

Business Cluster Semicon NL

I N T R O D U C T I O N

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NATIONAL NETWORK OF SEMICONDUCTOR COMPANIES



Outline

- Dutch Semicon Ecosystem
- BCSEMI NL Activities & Initiatives
- Global trends



About BCSEMI NL

- **Non-for-profit Foundation**
- **Established 2007**
- **Primary goal: Increase The Semicon Ecosystem & Business in The Netherlands**
- **Board representing the full Dutch Semicon Valuechain**
- **Scientific board from 3 TU's**
- **60+ members - Large Companies, SME & Institutes**
- **Relations with Government (local, regional, national) & EU clusters**

Business Cluster Semiconductors Netherlands (BCS) is a national network of 60 semiconductor companies and knowledge organizations active in the entire Semicon value chain of research, design, development, production and applications of Advanced ICs, MEMS, Sensors and Wireless Systems. We improve the success of your members by supporting collaboration initiatives, development of innovation projects, sharing competences and internationalisation.



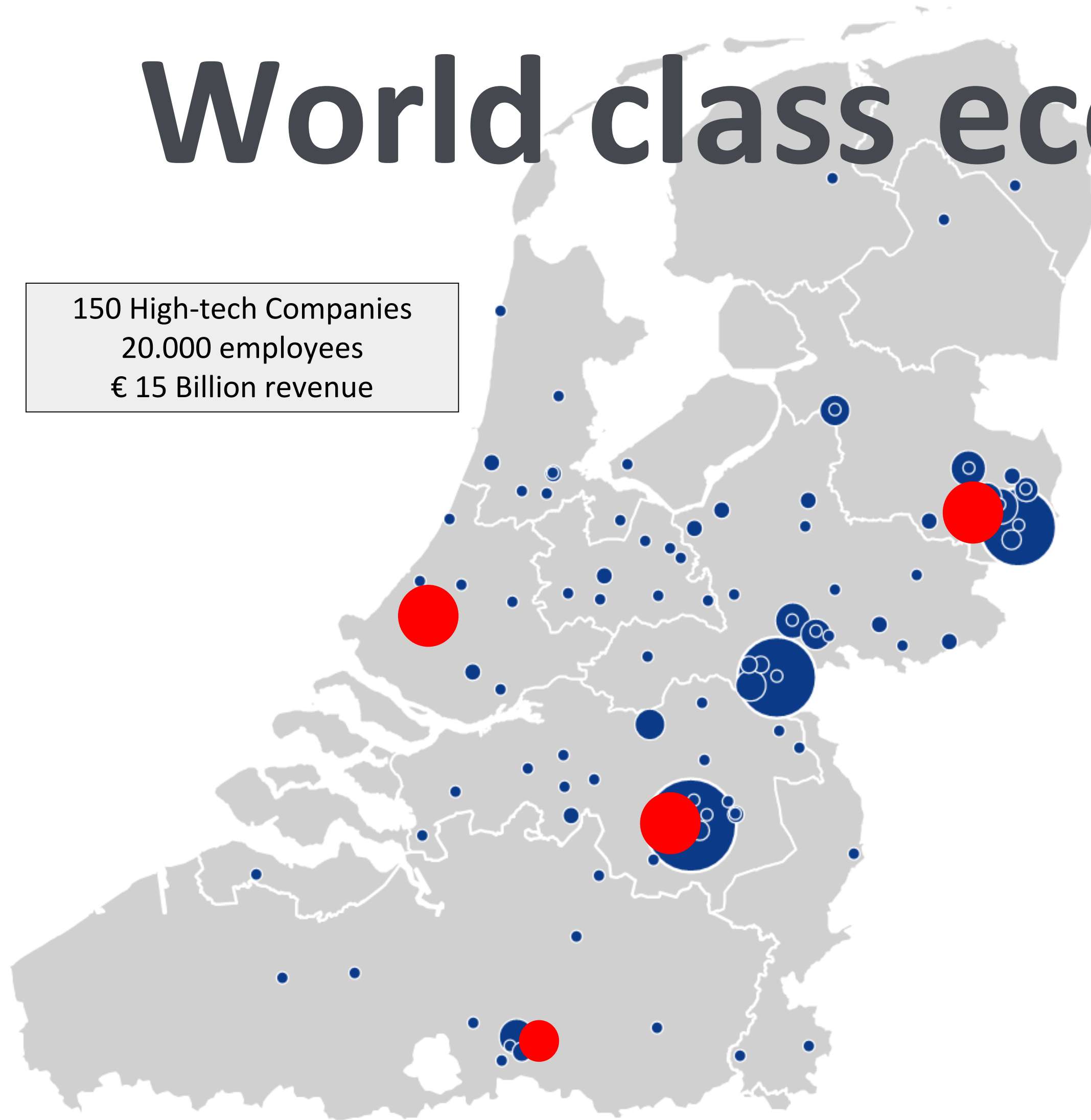
Dutch Semicon Ecosystem

NATIONAL NETWORK OF SEMICONDUCTOR COMPANIES



World class ecosystem

150 High-tech Companies
20.000 employees
€ 15 Billion revenue



- **Approx. 150 companies active in development & production (core business) and equipment & materials (tier 1 suppliers)**
- **Clustered around Eindhoven, Enschede and Nijmegen.**
- **Top-class Knowledge Institutes Technical Universities in Eindhoven, Twente and Delft, IMEC en Holst Center.**



Members



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Activities & Initiatives

BCSEMI NL Pillars



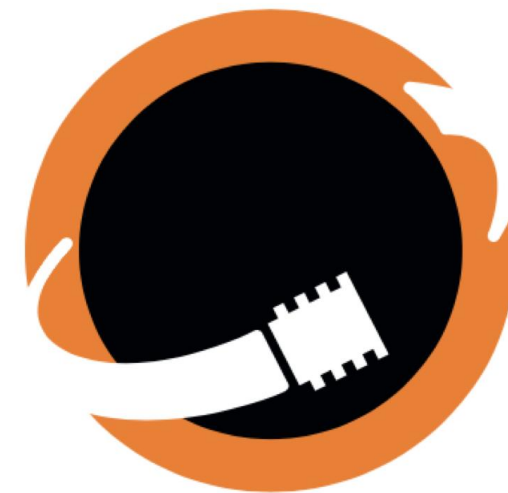
Network



Shared Infra



Innovation



Internationalisation



Network & Collaboration



- Member meetings
- Knowledge sharing
- Partner search
- Marketing & Awareness
- Lead distribution

Semiconductor components (from machines to chips)

From design, architecture, the production of chips and the equipment required to make them through to system integration and actual applications.

