Driving industrial competitiveness and resilience in Västra Götaland through strategic semiconductor investments

Current state, supply chain challenges, and foreign direct investment potential

Prepared for Business Region Göteborg and Region Västra Götaland

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VÄSTRA GÖTALANDSREGIONEN

BUSINESS REGION GÖTEBORG

EXTERNAL VERSION

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- **Executive summary**
- About this report
- Background and context
- Regional value chain, strengths, and conditions
- Industry needs, supply chain and regional gaps
- FDI opportunity areas

Executive summary

Background & context

- The semiconductor value chain is **highly complex** due to **global interdependencies**, few actors dominating advanced chips production and **geopolitical risks** that affect **supply chain stability**.
- Region Västra Götaland (VGR) is **home to several key industries**, including Automotive, ICT, and Aerospace, that rely on semiconductors for their operations.
- The semiconductor shortage during the 2020 pandemic **exposed vulnerabilities** in the **supply chains**, **highlighting reliance** on a stable and predictable supply.
- By mapping the regional semiconductor value chain and key industry needs and challenges, VGR can **understand how foreign direct investments (**FDI) can **potentially strengthen** key sectors.

Regional conditions & strengths

The regional semiconductor ecosystem **is small** in scale but with **strong innovation capabilities**, consisting of over **35 core companies.**

- The industry employed **~1100** people and generated **€221** million in revenue in 2024, with an **overall growth trajectory** over the past 5 years.
- Includes **mostly SMEs** developing **high-frequency** components such as RF modules, mmWave transceivers, radar systems and sensors.

Semiconductor strength areas in the region include;

- RF, Microwave & high-frequency components
- Chip design & Architecture
- Emerging area: Quantum technologies
- Over-arching strengths lies in systems engineering and advanced manufacturing.

Supply chain & regional gaps

The region is home to **world leading companies** in industries such as Automotive, ICT, Aerospace & Defense and Life scienc**e** with **high dependency** on **semiconductors.**

The following **gaps** were identified as **relevant where FDI** could help strengthen the industrial resilience:

- Lack of regional access to legacy nodes
- Limited prototyping & testing infrastructure
- Limited regional production capabilities
- Talent and competence shortage.

Other relevant challenges the industry faces from supply chain and regional perspective include:

- Need for increased regional collaboration
- Low purchasing power
- Need for clearer regional positioning & branding

FDI opportunity areas

The region can strengthen its resilience and competitiveness through **investments in cross-industrial infrastructure** for design, prototyping and production.

Key FDI opportunity areas include;

- **Scalable production capacity** of more mature semiconductor nodes, particularly for power and mixed-signal components.
- **Specialized infrastructure** for prototyping, testing, and validation to bridge the gap between research and industrial application.
- **Design center** focused on high-frequency technologies that would leverage existing expertise and positing the region globally.

These areas addresses several key gaps and challenges while also building on existing strengths.

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The report provides deeper understanding of regional semiconductor industry's needs & opportunities

Project foundation

BACKGROUND

- Region Västra Götaland (VGR) is home to several key industries – including Automotive, ICT, and Aerospace & Defense – that rely on semiconductors for production, R&D and operations
- The semiconductor shortage that emerged during the 2020 pandemic exposed significant vulnerabilities in the supply chains of many Swedish companies, resulting in reduced production volumes, lost revenues, and layoffs – highlighting dependencies on a stable and predictable supply of semiconductors
- For VGR, the disruptions highlighted the need for a deeper understanding of the regional semiconductor industry and its value chain to enable the continued growth and innovation capabilities of the regional key industries

PURPOSE & OBJECTIVE

- Deepen understanding of the possibilities to **attract foreign direct investments** (FDI) to the region to increase resilience in key sectors
- To identify areas for VGR to attract semiconductor FDI to strengthen the regional competitiveness, enable the industry's future development and increase resilience, this report:
  - Analyzed and mapped the regional ecosystem (incl. semiconductor companies, key end-users, and other stakeholders within R&D and academia)
  - Assessed the needs and risks of companies who could be exposed to future potential disruptions to the supply of semiconductors
  - Identified key markets and companies who could strengthen the local ecosystem and targeted for foreign direct investment (FDI) activities

