Rialtas na hÉireann
Government of Ireland

Silicon Island

Ireland's National Semiconductor Strategy

Prepared by the Department of
Enterprise, Trade and Employment
gov.ie

Contents

Minister’s Foreword

Semiconductors are the very bedrock of technology today, and the critical components which enable advancements in technology. As we stand on the precipice of new technological frontiers such as artificial intelligence, quantum computing and the key technologies to enable the green transition, the importance of the semiconductor ecosystem cannot be overstated. Furthermore, this technology supports us in our everyday lives from mobile phones to white goods in our kitchens and utility rooms, from transport and to medical devices, to name just a few.

The global semiconductor shortage from 2020-2023 underscored the critical importance of robust semiconductor supply chains. The COVID-19 crisis and surging demand disrupted these chains, highlighting the global significance of this technology.

In response, the European Union introduced the European Chips Act, aiming to double Europe's share of the global market to 20% by 2030. Ireland is poised to play a pivotal role in this ambition, boasting a dynamic domestic semiconductor industry and companies spanning the entire value chain, supported by a strong innovation ecosystem. As a small advanced economy, Ireland has unique opportunities under the European Chips Act.

This Strategy aims to foster the further growth of Ireland's semiconductor ecosystem over the coming decade in support of the European Chips Act and Digital Decade ambitions through three strategic strands: strengthening the existing ecosystem, ensuring a robust national talent pipeline, and seizing industry opportunities. Key deliverables include publishing a comprehensive mapping of Ireland's semiconductor ecosystem, fostering connections between research and innovation clusters, and engaging the education system to meet growing talent demands.

Guidance will come from an Advisory Council on Semiconductors, supported by an Irish Competence Centre in Semiconductors under the European Chips Act. This Strategy is designed to be adaptive, evolving to meet the industry's changing needs and emerging technological opportunities.

Ireland acknowledges both the opportunities and challenges ahead. To contribute effectively to the EU's goals and leverage these opportunities, we must support ambitious growth and remain responsive and resilient to change. A collaborative effort is essential, as outlined by the Government's commitment to fostering a competitive and diverse industry.

The Strategy will be regularly reviewed by the Semiconductor Advisory Council to ensure alignment with the fast-changing landscape of the industry. This Strategy marks the beginning of ongoing efforts to navigate the complexities of the global semiconductor ecosystem and optimise its potential for all sectors of Ireland's economy.

We extend our gratitude to all stakeholders involved in developing this Strategy. Our collective aim is to enhance Ireland's semiconductor industry and position it as a leader in vital technology, both nationally and internationally.

Peter Burke TD
Minister for Enterprise, Tourism and Employment

19 May 2025

Executive Summary

Semiconductor chips are the backbone of digital technologies and play a foundational role in the global economy, driving innovation, productivity, and economic growth. They power devices ranging from smartphones and laptops to servers and data centres, enabling communication, computation, and the storage of vast amounts of data. This Strategy is based on supporting analysis and mapping of our semiconductor sector. A summary of this mapping analysis will be made available on the Department of Enterprise, Trade and Employment's website alongside this document.

The economic impact of semiconductor chips extends beyond the industry itself, as they are essential components in nearly all electronics and machinery we rely upon every day and are essential for the operation of sectors across the economy. The path of digitalisation will see semiconductors become ever more prevalent in everyday life with the number of semiconductors per device expected to grow at an exponential rate.

There is an immediate strategic imperative for rebalancing the global supply chain for semiconductors. Europe is rectifying this situation to remain industrially secure through the European Chips Act. Ireland must play its part in this agenda while capitalising on the opportunity for growth in its existing semiconductor sector and attracting mobile investment.

Ireland is a central player in the increasingly strategically important European and global semiconductor ecosystem. However, Ireland now has the opportunity to become a leader in the industry by leveraging our strong track record in technology development, capitalising on our existing strengths, and taking proactive, strategic actions to address emerging challenges. With the sector's growth and geopolitical pressures, Ireland has a prime opportunity to attract semiconductor investment by addressing supply chain risks and diversifying.