Famous examples are multinationals such as NXP Semiconductors, Philips and Thales. But there are also a large number of SMEs that actively design, test, and simulate silicon components in MEMS, microfluidics, and photonics, as well as in specific application domains such as health and energy.

From equipment to components

The Netherlands also has a large base of companies that provide equipment for the semiconductor industry, such as state-of-the-art EUV equipment by ASML, and from and process, integration and packaging equipment by companies such as ASM, Boschman Technologies, BESI, ALSI, Solmate and Sempco.

Dutch companies work closely with the three technical universities and knowledge institutes such as TNO and ECN, as well as with specialized institutes such as the Materials Innovation Institute (M2I). All of these partners have their own sector expertise and specialization in the development of knowledge-intensive innovations across the whole semiconductor value chain. These innovations are used in global markets such as MEMS, flexible electronics, imaging devices and other key enabling technologies.

Examples of semicon solutions for innovative applications

HEALTH	ENERGY	INDUSTRY	MICROFLUIDICS AND ANALYTICAL	EQUIPMENT
Micro needles for painless injections	Thin-film flexible solar cells	MicroGas Analyser	Holst Centre	ASML
Health	Energy	Industry		

Health

Li Needle uses a unique in-plane silicon etching method to produce micro-needles with an extremely short bevel. The micro-needles are extremely sharp and feature perpendicular injection. Their high precision and astonishing ease of use enable accurate, quick, pain-free intradermal and subcutaneous delivery, for example, of vaccinations, drugs, and in-skin aesthetic treatments. The cooperation with other Dutch companies such as Advanced Packaging Centre (APC) for the challenges in the packaging of the needles, and with Micron Microfluidics for the combination with lab-on-a-chip solutions, enabled Li Needle to innovate faster and develop and manufacture actual solutions.