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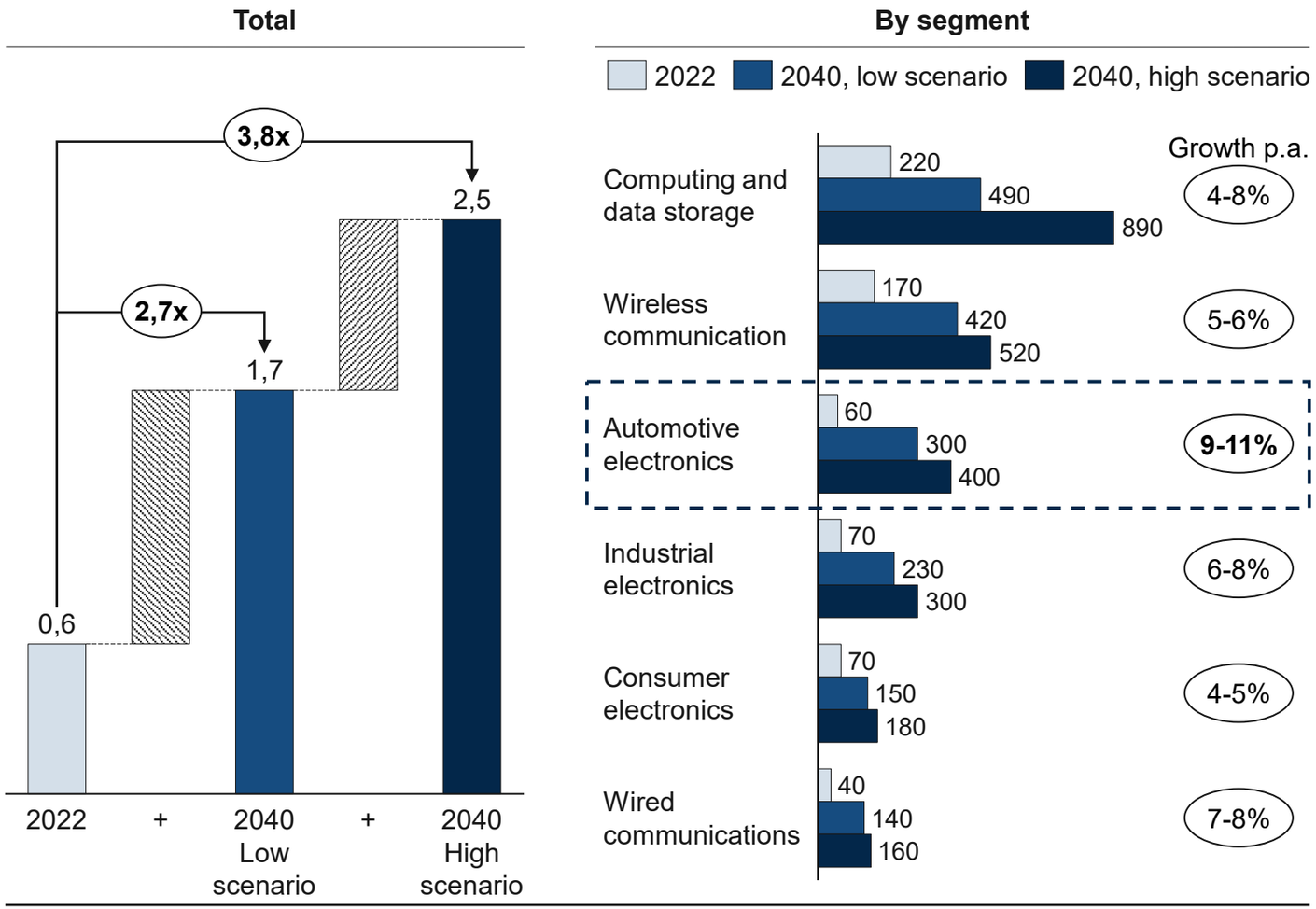
Global semiconductor industry expected to grow 3-4x between 2022 and 2040 where automotive electronics fastest growing segment at 9-11% CAGR

Global semiconductor industry revenue forecast and per segment
USD trillion, 2022 vs 2040 (high and low scenarios)



