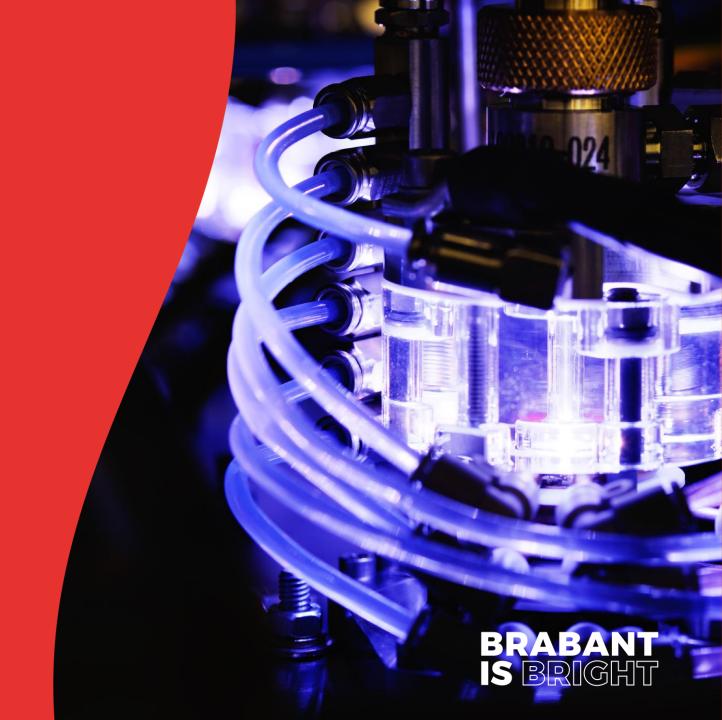
# HIGH TECH SYSTEMS & MATERIALS

in Brabant





# This is why Brabant excels



A distinct strong culture, history and industrial heritage (100+ years) of companies like Philips and DAF in informal and constructive partnerships based on open innovation



The complete HTSM value chain is present and well-developed; all expertise and every skill set is available

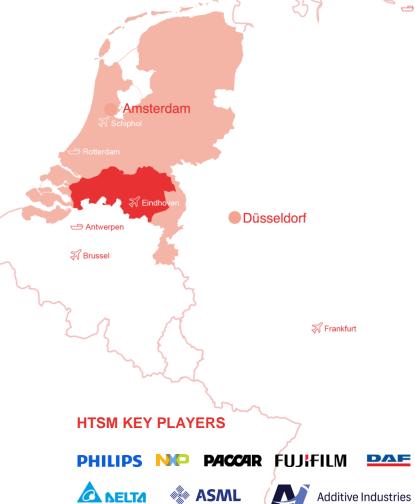
London



**Excellent education** at 15 top universities within a 1.5 hour's drive



Research, product and process development and manufacturing are part of **Brabant's DNA**.





#### HISTORY

More than 100 years in the making. In Brabant a number of key ingredients have been fruitfully mixed together, creating one of the strongest high tech systems regions in the world. In 1891, the brothers Gerard and Anton Philips founded their light bulb factory in the city center of Eindhoven. Already in 1919, Phillips started producing X-ray tubes for medical applications. Other groundbreaking innovations followed, both in medical systems and consumer electronics. In the late 1970s Philips invented the Compact Disc and its successors (DVD & Blu-Ray). Research and Development were always the core of Philips' existence.

1891











#### TODAY

As opposed to many other regions in the Netherlands and beyond, Brabant has a unique opportunity to provide many of the solutions to the challenges echoed by national and international studies. Brabant has evolved into a leading High Tech Systems and Materials region in the Netherlands, and boasts a long and world class track record in high complexity machine building and complex systems. The ecosystem is built around dedicated top players such as Philips, ASML, NXP, DAF Trucks, suppliers (often highly specialized SMEs), various campuses and renowned (applied) research institutes all the way through to engineering companies, system integrators, software developers and certification bodies.

2021

HIGH TECH CAMPUS





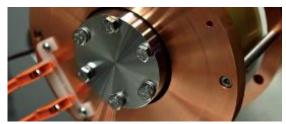








# Because of this heritage Brabant particularly excels in:



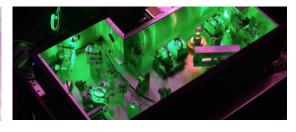
**Advanced Manufacturing** and Advanced Manufacturing Systems



**Smart mobility**, green and sustainable, connected mobility



**Electronics**, microtech and nanotech, and (integrated) photonics



**Wafer fabrication** equipment (design and production of lithography machines)



**Robotics** technologies and artificial intelligence for applications in manufacturing



**New energy**, sustainable technologies such as wind, solar, hydrogen, batteries



**Aerospace**, HTSM suppliers and specialists in Maintenance Repair and Overhaul

BRABANT IS BRIGHT



**15,560** companies

129,110 jobs

8.3%

growth of the number of HTSM companies 2014 - 2018

18.6%

Biggest growth in machine and appliances

81 billion euros

The Brabant Production Value in 2017 in the sector.

Representing more than 40% of the total Dutch production value; by far the largest regional contribution



**JOBS** 

15.3%

growth of the number of HTSM jobs 2014-2018 and...