Industry

Gemco, specialist in advanced MEMS product development and supply, developed a micro gas chromatograph for on-the-spot analysis. In cooperation with Maser Engineering and Advanced Packaging Centre, a lab-on-a-chip solution was developed that enables the detection of very low volumes of gas (Particulate Matter or PM) levels, thus providing on-the-spot measurements of gas in breath, without the need of large and expensive labs. Cooperating with both central partners such as Radboud University Medical Centre and technical partners such as University of Twente, Maser Engineering and Advanced Packaging Centre (APC), enabled Gemco to develop and test a revolutionary new high-tech product.

Equipment

ASML is one of the world's leading manufacturers of chip-making equipment. ASML invents and develops proprietary machines, microscopy systems and software products that together allow its customers to follow Moore's Law and produce ever smaller, cheaper, more powerful and energy-efficient semiconductors. The result: increasingly more powerful and capable electronics, with faster processing speeds, that enable the world to progress within a multitude of fields, including healthcare, technology, communications, energy, mobility and entertainment. An improvement of the quality of its ASML (Eindhoven, Netherlands) stock exchanged employs 16,000 people, has over 70 locations in 16 countries, and supplies most of the world's major chip manufacturers such as Samsung, Intel and TSMC.

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Shared Infra initiatives

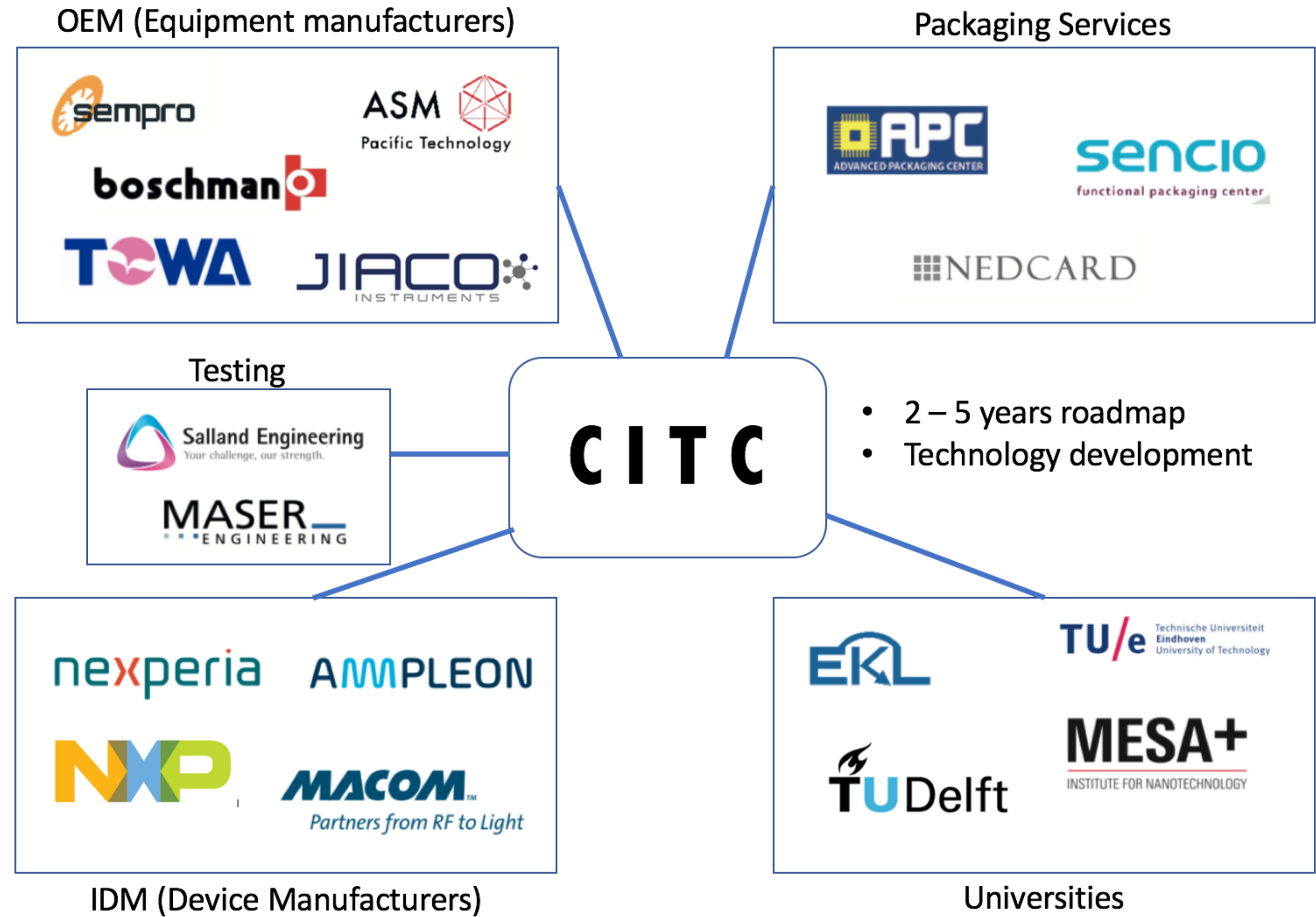