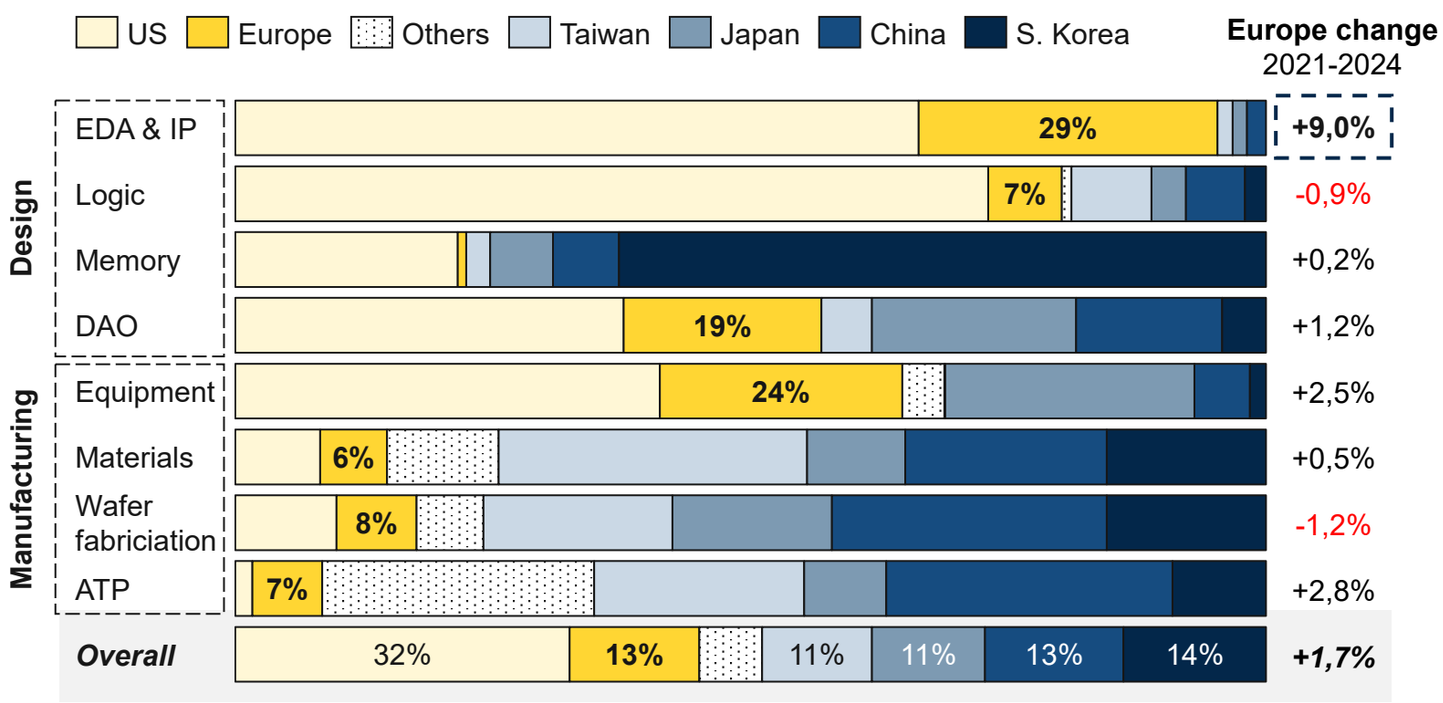
Key drivers and challenges

- **Resilience & regionalization:** Onshoring and diversification to reduce dependency on single regions and strengthen supply chain security.
- **Geopolitical complexity:** Export controls and tech sovereignty concerns reshaping global semiconductor flows.
- **Explosive growth of AI:** Rising demand for high-performance chips to power AI, machine learning, and edge computing.
- **Defense & dual-use technology:** Semiconductors enable both civilian and military systems, making secure access a strategic priority.
- **Automotive electrification:** EVs and autonomous vehicles driving demand for power chips and advanced chips for sensors and power systems.
- **5G & connectivity:** Network expansion fueling need for RF chips and edge processing solutions.
- **Talent shortage:** Critical skills gap in semiconductor design and manufacturing, prompting investment in training and automation.
- **Sustainability:** Push for greener fabs, energy efficiency, and resource recycling to meet environmental and regulatory goals.

Source: McKinsey & Co.; US Semiconductor Industry Association (SIA); SEMI Europe; news and industry reports; Business Sweden analysis

Geographical concentration creates interdependencies: Asia is dominant in chip production while Europe and USA are leaders in IP & Design

Semiconductor industry value added by activity and region, and change from 2021
%[1], 2021 vs 2024



Industry value added:
- Refers to the contribution of each activity and region to the overall economic value of the industry.
- It measures how much value is created at each stage of the value chain (such as design, equipment, materials, fabrication, etc.) after subtracting the cost of intermediate goods and services.

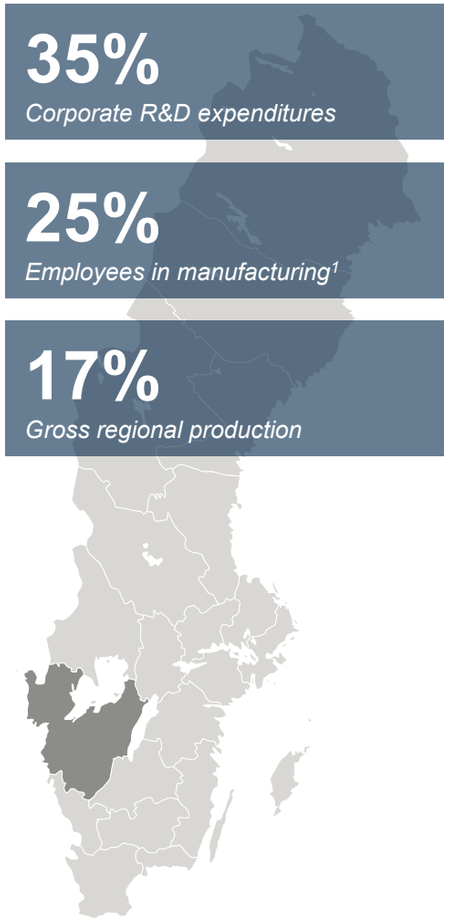
Observations

- The semiconductor industry is **concentrated to 6 countries which** creates **high supply chain vulnerabilities to end-user industries** such as Automotive, ICT and Defense.
- **Europe** remains in an **exposed position** in the semiconductor supply chain, with strong design capabilities but **limited capacity in chip manufacturing,** especially for advanced chips.
  - The **EU Chips ACT** is Europe's attempt to increase its global market share, especially in manufacturing, to **strengthen regional resilience,** but with **limited impact so far** due to stalled investments.
- **Taiwan dominates advanced chip-making** (< 10 nm) with 92% of global production, while South Korea and Japan lead memory chip-making. DAO chip-making is evenly split regionally.
- Between 2021 and 2024, **European** share of value added in the industry increased from 11% to 13% – the **fastest growing region** – and grew significantly within EDA & IP, ATP, and equipment.