Ireland has a well-educated, well-supported, sustainable, and competitive environment which attracts multinational companies, fosters local collaboration and innovation with research institutes, SMEs, and start-ups. With appropriate supports and the right collaboration between stakeholders, we will work to scale both the indigenous and MNC industry bases and grow Ireland's semiconductor market share.

Our overarching ambition is to foster the further growth of Ireland's semiconductor ecosystem over the coming decade in support of the European Chips Act and Digital Decade ambitions by promoting national policies and investments to further stimulate growth in chip design and manufacturing capabilities. To achieve this, we will:

- Build on our already-strong ecosystem to foster a vibrant environment for start-ups, spin-outs, SMEs and MNCs.
- Develop Ireland's skills pipeline to secure a steady supply of suitable talent.
- Identify and seize opportunities by strengthening our international collaboration while competing for investment.

In the development of this Strategy, the Department of Enterprise, Trade and Employment engaged extensively with a wide range of stakeholders, including through an open consultation process in March 2024. In total, 45 submissions were received from a broad range of stakeholders including MNCs, SMEs, industry groups, State agencies, academia and the research community, as well as local government.

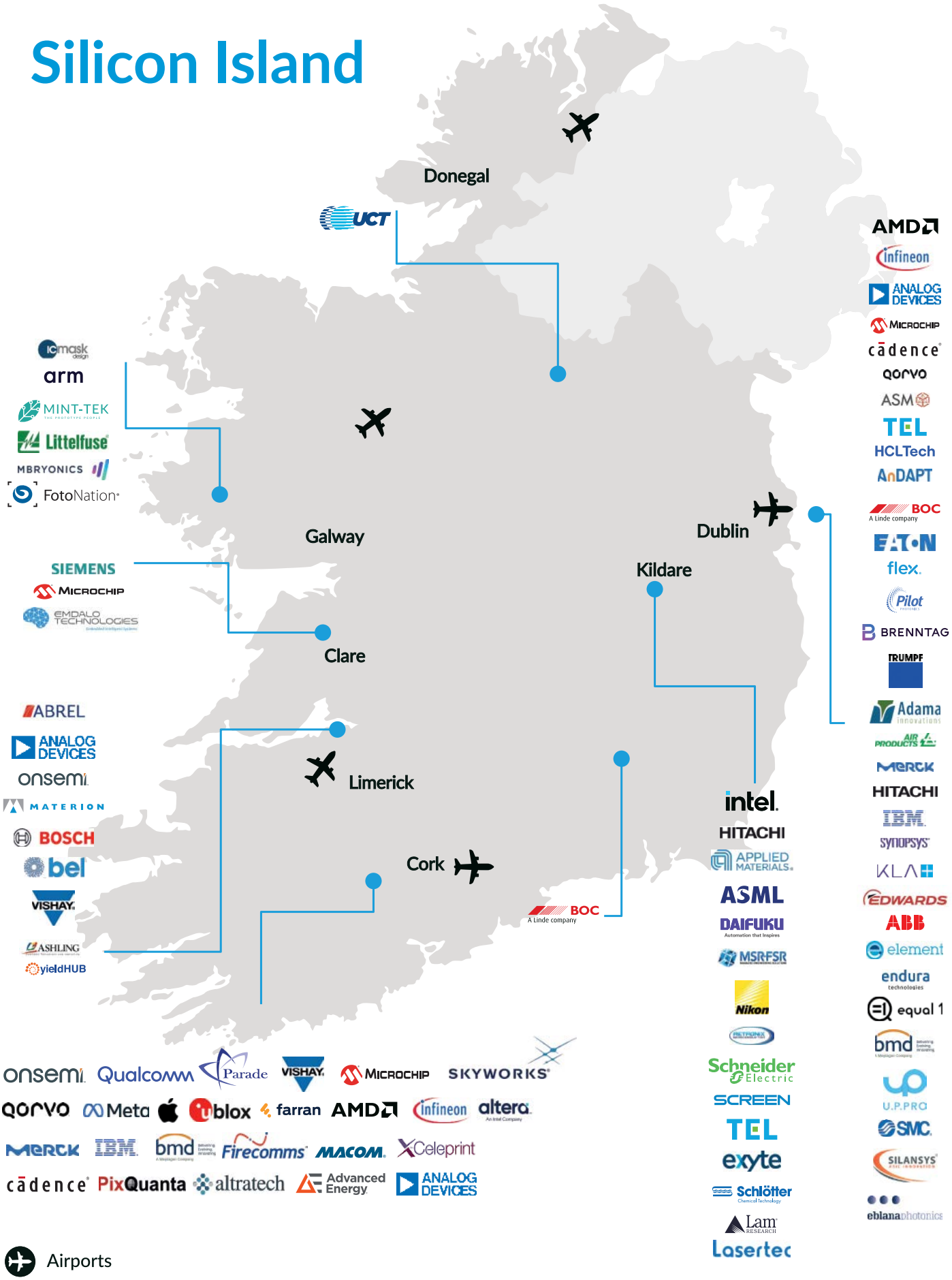
Alongside the public consultation, the Department of Enterprise, Trade and Employment engaged on an ongoing basis with relevant Departments, agencies, and representative groups, including:

- The Department of Further and Higher Education, Research, Innovation and Science
- Enterprise Ireland
- IDA Ireland
- Taighde Éireann-Research Ireland
- Tyndall National Institute
- Microelectronics Industry Design Association (MIDAS).

To guide the implementation of the Strategy and develop actions to successfully drive forward progress in the sector together, the Government will establish an Advisory Council to the Semiconductor Sector which will consider key actions and address emerging challenges and opportunities.

Strategies evolve as circumstances change. For this reason, this is a living Strategy, which will remain flexible and agile as we collaborate, co-operate, and learn from partners and stakeholders. Achieving our vision will require ongoing collaboration between Government, our enterprise agencies, industry and stakeholders right across the semiconductor value chain as we work towards our objectives. This Strategy is not the end of our work, but a significant step for a competitive semiconductor ecosystem.

Silicon Island



1

Our Vision

1.1 Vision Overview

Today, Ireland has a significant European and global presence in the industry, with the Continent's most advanced semiconductor volume manufacturing capability, a legacy node fabrication plant and a strong chip design sector, including major design activities in mixed-signal, automotive, communications, and power.

We will ensure alignment with and pursue opportunities presented by the European Chips Act, supporting and contributing to the EU goal of achieving 20% of the global market share in semiconductors by 2030. We will develop supporting metrics in the areas of R&D, employment, and exports, to measure Ireland's performance in contributing to the European Chips Act target. We will enhance our international reputation for research which supports globally competitive enterprises operating at the technological frontier. We will contribute to and complement EU activity in this sector, ensuring we have the correct framework policies in place to do so.

As a small country, Ireland needs to build on the advantage of our interconnectedness while also contributing to, and learning from, international best practice. We will achieve this through greater national and international collaboration including through our active membership of the European Semiconductor Board, the EU Chips Joint Undertaking, and the OECD Semiconductor Informal Exchange Network.

We will work to make Ireland a centre for investment in semiconductors, build our relationships internationally while raising Ireland's profile in the wider global semiconductor sector.

This Strategy forms an important part of Ireland's overall digital strategy; semiconductors are not only a key enabler of other digital technologies but share several key drivers and enablers. Accordingly, this Strategy is designed to complement Harnessing Digital: The Digital Ireland Framework, National Quantum Technologies Strategy for Ireland, and the refreshed national AI Strategy.

Quantum technologies are poised to become a key frontier in advanced computing and secure communications with profound implications for the future of the semiconductor sector. As the boundaries between classical semiconductor technologies and quantum-based systems begin to blur, Ireland recognises the strategic importance of fostering capability and innovation across both domains. The convergence of these fields will shape next generation materials, devices and processing architectures, offering new economic and technological opportunities. Ireland will actively support and engage with emerging EU-level initiatives, contributing to the development of a coherent European framework which strengthens technological sovereignty and innovation leadership.