- Shared EDA: Shared Licencepool EDA Software
- APC: Shared Advanced Packaging Centre
- Plug & Play Design Centre: Support MedTech & IoT Device Development
- Chip Integration Technology Centre: 'IMEC for BackEnd'



Chip Integration Technology Centre

- Focus on Backend – Innovative Packaging
- All parties in value chain involved
- Start in 2019
- Located on Novio Tech Campus



Innovation projects



I2I: EFRO project 'Innovation 2 Industrialisation', 5 projects in Health domain (11M € +)

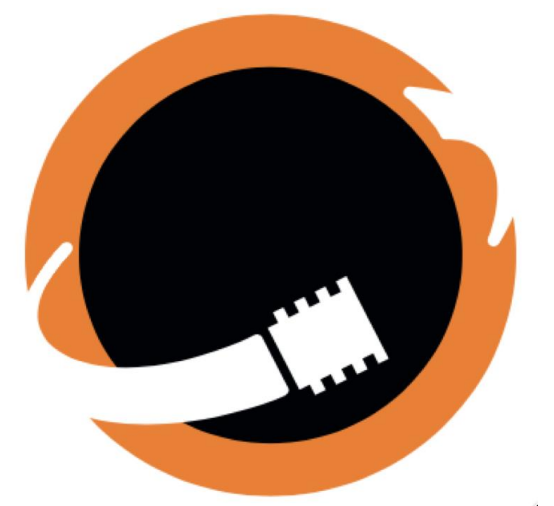
- **Breath Analyzer, Micro Inhaler, POC Cartridge, Blood Fluid Sampler, Ultrasound MEMS**

ROCKET: Interreg Project on Key Enabling Technologies (10M€+)

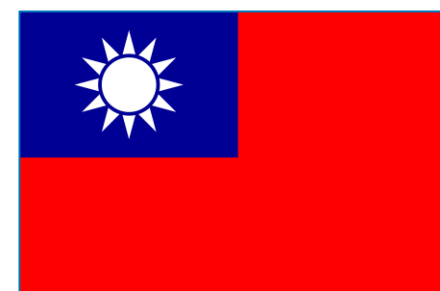
- **FastPharma: Fast microGC analyzer for PHARMA Applications (Qmicro, Aemics)**
- **TryHaSens: development of Hydrogen sensor packaging (Sencio)**
- **eNanoPrint: Near field electrospinning equipment (DoMicro, PPS Holland)**



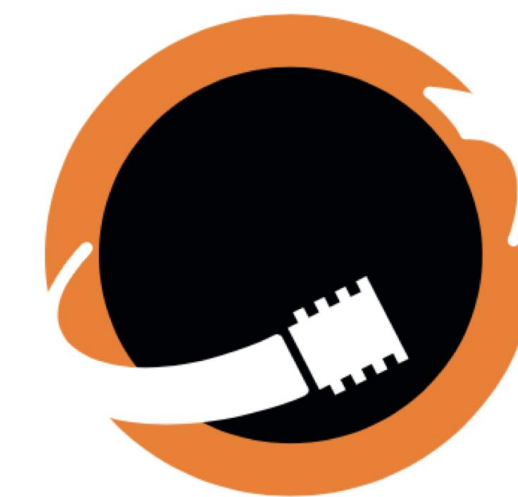
Internationalisation



- **Collective Booths on international (Semicon) Fairs**
- **Holland High Tech Branding company profile booklets**
- **Semicon Missions (Germany, Finland, Taiwan, China, ..)**
- **Partners in Business Program China (PIB)**
- **Silicon Europe access to all Semicon cluster in EU**



Access to Semicon in Europe



Silicon Europe is the brand under which the leading micro- and nanoelectronics clusters in Europe collaborate to represent, support and promote the companies and organizations belonging to their ecosystem both on European and global level.