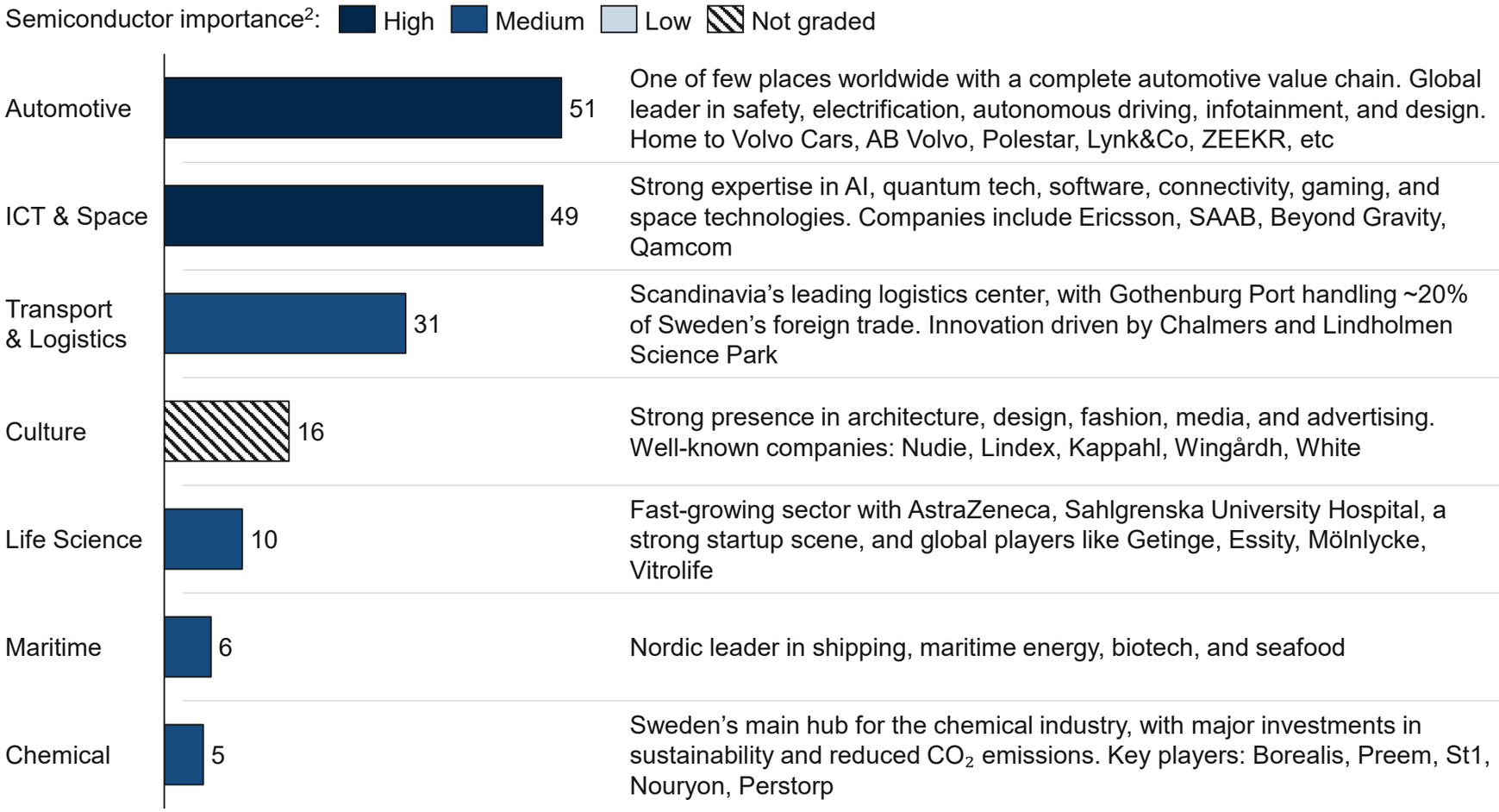
[1]EDA, design, manufacturing equipment, and raw materials based on company revenues and company headquarters location. Wafer fabrication and Assembly & testing based on installed capacity and geographic location of the facilities. | **Note**: EDA = Electronic Design Automation. IP = Intellectual Property. DAO = Discrete, Analog and Other. ATP = Assembly, Test, and Packaging. | **Source:** US Semiconductor Industry Association (SIA); Business Sweden analysis

Västra Götaland is home to key industries – including automotive, ICT and defense – where semiconductors are of critical importance

Key numbers Västra Götaland
% of Swedish total, 2023



Employment by sector in Västra Götaland and semiconductor importance
thousand employees, 2025