17.9%

biggest growth in machine and appliances

30%

of private R&D expenditure in the Netherlands

34,000

people engaged in R&D activities (19%)

Brainport Eindhoven 23%

of total private R&D spendingin the Netherlands

#### **PATENT APPLICATIONS**



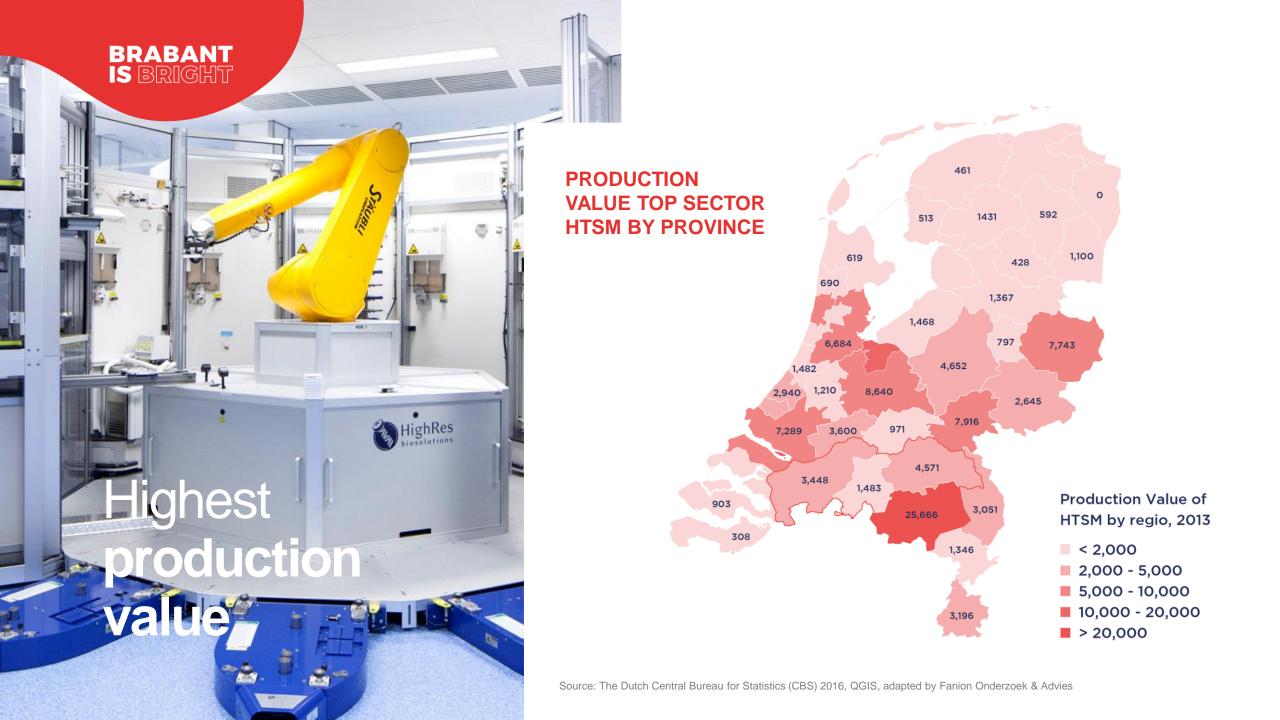
of all European patent applications from the Netherlands are generated in Brabant

#### 5th

place in Europe for regions with the highest number of patent applications

Cluster size
High Tech Systems
& Materials

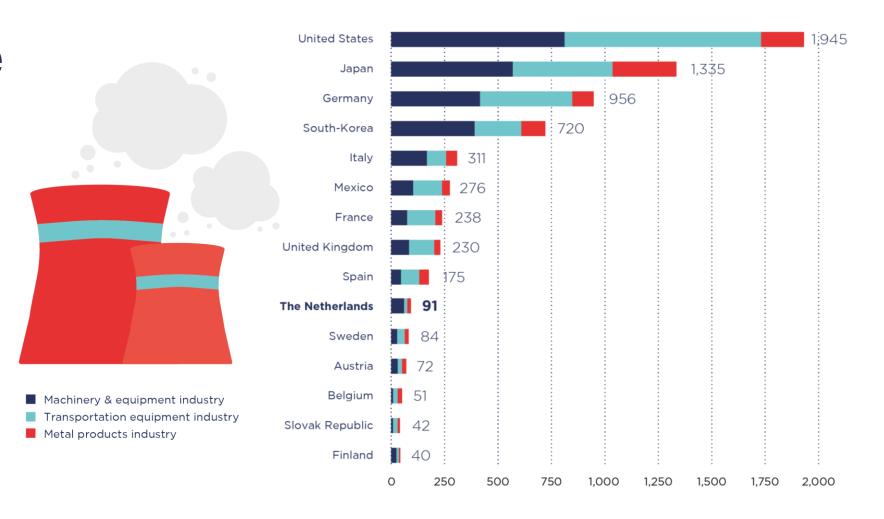
Source: In-depth Analysis High Tech Systems & Materials, 2021 (commissioned by BOM)





# Impressive ranking

The Netherlands ranks tenth among OECD countries in the manufacture of metal products, machinery & equipment, and transportation equipment. In Europe it is the sixth-largest, after Germany, France, Italy, the United Kingdom, and Spain.





# Milestones foreign investment

2016 .....



Thermo Fisher

SCIENTIFIC

#### **Thermo Fisher**

Thermo Fisher (scientific instrumentation) and FEI Company (high-performance electron microscopy) announced Thermo Fisher's acquisition. Thermo Scientific empowers scientists to solve complex analytical challenges in pharmaceutical, biotech-nology, academic, government, environmental and industrial research, as well as the clinical laboratory.





#### Shimano

Shaping the future of mobility from Eindhoven (2017). In 2017, Shimano moved its European head office to the High Tech Campus in Eindhoven. Marc van Rooij, President of Shimano Europe, reflects on the company's first two years in the region: "Eindhoven provides the perfect environment for us to find the right people and partners to help shape the future of mobility."

......

2017 .....



#### Merck

Merck invested €15 million in its production facility in Veldhoven for the production of Liquid Chrical window technology. The Eindhoven production line is unique and the first of its kind for liquid crystal windows. The largest size glass windows of up to 3.5 meters are produced here, which is a world record.



#### Advantech

According to Advantech, Brabant is the Silicon Valley of Europe. Self-driving robots and a digital kiosk where employees can order their lunch. The hypermodern European headquarters of Advantech in Eindhoven is more than a workplace; it is a showroom for the Internet of Things. The Taiwanese company has been active in Brabant for two decades. And when the old office became too small, it had no interest in leaving. Instead, Advantech realised a brand new HQ (2019).



