



Flanders
State of
the Art

STI^{IN} FLANDERS

SCIENCE, TECHNOLOGY
& INNOVATION



BRIEF OVERVIEW 2022

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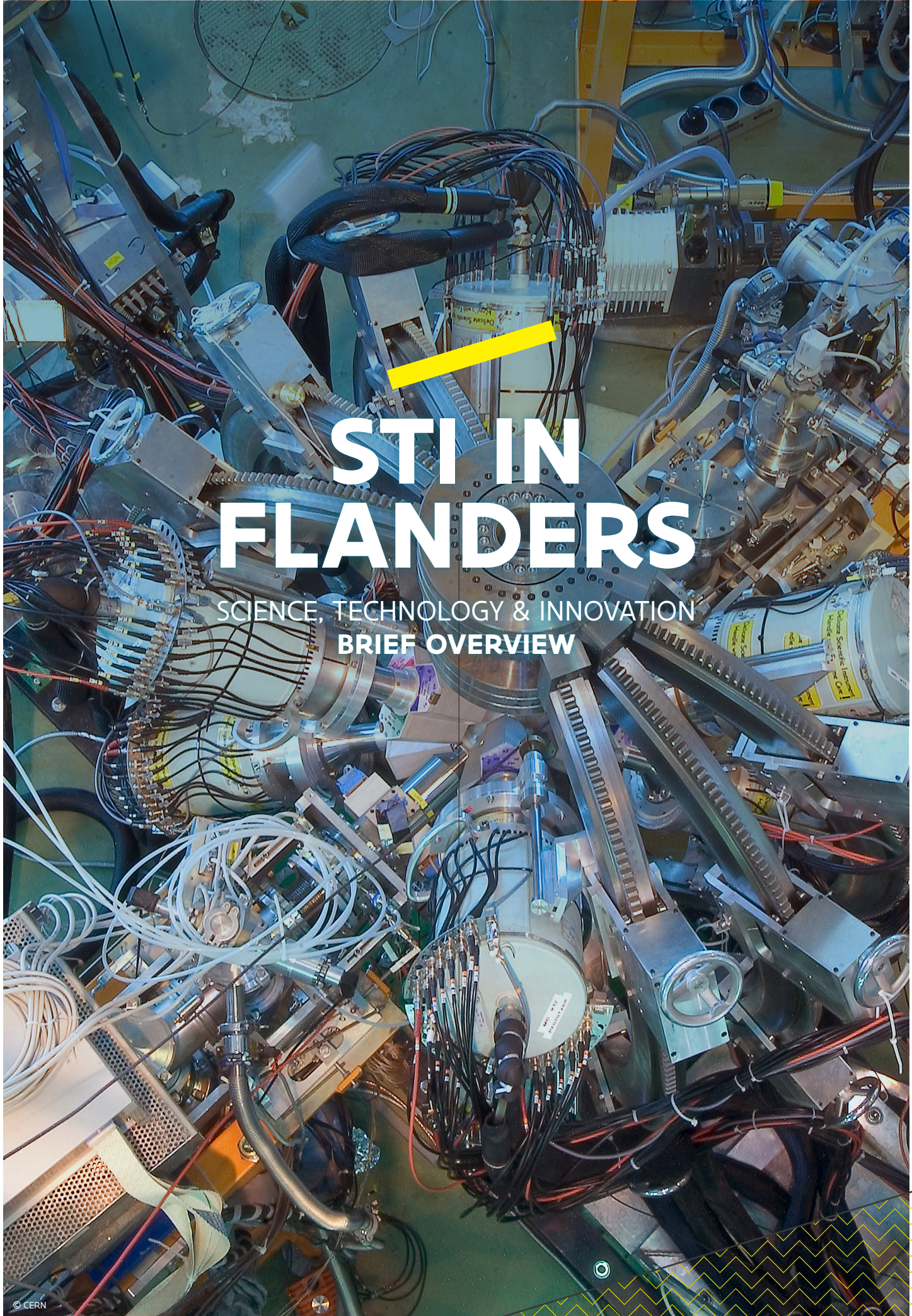
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STI IN FLANDERS

SCIENCE, TECHNOLOGY & INNOVATION
BRIEF OVERVIEW



RESEARCH AND INNOVATION IN A QUADRUPLE HELIX MODEL

The societal challenges that humankind faces, have grown more and more urgent in recent decades. At the same time, the ever-increasing pace of technological change and broad-based innovation hold the promise of global society rising to the occasion.

In order to overcome societal challenges, governments all over the world support advancement of science, technology and innovation. Within Flanders, the EWI Policy Domain (Economie, Wetenschap en Innovatie / Economy, Science and Innovation) uses its Science, Technology, and Innovation (STI) policy **to nurture and stimulate research and innovation in the region.**

However, the STI policy does not work in isolation. The Flemish Government has joined forces with knowledge institutions, business organisations and civil society to form a **quadruple helix** to develop initiatives, set policy targets and maintain important long-term efforts in the field of R&D and innovation.

This brochure looks at each of the elements of the quadruple helix in turn to give a glimpse of the STI-landscape in Flanders. For a more detailed overview, download the full STI in Flanders publication from www.ewi-vlaanderen.be/publications.



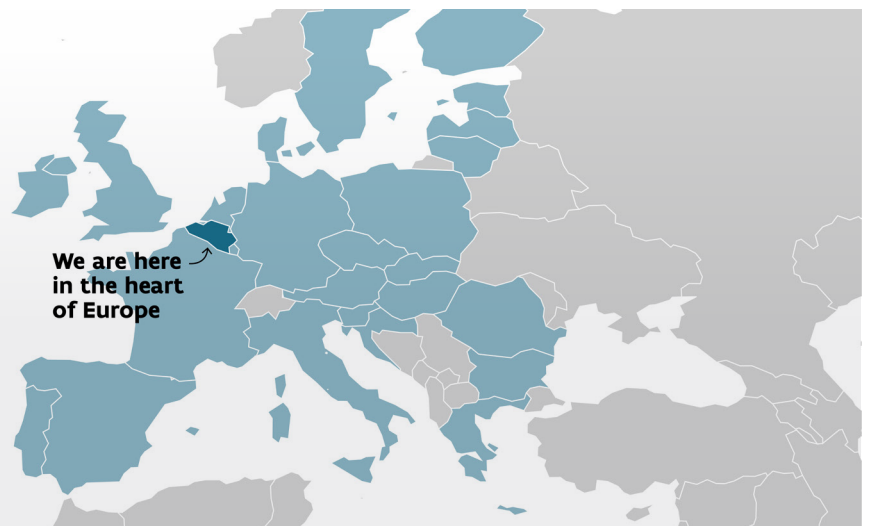
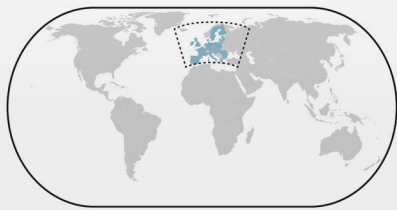
FLANDERS' STI IN A QUADRUPLE HELIX MODEL

Figure 1



FLANDERS IN THE HEART OF EUROPE

Figure 2



FLANDERS IN FIGURES

- **58%** of Belgium's total population lives in Flanders (6.6 million inhabitants)
- Flanders covers **44%** of Belgium's surface area
- Flanders generates **59%** of the Belgian GDP
- R&D expenditure in Flanders is almost **€9.35 BILLION** (3.35% of Flemish GDP), which is 62% of Belgium's total R&D expenditure in 2019
- **2ND IN EUROPE** for the proportion of enterprises with innovation activities (2019 Eurostat Community Survey, published in 2021)
- **1ST IN EUROPE** for university business accelerators, 5th worldwide (UBI Global, World Top 10 University Business Accelerators, 2019)
- **BRUSSELS** is the capital of Flanders and Belgium, the capital of the European Union and serves as the headquarters of NATO
- **2ND IN EUROPE** for the dimension innovation (finance and support) and 3RD for the dimensions (business investment and use of information technologies) (2021 European Innovation Scoreboard)
- **3RD BEST INNOVATIVE SYSTEM** in the world (2020 ZEW innovationsindikator)
- **3RD MOST INNOVATIVE ECONOMY** in the world (ZEW/ISI/BDI innovationsindikator 2020)
- **4TH BEST RESEARCH SYSTEM** in the EU (2021 European Innovation Scoreboard)
- KU Leuven is the **7TH MOST INNOVATIVE UNIVERSITY** in the world (Thomas Reuters Ranking, 2019)
- **3 BIOTECH INCUBATORS** from Flanders are in the European top 20 (Labiotech.eu, 2019)



WELCOME TO FLANDERS

From a geographical and governmental viewpoint, Flanders has a unique position in the world.