[1]Includes Halland. [2]Aggregated importance of semiconductors (high-frequency chips, microelectronics and photonics) to different value chains (digital industry, digital society, energy, healthcare, and transport & mobility) within the next 5 years according to Vinnova; Culture sector was not graded. | **Source**: Eurostat; SCB; Västra Götalandsregionen; Vinnova; Business Sweden analysis

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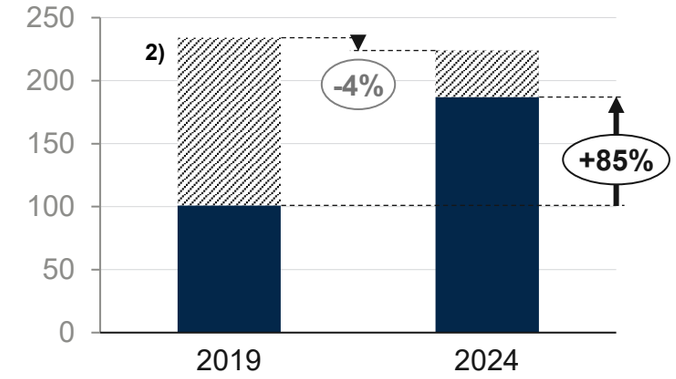
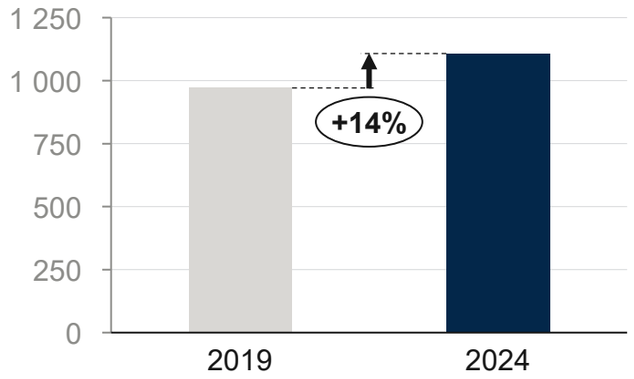
The regional chip industry employs 1000+ people and consists of mostly SME companies with a strong concentration in design

Key numbers – VGR chip industry
Various units, 2019 vs 2024

Revenue[1], EUR million

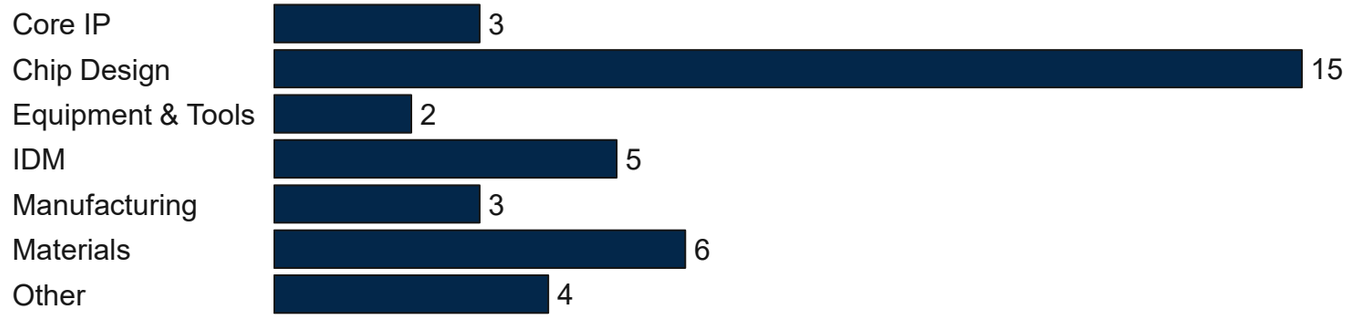


Employees[2], #



Largest Single Firm (in 2019)
Industry Revenue (All Other Firms)

