

BRIGHT BRABANT

A satellite night view of Europe, showing city lights and borders. A red dot is placed in the Brabant region of Belgium, with a thin white line extending upwards from it towards the horizon. The background is a deep blue space with stars and the Earth's horizon curve.

**Beyond boundaries, Brabant's
solutions to global challenges**

OUR CHALLENGE

Enabling the key technologies of the future

Key technologies will shape the way we live, learn, and work in the future. They contribute to addressing our societal challenges. Together with entrepreneurs, Brabant focuses on digitizing and making the High Tech manufacturing industry more circular and pioneering technical solutions.

Photovoltaic Solar Energy developed by Holst Centre. Holst Centre is a research and innovation partner specialized in health technologies, flexible and wireless electronics.

HIGH TECH SYSTEMS & MATERIALS

In Brabant, every component, every conceivable machine, every possible integrated system, or cyber-physical system can be invented, designed, developed, produced, assembled, marketed, commercialized, and maintained – even remotely, if necessary.

This focus on complex, High Tech challenges and their solutions is a powerful attractor for talent. Researchers and inventors, driven to find solutions for some of the most pressing global challenges, are drawn to Brabant due to the high density of tech companies, world-renowned knowledge institutions, and the opportunity to plug into any part of the value chain that fits their specialism. In addition, major OEMs such as ASML and Philips and the high number of tier-1, -2, and -3 suppliers provide ample opportunity for finding the right match between talent and employer.

The complete rich and deep value chain, from R&D to industrialization, is present in this innovative region. This is partly due to the advanced manufacturing legacy of major tech/industrial companies located here historically, such as Philips, ASML, VDL, and DAF Trucks, making Brabant the 7th most innovative region in Europe.

Unsurprisingly, it is with pride that Brabant has created the most complex machine in the world – ASML’s extreme ultraviolet lithography machine for the fabrication of the chips that sit in everything from iPhones to automobiles and satellites; a ‘hypermachine’ operating at the absolute cutting edge of human technical capability. ASML’s machines are so critical to everyday life that they influence world geopolitical equilibrium.

Freedom to pioneer

The legacy of Philips’ NatLab R&D unit is a common thread that interweaves throughout the region. As the global R&D core of Philips, NatLab created the template for innovation and manufacturing integration

in Brabant and even hosted lectures on theoretical physics by Albert Einstein. Research done at the gigantic NatLab ranged from product-specific to fundamental research into electronics, physics, and chemistry, as well as computing science and information technology. It subsequently evolved into the High Tech Campus Eindhoven (HTCE). HTCE is considered as the smartest square km in Europe, home to about 300 High Tech companies. In a thriving ecosystem, 12,500 innovators, researchers and engineers create the technologies and businesses of tomorrow.

Brainport Eindhoven is one of the most influential tech hubs in the world, with active involvement and presence in the various campuses and collaborations with the many local research centers. Campuses such as High Tech Campus Eindhoven, Brainport Industries Campus and Automotive Campus each have their own focus and a complementary position within innovation. These are prime examples of effective collaboration within the ecosystem and are generally substantially funded by national growth funds among which NxtGen Hightech, PhotonDelta, QuantumDelta and Battery Competence Cluster NL, to solidify and expand the technological development value chain and required infrastructure enabling these.

As a result, an impressive 30% of private R&D expenditure in the Netherlands is disbursed in Brabant.

Furthermore, many expert researchers that were part of the NatLab are now seeded in companies throughout the High Tech ecosystem, sharing their knowledge and continuing the trend of pioneering innovations. As a result, an impressive 30% of private R&D expenditure in the Netherlands is disbursed in Brabant.



Why Brabant excels in High Tech Systems & Materials

Complete value chain

Presence of the complete value chain. In Brabant, every component, every conceivable machine, every possible integrated system, or cyber-physical system can be invented, designed, developed, produced, assembled, marketed, commercialized, and maintained – even remotely, if necessary.

Strong manufacturing industry

Advanced manufacturing legacy of major tech/ industrial companies located here historically, such as Philips, ASML, VDL, and DAF Trucks.

Innovative campuses

Presence of High Tech Campus Eindhoven, smartest square km in Europe, Brainport Industries Campus and Automotive Campus.