# Milestones foreign investment

2019



Fujifilm

Fujifilm selects Brabant's collaboration power to boost innovation (2019). In the words of FujiFilm: "Brabant's concentration of eco-systems and unique global offering in cutting-edge collaboration is exceptional. Using this infrastructure to future-proof our business as well as to stimulate growth and development has become part of everyday life for us." Our newest product, membranes, based on our nanotechnology, is developed here in Tilburg."

2019



**Grai Matters Labs** 

Eindhoven has everything to build up a chip company (2019) GrAl Matter Labs BV (GML BV), which started just three years ago, is putting its efforts into the development of very efficient Artificial Intelligence chips. Even though its technology has not yet been fully productized, GML is already talking to various companies that are looking for alternatives to existing chips.

2020



Siemens:

Moved to Brainport because of its high tech ecosystem (2020) Siemens Digital Industries Software is the fastest growing division within the German conglomerate. The Benelux office is based in the Brainport Industries Campus (BIC) since December 2019. The software unit originated in 2007 as a result of acquisition of UGSa computer software company specializing in 3D & 2D Product Lifecycle Management software.

2021



**Delta Electronics:** 

Here we have all the ingredients to make our strategy work (2021), according to Delta. When Delta Electronics first arrived in Brabant, its ambition was to grow to a dozen people. Nearly 15 years later, its Eindhoven branch has far surpassed that goal. Recently, the Taiwanese company kicked off the construction of a new building at the https://www.automotivecampus.com/ in Helmond.



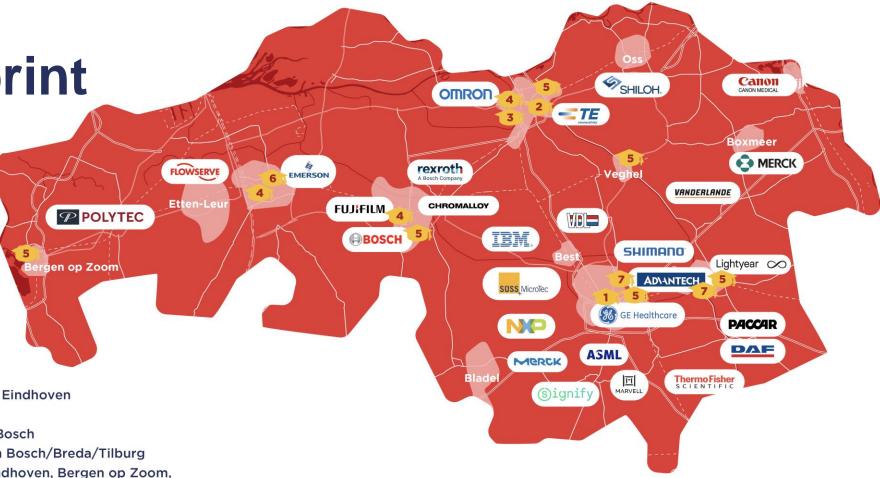
HTSM footprint

#### Companies

All company establishments highlighted above are production or R&D operations

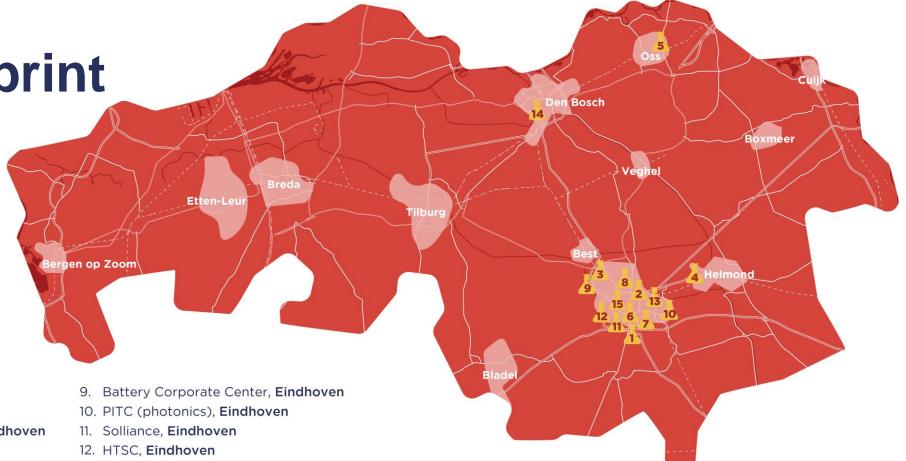
#### **Educational institutes**

- 1. University of Technology (TU/e Campus), **Eindhoven**
- 2. JADS, Den Bosch
- 3. HAS University of Applied Sciences, Den Bosch
- 4. Avans University of Applied Sciences, Den Bosch/Breda/Tilburg
- 5. Fontys University of Applied Sciences, **Eindhoven**, **Bergen op Zoom**, **Helmond**, **Den Bosch**, **Tilburg**, **Veghel**
- 6. Breda University of Applied Sciences (BUAS), Breda
- 7. ROC Summa (vocational), Eindhoven/Helmond





HTSM footprint



**Research institutes** 

- 1. High Tech Campus, Eindhoven
- 2. TU/e Campus, Eindhoven
- 3. Brainport Industries Campus (BIC), Eindhoven
- 4. Automotive Campus, Helmond
- 5. Pivot Park, Oss
- 6. Holst Centre, Eindhoven
- 7. PhotonDelta, Eindhoven
- 8. Eindhoven Engine, Eindhoven