Companies per category in chip value chain, # of companies



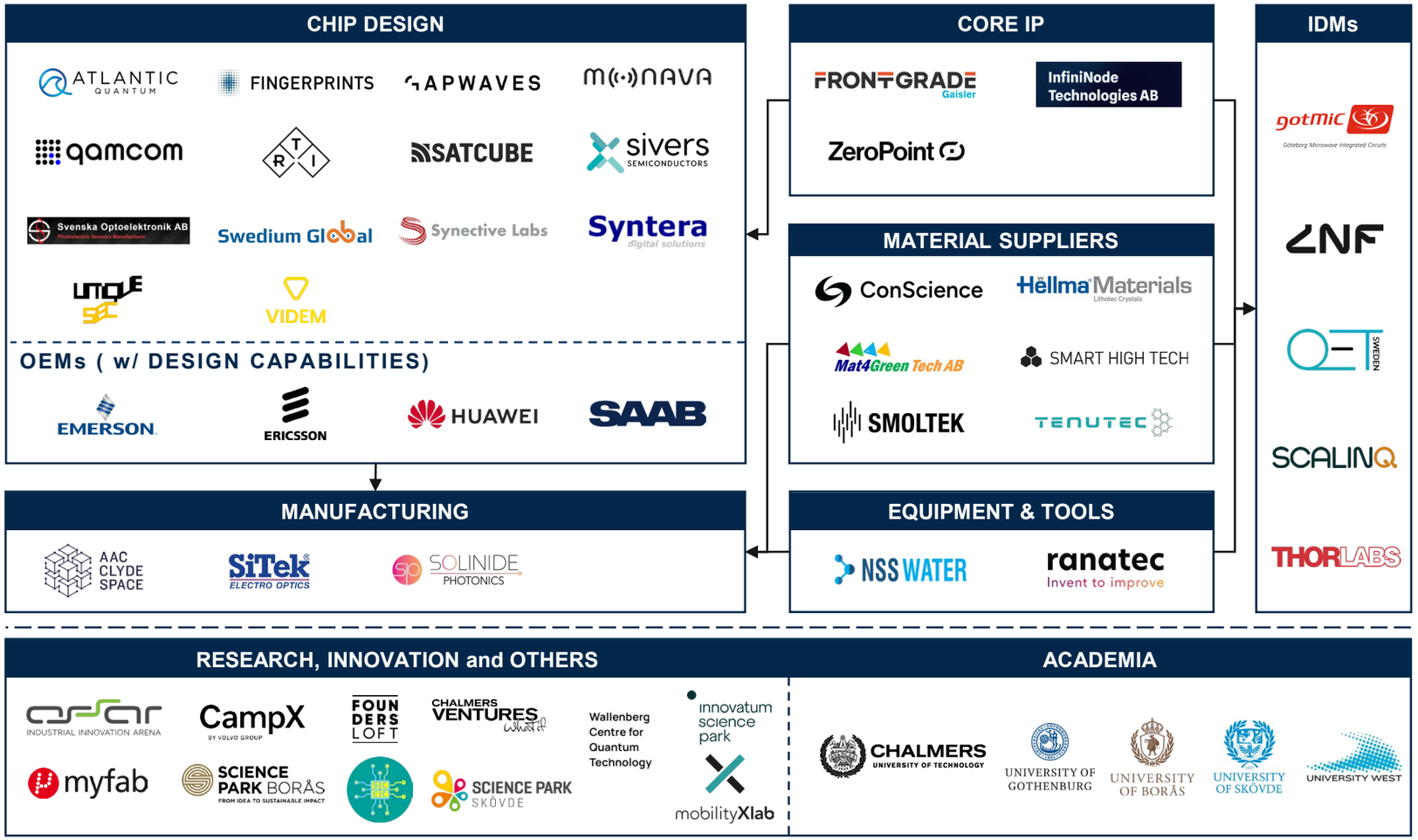
Observations and comments

- The industry employed **~1100 people** and generated **€221 million in revenue** in 2024
  - **2):** The decrease of 5% in the region's revenue is largely due to one company. If we disregard this company **revenue has increased 85%** from 2019 to 2024 in the region
- Over **60% of companies** in the core industry have a **focus on Chip Design & IP**, including IDMs
- **All core companies** are **small and medium sized**, with a few large industrial actors having in-house chip design capabilities
- **94%** of core semiconductor companies in the region **are Swedish owned**

[1]Includes only core semiconductor companies in the region. [2]Includes a conservative estimate of employees within large companies such as Ericsson that work with semiconductors. [3]Foreign companies are companies with a foreign global ultimate owner (i.e. a foreign entity or person has a >50% ownership stake in the company), all other companies are considered Swedish. [4]Companies may conduct activities typical to several categories **| Source**: Company records, Business Sweden analysis

Region Västra Götaland is home to an innovative and specialized semiconductor ecosystem with strong links to industry applications

Region Västra Götaland core semiconductor industry and value chain category



Observations and comments

- **Strong focus on design** but also capabilities in IP, materials, manufacturing, and system integration.
- **Includes many innovative SMEs** developing **high-frequency components** such as RF modules, mmWave transceivers, radar systems, antennas, and sensors.
- The core semiconductor actors are **closely aligned** with regional **industrial applications** such as 5G infrastructure, autonomous platforms, and advanced sensing solutions.
- **Strong academic institutions** and national research infrastructures that contribute to innovation in microelectronics, photonics, and materials science.

Source: Business Sweden analysis, Business Sweden interviews

The region is a hub for advanced component design and systems integration focusing on high-frequency technologies, chip architecture and quantum

Key strengths within the region

RF, Microwave & high-frequency components

Leading hub for advanced RF, microwave, and high-frequency technologies, enabling critical applications in telecom, automotive, defense, and space.

- mmWave antennas for automotive radar and telecom
- RFICs and transceivers for 5G/6G and satellites
- mmWave front-end ICs for wireless systems
- Ultra-low-noise amplifiers for radio astronomy and quantum computing
- Radar electronics for defense and aerospace platforms

EMERSON · ERICSSON · APWAVES · ZNF · gotmic (Göteborg Microwave Integrated Circuits) · sivers SEMICONDUCTORS

Chip design & Architecture

Strong capabilities in chip design and architecture, enabling advanced solutions for telecom, automotive, space, and industrial systems.