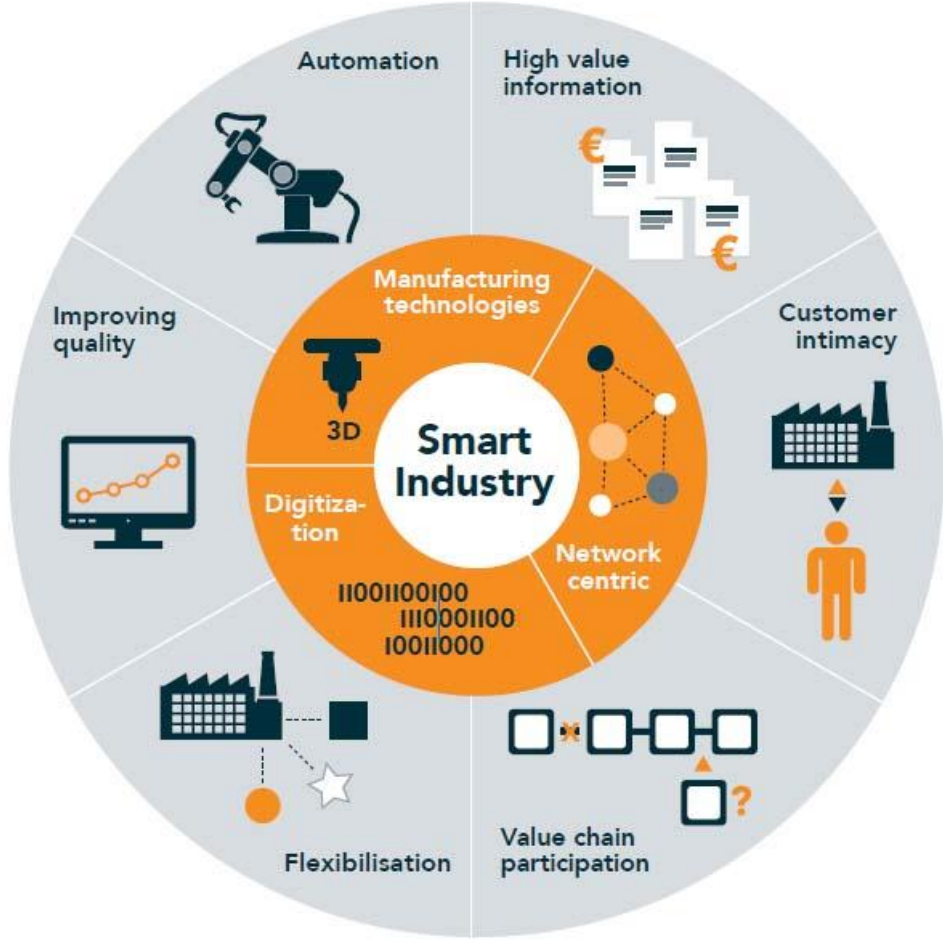
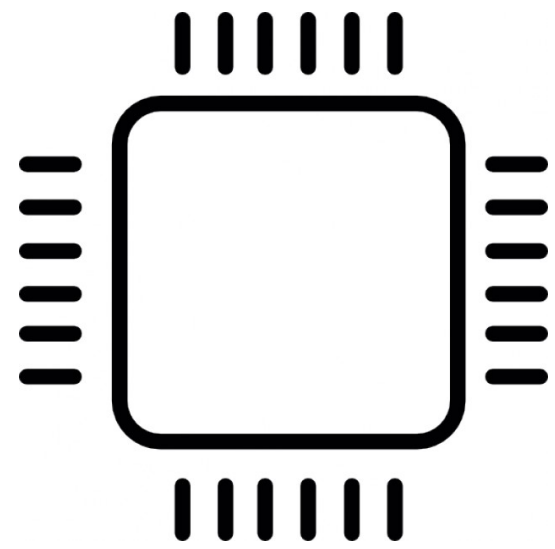
