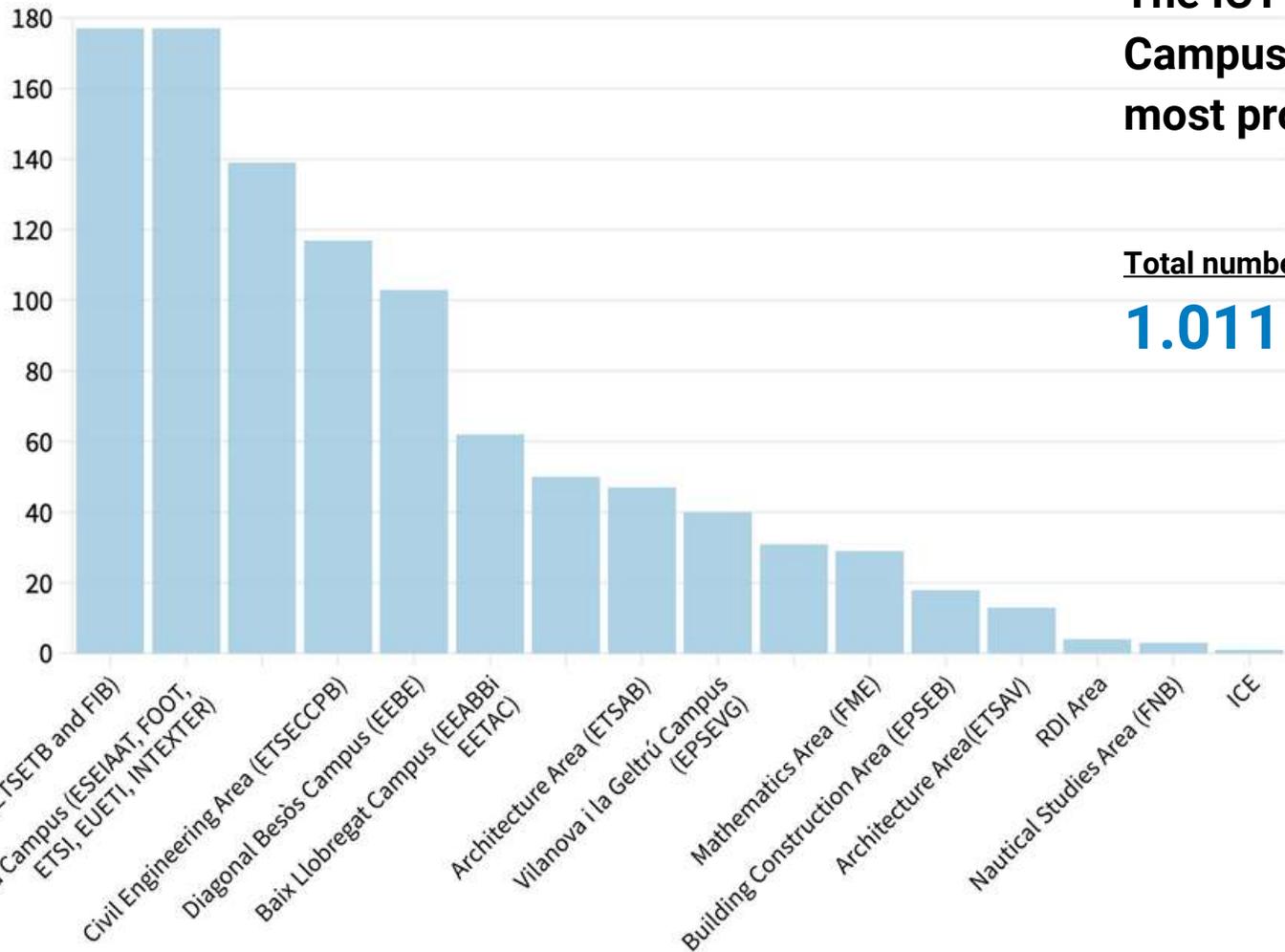
Total contract revenue 2018–2022

€360.4 m

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Contract revenue

Number of projects 2022, by UTG



The ICT and Terrassa Campus UTGs secured the most projects, 177 each.

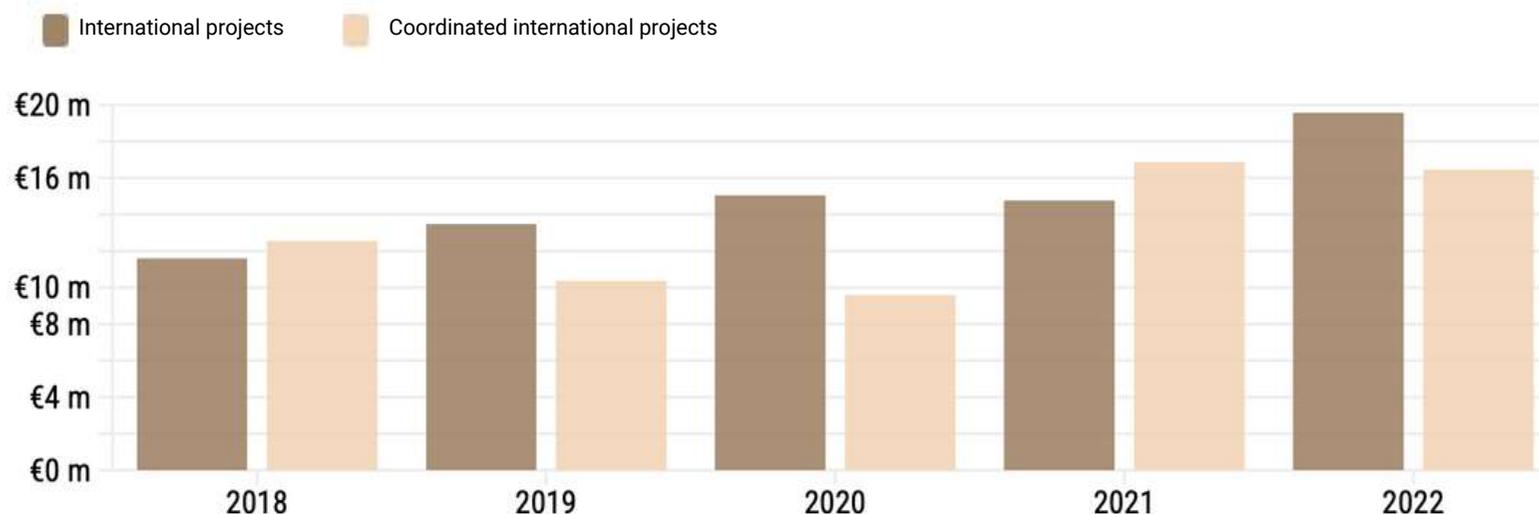
Total number of projects 2022

1.011

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

International projects

Revenue from international projects, 2018–2022



Revenue from international projects increased compared to previous years, while revenue from coordinated projects fell slightly.

Note that revenue for coordinated projects is shared among the partners involved, while in the case of international projects, all of the revenue stays within the UPC.

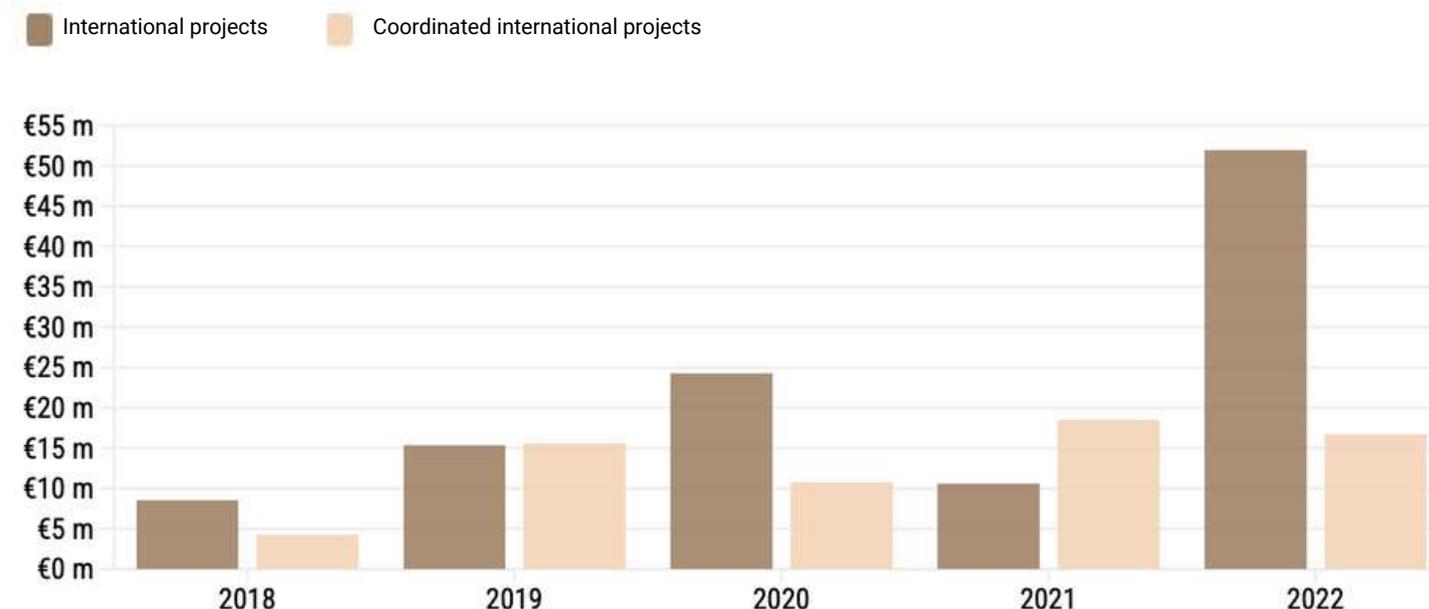
Revenue from international projects, 2022

€36 m

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

International projects

Contract revenue for international projects, 2018–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Contract revenue for international projects increased almost fivefold (from 11 million euros in 2021 to 52 million euros in 2022).