- Custom ASICs and FPGAs for telecom and automotive systems
- Processor IP cores for space-grade electronics
- Radiation-hardened processors for satellites
- Memory compression technologies for data-intensive applications

qamcom · ZeroPoint · FRONTGRADE Gaisler · Swedium Global · Synective Labs · ERICSSON

Emerging strength within the region

Quantum technologies

Emerging center for quantum, building on its strong foundation in advanced electronics, photonics, and research-driven innovation.

- Superconducting quibits for Scalable quantum processors
- Quantum Photonics for secure network communication
- Quantum RF/Microwave for cryogenic microwave control and readout for quantum processors

ATLANTIC QUANTUM · QT SWEDEN · SCALINQ · AstraZeneca · IONQ · WACQT

Overarching strengths within the region

Systems engineering know-how

Solid foundation in complex systems engineering, with broad capabilities in **integrating hardware and software across multiple domains**. The region's strengths lie in system-level thinking, embedded platforms, real-time communication, and control systems.

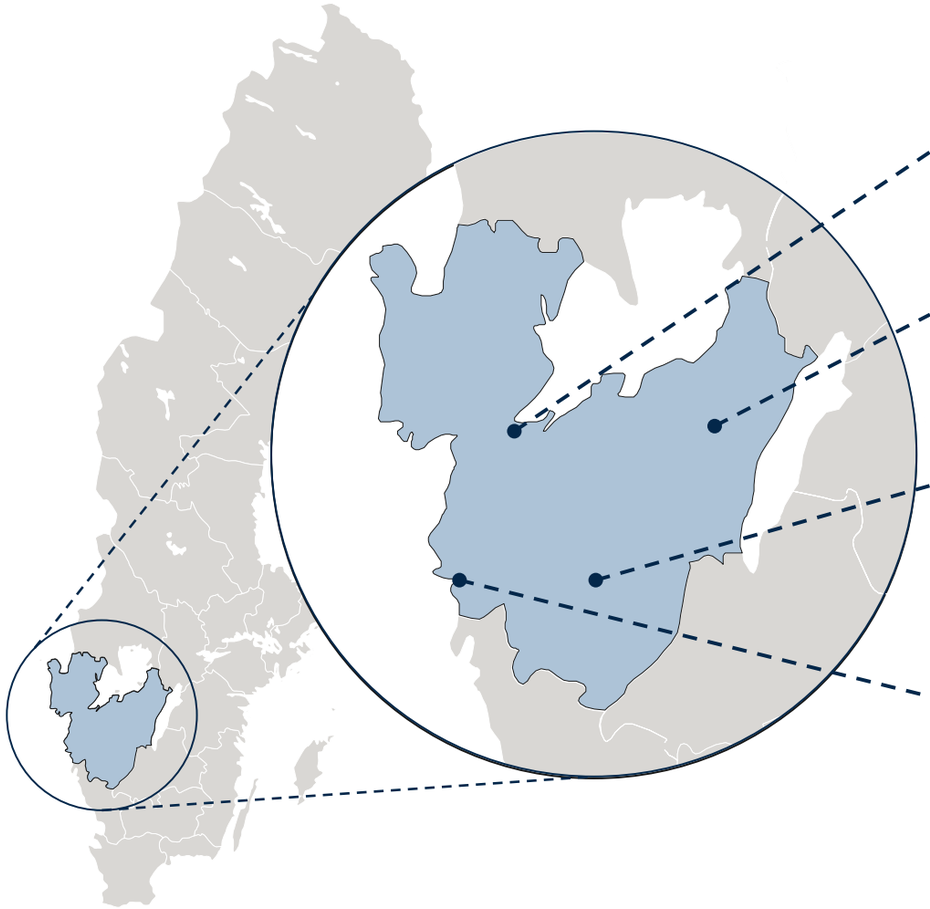
Advanced manufacturing competencies

Strong in precision engineering and advanced manufacturing for aerospace and automotive, with leading expertise in automation, robotics, and smart factory solutions, including connectivity and reconfigurable systems.

Source: Business Sweden analysis, Business Sweden interviews

There is a strong supporting ecosystem across the region based around science parks, test beds and company accelerators, supporting industry growth

Key industrial clusters across Västra Götaland



innovatum science park · UNIVERSITY WEST

Trollhättan is a regional **hub for advanced and additive manufacturing**, driven by strong industrial capabilities and innovation centers supporting automation, metal 3D printing, and production technologies.

ASSAR INDUSTRIAL INNOVATION ARENA · SCIENCE PARK SKÖVDE · UNIVERSITY OF SKÖVDE

Skövde is a leading center for **advanced manufacturing and smart industry**, anchored by the **ASSAR Innovation Centre**, that drives collaboration between industry and academia.