FLANDERS IN EUROPE

As Belgium's northern region, Flanders shares land borders with France, Germany, Luxembourg and the Netherlands, with the United Kingdom located on the other side of the North Sea. The region is in the middle of the Blue Banana, an area responsible for a substantial part of the economic added value within the European Union (EU).

FLANDERS IN BELGIUM

Belgium is governed by a unique form of federalism. With its three Regions (the Flemish Region, the Brussels-Capital Region, and the Walloon Region) and three language Communities (the Flemish Community, the French Community and the German-speaking Community), it can be complicated to understand at first glance.

The system works by each Region and Community having their own separately elected parliament, government, administration, legislation, advisory bodies, etc. which have exclusive powers and competencies in various areas both inside and outside Belgium. It is important to note that there are no hierarchical relationships between the Federal level, the Regions and the Communities.

The Flemish Region and the Flemish Community have been combined into a single Flemish Government and Parliament that handles all matters in Flanders and for the Flemish community in Brussels.

SCIENCE, RESEARCH AND INNOVATION IN FLANDERS: INNOVATION LEADER

In Belgium, almost 80% of the total public R&D&I support is managed by the Communities and Regions. Flanders counts for 56 of all Belgian public R&D support. In Flanders, this means that €3.016 billion is aimed at scientific research and innovation, out of Flanders' total budget of €56.6 billion in 2021. The European Commission ranked Flanders in the Region Innovation Scoreboard 2021 as a "innovation leader".

Flanders deploys a number of different activities and policy instruments in the field of science, research and innovation. These measures include:

- **Direct support for R&D&I**

Subsidies or other support channels for cutting-edge and applied research; business-oriented support; collective research opportunities; and the promotion and popularisation of STI in education, society and business.

- **Research related to the community**

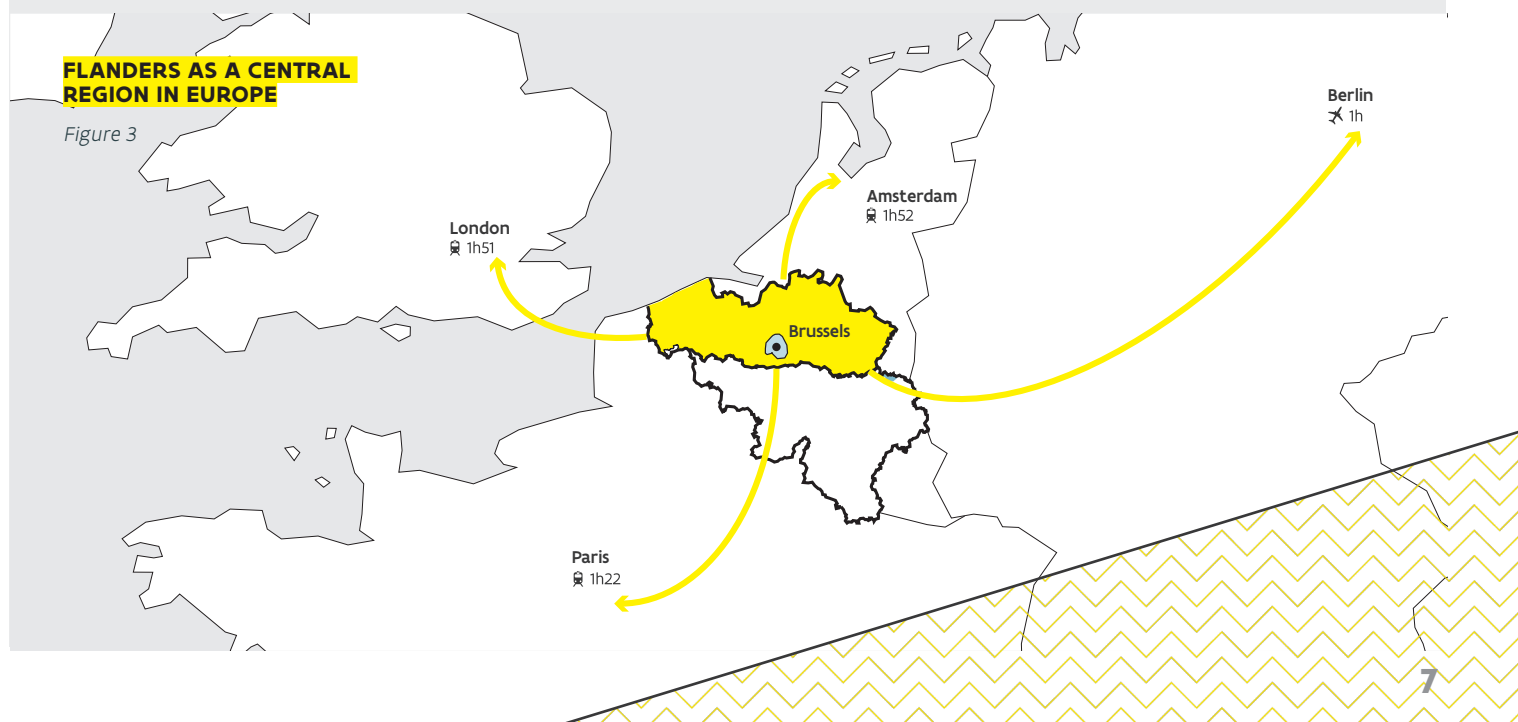
Broad innovation and scientific research policies; research at higher education institutions, public research institutions (PROs), scientific institutes and policy research centres; research and innovation infrastructure; science parks, technology parks and incubators; and policy research.

- **Access to finance**

Financial support for start-ups and spin-offs including seed capital, risk capital, loans and business angel assistance.

FLANDERS AS A CENTRAL REGION IN EUROPE

Figure 3





GOVERNMENT ACTORS

Government plays a strong role within Flanders' quadruple helix in supporting and stimulating science and technology.

GOVERNMENT STI POLICY

INNOVATING OUR WAY OUT OF THE CRISIS

The corona crisis has shaken the world's economy, causing major social and financial consequences in countries around the world, including Flanders. The Flemish Government is taking this moment of upheaval to focus on resilient, innovative, and productive investments that will act as a catalyst as the Region transitions towards being a digital, sustainable, and circular economy. This is supported by the Flemish Government recovery plan which will invest over €4.3 billion in the region, including more than €500 million within the economy, science and innovation domain during 2021-2023.

GOVERNMENT STI ACTORS

The **EWI Department** is responsible for preparing, monitoring, evaluating and reporting on public policy in the field of enterprise, science and innovation. The EWI Department also funds fundamental and applied research at the universities,

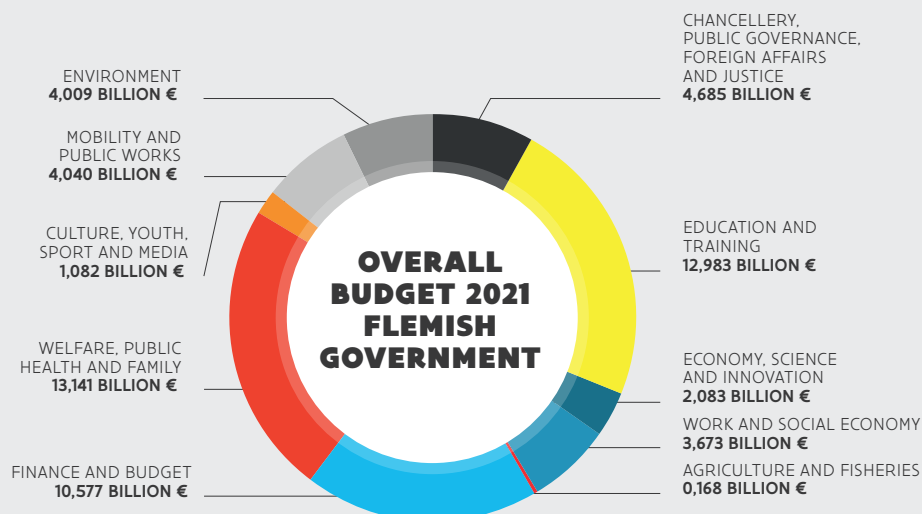
strategic research centres and scientific institutes. From these evaluations and reports, the EWI Department creates **STI policy that aims to** create sustainable economic growth by facilitating entrepreneurship, stimulating innovation and encouraging knowledge creation.