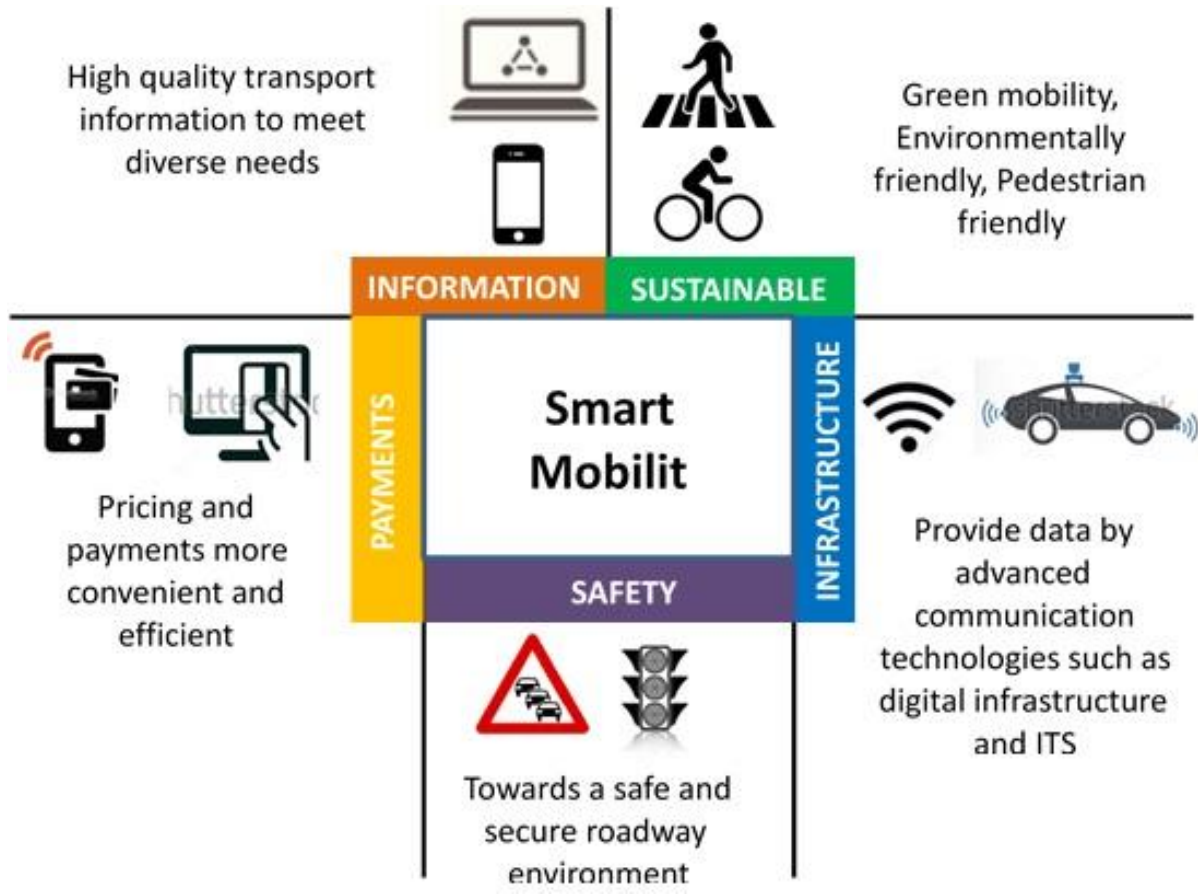
Global Trends