SCIENCE PARK BORÅS FROM IDEA TO SUSTAINABLE IMPACT · UNIVERSITY OF BORÅS

Borås is a national center in **textile innovation and automation**, driven by institutions like the **Swedish School of Textiles** and **Science Park Borås**, leading research in smart textiles and circular production models.

CHALMERS UNIVERSITY OF TECHNOLOGY · myfab · CHALMERS VENTURES · mobilityXlab · CampX BY VOLVO GROUP · GU Ventures · Wallenberg Centre for Quantum Technology · UNIVERSITY OF GOTHENBURG · FOUNDERS LOFT

Gothenburg is **Sweden's industrial and innovation hub** where industry, SMEs, academia, and public actors collaborate on **advanced manufacturing, electrification, and sustainable technologies**, supported by leading science parks and robust R&D infrastructure.

Source: Business Sweden analysis, Business Sweden interviews, Swedish Incubators & Science Parks

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There are several overlapping cross-industry gaps and challenges that present opportunities to strengthen industrial resilience and competitiveness

Gaps & challenges	Risk description	Automotive	ICT	Defense & Aerospace	Life Science	Electronics	FDI relevance to reduce risk
Few options for advanced chips & EDA tools	Dependence on a few global actors for advanced nodes and EDA software creates vulnerabilities in the supply chain with disruptions potentially stopping development and production.	✓	✓	✓	✓	✓	MEDIUM
Talent and competence shortages	Lack of local expertise in chip design, embedded systems, and emerging technologies (AI & Quantum) risks slowing innovation and reducing competitiveness, leaving critical industries exposed.	✓	✓	✓	✓	✓	HIGH
Geopolitical complexity	Export restrictions, classification complexities, and rising geopolitical tensions increase the risk of supply disruptions and limit access to advanced technologies.	✓	✓	✓	✓		LOW
Low purchasing power	Low-volume orders make it difficult to negotiate favorable terms or secure priority access to critical components, leaving companies exposed during shortages and price volatility.	✓	✓	✓		✓	MEDIUM
Limited prototyping & testing infrastructure	Lack of regional prototyping, testing, and validation facilities delays product development, increases time-to-market, and forces reliance on foreign infrastructure, creating a strategic vulnerability.	✓	✓	✓		✓	HIGH
Limited regional production capabilities	Absence of commercial semiconductor production and packaging capacity in Sweden and Västra Götaland increases dependency on external suppliers and reduces resilience.	✓		✓		✓	HIGH
Need for increased regional collaboration	Un-tapped opportunities to increase alignment and coordination in regional industry prevents collective action to address supply chain challenges, weakening resilience and innovation capabilities.	✓	✓			✓	LOW
Lack of regional access to legacy nodes	Inability to secure sufficient older-node capacity increases exposure to supply chain disruptions and dependency on non-European suppliers, threatening operations for critical industrial sectors.	✓		✓		✓	HIGH
Need for clearer regional positioning & branding	Broad regional positioning and branding reduces the ability to attract targeted investments and talent, reducing regional competitiveness.			✓	✓		LOW

Source: Business Sweden analysis and company interviews

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The region can strengthen resilience and competitiveness through investments in cross-industrial infrastructure for design, prototyping and production

FDI opportunity area	Strategic fit	Addressed gaps and strengths
Scalable production of legacy components	• Opportunity to establish scalable production of more mature semiconductor nodes (e.g., >40nm, analog 90nm+), particularly for power and mixed-signal components that remain critical across automotive, defense, and industrial sectors. • Would have lower cost and risk compared to advanced-node fabs as older technologies rely on proven processes with stable yields, making them viable for specialized low-volume production. • Would strengthen regional resilience and competitiveness while aligning with European objectives for supply chain security, unlocking potential funding and partnership opportunities.	Lack of regional access to legacy nodes Limited regional production capabilities Low purchasing power Need for increased regional collaboration Advanced manufacturing competencies
Pre-commercial infrastructure	• Good conditions to develop more specialized infrastructure for prototyping, testing, and validation to bridge the gap between research and industrial application, particularly for RF, microwave, and high-frequency components. • Would lower barriers for SMEs by providing shared access to advanced equipment and expertise, enabling them to scale and integrate into regional and European value chains. • This would not only strengthen the region's position as a hub for advanced electronics but also align with EU objectives for technological sovereignty, unlocking potential funding and partnership opportunities.	Limited prototyping & testing infrastructure Talent and competence shortage Need for increased regional collaboration RF, Microwave & high-frequency components Systems engineering know-how
Center for high-frequency technologies	• Solid foundations to develop a dedicated design center focused on high-frequency technologies (e.g., RF, microwave, mmWave), supporting key industry applications. • Would leverage Västra Götaland's existing expertise and cluster strengths, providing shared design tools, simulation environments, and specialized know-how identified as critical for accelerating innovation. • Opportunity to become a centre of excellence by providing expertise and infrastructure for high-frequency component design and validation, critical for secure communications and radar systems.	Need for clearer regional positioning & branding Limited prototyping & testing infrastructure Talent and competence shortage Systems engineering know-how RF, Microwave & high-frequency components

For more information

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