- 13. Differ, Eindhoven
- 14. JADS, Den Bosch
- 15. EAISI (AI), Eindhoven



# Integrated value chain core







**DESIGN & ENGINEERING** 

**COMPONENT & SUB-ASSEMBLIES MANUFACTURING** 

COMMERCIALIZATION

#### **HIGH TECH SYSTEMS & MATERIALS**



















engie



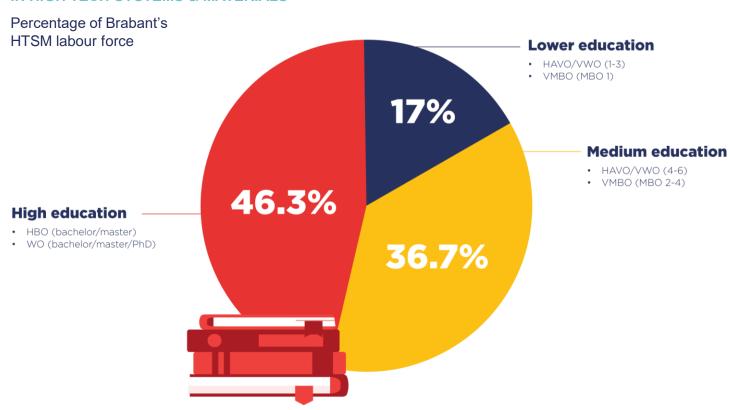
# Integrated value chain support Selection of organisations



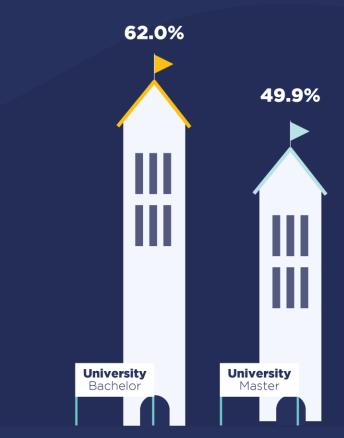


# Highly educated workforce

NUMBER OF JOBS BY EDUCATION LEVEL IN HIGH TECH SYSTEMS & MATERIALS



NUMBER OF GRADUATES IN HIGH TECH SYSTEMS & MATERIALS % GROWTH SINCE 2014



#### **BRABANT** IS BRIGHT versity of Amsterdam VU Amsterdam Leiden University Utrecht University **Delft University** of Technology 5 Wageningen University & Research Erasmus University Rotterdam **Radboud University** JADS Den Bosch **HAS Den Bosch Avans Hogeschool Breda Tilburg University** Fontys Eindhoven **Eindhoven University** of Technology University of Antwerp Ghent University Hasselt KU Leuven Maastricht University **RTWH Aachen** University

# Education – universities closeby

Within a radius of 150 km around Brabant, there are 22 universities in three countries: a total of 605,340 students, 255,680 of which in the field of nature, health or technology.



Independent and open innovation R&D centre in Eindhoven, with special focus on wireless autonomous sensor technologies and flexible electronics. Holst is jointly set-up and operated by IMEC and TNO.



#### **OBJECTIVES**

- Being an independent research and innovation center that focuses on innovations for improving health and wellbeing and on guaranteeing sustainable environments
- Improving quality of life while controlling healthcare spending



#### **CORE COMPETENCES**

- At the forefront of developments in personal health and biomedical sensing technologies
- Multifunctional solutions for wearable and noncontact monitoring



#### **FACILITIES**

- R&D prototyping in an open innovation setting, including initial clinical trials
- Circuit design to reduce power consumption
- Printed and flexible electronics lowers manufacturing costs and increases user comfort



#### **APPLICATION AREAS**

- 200 employees from 28 nations
- · Disease prevention through
- Behavioral change





TNO, the Netherlands Organisation for applied scientific research, connects people and knowledge to create innovations that boost the competitive strength of industry and the well-being of society in a sustainable way.



#### **OBJECTIVES**

Effective innovation in close cooperation with companies, governments and a whole range of organisations. Through collaboration TNO creates innovations that sustainably strengthen the competitiveness of companies and the wellbeing of society. Developing knowledge not for its own sake but for real applications.



#### **IMPACT**

TNO works on issues that concern the environment, safety and security, the energy transition, innovations in industry and how to keep the ageing population actively engaged.



#### **3D-PRINTING**

TNO and the University of Technology in Eindhoven (TU/e) have years of experience of 3D-printing and have clustered their strengths and knowled-ge in the innovation centre

AMSYSTEMS Center. The innovation centre is concerned with the development of entirely new value chains, based on the next generation of multimaterial 3D-prin-ting technologies. TNO and TU/e are integrating their innovation programmes in this field, sharing R&D facilities and jointly training experts.



#### BRABANT IS BRIGHT



#### **Eindhoven University of Technology in numbers**

SCIENTIFIC PUBLICATIONS

3,000

PHD-AWARDS

140

PATENTS EVERY YEAR

40

BACHELOR COLLEGE WITH
15 DIFFERENT MAJORS

#### MASTER PROGRAMS IN THE FIELDS OF:

- ARTIFICIAL INTELLIGENCE
- ENGINEERING & HEALTH
- HUMANS AND TECHNOLOGY
- SMART CITIES
- SMART MOBILITY
- SUSTAINABLE ENERGY

# **Key Research Institutes**

#### Eindhoven University of Technology



#### **COLLABORATION**

A spirit of collaboration is at the heart of the university community. Globally, the university stands out when it comes to collaborating with advanced industries, as it has done with Royal Philips since its inception. Academic education is driven by both fundamental and applied research. The TU/e Campus is in the centre of one of the most powerful technolo-gy hubs in the world, Brainport Eindhoven.

Its research institutes, the Eindhoven Artificial Intelligence Systems Institute (EAISI), the Eindhoven Institute for Renewable Energy Systems (EIRES), the Institute for Complex Molecular Systems (ICMS), and the Institute for Photonic Integration (IPI), combine the strengths of the university with industry needs and government strategy.

#### DEPARTMENT OF MECHANICAL ENGINEERING

#### **Research Groep**

- Control systems technology
- Dynamics and control
- Energy technology
- Polymer technology
- Power & flow

#### DEPARTMENT OF ELECTRICAL ENGINEERING

#### **Research Groep**

- Center for wireless technology Eindhoven (CWTE)
- Advanced network management and control
- Control systems
- Electromagnetics
- · Electronic systems
- Photonic integration

#### BRABANT IS BRIGHT







#### **CO-CREATION**

Al-research in close collaboration with student teams and industry representatives.