Four agencies are tasked with the implementation of the STI policy:

- **FWO (Fonds voor Wetenschappelijk Onderzoek Vlaanderen /Research Foundation Flanders)** which supports fundamental and strategic research and cooperation at Flemish universities.
- **VLAIO (Vlaanderen Agentschap Innoveren en Ondernemen /Flanders Innovation and Entrepreneurship)** is the one-stop-shop for companies, managing all the economic and innovative support needed by new or growing companies located or active in the Flemish Region.
- **PMV (Participatie Maatschappij Vlaanderen/Flemish Investment Company)** provides capital, loans and guarantees for Flemish businesses.
- **LRM (Limburg Investment Company)** develops and stimulates economic growth in the Flemish province of Limburg by providing lending and venture capital.

**FLEMISH AUTHORITIES:
10 POLICY AREAS
WITH A BUDGET OF
56,583 BILLION €
IN 2021**

Figure 4



Source: Department of Economy,
Science & Innovation, Flemish Government

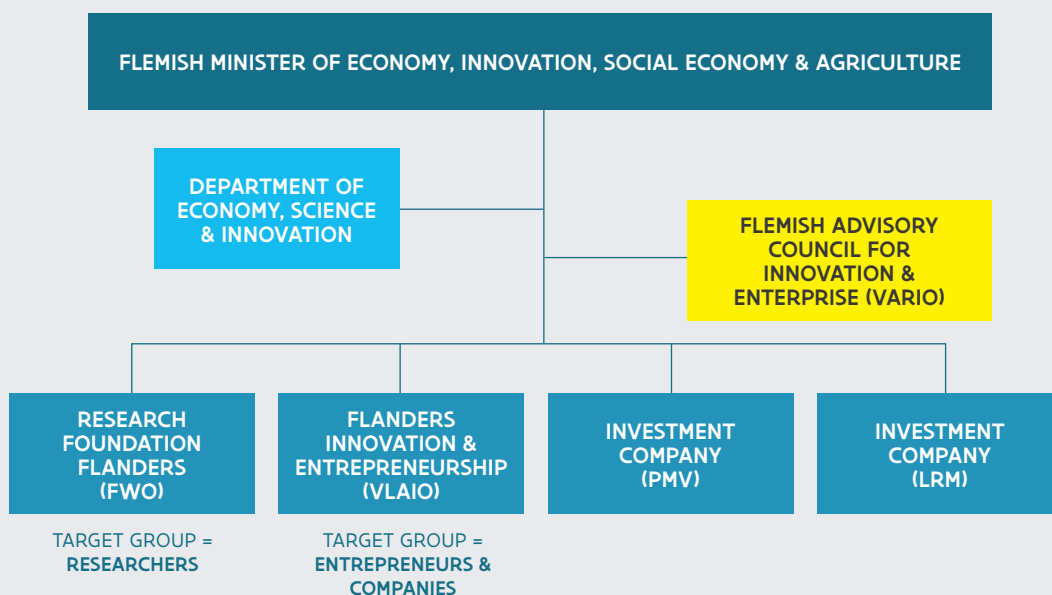
R&D&I RESOURCES IN FIGURES

- **€9.350 BILLION** – total expenditure on **R&D** by all (public and private) actors in 2019
- **3.35%** – level of **R&D intensity** in Flanders in 2019
- **€3.842 BILLION** – government budget for **science, higher education and innovation in Flanders** in 2021 on a total government budget of €56.6 billion
- **€1.999 BILLION** – government budget for **R&D** in Flanders in 2021, of which 1.014 billion applied research and 985 million basic research



ECONOMY, SCIENCE AND INNOVATION (EWI) POLICY AREA FROM THE FLEMISH GOVERNMENT, ANNO 2021

Figure 5



II

KNOWLEDGE INSTITUTIONS

Research institutions – higher education institutes, strategic research centres and scientific & knowledge institutes – are vital for pushing technological boundaries, creating knowledge and sharing innovative ideas in Flanders.

5 HIGHER EDUCATION INSTITUTIONS

In 2003 the Flemish Parliament created university associations in order to stimulate the collaboration between the five universities (academic higher education and research) and 13 university colleges (professional higher education, applied research and arts).

Mission and goals of these 5 university associations are situated on the research, educational and service level. Therefor their aim is to coordinate and set up projects that stimulate the collaboration in order to strengthen the link between fundamental and practical research, create closer collaboration and stimulate student mobility between academic and professional educational programmes, and services offered by higher education institutions (such as sport activities, student wellbeing, science communication towards a broader public, collaboration between industries and higher education, cultural programmes). The five university associations tend to work together in order to strengthen the critical mass and efficient outcomes.

In addition to providing higher education and advanced vocational training, the five universities in Flanders undertake a significant amount of research, generating almost 90% of all non-private scientific output in the Region.

The headquarters of the five university associations of the Flemish Community are situated in the cities of Antwerp, Brussels, Ghent, Hasselt and Leuven.

ASSOCIATIE KU LEUVEN

ASSOCIATIE KU LEUVEN (AKUL)

Katholieke Universiteit Leuven and the university colleges Odisee, LUCA Schools of Arts, Thomas More, UC Leuven Limburg and Vives Hogeschool.

www.associatie.kuleuven.be



ASSOCIATIE UNIVERSITEIT GENT (AUGENT)

Universiteit Gent and the university colleges Arteveldehogeschool, HOGENT and Howest and Schools of Arts KASK and Conservatoire.

www.augent.be



ASSOCIATIE UNIVERSITEIT & HOGESCHOLEN ANTWERPEN (AUHA)

Universiteit Antwerpen and the university colleges AP Hogeschool Antwerpen and Schools of Arts Antwerp of Fine Arts and Conservatoire, Hogere Zeevaartschool and Karel de Grote Hogeschool.

www.auha.be



UNIVERSITAIRE ASSOCIATIE BRUSSEL (UAB)

Vrije Universiteit Brussel and the university colleges Erasmushogeschool Brussel and Schools of Arts RITCS and KCB and a cooperation agreement with the Brussels based Royal Military School.

www.universitaireassociatiebrussel.be



ASSOCIATIE UNIVERSITEIT-HOGESCHOOL LIMBURG (AUHL)

Universiteit Hasselt and the university of applied sciences and arts PXL and MAD School of Arts.

www.auhl.be





4 STRATEGIC RESEARCH CENTRES

Each of the four SOC/SRC (Strategische Onderzoekscentra/ Strategic Research Centres) is active in a specific research area, and has co-founded several spin-off or start-up companies, often based on breakthrough research.



imec

- World-leading research and innovation hub in nanoelectronics and digital technologies
- Over 4,000 researchers with almost 100 nationalities
- Various R&D groups in Flanders, the Netherlands, Taiwan, the US, India and Japan
- €680 million in revenue in 2020

www.imec-int.com/en



VIB

- Independent research institute doing cutting edge research on molecular mechanisms of life, from microorganisms to plants and human beings
- 1,700 scientists from 77 countries
- Close collaboration with Flemish universities and businesses to bridge the gap between scientific research and entrepreneurship
- Achieved major biotech breakthroughs
- €120 million turnover in 2020

www.vib.be



VITO

- Independent research centre focused on cleantech and sustainable development
- Almost 1,000 employees from 45 countries, including over 100 people with a PhD
- Interdisciplinary research and large-scale pilot installations
- Focuses on the fields of energy, chemistry, materials, health technology and land use
- €205 million revenue in 2020

www.vito.be



Flanders Make

- Strategic research centre that stimulates product and production innovation for the Flemish industry
- 700 full-time researchers and over 140 company members, of which 50% are Small and Medium sized Enterprises (SMEs)
- Close collaboration with universities, other research institutions and businesses
- High-tech research infrastructure for testing and validating new products
- €70 million turnover in 2020

www.flandersmake.be



PATENTS IN FIGURES

- **37,969 PATENTS** applications were filed in Flanders between 1980 and 2019, of which 21,263 (55%) have been effectively assigned
- Flanders is ranked **9TH FOR THE NUMBER OF PATENTS BY ORIGIN** (based on inventor and/or applicant address) with 266.8 patents per million of population
- Almost **11%** of Flemish patents are held by **public research centres and universities**, which is significantly higher than the international average