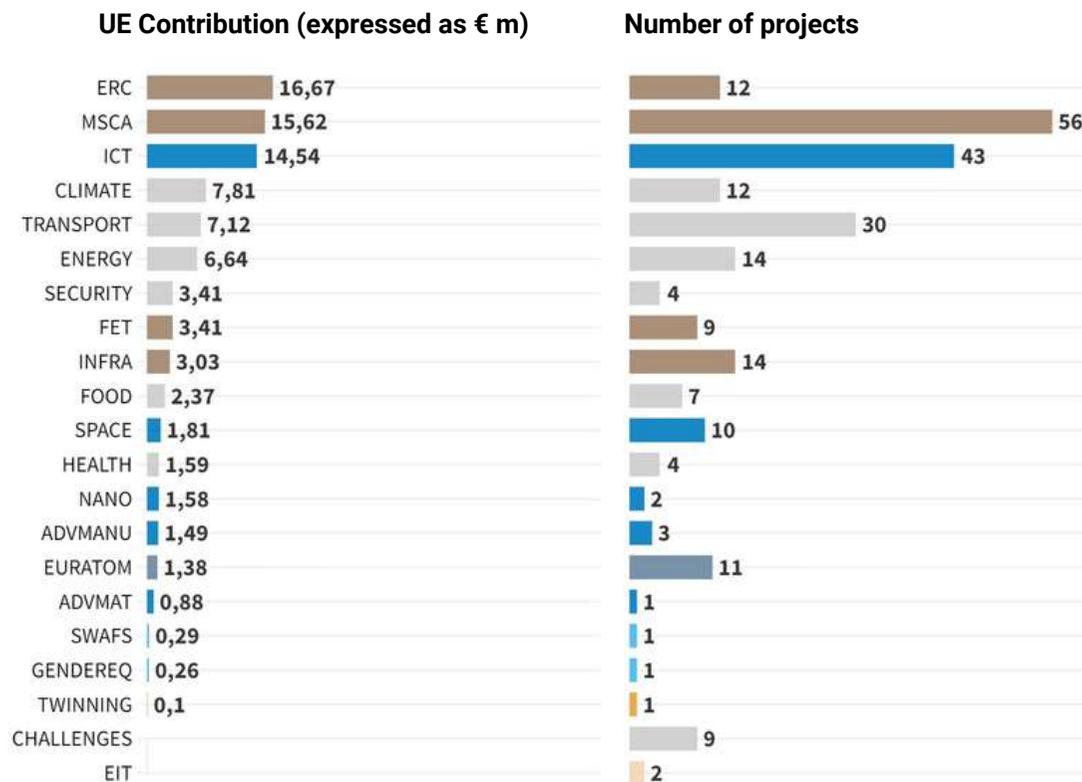
This is due to the UPC's success in attracting funding from the Next Generation programme.

2022 contract revenue for international projects

€68 m

International projects

UPC participation in the Horizon 2020 programme



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The UPC participated in a total of 246 Horizon 2020 projects.

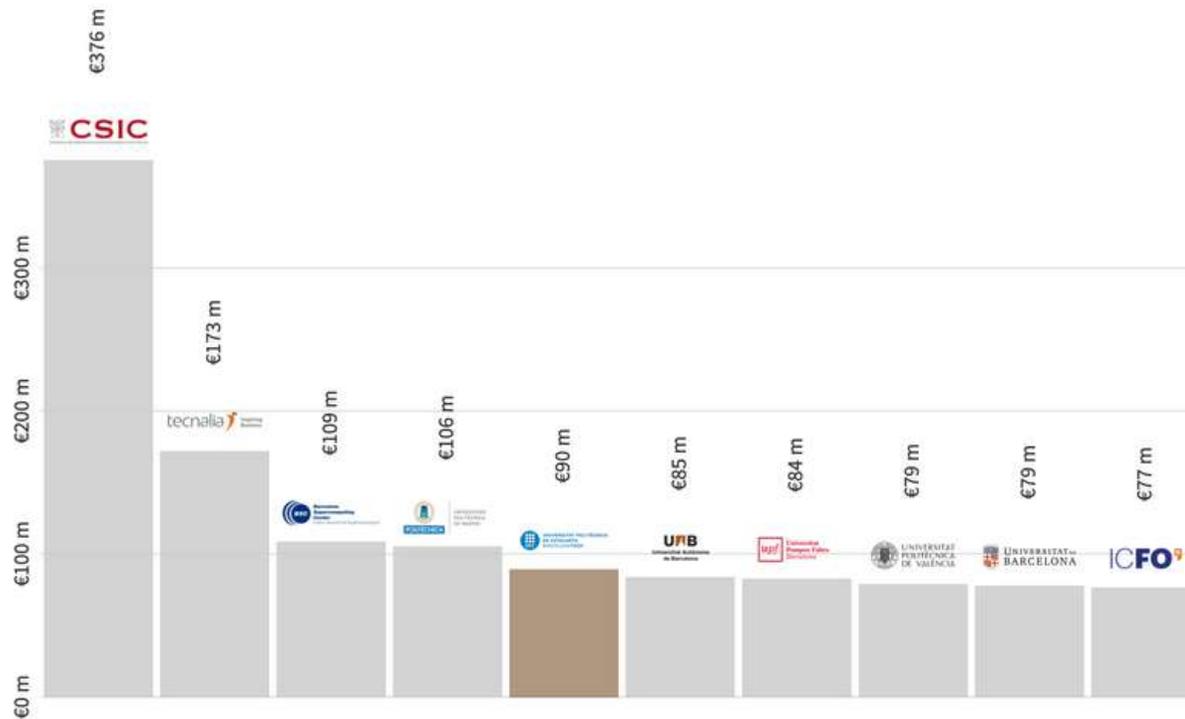
The programmes that attracted the most funding are Excellent Science (in brown), Industrial Leadership (in UPC blue) and Societal Challenges (grey). The largest total amounts were received from the ERC and MSCA programmes and in the ICT area. MSCA is the area in which the UPC secured the most projects.

EU contribution for Horizon 2020 projects with UPC participation

€90 m

International projects

UPC participation in the H2020 programme compared to state entities



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

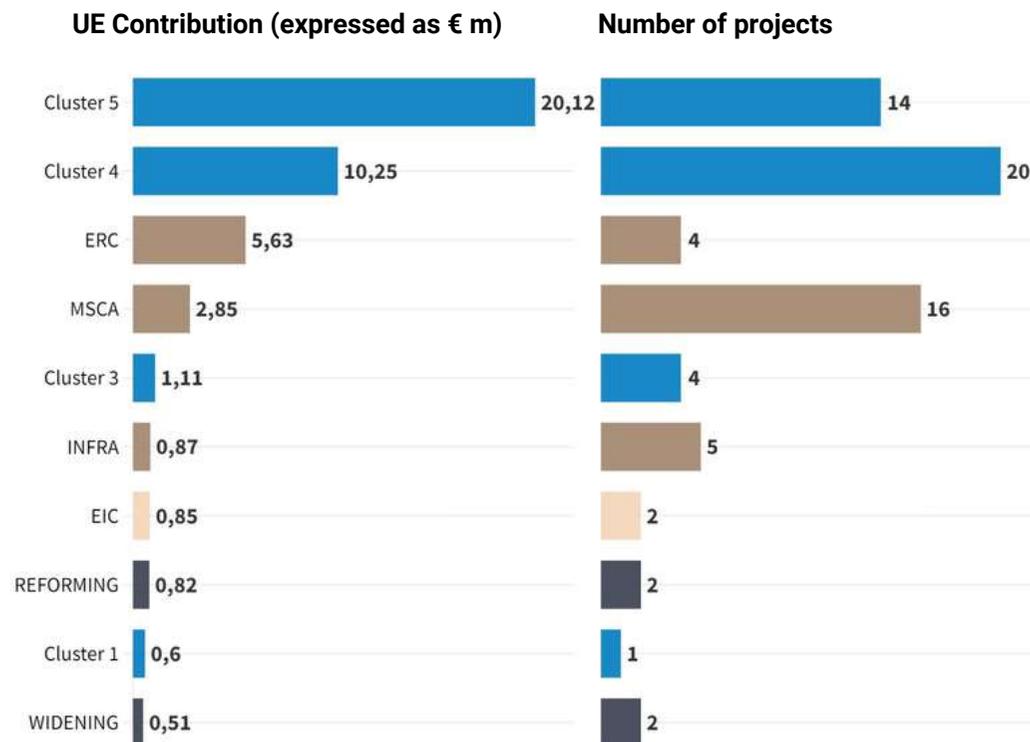
The UPC consolidated its position as the top Catalan university, the second Spanish university and the fifth Spanish entity in attracting H2020 funding.

EU contribution for Horizon 2020 projects with UPC participation

€90 m

International projects

UPC participation in the Horizon 2020 programme



Cluster 1 - Health

Cluster 3 - Civil Security for the Society

Cluster 4 - Digital, Industry and Space

Cluster 5 - Climate, Energy and Mobility

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The UPC signed contracts for 70 Horizon Europe projects in 2022.

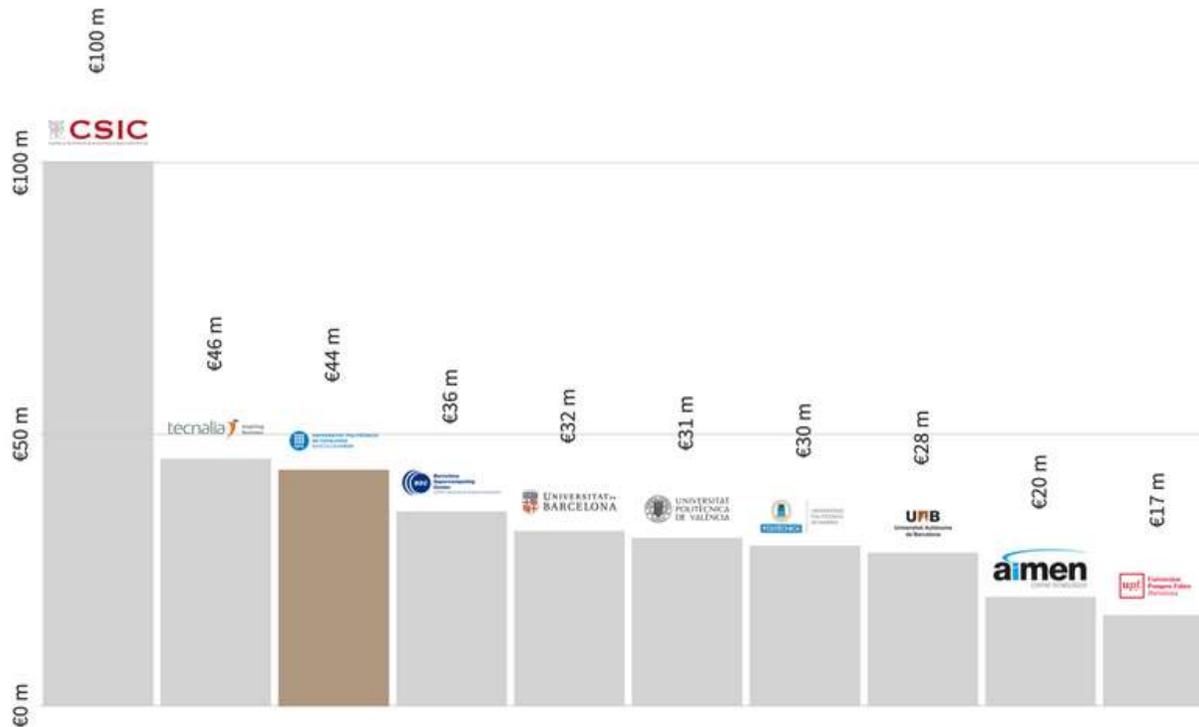
The programmes that attracted the most funding are the clusters (in UPC blue) and Excellent Science (in brown). The clusters in which the UPC participated most were Cluster 5 (Climate, Energy and Mobility) and Cluster 4 (Digital, Industry and Space).