# **Key Research Institutes**

#### **EAISI Institute**

World class Research: The Eindhoven Artificial Intelligence Systems Institute (EAISI) is the new institute of Eindhoven University of Technology in the field of artificial intelligence (AI).



#### **OBJECTIVES**

The Eindhoven AI Systems Institute combines all TU/e Artificial Intelligence activities. Top researchers from various research groups work together to create new and exciting AI methodologies and applications with a direct impact on the real world. TU/e has been active in the field of AI for many years, which gives the new institute an excellent starting position to build upon.



#### **COLLABORATION WITH INDUSTRY**

ICAI is a network of Dutch research programs that is designed to bring together AI-researchers. The network helps TU/e to further strengthen its already close ties with Dutch industry, and exchange AI expertise and talent with other universities and knowledge institutes.



#### **FOUR ICAI LABS**

**EAISI AIMM LAB** has been set up to improve decision making in manufacturing and maintenance using AI, together with Nexperia, KMWE, Marel and Lely.

**E/MTIC AI LAB** is aimed at improving personalized treatment by having AI work in close collaboration with the clinical staff and MedTech industries to make more reliable decisions.

**EAISI FAST LAB** researches how mobile robot systems can operate safely whilst performing in environments that are subject to static and dynamic changes.

**EAISI MOBILITY LAB** focuses on accident-free mobility. It aims to help mobile systems understand the environment that they operate in.



Pivot Park: Life sciences campus in Oss, with special focus on pharmaceutical innovation



#### **OBJECTIVES**

- Connecting knowledge and experience between established companies, startups and spin-outs
- Helping entrepreneurs to accelerate growth by providing facilities and infrastructure



#### **CORE COMPETENCES**

- Active and innovative pharma R&D and manufacturing community
- Providing start-ups with ingredients for kickstarting their company the best way possible



#### **FACILITIES**

 25.500 m2 of R&D facilities, labs, cleanrooms and office space. And 175 m2 open access lab.

- Access to shared equipment for chemical, biological and analytical applications
- Ultra-high throughput screening centre and GMP-certified pilot plants available on-site



#### **COMMUNITY**

- More than 60 life sciences companies, employing appr. 600 highly skilled people
- Most firms perform product development, contract research, contract manufacturing and pharma support

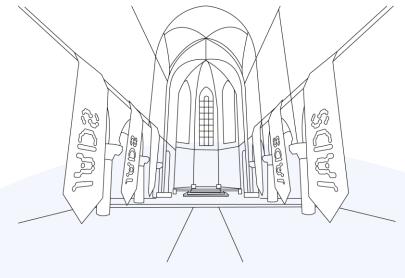


#### **APPLICATION AREAS**

- Immunology
- Oncology
- Cell therapy



#### BRABANT IS BRIGHT



#### **Jheronimus Academy of Data Science (JADS)**

At JADS, researchers and students work closely with the business community. In addition to education and research, JADS also offers space for innovative, data-driven entrepreneurship and public-private partnerships.

APPLIED RESEARCH LABS

3

NATIONALITIES

30

IN PDENG PRGRAM DATA SCIENCE

77 trainees

PROFESSIONAL EDUCATION CERTIFICATES

JOINT DEGREES DATA SCIENCE AND ENTREPRENEURSHIP

#### ECCIONAL EDUCATION

 Enhance the relevance of academic research to business and society

**OBJECTIVES** 

 Adding value with data science, such as data entrepreneurship and data innovation. It entails the fundamental question on how to create societal and economic value with data.



#### **APPLICATION AREAS**

- Datafication in Agrifood
- Smart farming
- Food sustainability
- Reducing ecological footprint



# **Key Research Institutes**

Jheronimus Academy of Data Science (JADS)

Data Science is essential to finding answers to today's challenges in the Agrifood sector. JADS offers data science bachelor and master programs, PDEng education, professional education and help organizations shape their data driven future.



Often recognized as the smartest square km in Europe, the HTCE campus is built around an ecosystem of 235 companies with a range of application fields. Home to over 12,000 innovators, researchers, engineers that create the technologies and business of tomorrow.



#### **OBJECTIVES**

High Tech Campus is Eindhoven, the smartest km2 in Europe is an ecosystem of 235 high tech companies. It's home to more than 12,000 innovators, researchers and engineers. Each company at High Tech Campus Eindhoven shares a common goal: developing new technolo-gies and applications that help solve social problems and challenges, and successfully bringing these to the market.



#### **LEADING COMPANIES**

- Multinationals such as Philips Healthcare, Teleledyne Dalsa, NXP and Intel
- Research institutes like the Holst Centre,
   Philips Research and Innovation lab
- Scale ups and startups like Usono, Lifesense Group, Bambibelt, GTX medical and Sirius Medical



#### **KEY CHARACTERISTICS**

- 42% of all patent applications in the NL come from the Campus
- >85 nationalities
- Al innovation Centre
- 12,500 Smart People
- Total 350,000 m2
- 25,000 sqm R&D facilities
- 1 billion private R&D
- Top 7 incubator for start-ups



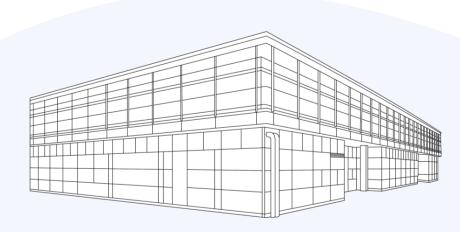
#### **APPLICATION AREAS**

HTCE is a global hotspot in the areas of Health & Vitality, Sustainability, Applied Intelligence, Smart Environments & Connectivity and Software & Platforms.