SCIENTIFIC AND KNOWLEDGE INSTITUTES

Flanders is also home to a wide variety of scientific and knowledge institutions, each with a specific focus. These institutions include such as:

- **Agency Botanic Garden Meise** (Agentschap Plantentuin Meise)
- **Institute for Agricultural and Fisheries Research** (Instituut voor Landbouw en Visserijonderzoek, ILVO)
- **Research Institute for Nature and Forest** (Instituut voor Natuur- en Bosonderzoek, INBO)
- **Royal Museum of Fine Arts Antwerp** (Koninklijk Museum voor Schone Kunsten Antwerpen, KMSKA)
- **Agency for Archaeological Heritage** (Agentschap voor Onroerend Erfgoed, AOE)
- **Flanders Marine Institute** (Vlaams Instituut voor de Zee, VLIZ)
- **Institute for Tropical Medicine** (Instituut voor Tropische Geneeskunde, ITM/ITG)
- **Centre for Research and Conservation** (CRC) from the Royal Zoological Society of Antwerp (RZSA)
- **Antwerp Management School**
- **Vlerick Business School**

COOPERATION BETWEEN RESEARCH INSTITUTIONS

Cooperation between Flemish research institutions is increasingly common:

- **Energyville** which researches sustainable and intelligent energy systems and
- **Neuro-electronics Research Flanders** (NERF) that researches nano-electronics and neurobiology.

RESEARCH INFRASTRUCTURE

Flemish policy concerning research infrastructure is the responsibility of the **FWO** and **EWI Department**, with the EWI Department drafting policy and representing the Flemish position in international forums while the FWO supports Flemish research.

EXAMPLES OF SOME STATE-OF-THE-ART RESEARCH INFRASTRUCTURES IN FLANDERS

- **Coastal and Ocean Basin (COB)** – a wave tank that allows users to conduct tests for coastal and offshore energy engineering for research and commercial projects.
- **Nanobodies4instruct** – produces and characterizes nanobodies that are used as auxiliary tools in structural and cellular biology
- **Library of Voices** – a high-tech and innovative audio technology for researching the musical heritage of the low countries.

For more information on the Flemish participation in international research infrastructures, consult the publication *Large scale research infrastructures in Flanders* from www.ewi-vlaanderen.be/publications





BUSINESS

Business research and innovation activities are essential for maintaining Flanders' competitive advantage.

7 SPEARHEAD CLUSTERS

At the heart of Flemish R&I-policy aimed at enterprises are seven spearhead clusters that stimulate active and sustainable cooperation between ambitious and forward-thinking business organisations and knowledge institutes.

These large-scale initiatives develop and implement an ambitious long-term strategy and competitiveness programme in a strategic domain. The spearhead clusters in Flanders are:



Catalisti
sustainable chemistry and
synthetics



Flanders' Food
agro-food



**Strategic Initiative
Materials (SIM)**
advanced materials



**Flanders Logistics
Cluster (VIL)**
specialised logistics



Flux50
energy and smart grids



Blue cluster
sustainable North Sea
economic activities



flanders.healthTech
crossover biotech, medical
and digital technologies

R&D&I in companies

Enterprises play an important role in the STI system in Flanders, funding 76% of Flemish R&D in 2019. While most of this investment comes from innovation-active international companies, a growing amount comes from innovation-oriented high-tech SMEs.

NETWORKS AND COLLABORATION

Flanders' network of science parks, research parks, incubators, and accelerators stimulate collaboration for research-based young companies and innovative enterprises to develop their internal knowledge and tackle common technological issues efficiently.

BUSINESS ORGANISATIONS



VOKA

Voka, the biggest Flemish network of enterprises, was established in 2004 as an alliance of the then eight Flemish Chambers of Commerce. As a network Voka unites more than 18.000 businesses. Its mission is to create an optimal framework for successful entrepreneurship.



UNIZO

UNIZO, the Union of Independent Entrepreneurs, has existed since 1948. UNIZO unites a total of 110.000 independent entrepreneurs and SMEs. Either they are a direct member of UNIZO or they are members through the more than 100 sector organizations that are affiliated with UNIZO.

.AGORIA

AGORIA

Agoria is the technology federation for all technology-inspired companies in Belgium. Agoria is structured by expertise centres, market teams, industry teams and policy units.

PRIVATE R&D IN FIGURES

- **76% OF R&D** in Flanders was funded by the business enterprise sector in 2019
- **70%** of all companies in Flanders in 2016-2018 can be called innovative (product innovation, business process innovation as well as ongoing or abandoned innovation activities) according to the 2019 Community Innovation Survey (CIS). This is well above the EU-27 average
- Business expenditure on R&D in 2019 was **€ 6.705 BILLION**, of which 34% was invested in the chemical and pharmaceutical sector
- **22.5%** of foreign investments in 2019 took place in the R&D sector
- **R&D intensity** in the business sector was **2.55%** in 2019 (higher than the EU-27 average) compared to 2.04% in 2018
- Flanders represents about two thirds of the total Belgian patent portfolio, out of which **83%** of patent activity is accounted for by private companies

Flanders: 2nd in Europe
for the proportion
of enterprises with
innovation activities



Flanders has implemented a number of initiatives to increase the scientific knowledge and literacy of Flemish society and encourage young people to study STEM.

IV

CIVIL SOCIETY

The knowledge, skills and innovation of Flemish citizens form another important element of the quadruple helix. Flanders stimulates the curiosity and talents of people of all ages.

CITIZEN SCIENCE

Flanders has implemented a number of initiatives to increase the scientific knowledge and literacy of Flemish society and encourage young people to study STEM. Some of these initiatives are:

- **Citizen Science:** researchers initiate projects that rely on the active participation of citizens for data gathering and processing.
- **Science Agenda:** the FWO and Royal Academy of Sciences regularly collect questions for scientists from Flemish citizens.
- **Science communication:** Technopolis science centre, Science Communication Expertise Centres, and other science information actors promote science through activities, experiments and workshops.
- **Media:** scientific themes are also spread via the Flemish Radio and Television Broadcasting (VRT) and EOS publisher.
- **Science festivals:** the general public can meet scientists at events like the Flemish Science Day, Day of Biotechnology, Sound of Science festival, and& festival and Supernova science festival.

STEM EDUCATION

Attracting more people towards STEM careers starts early in Flanders. The STEM Action Plan 2020-2030 aims to encourage young people to seriously consider a STEM career with a range of initiatives, including rolling out STEM academies to teach young people coding and other computing skills.

STEM CAREERS

Outstanding researchers are vital to Flanders' efforts to stimulate R&D&I in the region. For this reason, Flanders has developed a range of initiatives to encourage excellent researchers and support their long-term career paths. Flanders also encourages the mobility of researchers, welcoming researchers from China, Germany, India, Italy, the Netherlands and Spain, as well as many other countries.

OPEN SCIENCE

Flanders implements Open Science through its Flemish Open Science Board.

VARIO

The Flemish Advisory Council for Innovation and Enterprise (Vlaamse Adviesraad voor Innoveren en Ondernemen or VARIO) advises the Flemish Government and the Flemish Parliament on its science, technology, innovation, industry and entrepreneurship policy. The council does this on its own initiative as well as on request.