EU contribution for Horizon Europe projects with UPC participation

€43 m

International projects

UPC participation in the Horizon Europe programme compared to state entities



The UPC was the top Spanish university and the leading Catalan research entity in terms of attracting funding from the Horizon Europe programme in 2022.

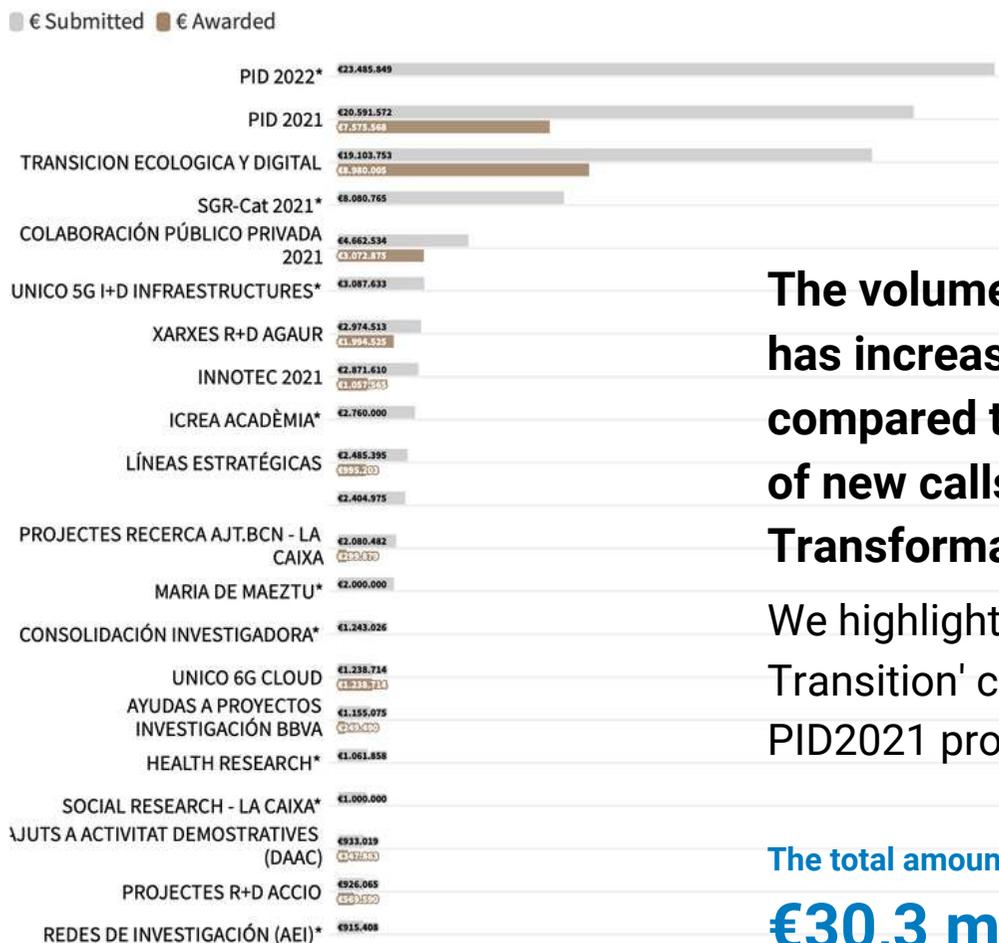
You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

EU contribution for Horizon Europe projects with UPC participation

€43 m

National projects

Applications submitted and national projects awarded by call



The volume of contracting for national projects at UPC has increased significantly, almost doubling compared to previous years, given the large number of new calls funded with resources from the Recovery, Transformation, and Resilience Plan (PRTR).

We highlight the success rate in the 'Ecological and Digital Transition' call (61% in proposals and 47% in funding) and the PID2021 projects (50.5% in proposals and 36.8% in funding).

The total amount granted in 203 projects during the year 2022.

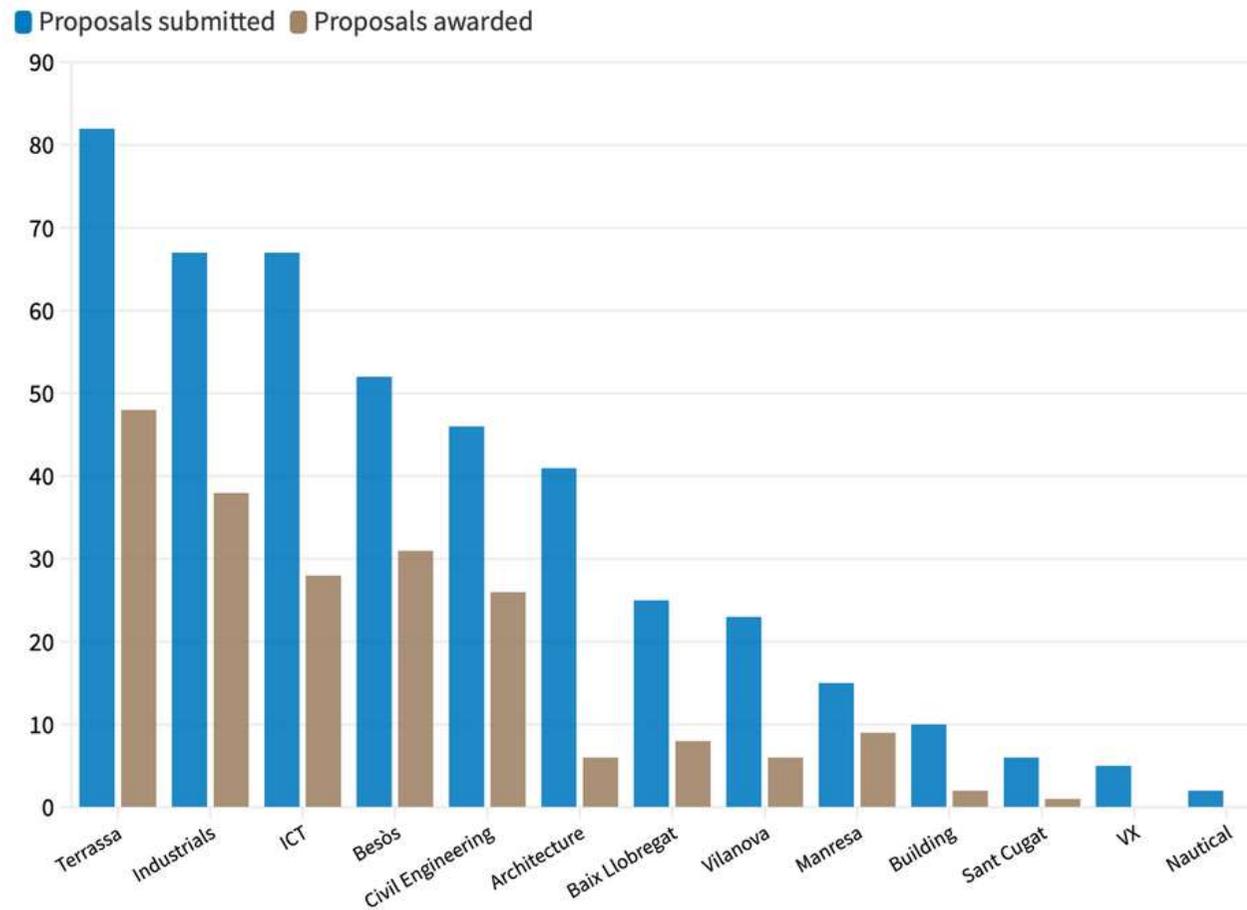
€30,3 m

*sol·licituds de convocatòries pendents de resolució.

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

National projects

Applications submitted and granted for national projects, by UTG (*Unitat Tècnica de Gestió*, Technical Management Unit in english).



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The cross-functional management unit that has handled the most applications in 2022 has been the one in Terrassa, followed by the one in Industrials and the one in Information and Communication Technologies.

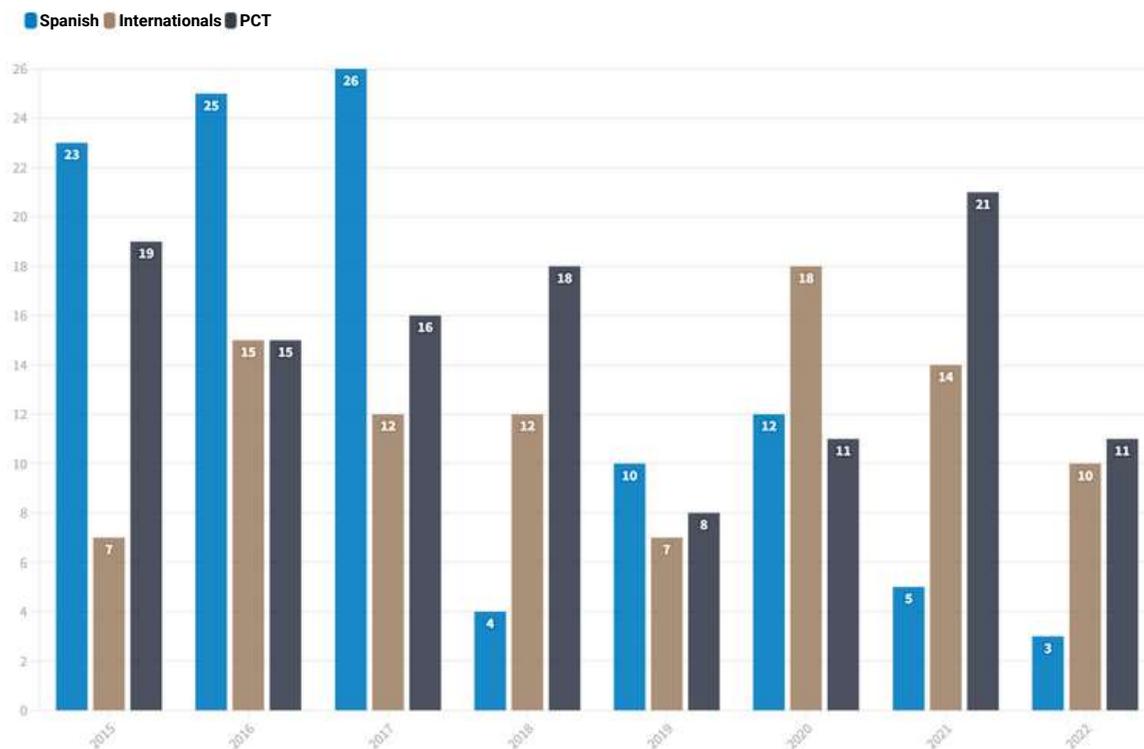
Some granted projects correspond to applications made in 2021, and some requested projects are still pending resolution.