#### BRABANT IS BRIGHT





#### **Founders of the Eindhoven Engine**

The founders of the eindhoven engine are the know-ledge institutes fontys, tno and the eindhoven uni-versity of technology, together with philips healthcare, signify, asml, vdl, nts, and nxp. Eindhoven engine's funds (75 million euros between 2019 and 2025) have been made available through the brain-port regional deal (national funding) and by industry partners.

# **Key Research Institutes**

#### Eindhoven Engine

The **Eindhoven Engine** accelerates innovation in the Brainport Region through challenge-based research in its public-private research facility on the TU/e campus.



#### **MISSION**

The Eindhoven Engine accelerates innovation in the Brainport Region through challenge-based research in its public-private research facility on the TU/e campus.



#### **COLLABORATION**

The Eindhoven Engine unlocks the collective intelligence in the Brainport region. Thanks to a unique formula, innovators from companies can join forces with students and experienced researchers and employees from knowledge institutes to work together to accelerate innovation and create disruptive co-creation projects in which colocation is a prerequisite.



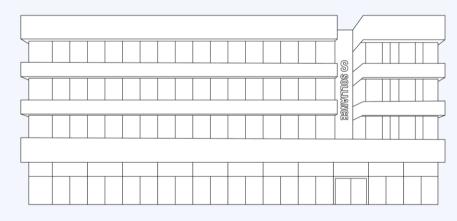
#### **INSPIRATION**

The program is inspired by three regional and highly successful concepts:

- The renowned former Philips NatLab (Philips Physics Laboratory) in Eindhoven,
- The successful Knowledge Worker
   Program from the last economic crisis,
   when companies could temporarily
   outplace their R&D employees to a
   knowledge institute with a substantial
   subsidy.
- The Eindhoven student teams, which have a knack for innovating quickly and disruptively.







#### Solliance's industrial partners

Solliance's industrial partners include CCM, DSM, Hanergy, Heijmans, Kameleon Solar, Monier, Panasonic, Polyplastic, Rexroth, Rockwool, Shell, Solaris, Solaytec, and the VDL Group.

# **Key Research Institutes**

#### Solliance

**Solliance** stands for shared research. By working together with partners and inspiring each other, new perspectives and fruitful ideas emerge.



#### **MISSION**

The mission of Solliance is to create jobs in thin-film solar technology. The research institute, which is a partnership between the TNO, imec, ECN, Holst Centre, TU/e, TU Delft, University of Hasselt (BEL), and Forschungszentrum Jülich (GER), does this by continuously developing the latest thin-film PV technologies and making them available to companies.



#### **OFFERING**

The Eindhoven Engine unlocks the collective intelligence in the Brainport region. Thanks to a unique formula, innovators from companies can join forces with students and experienced researchers and employees

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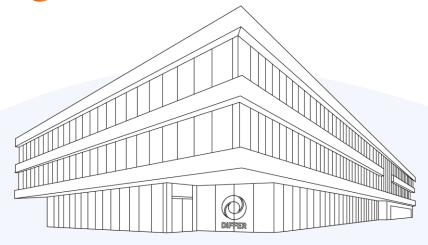


#### **INSPIRATION**

Solliance aims to connect the worlds of science and business in order to create a sustainable energy system. The institute, which turned ten in January 2021, has made enormous strides, with the thin-film solar technology research a great success and with almost 180 scientists and a research budget of over 20 million euros to its name.

#### BRABANT IS BRIGHT





#### Cooperation

DIFFER works with industry and knowledge partners in a range of fields, including physicists, chemists, engineers.

**SCIENTISTS** 

90

**TECHNICIANS** 

40

SUPPORT STAFF MEMBERS

90

DIFFERENT NATIONALITIES

30

# **Key Research Institutes**

#### Differ

**DIFFER** research focuses on developing a clean, inexhaustible energy supply that is available to anybody, anywhere in the world. Two major energy themes:



#### **FUSION ENERGY**

DIFFER researchers are investigating how the enormous potential of generating clean power from fusion energy can be achieved. DIFFER is the leading Dutch research center for nuclear fusion and the point of contact between Dutch researchers and companies that are part of the worldwide research into nuclear fusion.



#### **OFFERING**

DIFFER's role as a national institute allows it to run research facilities that are beyond the scope of individual universities. These facilities help DIFFER to scale up the insights gained from fundamental research into ones that could have industrial

applications. DIFFER's highly experienced engineers design, manufacture, and operate DIFFER's facilities. Our mid-sized laboratory setups, Magnum-PSI and Ion Beam Facility, offer unique opportunities for researchers and partners, while well-equipped labs for optics or materials research are dedicated to research into solar fuels.

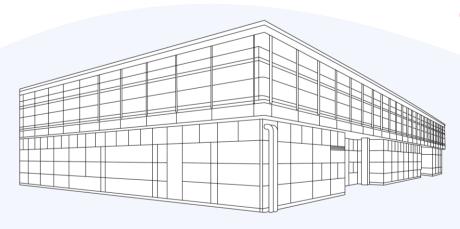


#### **SOLAR FUELS**

Research conducted by DIFFER into solar fuels addresses the global challenge of efficiently converting sustainable energy into chemicals and storing it. This approach provides the greatest amount of energy and is ideal for the long-term storage and long-distance transport of sustainable energy.







#### **Ecosystem**

COMPANIES

**17** 

MILLION TURNOVER

60

FTES

**550** 

MLN TOTAL INVESTMENTS

110

# **Key Research Institutes**

#### **PhotonDelta**

**PhotonDelta** is an independent growth accelerator for the integrated photonics industry.



#### **COLLABORATION**

PhotonDelta has established a collaborative ecosystem of organisations that is able to design, develop and manufacture the next generation chip technology. It was created as a public private partnership to accelerate the emerging Dutch integrated photonics industry and was granted € 240 million to execute the national plan for photonics.