STEM EDUCATION IN FIGURES

- **2,810** more students in secondary education studied **STEM courses** in 2019-2020 compared to 2010-2011
- Approximately **28%** of higher education degrees are in **STEM subjects**
- **32%** of first entry master students at Flemish universities are studying in the **science and technology** domain
- **16.4%** of 20-29-year-olds in Flanders have a **higher degree in mathematics, science and technology**

STEM CAREERS IN FIGURES

- **59,283 FULL-TIME EQUIVALENTS** (FTE) R&D personnel in Flanders in 2019, which is **32.3% more** than in 2014
- **64.8%** of R&D personnel work in the **private sector**
- **72.2%** of R&D personnel in the public sector work for the higher education sector (HES), of which **81.4% are researchers**, a figure significantly higher than the EU-27 average
- **43.1%** of researchers in HES are **female**, which is more than in the neighbouring countries of France and Germany
- **72%** of R&D personnel working for the Flemish government research institutes are **researchers**, which is higher than the EU-27 average
- **1 IN 3** of all R&D personnel in the public sector has a **PhD**
- R&D personnel made up **1.91%** of the labour force or **0.90%** of the total population of Flanders in 2019 – higher than the EU-27 average
- **22%** increase in **the total number of PhDs** in Flanders from 2013-2014 to 2018-2019
- **44%** of PhD holders are **female**

FLANDERS ON THE INTERNATIONAL STAGE

Flanders pushes beyond its borders entering into bilateral and international agreements, supporting companies as they expand, and cooperating with actors across Europe and the world.

FLANDERS IN EUROPE

The Flemish Government has made a substantial effort to internationalise STI policy, with a particular focus on the EU level. This includes aligning its priorities with those of the EU regarding the grand challenges, the European Research Area, the Europe 2020 strategy (European Semester) and Horizon 2020 / COSME programmes.

HORIZON EUROPE

The Flemish government plans to participate in 13 of the 14 partnerships of the first wave of the first Horizon Europe strategic plan for a total amount of around 120 million in cash and about 140 million in kind.



€1,649.5 million
generated from
Horizon 2020
projects.

FLANDERS IN THE WORLD

Flanders also works within the frameworks of the United Nations (UN) and Organisation for Economic Co-operation and Development (OECD) to present Flanders' strengths in the fields of economy, science, and innovation and to learn from other countries and regions.

NATIONAL, REGIONAL AND INTERNATIONAL SUPPORT

Flanders Investment and Trade (FIT)

Working in both the EU and further afield, FIT supports the international activities of Flemish companies and attracts foreign investors to Flanders. From its worldwide network of over 90 offices, FIT offers tailored advice and guidance, shares its network of contacts, and provides financial support and information about a wide range of financial incentives.

VLAIO

In the field of international innovation, VLAIO supports business organisations as the National Contact Point (NCP) for Flanders for the European Framework Programme (together with FWO) and Enterprise Europe Network Flanders (together with FIT). It also provides co-funding for European projects.

FWO

The actions of FWO are crucial to stimulate the internationalisation of research and focus on international mobility, including research projects, international collaboration, international contacts, European programmes and involvement in international policy.

VLEVA

The liaison agency Flanders-Europe (VLEVA) is successfully supporting Flemish actors to discover the most appropriate European funding opportunities. VLEVA creates a platform for Flanders in Europe by bridging the gap between Flanders and Europe and underlining how important Europe is to Flanders.

EWI stakeholder platform

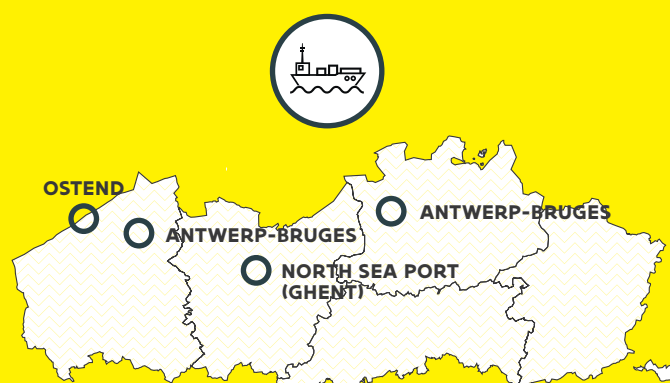
The EWI stakeholder platform for European R&I matters not only support EWI representatives in European committees and working groups to prepare policy positions but has also proactively produces policy reflection papers, such as an internationally well received paper on the new ERA.

GLOBAL FLANDERS

IN FIGURES

IMPORT
EUR 313 BILLION
(GOODS, 2019)

EXPORT
EUR 325 BILLION
(GOODS, 2019)



FOREIGN INVESTMENTS

2021

295
NEW
PROJECTS

6233
NEW
JOBS

INTERNATIONAL COLLABORATION

10 SCIENCE AND TECHNOLOGY OFFICES WORLDWIDE

in New York, Palo Alto, Paris, London, Copenhagen, Munich, Mumbai, Singapore, Guangzhou and Tokyo;

SCIENTIFIC COOPERATION

agreements with a number of countries for the funding of potential exchange projects, namely with: Japan, Bulgaria, Poland, China, Brazil, Argentina, France, South-Korea, Taiwan, Turkey, Mexico, France-Tourneval, Hungary;

BILATERAL RESEARCH COOPERATION

with Brazil, China, Ecuador, Vietnam, South-Africa, Québec (Canada);

LEAD AGENCY PROCEDURES

with Luxembourg, Austria, Slovenia and Switzerland.

BIG SCIENCE PROJECTS:

the "Big Science" programme supports researchers at institutes of the Flemish Community who want to conduct research projects at major international research facilities, the membership for which is paid for by the Belgian Federal or Flemish government.

MAIN EXPORT SECTORS



1. **CHEMISTRY AND PHARMA**
EUR 74,5 billion



2. **TRANSPORT EQUIPMENT**
EUR 44,0 billion



3. **MACHINES & ELECTRICAL EQUIPMENT**
EUR 74,5 billion

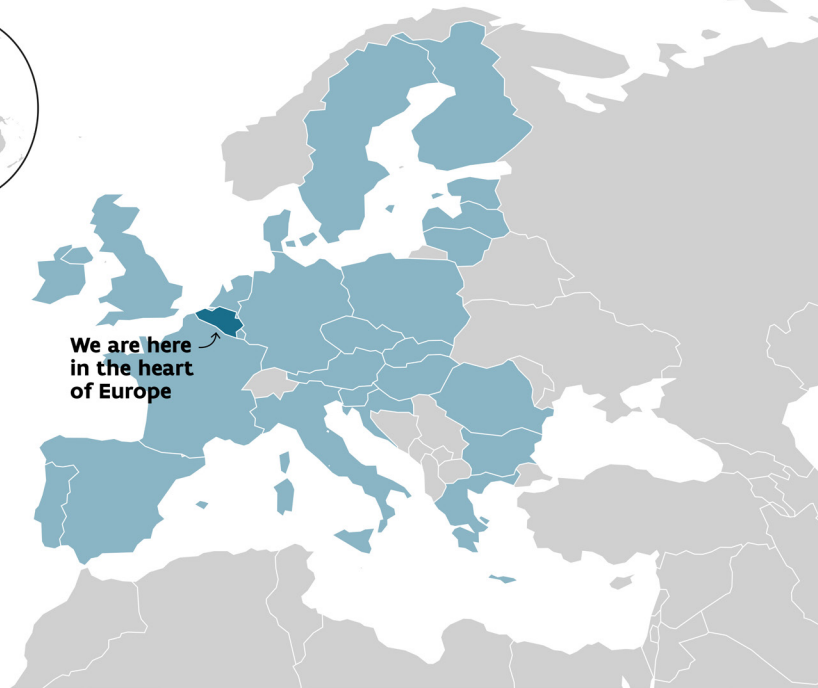
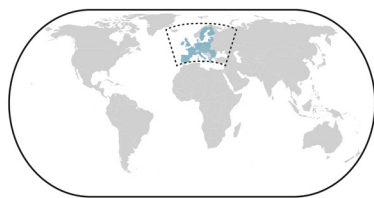


4. **MINERAL PRODUCTS**
EUR 29,9 billion



5. **PLASTIC AND APPLICATIONS**
EUR 26,4 billion

Source:
Publication Flanders is International, Flanders
Chancellery and Foreign Office, Flemish Government
Publication Science, Technology & Innovation in
Flanders, Department EWI, Flemish Government