Total number of applications submitted with a total amount of 112.3 million euros.

441

Patents

Number of Spanish, international and PCT patents granted, 2015–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The UPC is the leading university in terms of patents applied for and exploited, having filed more than 500 applications over its history.

In 2022, 13 priority applications were filed, 10 of which were European.

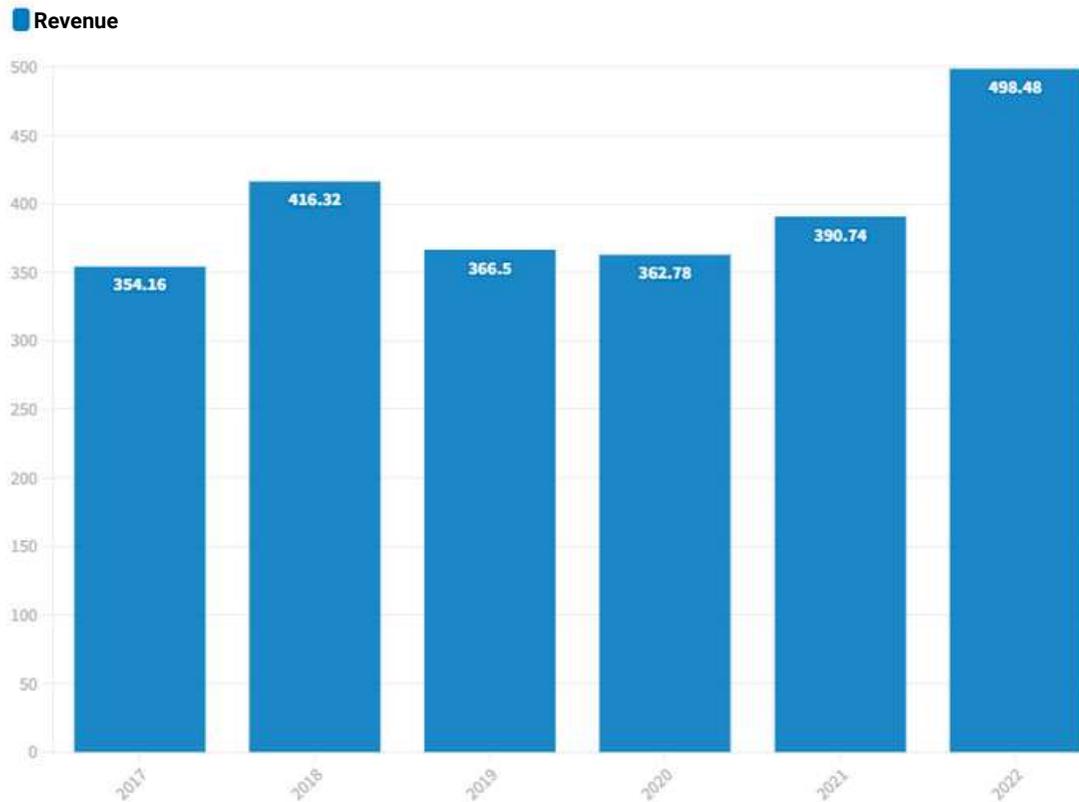
Protection for 11 patents applied for in 2021 was extended through the PCT (Patent Cooperation Treaty).

Priority patents 2022

13

Royalties

Royalty revenue from licences granted to third parties and spin-offs, 2017–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

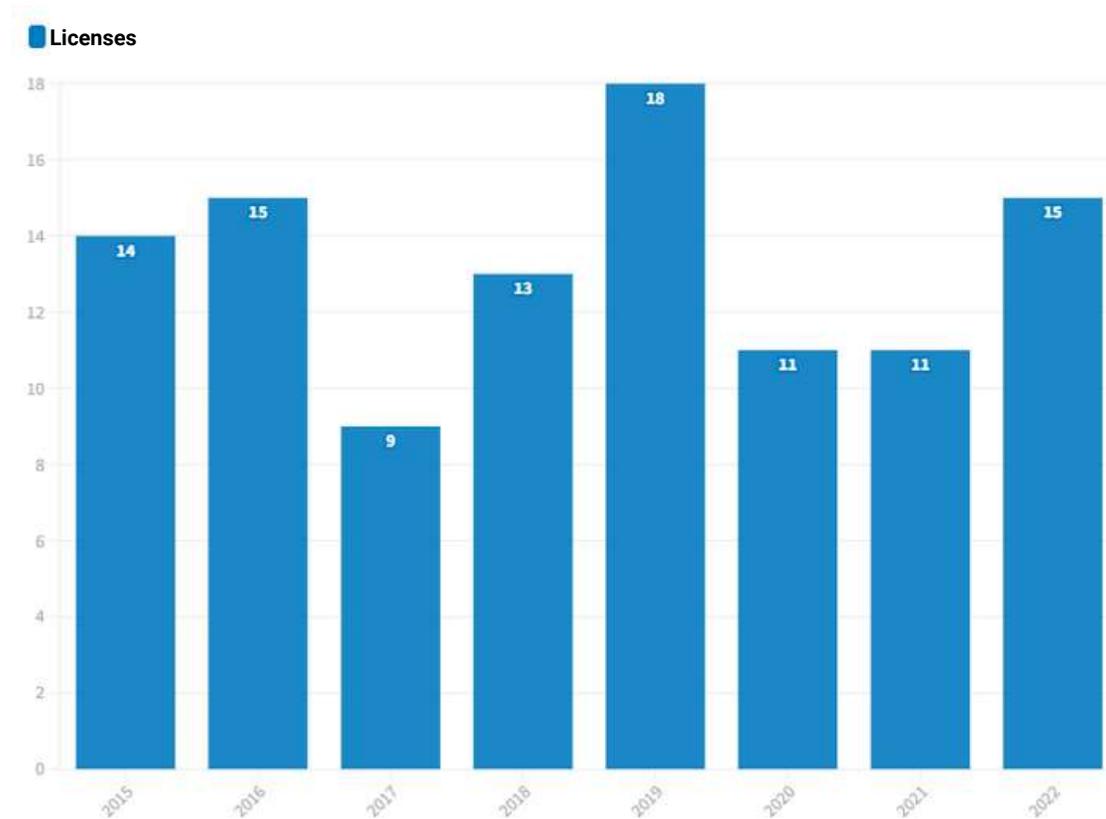
The total revenue of spin-offs in which the UPC had a stake in 2021, which is the basis for calculating royalties for 2022, was 8 million euros.

Royalty revenue 2022

€498,476

Licences

Licences granted, 2015–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

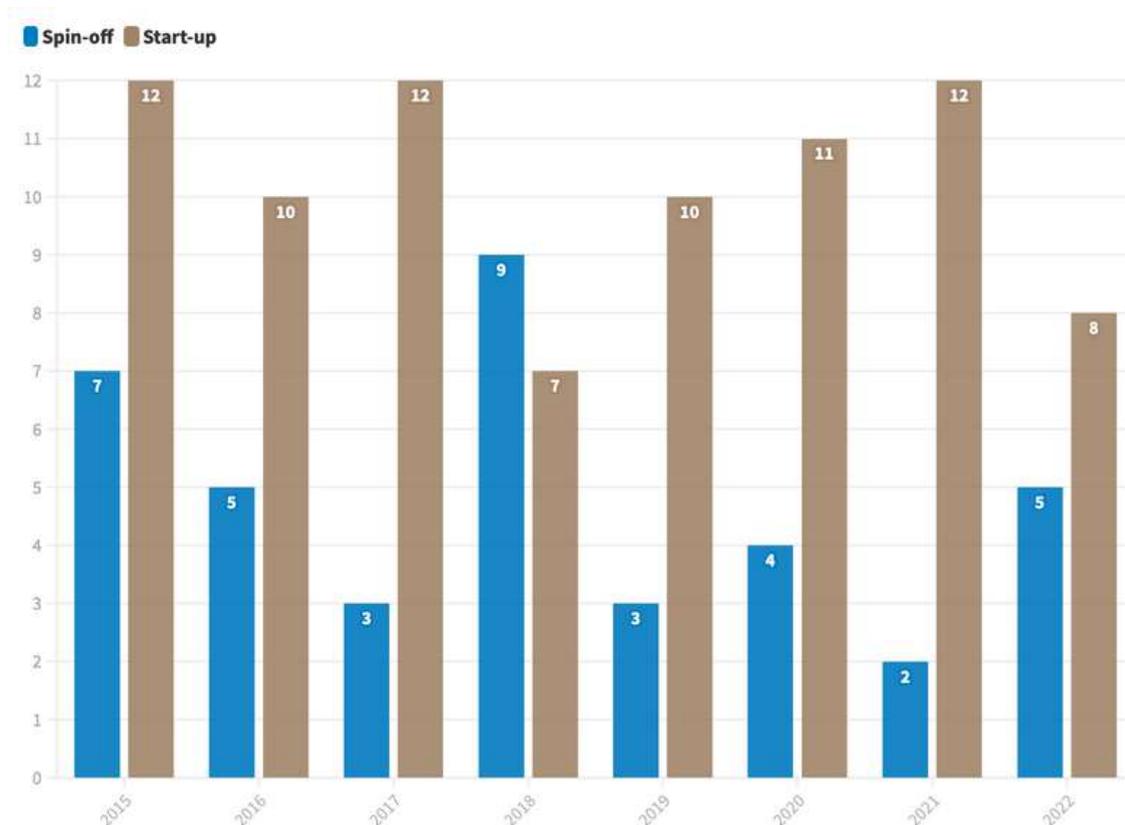
The royalty return from licensing agreements was nearly €500,000 (of which approximately €150,000 was invoiced by spin-offs).