Relevant knowledge institutes

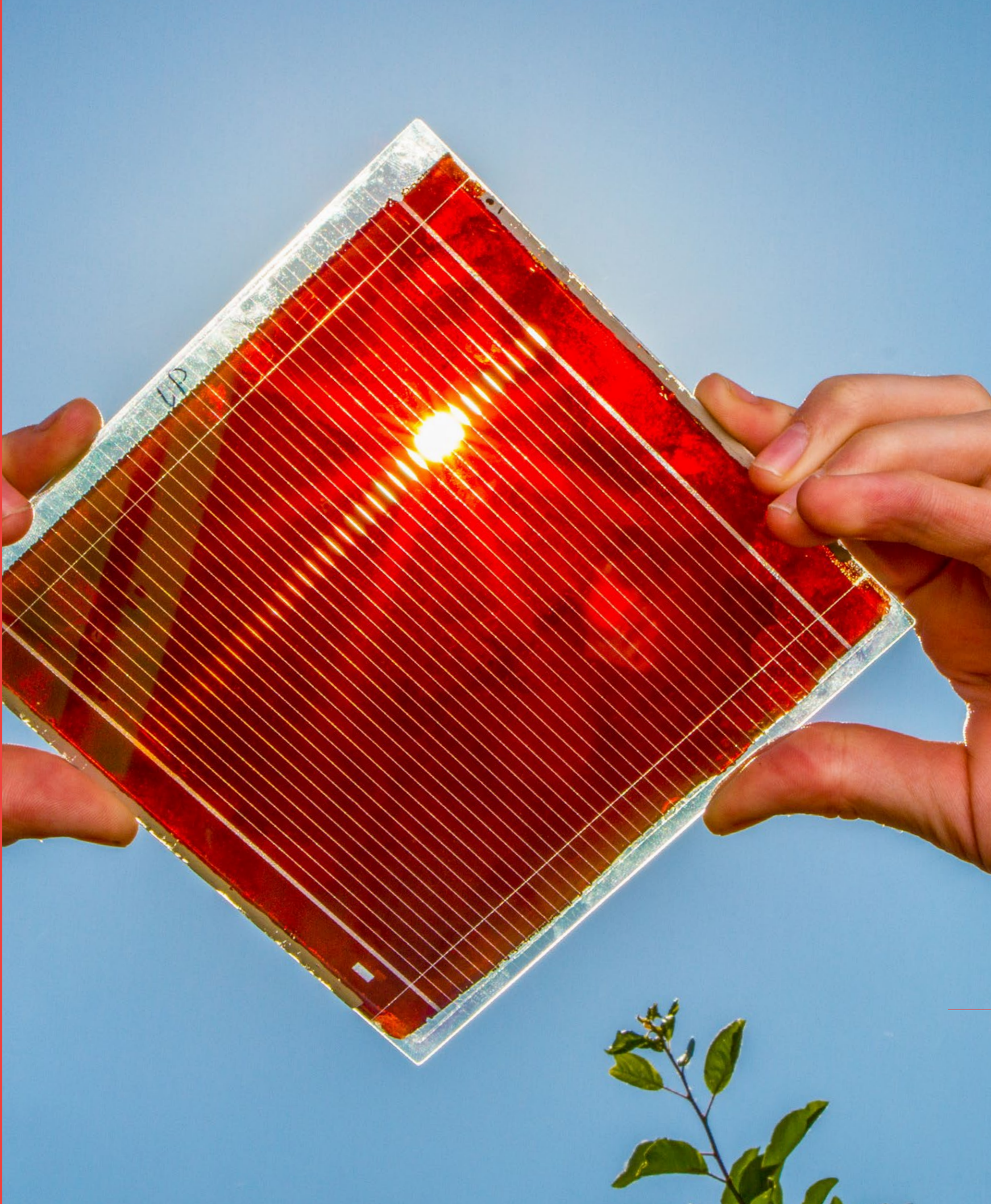
Relevant knowledge institutions in the region, including TU/e, Holst Centre and TNO.

Inkjet Printing Flexible Electronics by Holst Centre. This technology boosts the performance of next-generation electronic devices like sensors and medical instruments where volumetric constraints apply.

Facts & figures

- 17,850 companies
- 21.9% (144,570) of the total HTSM jobs in the Netherlands
- 54% of all Dutch patents in the Netherlands originate from Brabant
- #1 region in R&D spending
- €33.5 billion total export HTSM Brabant 2023
- 23.3% growth of foreign companies in Brabant between 2016 – 2021.

Recent foreign investments in Brabant



Critical collaboration

Brabant's High Tech sector can also be viewed as a highly efficient machine. The blueprint for its success is the Dutch Triple Helix innovation framework, designed in the 1990s to align the interactions of government, industry, and academia.

The technological challenges and complexity the sector faces mean that collaboration is a critical element in the development process, and therefore the tendency for co-creation between companies and academic institutions is exceptionally high. Moreover, the concentration of highly specialized tech businesses means that collaboration across the value chain is essential. Accordingly, the very composition of the value chain in Brabant is designed precisely to facilitate horizontal collaboration, and the High Tech businesses in the region are open to finding vital collaborators: it is part of the mindset here. As a result, organizations in the various ecosystems often view each other as potential collaborators rather than competitors.