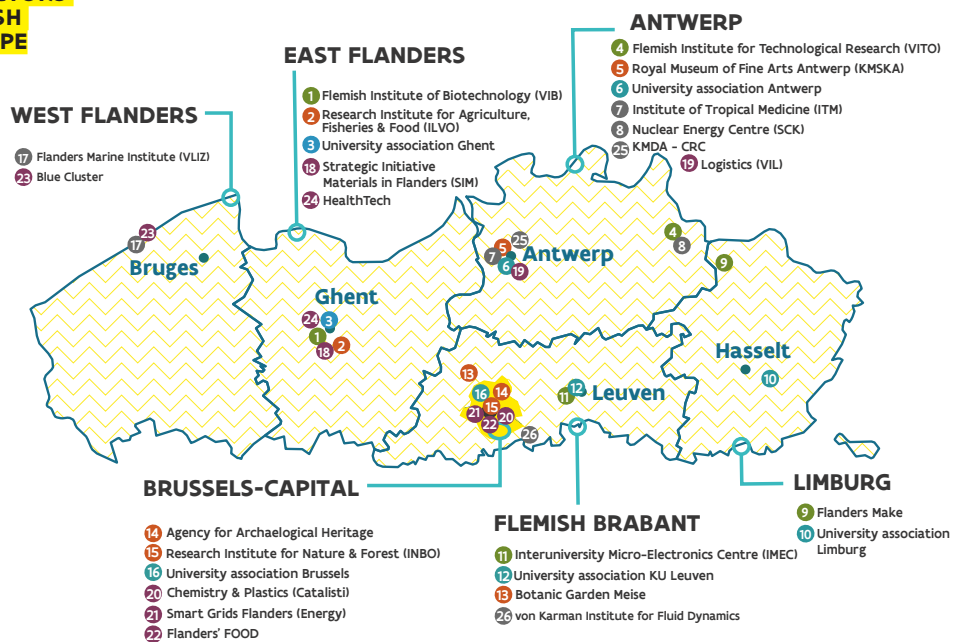


FLANDERS IN THE HEART OF EUROPE

Figure 6

MAIN RESEARCH AND ECONOMIC ACTORS IN THE FLEMISH STI-LANDSCAPE

Figure 7





70% of all companies in Flanders in 2016-2018 can be called innovative according to the 2019 Community Innovation Survey (CIS).

R&D INTENSITY

Investments in R&D are key to ensuring a high level of productivity and maintain competitiveness in a global perspective. R&D-investments are also expected to be crucial to tackle grand societal challenges such as the energy and climate transition or an ageing population. In its Innovation Pact of 2003 and on subsequent occasions (Pact 2020, Flanders in Action, Vision 2050) the Flemish Government has stated its ambition to reach a 3% R&D-intensity (measured as the percentage of GERD related to GDP) , thus subscribing to the Europe 2020 3%-target.

Investments in R&D are key to ensuring a high level of productivity and maintain competitiveness in a global perspective.

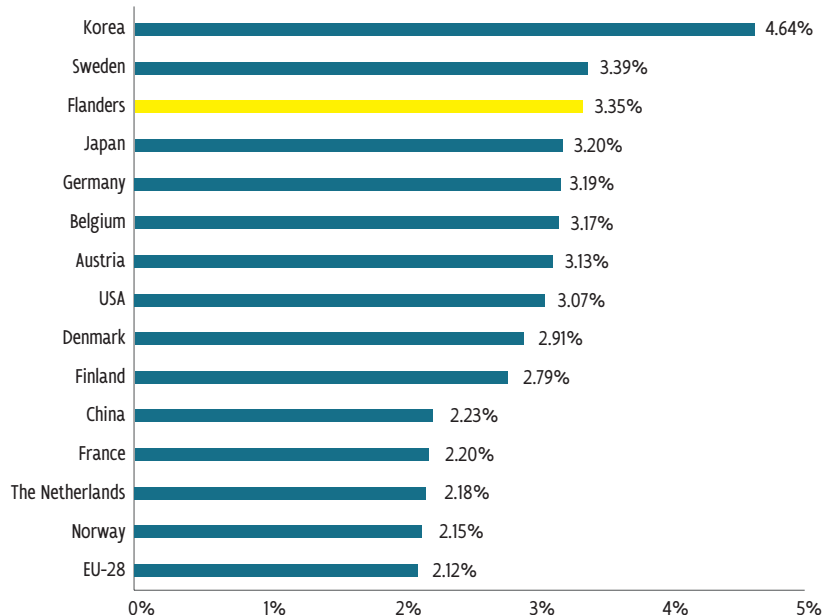
GERD

In 2019, Flanders spent over 9.351 million euros on R&D (GERD). More than two-thirds of the research cost was paid by companies (the Business Enterprise Sector or BES) and almost one-third by public research institutes (PNP, GOV and HES).

The R&D intensity (measured as the percentage of GERD related to GDP) of Flanders was 3.35% in 2019 (compared to 2.75% in 2016, 2.88% in 2017 and 2.93% in 2018). Flanders ranks very high for the total R&D intensity of GERD in 2019 and only Korea (4.93%) and Sweden rank still higher (3.39%). Flanders ranks higher than Austria, Germany, the USA and the EU-27 average.

GERD AS A PERCENTAGE OF GDP (2019)

Figure 8

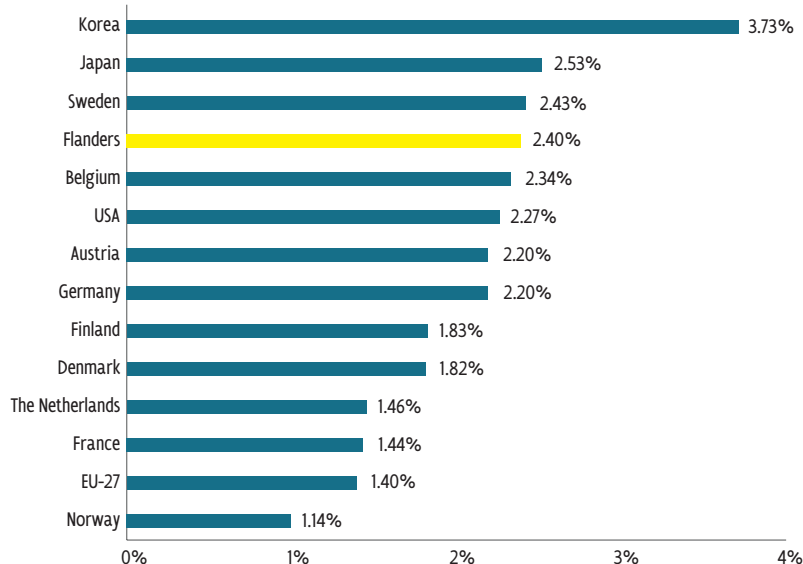


BERD

In 2019, the business enterprise sector spent 6.705 million euros on R&D activities in Flanders, measured at current prices. This is the Business Expenditure on R&D (BERD), which corresponds to a R&D intensity (BERD as a % of GDP) of 2.40%. Flanders therefore ranks higher than the EU-27 average, France, the Netherlands, Finland, Germany and Austria, but lower than Japan and Sweden.