Licensing 2022

15

Technology-based companies (TBCs)

Number of technology-based companies created, 2015–2022



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The UPC mentored and supported the creation of five technology-based companies (spin-offs) and acquired a stake in one created in 2021.

The portfolio of spin-offs in which the UPC has a stake currently includes 41 companies.

TBCs created in 2022

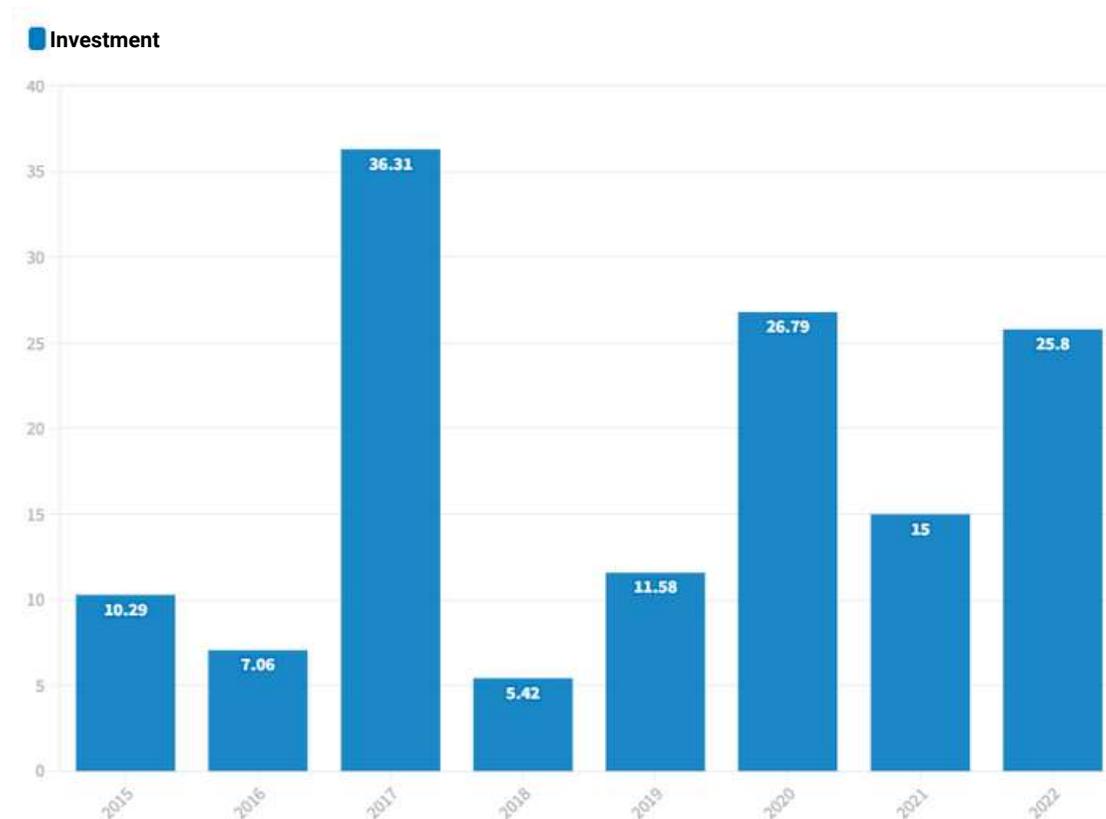
13



Algunes de les EBTs creades el 2022 a la UPC.

Investment mobilised

Mobilisation of capital by TBCs in the form of investment, convertible loans and grants, 2015–2022



The UPC's technology-based companies raised capital in the form of investment, equity loans and grants totalling 26 million euros.

Investment and grants 2022

€25,795,069

You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Economic management

Research project costs substantiated



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

H2020 projects accounted for by far the highest substantiated costs.

In total, more than €45 m in costs were substantiated for 107 projects. State Research Agency projects were much more numerous (504), but substantiated costs were lower (€6.9 m).

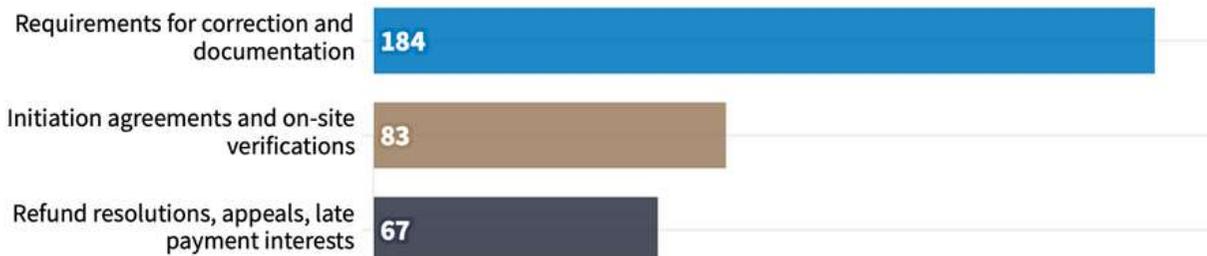
Projects for which costs were substantiated in 2022

765

Economic management

Requests from funding bodies

Number of requirements



Sum of requirements



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

Requests to amend and requests for documentation were the most frequent.

The amount related to these requests was €4.6 m, far higher than the €749,000 for agreements to initiate repayment and on-site verifications, or the €86,000 for repayment decisions, appeals and interest for late payment.

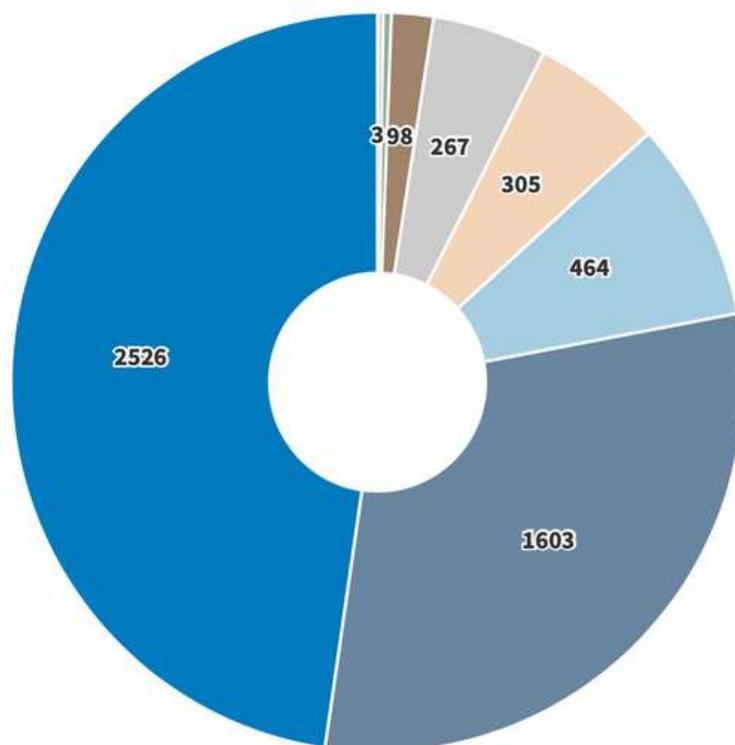
Requests received in 2022

334

Research output

Number of publications

■ Journal articles
 ■ Book
 ■ Conference presentations
 ■ Book chapters
 ■ Scientific and technical papers
 ■ Doctoral theses
 ■ Publication of exhibition catalogues
 ■ Conference proceedings
 ■ Exhibition catalogue chapters



You can customise this chart and consult the data table [in the chart explorer](#) for the 2022 SSRI Report.

The largest number of publications were journal articles, followed by conference presentations and scientific and technical papers.

The total number of publications decreased slightly compared to 2021. However, the number of papers presented at conferences increased.

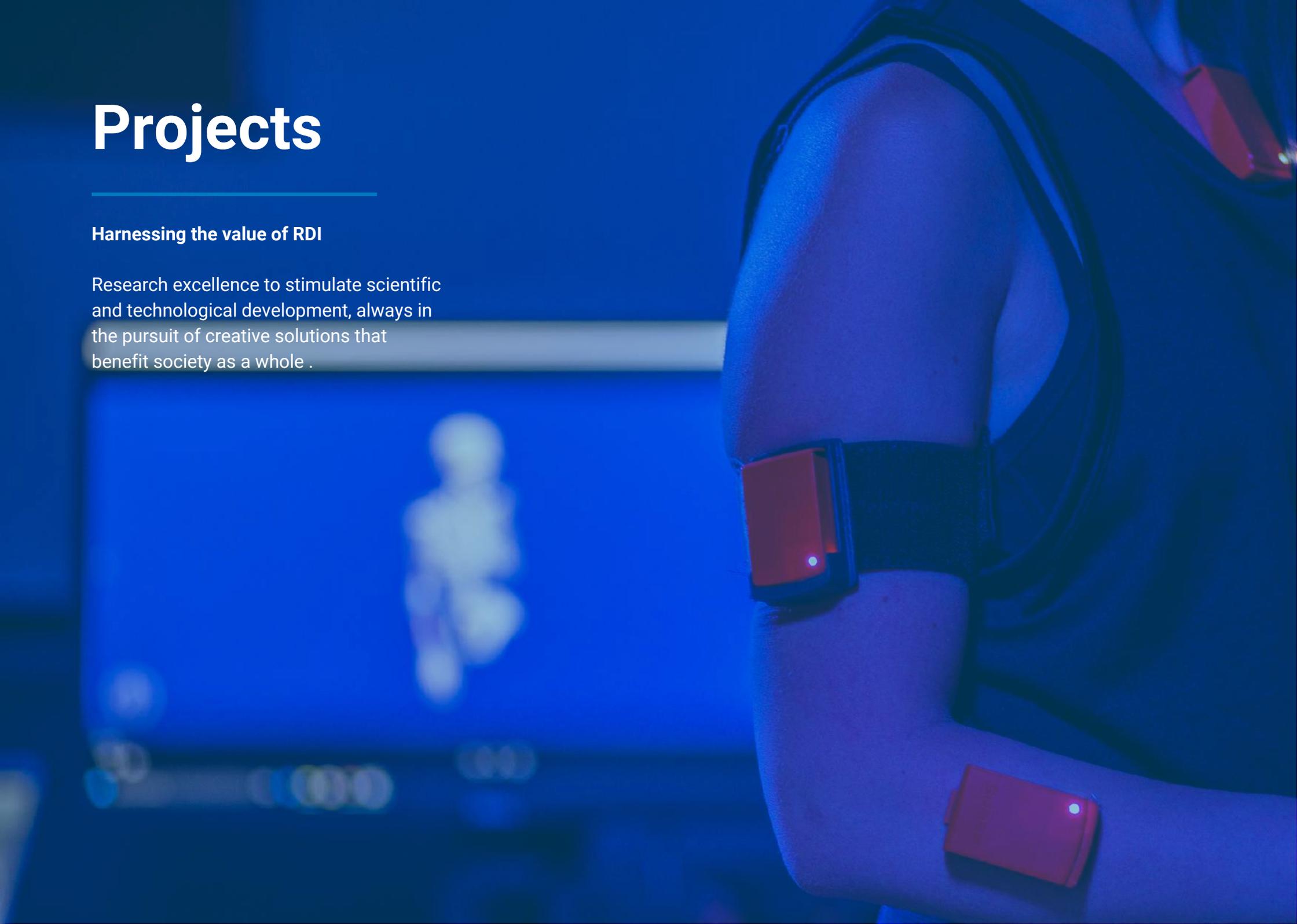
Total publications in 2022

5.295

Projects

Harnessing the value of RDI

Research excellence to stimulate scientific and technological development, always in the pursuit of creative solutions that benefit society as a whole .