#### **PITC**

PhotonDelta, TNO, Eindhoven University of Technology and University of Twente signed a cooperation agreement in 2021 for the new Photonic Integration Technology Center (PITC) in the Netherlands. This centre accelerates the uptake of integrated photonics by bridging the divide between research and applications such as autonomous mobility, healthcare, data & communications.

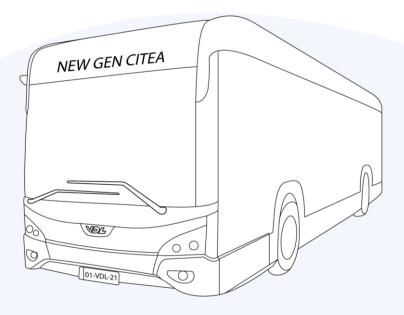


#### **SUPPORT ACTIVITIES**

PhotonDelta actively supports the ecosystem through a wide range of activities, including funding, coaching, and connecting them to industry. This is providing an environment that stimulates the creation of companies, products and applications that contribute to a better world.

### BRABANT IS BRIGHT





#### **Partners**

Founding fathers of the Battery Competence Center are Brainport Development, RAI Automotive Industry NL, VDL Groep, DAF Trucks, Damen Shipyards, ELEO, NMT, TU Eindhoven and TNO.

# **Key Research Institutes**

#### **Battery Competence Center**

The Battery Competence Center is an innovation program where companies, knowledge institutions and public organizations work together to accelerate the transition to electric vehicles and vessels.



#### **GOALS**

The goal is to build expertise and knowledge on a national level around battery technology and its applications in various heavy-duty and industrial markets. By developing this knowledge and combining existing knowledge by working together in projects, companies and organizations will continue to differentiate and maintain and strengthen their competitive position in leading industries.



#### **PROGRAM**

The Battery Competence Center is the program where companies, knowledge institutions and organizations join forces to build knowledge and competencies in the field of battery technology. The battery,

transport and shipping industry of the Netherlands comes together here.



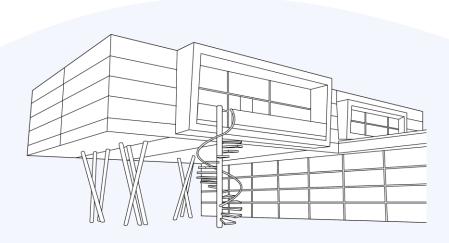
#### **MISSION AND AMBITION**

The mission is to develop unique battery competencies and knowledge within the ecosystem and make it accessible for Dutch industry. The ambition is to become a leading center of expertise on application-driven battery technology development. This will lead to:

- Technological lead and improved competitive position
- Reduction of procurement costs and decrease of (international) dependency
- Creation of added value in the Netherlands
- Preservation and growth of employment







#### **Currently HTCS had more than:**

T-shaped engineers

150

Working on projects related to our center's focus

Of which PhD students

80%

And PFEng trainees

20%

# **Key Research Institutes**

#### High Tech Systems Center

HTSC of Eindhoven University of Technology groups its research activities in the domain of complex high tech mechatronic systems into a one top level research center.



#### **FUNDAMENTAL RESEARCH**

At the TU/e High Tech Systems Center (HTSC), fundamental research and design around new concepts and prototypes takes place while focusing on the needs of the industry. Using systems design paradigms forms a central part of the program and challenges within HTSC.



#### **FOCUS AREAS**

The seven focus areas of HTSC are innovative and will continue to develop complex engineering: Robotics, Digital Engineering, Industrial Internet of Things, Scientific Instrumentation and Metrology, Optomechatronics, Artificial Intelligence and Contamination Control.

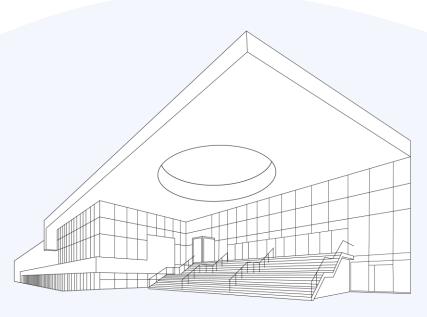


#### **FOUR DEPARTMENTS**

By combining the expertise from four departments: Mechanical Engineering, Electrical Engineering, Mathematics and Computer Sciences and Applied Physics, the HTSC addresses the complexity problem of future high tech systems design in a multidisciplinary way, with strong emphasis on System Engineering. The High Tech Systems Center performs fundamental research and design of new concepts and prototypes, and understands the needs of the industry.

#### BRABANT IS BRIGHT





### **Key Research Institutes**

### **HTSM Center of Expertise**

The Fontys Centre of Expertise HTSM is the driving force behind the application of fundamental research results in high tech systems and materials in Brabant.



#### PRACTICE-BASED RESEARCH

The Center connects higher vocational education to the (technical) business community. Within High Tech Systems and Materials (HTSM), Fontys experts work in multi-disciplinary teams with companies and institutions on practice-based research.

Lecturers, teacher-researchers and students, investigate in how they can innovate research in practice. By working, learning and researching within different disciplines, to solving complex social and technical issues become possible.



#### **RESEARCH PROJECTS**

Several lectorates operate within HTSM, carrying out practice-based research projects, such as:

- Creative economy
- Enabling technologies
- Future of learning
- · Healthy & inclusive society
- Smart mobility
- Sustainability and circularity





The most innovative and successful companies and institutions in the Brainport region come together as one on the **Brainport Industries Campus**.



#### **KEY FIGURES**

- Over 35 companies
- 2,000 high level staff
- 1,500 students
- Surface 105,000 m2
- 6,000 m2 of shared facilities
- 6,000 m2 of shared warehousing



#### **HIGH TECH MANUFACTURING**

Brainport Industries Campus is the place to be for far-reaching partnerships between suppliers, specialist companies and innovative education and knowledge institutes. This is where the next generation of professionals in the hightech manufacturing industry is trained in a state-of-the-art working and learning environment.