BERD AS A PERCENTAGE OF GDP (2019)

Figure 9

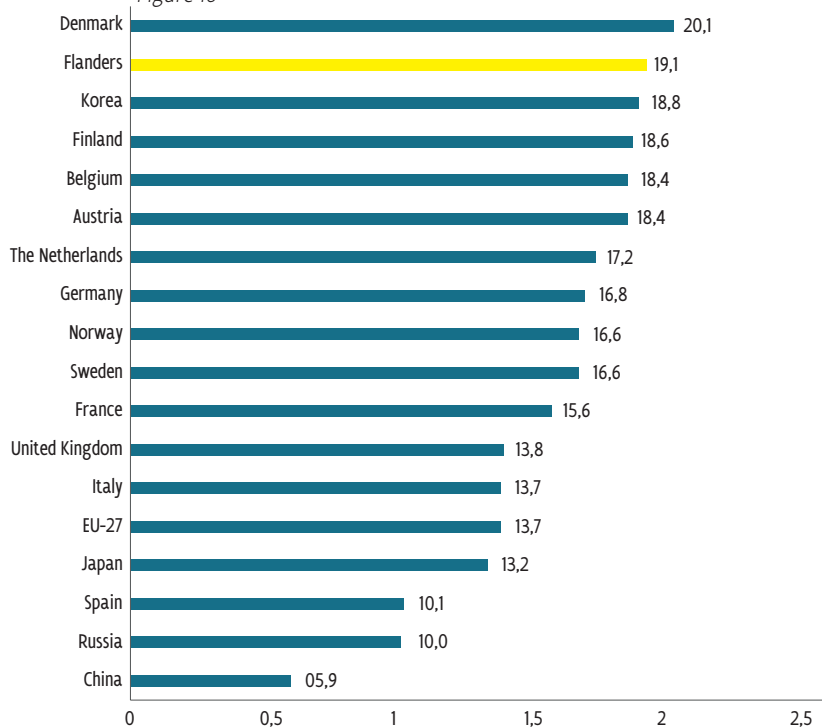


TOTAL R&D PERSONNEL PER THOUSAND LABOUR FORCE

The level of R&D personnel corresponds to 19.1% (2019) per thousand labour force. Flanders therefore belongs to the top and this figure is much higher than the EU-27 average but Denmark has a significant lead.

TOTAL R&D PERSONNEL PER THOUSAND LABOUR FORCE (2019)

Figure 10



* UK and Norway: figure for 2018

FLEMISH UNIVERSITIES

All the Flemish universities score very high on these three different rankings and belong almost for each ranking to the top 3% worldwide.

The Catholic University of Leuven and the Ghent University even rank in the top 1% for all these three rankings. Each ranking uses different criteria with different weights in their calculation of the ranking position. We give the main elements for these three well known rankings.

The Times Higher Education (THE) World University Rankings 2021 is an international "league table" ranking that uses 13 metrics clustered in following 5 indicators teaching, research, citations, industry incomes and international outlook.

The Academic Ranking of World Universities (ARWU) 2020, the so-called "Shanghai Ranking", scores the 1.000 universities worldwide that have the best results on indicators that are mainly focusing on research (Highly cited researchers in Web of Science, articles in Nature and Science, articles in two citation

indexes of Web of Science and results on the indicators per researchers) and prestige (Alumni and staf with awards). Since 2019 all Flemish universities are part of this ranking.

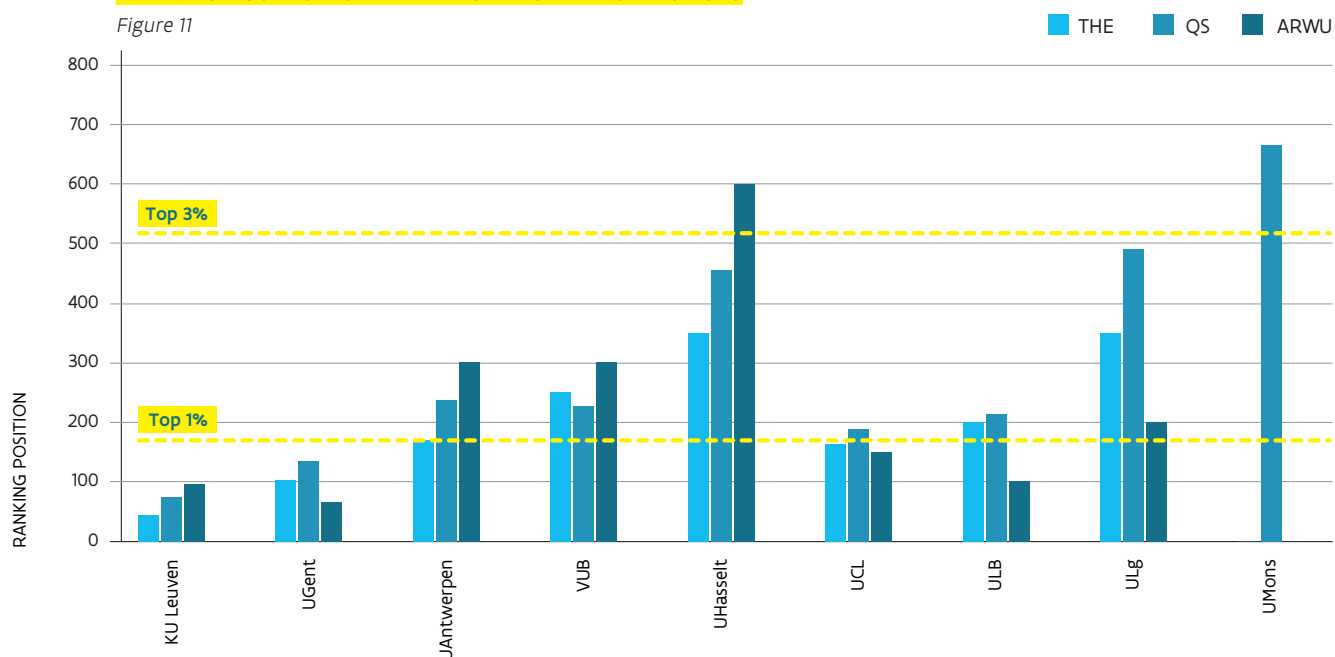
The Quacquarelli Symonds (QS) World University Ranking 2022 scores universities worldwide on the indicators Academic reputation, Employer reputation, Faculty/student ratio, Citations per faculty, International faculty ratio and International student ratio. Next to this three well known rankings, the European Commission asked to develop another type of ranking.

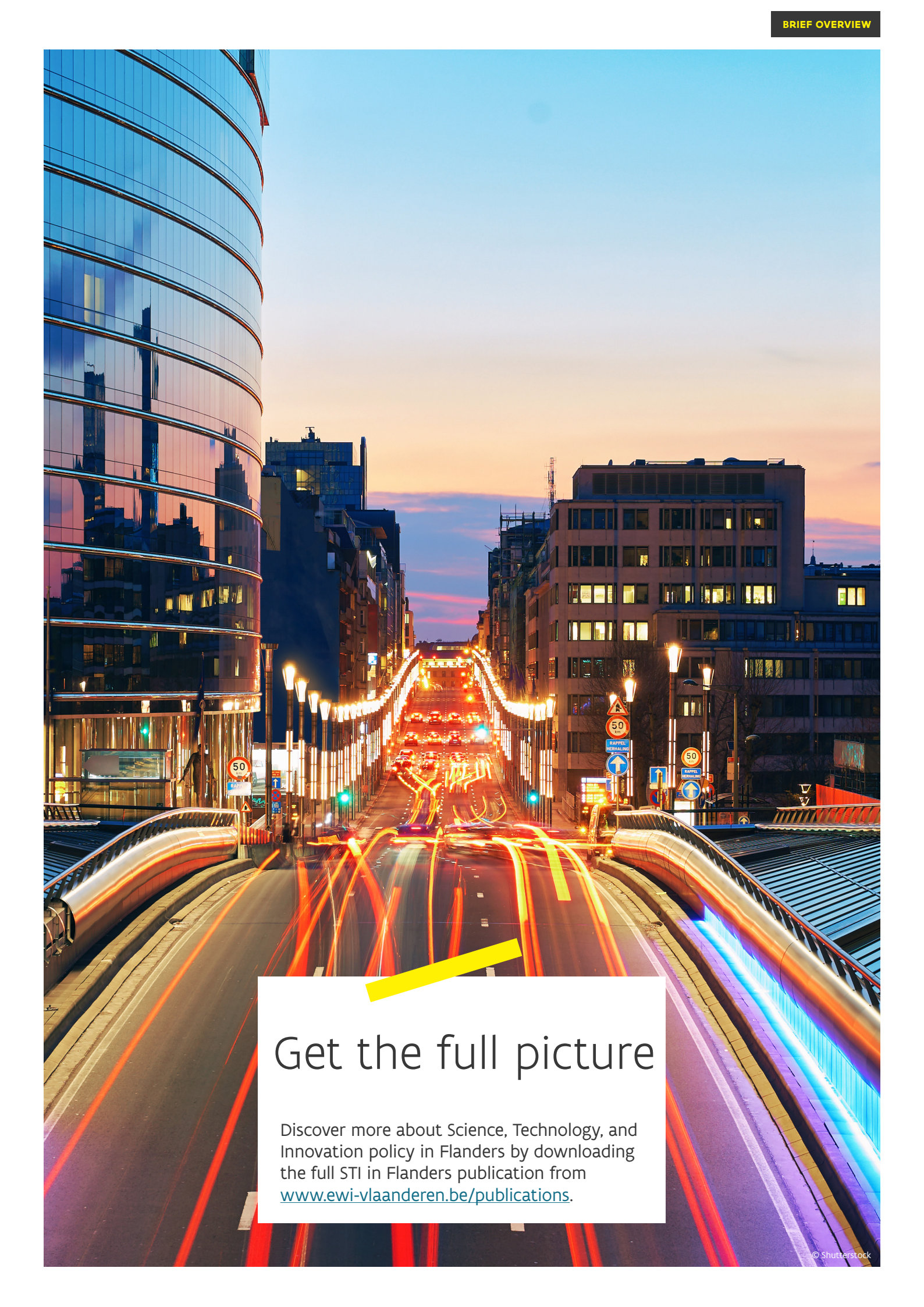
Since 2014 the **online ranking tool U-Multirank** is active. The U-Multirank is different than the other rankings because it scores the universities in groups from A "very good" to E "weak". This meets a frequently recurring criticism of rankings, namely that the allocation of ranking positions makes performance differences between universities appear larger than they really are. Through an online tool www.umultirank.org it is possible to compare universities based on the criteria of your own choice. The 35 different criteria are grouped into 5 dimensions: Teaching & learning, Research, Knowledge Transfer, International Orientation and Regional Engagement.