Horizon Europe

The UPC, a leading university in attracting funding for European research and innovation projects.

The University is participating in 70 of the assigned projects and leads 12 of them. The projects received a total of 43.59 million euros in funding.

iPLUG

Distributed multiport converters for integration of renewables, storage systems and loads while enhancing performance and resiliency of modern distributed networks.

VERGE

AI-powered eVolution towards opEn and secuRe edGe architEctures.

SCAPE

Switching-Cell-Array-based Power Electronics conversion for future electric vehicles.

VITAMIN-V

Virtual Environment and Tool-boxing for Trustworthy Development of RISC-V based Cloud Services.

CLIMAAX

CLIMAtE risk and vulnerability Assessment framework and toolbox.

RHODAS

Reinventing High-performance pOwer converters for heavy-Duty electric trAnSport.

Excellent research

The UPC also has a strong presence in the Excellent Science pillar. ERC grants awarded directly to four researchers totalled more than €5.5 m.

BAMBBI

Maria Pau Ginebra
Department of Materials
Science and Engineering

WINC

Sergi Abadal
Department of Computer Architecture

SCRAMBLE

Lluís Jofre
Department of Fluid Mechanics

TRANSFORMER

Cristina Canal
Department of Materials Science
and Engineering

16 MSCA projects were awarded to the UPC, including the following:

GAP Noise

Global Acoustic interaction and Psychoacoustic impact of the autonomous vehicles in interior and exterior NOISE.

CO2FOREARM

Fundamental Study of CO2 Storage through Microbially Enhanced Carbon Mineralization.

ADOReD

Accelerating the Deployment of Offshore wind using Dc technology.

Vortexons

Vortices with massive cores in quantum matter.

State Plan for Scientific, Technical and Innovation Research

RDI projects in strategic lines of action

- **3D (bio)printing for integrating BIOMimetic Electronics into Engineered Tissues:** A giant leap in regenerative medicine (3D-BIOMEET).
- **Cold plasma at atmospheric pressure:** a physical therapy for the global management of paediatric bone cancer (Plasma4KidsCancer).
- **New manufacturing strategy for 3D printing** by developing a novel head enabling DLP multi-material printing technology - DLmultiPrint.

UNICO Programme – Digital Infrastructure for Cohesion – R&D Cloud

PLATON – Federated machine learning for electricity distribution networks.

Universalisation of Digital Infrastructure for Cohesion (UNICO) programme, R&D 6G 2022

Submission of two proposals: 6G-OpenLab and Laboratory for 6G Communications-Sensing Convergence.

Complementary plans

Complementary Quantum Communication Plan, "RDI in the area of quantum communication" sub-project, led by the ICFO, with a grant of €167,000 for the UPC.

Complementary Plan for Astrophysics and High Energy Physics, "Advanced technologies for exploring the universe" sub-project, led by the IFAE, with a grant of €600,000 for INTE-UPC.

PERTE project: Electric and Connected Vehicles D-HUB

The UPC participated in the proposal for one of the 10 projects awarded in the first call in the PERTE project to develop electric and connected vehicles: **the electromobility hub, D-HUB**, which obtained an initial grant of 107.8 million euros.

PROMETHEUS

Award of the PROMETHEUS project in the 2022 MICINN call for dynamisation actions: preparation and management of European projects in 2022 to promote and improve the UPC's participation in the Horizon Europe programme.

Erasmus+

[UPC participates in European project to incorporate content on artificial intelligence into university courses.](#)

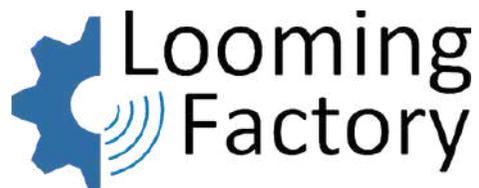
UNESCO Chair of Higher Education Management

The Research and Innovation Support Service participated in the projects [Promoting Modern Talent Management Practices in Asian \(Malaysian and Chinese\) Higher Education Institutions \(aTM\) and World Pendulum Alliance \(WP@ELAB\)](#), part of the Capacity Building for Higher Education action, within the framework of the 2022 programme of the [UNESCO Chair of Higher Education Management](#), in the final stage.

Participation and coordination of hubs

Looming Factory emerging cluster

The SSRI coordinated and managed the emerging cluster [Looming Factory](#), an Industry 4.0 project within the framework of the RIS3CAT strategy, with co-financing from the European Regional Development Fund (ERDF). Nine entities participated in the project as partners, and the UPC's SSRI led the main lines of action and the objectives achieved. The project ended in 2022.



Digital Innovation Hub of Catalonia (DIH4CAT)

The project consists of seven nodes in the following technological areas: **Cybersecurity**, Smart Connectivity, Additive Manufacturing and 3D Printing, Advanced Manufacturing and Robotics, Photonics, Supercomputing and Artificial Intelligence. The SSRI carried out project design tasks, organised and prepared the action plan for training work packages, and coordinated the **Cybersecurity Node**.



Digital Impulse Hub

The Digital Impulse Hub (DIH) is an alliance between chambers of commerce, universities and local government to **help digitise SMEs and local government in Catalonia**. The DIH addresses challenges, provides digital solutions and seeks resources to support these entities in the digital transformation process.



Specific Centre for Hydrogen Research

Harnessing the full potential of the UPC in the field of hydrogen

In March 2022, **management of the UPC's Specific Centre for Hydrogen Research was launched with the aim of boosting hydrogen technologies** and the University's activities in this field. The RDI Area is supporting the start-up of the centre. This support includes actions such as defining strategy, organising governance, representing the Centre, designing the workspace, establishing institutional relations, seeking and presenting funding opportunities and developing the website.

Institutional support accelerates the establishment of the Centre, enabling different groups to contribute to the activity in a multidisciplinary way.

The Centre currently has 39 members from nine research groups based at three UPC schools: CITCEA, CREMIT, CTTC, CIEFMA-PROCOMAME, ENMA, GReCEF, NEMEN, R2EM and SAC. The aim is to bring in new research groups that complement the Centre's expertise.



Researcher Attila Husar speaking at the [Hydrogen Symposium: Opportunities and Strategies](#).

Agri-Food Technology Specific Research Centre

Bringing research, innovation and technology transfer closer to the agri-food sector

With the aim of bringing research, training and technology transfer closer to the agri-food sector, the **Agri-Food Technology Specific Research Centre was inaugurated in June 2022**, with a team of more than 60 researchers from 16 UPC research groups.

The Centre has facilities spread across the various UPC campuses and focuses on five main research areas: **precision agriculture** (mechanisation, robotics, remote sensing, etc.); **plant production** (biotechnology, greenhouses, horticulture, etc.); **valorisation** (biomaterials, plant fibres, circularity); **digitalisation** (machine learning, artificial intelligence); and **sustainability**(biodiversity, climate change, renewable energies, etc.).

The opening of the Centre is a great opportunity to put the UPC brand at the forefront of research in the agri-food sector and bring technological progress to the field to boost production and quality while reducing the environmental footprint of activities in this area.



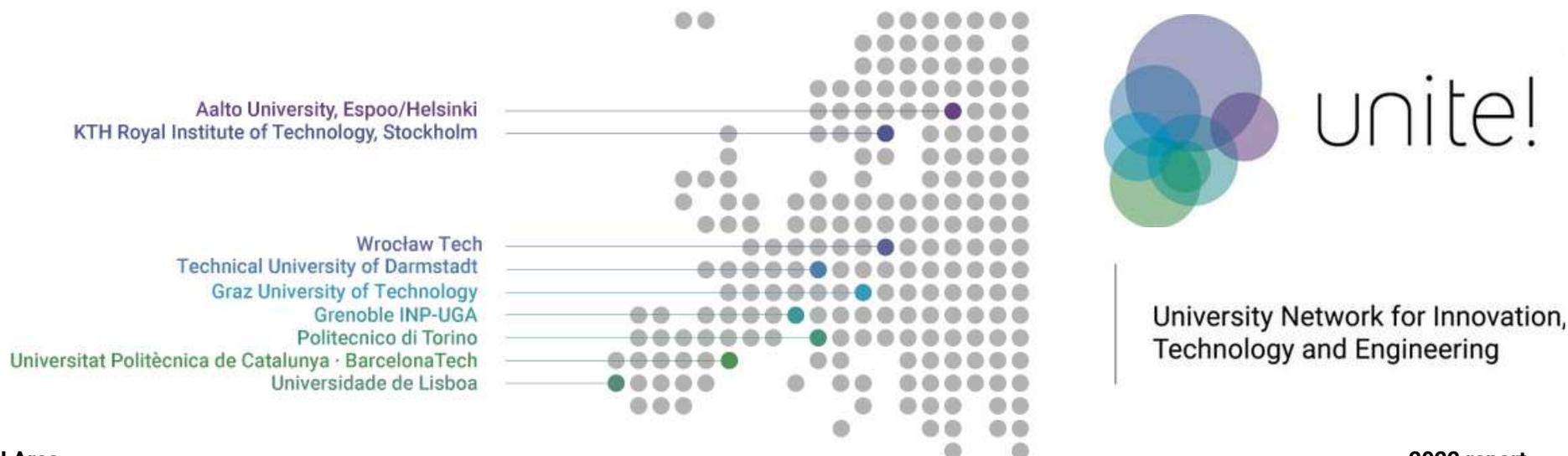
Unite! University

Consolidation of the alliance, with the continuation of the pilot project launched in 2019

In 2022, the [Unite! alliance](#) received **14.4 million euros** in funding to initiate the second stage of the project Erasmus+, which will bring in two additional partners: Graz University of Technology (TU Graz) and Wrocław University of Science and Technology in Breslau (Wrocław Tech).