#### **COOPERATION**

Brainport Industries Campus is the very first location where high tech suppliers innovate and manufacture together, where the most successful companies share high-quality facilities, such as cleanrooms, flexible production areas, warehouses, and other advanced facilities, and where they present themselves as a unified force that they can showcase to their national and international customers.





**The Automotive Campus** has become a hotspot where businesses, knowledge institutes, and student teams find one another and form partnerships.



#### **PARTNERING**

The organizations on campus partner with the leading high tech businesses in the Netherlands, as well as leaders in other industries, including IT, energy, and infrastructure. This cross-pollination encourages innovation and creates partnerships that mean ideas can be turned into the technology of the future, faster than ever before.



#### **APPLICATION AREAS**

Application areas include green mobility and smart mobility. The campus is home to various high-quality, multi-purpose technical testfacilities and research labs, such as TNO's automotive center for powertrain tests.



#### **KEY FIGURES**

- 45 companies and organizations
- 25 labs and test facilities
- 620 engineers and research specialists
- 600 automotive students at all education levels
- 110,000 m<sup>2</sup> offices, workshops and labs
- 140,000 m<sup>2</sup> still to be constructed
- 100 events per year
- 10,000 visitors per year



#### **LEADING COMPANIES**

Some of the leading companies on campus are Altran Engineering, Lightyear, VDL ETS, TASS International, Durapower, V-Tron.





# Prominent players in brabant

**PHILIPS** 







































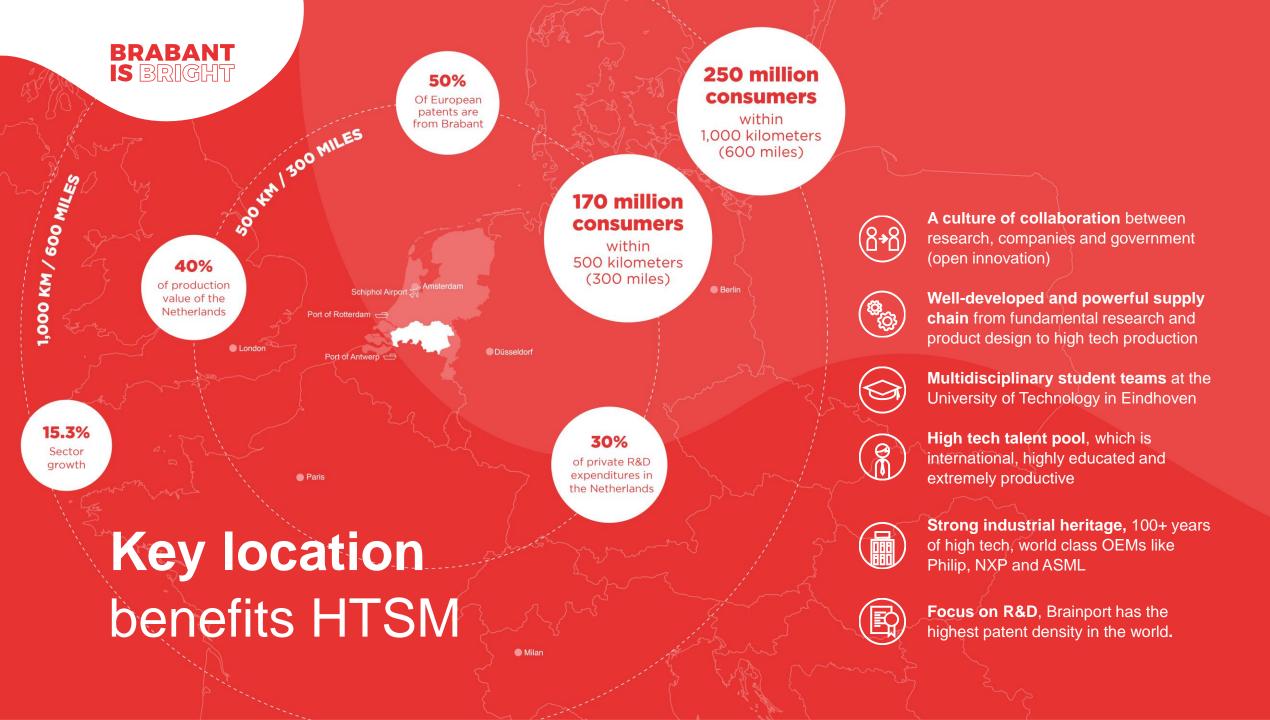


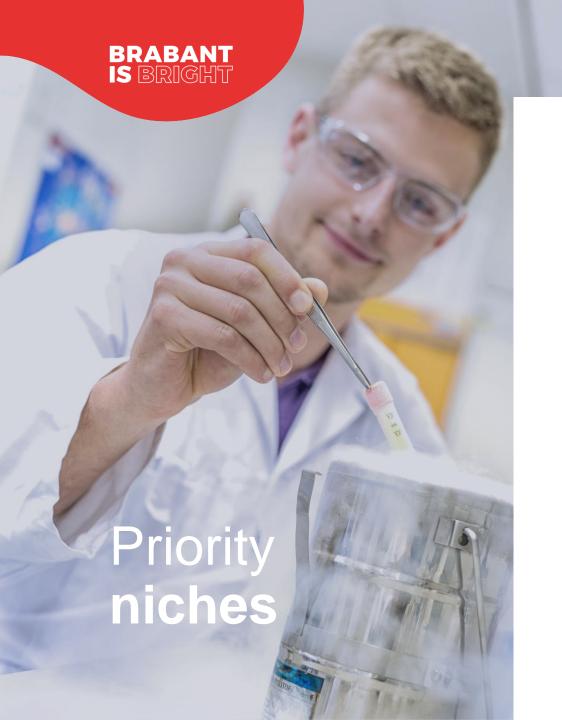














Advanced manufacturing



Water fabrication



Aerospace



Smart mobility



New energy



Robotics



Electronics