The presence of universities from the Flemish Community in the major worldwide rankings are as follows:

RANKING POSITION OF THE BELGIAN UNIVERSITIES 2020

Figure 11





Get the full picture

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MAIN R&D ACTORS

PUBLIC AUTHORITY

Department of Economy, Science and Innovation	www.ewi-vlaanderen.be/en
Flanders Chancellery and Foreign Office	www.fdfa.be/en/home
Research Foundation Flanders (FWO)	www.fwo.be/en/
Flanders Innovation and Entrepreneurship (VLAIO)	www.vlaio.be www.vlaio.be/nl/andere-doelgroepen/flanders-innovation-entrepreneurship
Flanders Holding Company (PMV)	www.pmv.eu/en
Limburg Reconversion Company (LRM)	www.lrm.be/en
Flanders Investment and Trade (FIT)	www.flandersinvestmentandtrade.com/en

ADVISORY COUNCILS

Flemish Advisory Council for Innovation and Enterprise (VARIO)	www.vario.be/en
Social and Economic Council of Flanders (SERV)	www.serv.be/en/serv

SCIENTIFIC INSTITUTES (from the Flemish Community)

Agency Botanic Garden Meise	www.plantentuinmeise.be/en/
Institute for Agricultural and Fisheries Research (ILVO)	www.ilvo.vlaanderen.be/language/en-US/EN/Home.aspx
Research Institute for Nature and Forest (INBO)	www.inbo.be/nl/webform/contacteer-inbo
Royal Museum of Fine Arts Antwerp (KMSKA)	www.kmska.be/en
Agency for Archaeological Heritage (AOE)	www.onroerenderfgoed.be/

OTHER BODIES OF PUBLIC INTEREST IN THE FIELD OF SCIENCE AND INNOVATION

Royal Flemish Academy of Belgium for Arts and Sciences (KVAB) www.kvab.be/en/home-1

Royal Academy of Belgium for Medicine (KAGB) www.academiegeneeskunde.be/

Royal Academy for Dutch Language and Literature (KANTL) www.kantl.be/

Flanders Foundation for Technology Assessment
in Innovation and Work (STV voor Innovatie en Arbeid) www.serv.be/en/stichting

Flemish Academic Centre for Science and the Arts (VLAST) www.kvab.be/nl/vlast

UNIVERSITY ASSOCIATIONS

Antwerp www.auha.be

Brussels www.universitaireassociatiebrussel.be/en

Ghent www.augent.be/en

Leuven www.associatie.kuleuven.be/eng

Limburg www.auhl.be

STRATEGIC RESEARCH CENTRES

Interuniversity Micro-electronics Centre (Imec) www.imec-int.com/en

Flanders Make www.flandersmake.be/en

Flemish Institute for Biotechnology (VIB) www.vib.be/en

Flemish Institute for Technological Research (VITO) www.vito.be/en

OTHER KNOWLEDGE INSTITUTES

Flanders Marine Institute (VLIZ) www.vliz.be/en

Institute for Tropical Medicine (ITM) www.itg.be

Centre for Research and Conservation (CRC) bebol.myspecies.info/content/centre-research-and-conservation-crc

Antwerp Management School www.antwerpmanagementschool.be

Vlerick Business School www.vlerick.com

FEDERAL SCIENTIFIC INSTITUTES

Belgian Institute for Space Aeronomy (BIRA)	www.aeronomie.be/en
National Library of Belgium (KBR)	www.kbr.be/en
Royal Belgian Institute of Natural Sciences (KBIN)	www.naturalsciences.be
Royal Institute for Cultural Heritage (KIK)	www.kikirpa.be/EN/1/61/Home.htm
Royal Meteorological Institute of Belgium (KMI)	www.meteo.be/en/belgium
Royal Museum for Central Africa	www.africamuseum.be/en
Royal Museums of Art and History (KMG)	www.kmkg-mrah.be/art-history-museum-0
Royal Museums of Fine Arts of Belgium (KMSK)	www.fine-arts-museum.be/en
Royal Observatory of Belgium (KSB)	www.astro.oma.be/en
State Archives of Belgium	www.arch.be/index.php?l=en

FEDERAL RESEARCH CENTRES

Sciensano	www.sciensano.be/en
National Institute for Radio-elements (IRE)	www.ire.eu
Nuclear Energy Centre (SCK)	www.sckcen.be/en

INTERNATIONAL INSTITUTES, ORGANISATIONS OR PLATFORMS IN THE STI FIELD, LOCATED IN FLANDERS

JRC - Institute for Reference Materials and Measurements (IRMM)	www.confidence.eu/participants/ec-jrc-irmm
EU Joint Technology Initiatives (IMI, Clean Sky, ECSEL, FCH)	www.rvo.nl/subsidie-en-financieringswijzer/joint-technology-initiatives
European Cooperation in Science and Technology (COST)	www.cost.eu/news/ESA
Business and Innovation Centre (ESA BIC)	www.sbicnoordwijk.nl/esa-bic
United Nations University Institute on Comparative Regional Integration Studies (UNU-CRIS)	www.cris.unu.edu
European Marine Observation and Data Network (EMODnet)	www.emodnet.eu
European Marine Board (EMB)	www.marineboard.eu
Von Karmann Institute (VKI)	www.vki.ac.be

TECHNOLOGY TRANSFER OFFICES (TTO) AT THE UNIVERSITIES AND THE STRATEGIC RESEARCH CENTRES

KU Leuven Research & Development	www.lrd.kuleuven.be/en
UGent TechTransfer	www.ugent.be/techtransfer/en
VUB TechTransfer	www.vubtechtransfer.be
AUHA Interfacedienst	www.uantwerpen.be/nl/onderzoek/informatie-voor-bedrijven
UHasselt Tech Transfer Office	www.uhasselt.be/techtransfer_en
Tech Transfer Offices Flanders	www.ttoflanders.be/en

SCIENCE / TECHNOLOGY PARKS

Tech Lane Ghent Science Park (previously the Ardoyen and Eiland Zwijnaarde parks) (Ghent)	www.techlane.be/about
Zellik (Asse)	www.researchparkzellik.be
Arenberg, Haasrode (Leuven)	www.wetenschapspark-arenberg.be/en
Feed Food Health (Tienen)	www.foodport.be
Thor Park (Genk)	www.thorpark.be
Corda Campus (previously Research Campus Hasselt) (Hasselt)	www.cordacampus.com/en

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