Within the framework of the alliance, the **University Partnership for Acceleration of European Universities (aUPaEu) project** received **3.4 million euros** in funding from the European Commission to design, integrate and implement acceleration services for European universities.

As for research and innovation, within the **Unite! H2020 project**, in which an integrated, shared and long-term research and innovation strategy is being developed, the **midterm report was presented and work began on implementation of pilot initiatives**, which will enable tangible results to be obtained towards institutional transformation and the identification of good practices for modernising RDI.



Technological valorisation and knowledge transfer

Support to researchers in valorisation calls to advance the TRL process in the market

AGAUR's Knowledge Industry Call, in the Seed, Product and Innovators categories. A total of **20 LRT projects** were awarded to the UPC, with a total budget of **€1,543,736**.

AEI Proof of Concept Call, **eight projects** to bring technologies closer to the market, with total funding of **€915,055**.

UPC Llabor Call, valorisation of **four projects** in the first TRL stages, with a total budget of **€50,000**.

The Collider call, two projects (**Muvity** from the CREB and **N2B2** from the CRIC) in the Mobile World Capital Foundation programme. The 2021 project was set up as a spin-off (**eRoots Analytics, S.L.**).

CIMTI Innovation Call, two projects selected to take part in the training and mentoring programme in 2023: **MV-Optimizer** and **Muvity**.

CaixaImpulse Validate call, **two projects** selected to be interviewed and apply for funding.



Licensing agreements are a way to connect with the business fabric and transform the knowledge generated by the UPC's research groups and centres into productive value.

15
confidentiality agreements

7
co-ownership agreements

15
licensing agreements

Boosting innovation

Pre-incubation

Projects participating in the **Emprèn UPC** entrepreneurship programme receive advice from the programme team and access to mentors and experts in different areas.

€90,000

in Impuls UPC grants

+100

projects supported

+1000

students trained

8

start-ups created

Parc UPC

The Parc UPC incubator enables the creation of an innovation ecosystem that provides infrastructure and services to companies and entities.

Twenty-five requests for spaces were handled, and five new companies were brought into UPC facilities. Services are currently being provided to a total of **51 companies and entities being incubated in Parc UPC buildings.**

Thirty events were organised by UPC Incubation in collaboration with other institutions (APTE, XPCAT and XaFIR).

The participation of companies incubated in the UPC ecosystem as speakers was promoted.



Acceleration

Four programmes with over 70 projects per year.

The UPC is coordinating a winning project: **ESA BIC 2022–2027**. Incubation of up to 18 companies in three years + €50,000 grant.

EIT **South urban mobility** acceleration programme, led by the UPC. In 2022, 73 European companies were included (top programme in EITUM applications).

Industrial Tech pre-acceleration programme, coordinated by the UPC with the CIM-UPC Foundation.

Fifth edition of the **From Science to Market** pre-acceleration programme. Coordinated by the UB with the collaboration of the UPC, the UAB and the UPF.

Boosting innovation

Innovation hubs

Identification of technologies, start-up scouting, talent recruitment and synergies.

In 2022, activities connected to active hubs with Huawei, Damm and the Port of Barcelona were consolidated.

The challenge launch programme included 14 companies, 30 challenges, 492 student participants and 16 subjects delivered at five UPC schools.

The new Fractus-UPC Deep Tech Hub –a centre for research activities, where deep tech will be designed and improved–was created.

Innovation in the region

BCN Deep Tech Node

The Deep Tech Summit was held on 22 September, with 888 attendees, 113 speakers, 80+ participating companies and 50+ investors.

Fàbrica Nova, a Manresa

Signing of the fourth generation university campus project in Manresa. The new space will be shared by the Manresa School of Engineering, a secondary school, the Practical Training Centre, and the Manresa City Council's CEDEM.

Mobile World Congress 4YFN

Active UPC participation with the UPC start-up corner and support for 25 entrepreneurial projects.

Sustainable Mobility Training Centre

In 2022 the UPC won a tender to manage the Martorell Automotive Vocational Training Centre. The Centre focuses on transfer, entrepreneurship and innovation in sustainable mobility.



University Entrepreneurship Network (XEU)

24 projects from the 12 Catalan universities. The UPC participated in preparing the action plan for promoting university entrepreneurship.

CACI space in Badalona

Management and governance agreement between CIM, Badalona City Council and the UPC, and preparation of a functional feasibility plan to lay the foundations for the relocation of CIM UPC to the former CACI factory in Badalona in 2024 to create a scientific centre.

Knowledge management

RDI information systems

Tailor-made training and pathways for information systems used by people working in the RDI Area and research support and research units, and other staff involved in these activities.

- [eTramita](#)
- [Timesheets](#)
- [gRDI](#)

Time and financial forecasting for delivery notes and revenue in gRDI

Design of requirements for contracts, agreements and services, as well as automated delivery notes, and scheduling and definition of controls related to project types and amounts to be invoiced, with invoicing alerts for academic staff. Work is currently underway to complete the final operational tests, and production tests have been initiated with the Civil Engineering Management and Support Unit.

ICT projects carried out

IDEAS

Tool for managing intellectual and industrial property and its linkage to SAP EcoFin for financial monitoring and management.

SPENT

Improved monitoring of expenditure on research projects for principal investigators and support staff. Organised by major area of expenditure.

CRM

New research project: management of clients, new project partners, contacts from marketing actions and research suppliers. Parameterisation and classification by knowledge area, activity and application, exploitation of information integrated by BI, and internal and external promotion.



More ICT projects carried out

Application and dossier management tool

A tool for the UPC community, designed to facilitate assessment and evaluation of ethics in research projects.

Timesheets

Improved management, reporting, timesheet templates and data exploitation to optimise the information needed by academic and project management staff.

Fees

Improvements and adaptations to calculations in line with funding body regulations.

gRDI project manager

Improvements to facilitate use of aggregated data and information by academic staff and in decision making. Incorporation of the OSH SIGRIS system.

New accounts receivable intranet

Improvements in functionality and updating of clients, quality of clients and data protection.

FLUX2 2023

Integration and unification of tools and processes for processing and applying for projects, contracts and agreements with clients in the gRDI.



Communication and participation

Bringing RDI closer to the public

We continue to work on effective communication to attract investment, position the area as an example to follow and bring knowledge closer to society at large.

Short information videos

With the aim of increasing participation in RDI projects, the Research and Innovation Support Service conceived and coordinated the preparation of a series of videos in which **UPC research staff offer [advice on how to successfully tackle the stages of an RDI project](#)**.



RDI notifications

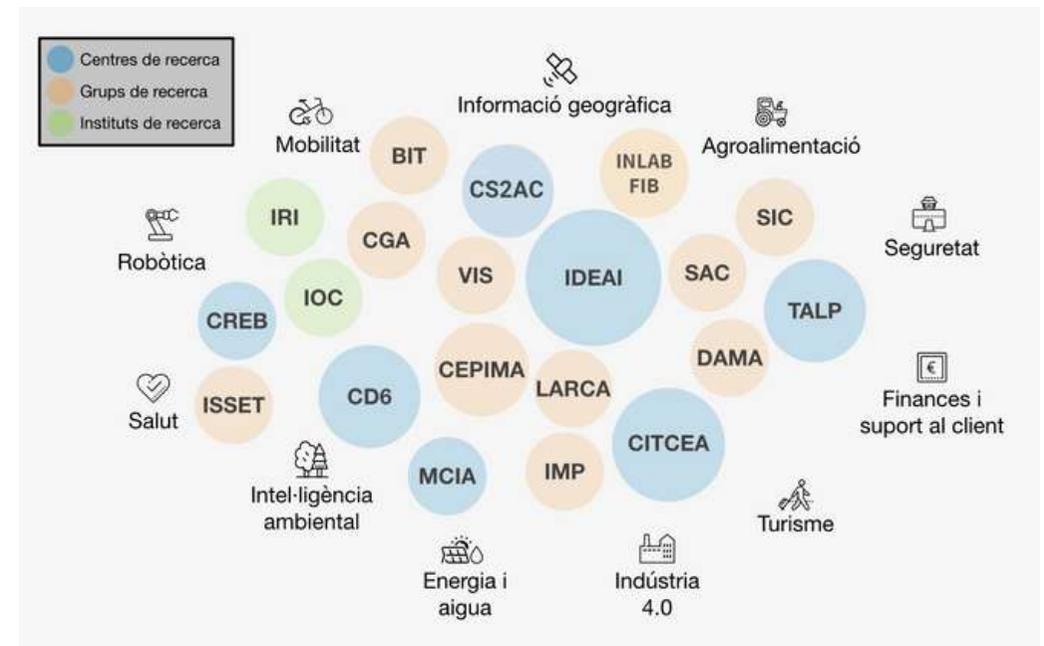
A new system for direct communication with academic staff was implemented thanks to the adoption of the GenNews tool. GenNews is an e-mail manager and editor that, in conjunction with UPC Lists and MyList UPC tools (used to manage subscription lists), has made it possible to standardise the style of all communications sent by e-mail to the various distribution lists and to **improve the internal management of subscription lists** by detecting lists that have expired and creating new ones as required.

RDI digital newsletter

To increase the visibility of the work and results of the University's strategic RDI sectors, the Research and Innovation Support Service provided **support to the Communication Service to create a digital newsletter on artificial intelligence at the UPC**.

Specifically, all data related to research output, notable projects and participation in key networks and alliances were identified and made available.