Collaboration is a critical element in the development process, and therefore the tendency for co-creation between companies and academic institutions is exceptionally high.

Solliance Solar Research Film. Solliance is a partnership of R&D organizations and companies, specializing in the development of thin-film solar technology.

5 most promising HTSM start-ups in Brabant

With over 1,500 startups, Brabant has truly become a startup province with a strong focus on technology. The Brabant40 is an initiative of several Brabant-based organizations in the startup ecosystem, including BOM, The Gate, Braventure, Rewin, and Brainport. It is a list and an award for the most promising startups in a year. The following startups made the top 40 in HTSM innovations.

LionVolt

astrape
networks

FononTech

ANTENNEX

SMART
PHOTONICS

Future path

As machines become more complex with improved functionality and smaller size, this places according demands on production processes. Digitization drives the transition from hardware to software and the factory of the future, becoming smarter, faster, more efficient, and more sustainable. Advances in the High Tech sector impact the crucial ‘smart’ and ‘sustainable’ aspects of business. Countless open, innovative platforms exist where companies and knowledge institutions connect to generate novel solutions for today’s challenges and envision the future. Helping to secure the High Tech future of Brabant are collaborative initiatives in the fields of Semicon, Integrated Photonics, Quantum and Advanced Manufacturing.

Countless open, innovative platforms exist where companies and knowledge institutions connect to generate novel solutions for today’s challenges and envision the future.

PhotonDelta is a program for stimulating the development of an Integrated Photonics ecosystem in the Netherlands. The PhotonDelta ecosystem brings industry and academia together to promote photonics in new and emerging markets. This has led to a complete end-to-end value chain for photonic chips and it is ready to scale. Brabant has key players in various steps of this value chain.

Within the Quantum field, Eindhoven University of Technology (TU/e) is one of the five main Quantum



SHOWCASE

SMART Photonics

As a foundry for integrated photonic circuits, SMART Photonics offers solutions for data and telecommunications, as well as for sensing – such as Lidar – and medical applications.

SMART Photonics is a pureplay indium phosphide foundry, producing only photonic components (discrete and integrated circuits) for its customers, based on precise designs. As it is an independent

foundry, clients gain several important advantages, including:

- The product’s intellectual property stays with the customer
- The cost benefits of using one expensive infrastructure for multiple customers
- Operational excellence, resulting in high-quality products with a short time to market

SMART Photonics recently secured an additional round of funding of €100m from a group of strategic industry and financial Dutch players. The foundry will use these funds to extend its manufacturing capabilities and accelerate the development of its photonic integrated-chip technology platforms and process design kits (PDKs).

SHOWCASE

ASML

Brabant is home to ASML, an innovation leader in the semiconductor industry. The company provides computer chip manufacturers with everything they need – hardware, software, and services – to mass produce patterns on silicon using lithography.

ASML was founded in Eindhoven in 1984 and has grown into a global company with almost 40,000 employees of 140 different nationalities and counting. The company's headquarters are located in Europe's top tech hub, the Brainport Eindhoven region in the Netherlands, and global operations are spread across Europe, Asia, and the US. ASML, with almost 20,000 highly-skilled employees in the Eindhoven region, is by far the largest Dutch investor in research and development.

ASML's machines are so critical to our everyday lives that they influence world geopolitical equilibrium.



hubs in the Netherlands. With Eindhoven Hendrik Casimir Institute (EHCI) as a leading institute with strong knowledge on both Integrated Photonics and Quantum. Brabant has distinctive competences to offer. Unique in the world is the open testbed and network for Quantum communication facilitated by TU/e, where technologies such as Quantum Key Distribution (QKD) and Quantum Communication can be applied and tested. A unique testbed is open to any company for testing at either component- or system-level and is designed to accelerate the development of quantum technology in Brabant, a perfect example of facilitating collaborative innovation.

Key technologies such as Integrated Photonics can drive development in energy-efficient applications – reducing costs and environmental impact, for instance, in energy-consuming data centers, advancing innovation in remote care within the health sector, and sensing and monitoring technology within Agrifood. Quantum and AI are other rising technologies that will significantly impact systems engineering. The applications are endless. And the place where it is all happening – is Brabant. ●

The applications are endless. And the place where it is all happening – is Brabant.

Scan the QR-code for more information and facts & figures about High Tech Systems & Materials in Brabant.



Value chain

DESIGN & ENGINEERING



COMPONENT & SUB-ASSEMBLIES MANUFACTURING



COMMERCIALIZATION



RESEARCH & DEVELOPMENT



PROTOTYPING & INDUSTRIALIZATION



SYSTEM INTEGRATION



SERVICE & MAINTENANCE



(this is a selection of companies)