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No 'Smart' Without Semicon

SMART ENERGY 



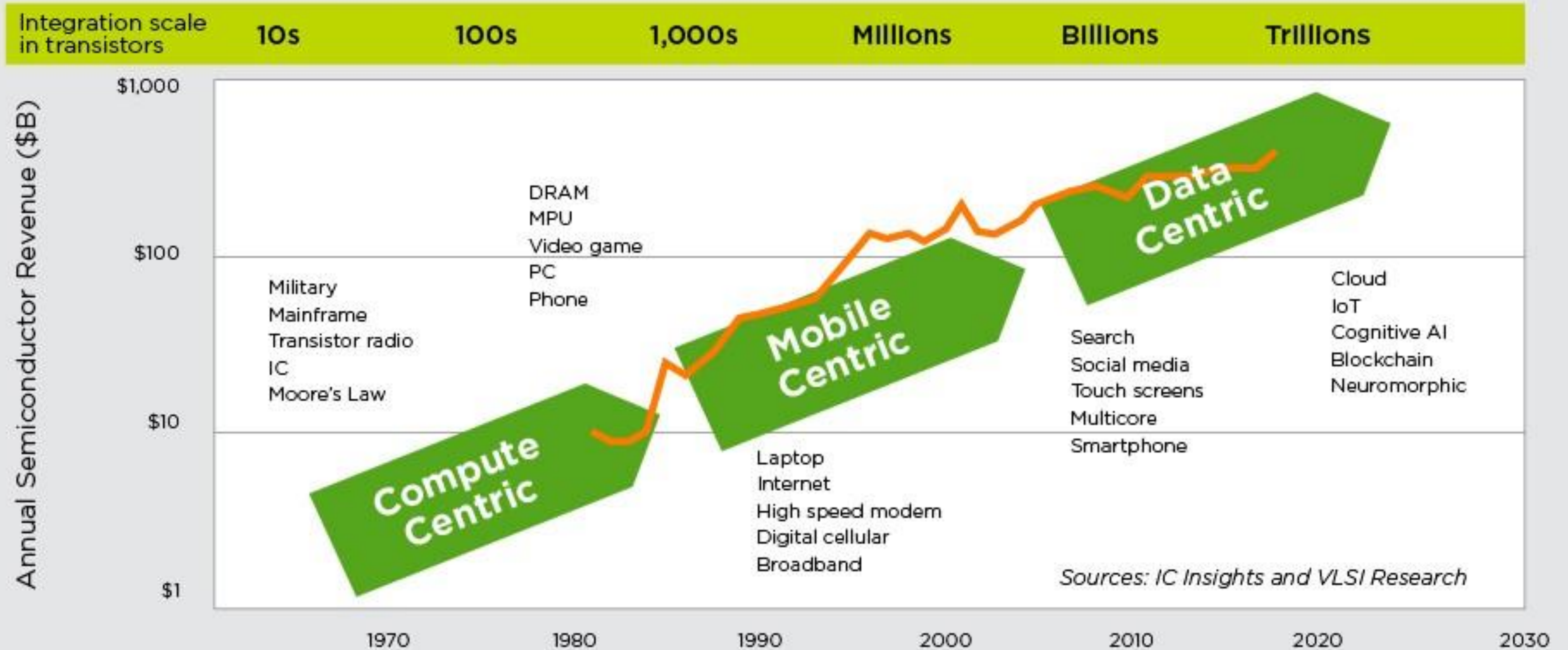
SMART HEALTH

Without this.



None of these.

Moore's Law Evolution



Relevance of Semicon

Financing the digital transformation

Unlocking the value of photonics and microelectronics

“The success of Europe in this next wave of innovation will ultimately depend on photonics and semiconductor components.”

Alexander Stubb, Vice-President, European Investment Bank



Impact on the Netherlands

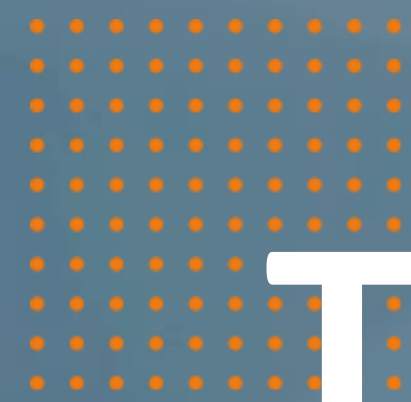
- Continued shift of production to Asia;
- Further growth of the Foundry concept in Front and Back end production
- Large customers for the manufacturing equipment companies in the Netherlands

- More & more niches in Design
- Low entry barrier for Fabless Design Companies
- Growing & New design companies like Axign, Enzyre, BioVolt

- Specialization on RF

- Cross overs with other technologies
- Specialization on Automotive, Identification, Security and Health

Any questions?



Thank you for your attention!