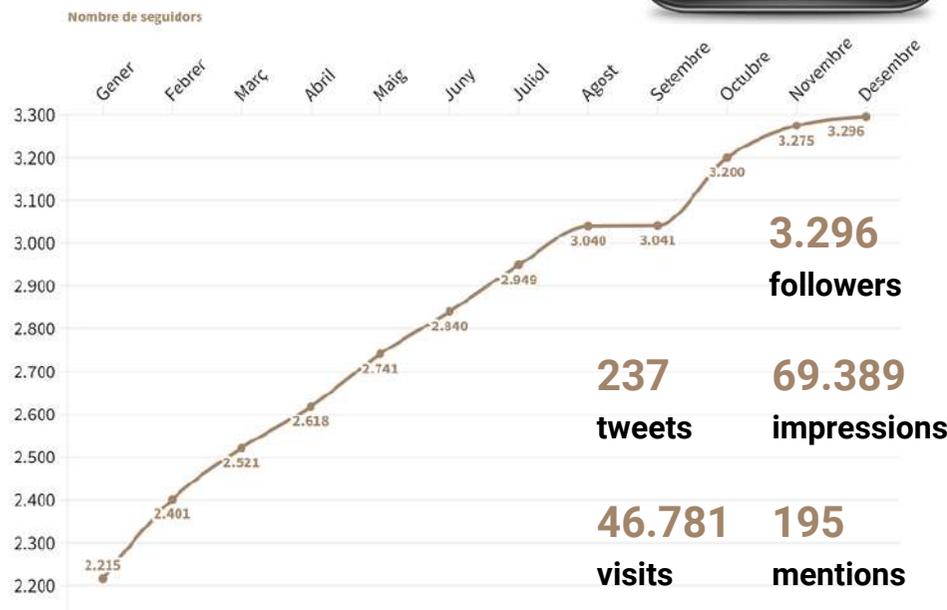
Infographics on artificial intelligence at the UPC were also produced.



Social networks

Twitter [@RDI_UPC](#)

We increased our activity on Twitter, tweeting or retweeting content on a daily basis and interacting with our community of followers. **News related to research and innovation at the UPC, calls of interest to researchers, useful resources and materials, events** organised by the Service, etc.



LinkedIn [Research, Development and Innovation UPC](#)

Much of the content related to the UPC's RDI activity is of great interest to people in the professional, business, educational, academic and technological spheres, but it isn't always a good fit with Twitter's orientation towards current events and immediacy. For this reason, in **July 2022** we opened a profile on the social network LinkedIn.

We are active on Twitter every day, but post less frequently on LinkedIn in order to have a greater impact. With one post per week, we have generated more than **16,000 impressions** in six months within our community, which now exceeds **1,000 followers**.

The two most liked posts were:

[Call for selection tests for specialist staff for the SSRI and the Campus Diagonal-Besòs UTG](#)

23 September 2022



[Presentation of the Looming Factory project demonstrators](#)

22 December 2022



Citizen science



The **relationship between universities and society is becoming very important** and is increasingly reflected in strategies to be pursued. The SSRI continued to **promote and disseminate projects that involve society**. Citizen science projects at the UPC, one of the objectives of the Strategic Plan 2022–2025, continued to be included in the [UPC Citizen Science Portal](#) and the SSRI, together with the Libraries Service, participated in the organisation and staging of the **Third UPC Open Science Day**.

Third UPC Open Science Day

At the event, the UPC Citizen Science Portal was presented and representatives of UPC projects—including the Co-Hab-Raval (REARQ group) and **citizen participation projects** in urban mobility (GPI group and SISCOM group), which receive national funding—gave talks. External agents were also invited to take part. In particular, two representatives from Ideas for Change presented the citizen science projects WeCount and D-NOSES and led a **discussion session on how these initiatives can act as a lever for social change**.

UPC Social Engagement Day

In July, the SSRI also participated in the **UPC Social Engagement Day**. At the round table **Why, how and with whom do we share knowledge?**, the SSRI acted as content coordinator, managed moderation and gave a presentation on science communication, open science and citizen science, which included a discussion with two representatives of UPC research staff.



RDI Area

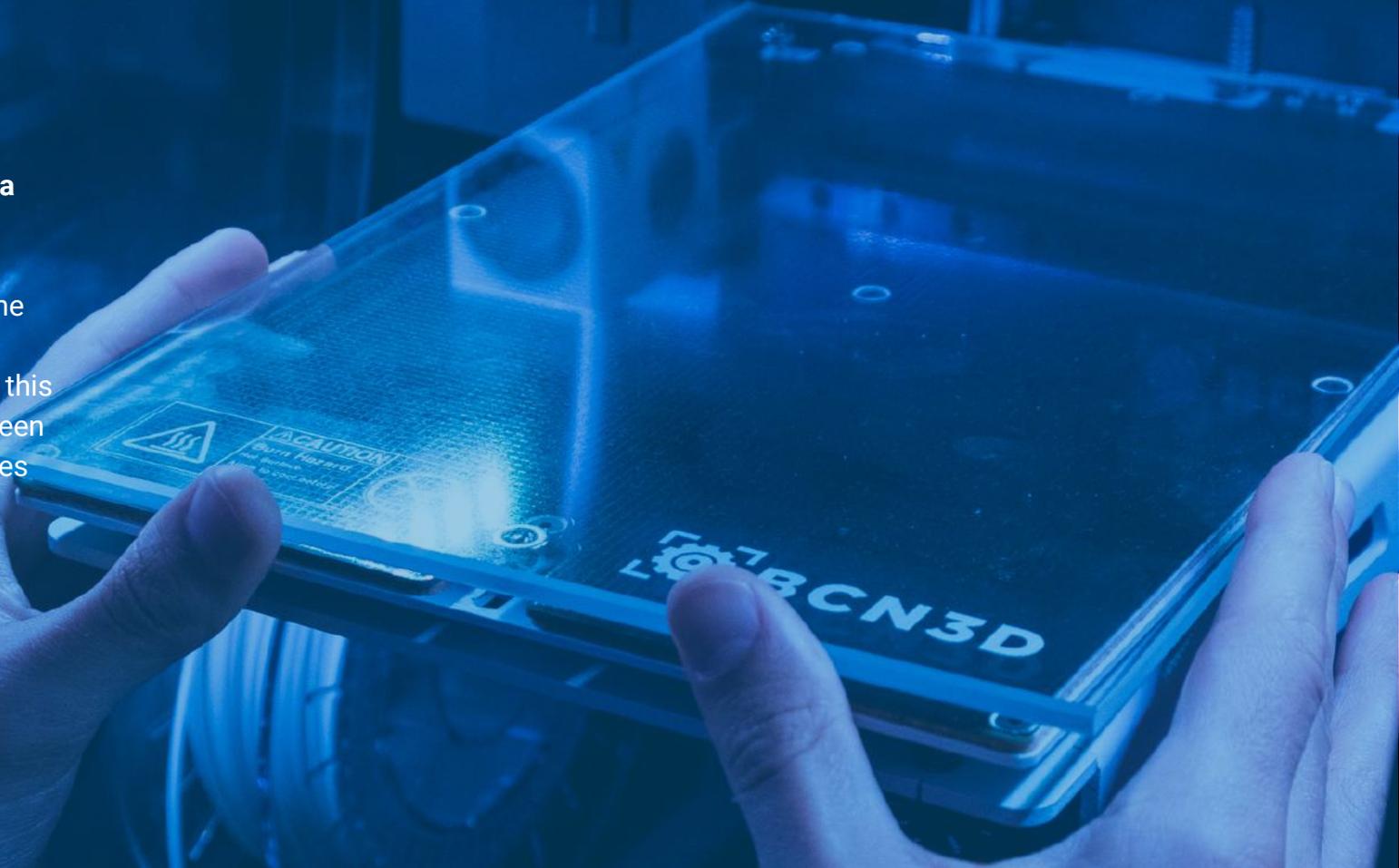


2022 report

Future

Building the future to make the world a better place

RDI is constantly pushing ahead into the future, opening doors of creativity and technology to transform our world. On this journey of discovery, the synergy between the human mind and scientific advances promises an exciting future full of possibilities.



Future

Leading knowledge generation and transfer

2023 will be an exciting year for the RDI Area. A series of unprecedented challenges and opportunities will be tackled, building on the record activity of recent years.

The UPC Research, Development and Innovation Area's strategic vision for 2023 focuses on strengthening its leadership in research and innovation by capitalising on opportunities offered by new national and international funding and programmes.

The UPC's Research, Development and Innovation Area is focused on strengthening its leadership in research and innovation.

Based on a multidisciplinary, efficient and transparent approach, the UPC will position itself as an example to be followed in the research community and actively contribute to developing society and building a sustainable economy.

With boldness and determination, the UPC is ready to face the challenges of the future and consolidate its status as an institution of excellence in research and knowledge transfer.



The UPC is ready to face the challenges of the future and consolidate its status as an institution of excellence.

Glossary

Definition of RDI technical terms,
initialisms and acronyms



Glossary

Licensing agreement

A contract under which the licensee obtains from the licensor the right to use the licensor's assets, usually of a non-tangible or intellectual nature, in exchange for a financial consideration.

Back office

Sections of an institution that are not customer-facing.

Citizen science

Active participation of non-professionals in scientific activities.

Open science

A collaborative and transparent approach that aims to facilitate open access to data, methods and research in order to encourage collaboration.

Competition

An open competition between several people or institutions in the same conditions to choose the best one(s)..

Call

A call for project proposals to receive funding.

TBC

Technology-based company.

EVR

SCatalan initialism for *entitat vinculada de recerca* (associated research entity).

Pre-award/post-award stages of a project

Two distinct stages that occur before and after the awarding of a grant.

Hub

A centre or platform where people, companies or institutions come together to collaborate.

Tendering

A procedure to award a service to the bidder that offers the best price.

PAS

Catalan initialism for *personal d'administració i serveis* (administrative and service staff).

Patent

A legal title that recognises the right to exclusive exploitation of the patented invention and prevents others from making, selling or using it without the holder's consent for the term of the patent.

PCT

Patent cooperation treaty

PDI

Catalan initialism for *personal docent i investigador* (teaching and research staff).

SME

Small and medium-sized enterprise.

Quadruple hèlix

Government, citizens, companies and universities.

RDI

Research, development and innovation.

Royalties

Financial consideration paid by a licensee to a licensor for exercising the right to use and commercially exploit a patent, software or knowledge owned by the licensor. Royalties are calculated as a percentage of the revenues generated by the licensee from the exploitation of the licensed industrial and intellectual property rights.

Spin-off

A new entity created within an institution.

Start-up

A company that is based on an innovative idea, but is not created within an institution.

TRL

Technology readiness levels: a method for estimating the maturity of technologies.

A close-up photograph of a laboratory experiment. A glass pipette is positioned at the top, dispensing a clear liquid into one of the wells of a multi-well plate. The plate contains several other wells, some of which already contain liquids of different colors, including red and orange. The background is a soft, out-of-focus green, suggesting a laboratory environment. The overall lighting is bright and clean.

“We are a leading university in research and knowledge transfer, connected to the world with an ambitious internationalisation strategy and strongly rooted in the territory.”

Daniel Crespo, rector of the Universitat
Politécnica de Catalunya

Universitat Politècnica de Catalunya

Research, Development and Innovation (RDI) Area



@RDI_UPC



Research, Development and Innovation UPC



suport.rdi@upc.edu



rdi.upc.edu



93 413 76 22