The Strategy lays out specific deliverables led by nominated Departments, State agencies and other relevant bodies, as set out in the relevant strands.

The vision guiding this Strategy is to build and grow upon Ireland's existing strengths and to position Ireland as a world leader in the semiconductor space. By ensuring a supportive policy environment, we aim to:

Promote national policies and investments to further stimulate chip design and manufacturing capabilities.

Foster the growth of Ireland's semiconductor ecosystem over the coming decade in support of the European Chips Act and Digital Decade ambitions.

Develop supporting metrics, such as level of research and development (R&D), employment numbers, exports, to measure Ireland's performance.

Ensure the availability of necessary physical infrastructure including utilities and sites, including next generation sites.

Create a strong talent pipeline.

Foster an open ecosystem based on collaboration.

1.2 Key Ambitions and Targets

This Strategy sets out key ambitions for Ireland's semiconductor industry to ensure the sector is fully equipped to fulfil its potential, both nationally and globally.

- Build a stronger leadership position in Europe to become a pivotal player in global chip manufacturing, research and innovation.
- Leverage existing expertise and foster a thriving ecosystem and competitive offering that will continue to attract significant strategic investment, and one that attracts, trains and nurtures high-quality talent.
- Compete for investment across the entire semiconductor sector value chain, including for large-scale manufacturing projects.
- Building on our strong reputation for semiconductor manufacturing, become a highly desirable location for new investments in semiconductor design and advanced packaging.
- Promote Ireland on a global stage as a prime destination for investment, utilising IDA Ireland's overseas network to grow our presence and brand as a player in the global semiconductor industry.
- Foster start-ups as a byproduct of continued innovation investment through the work of Tyndall National Institute, MCCI and IPIC.
- Establish Ireland as a global research and innovation leader across the semiconductor value chain and in the application of semiconductors in the green and digital transitions.
- Engage at EU level throughout the implementation of the ambitious targets of the European Chips Act, as well as actively contributing to development of the European Chips initiative and via future EU Framework Programmes.

2

The Global Semiconductor Industry – Current Ecosystem and Emerging Patterns

2.1 Semiconductors: The Fundamental Building Blocks of Digital Technology

The global semiconductor industry is a critical, complex, capital intensive, and highly interconnected network of companies which design, manufacture, and sell semiconductor products. A finished chip can contain components which have travelled more than 25,000 kms by the time of final product integration.[1] The industry relies on specialised knowledge, significant capital investment, and global collaboration to drive technological advancement and innovation.

Types of Chips by Functionality

There are three broad categories of chips in terms of circuitry: analog, digital, and mixed. The essential difference between analog and digital function lies with the electric signals they process. In analog chips, the signals are continuous, meaning they can take on any value within a given range, and they use more traditional circuit elements (resistors, capacitors and occasionally inductors). In digital chips, the signals are binary. Chips are designed for specific tasks in specific markets, so the main categories of chips used are digital (logic and memory) or a mix of analog and digital.

The Power of Chips

The computer that navigated the Apollo missions to the moon in 1969 had 32.768 bits of Random Access Memory (RAM) and 589.824 bits of Read Only Memory (ROM). Today, a modern smartphone has around **100,000 times as much processing power,** with about a million times more RAM and seven million times more ROM.

Source: ASML, The basics of microchips: Everything you need to know about microchips – the foundation of the digital world

Logic

The 'brains' of electronic devices, logic chips process binary information to complete a task. Among the types of logic chips available are **central processing units (CPUs), graphical processing units (GPUs), and neural processing units (NPUs),** which are designed for deep and machine learning applications. The most advanced generations of logic chips are produced using leading-edge processes and technologies.

Memory

Memory chips store data. Different types of memory chips serve different functions and are separated by their ability to retain data without power. This includes **volatile memory technologies (e.g. DRAM)** which only temporarily store information while switched on, and **non-volatile memory (flash memory, advanced memory)** which retains data even after the system is switched off, making it suitable for long-term storage.

Others

Other types of chips include **application-specific integrated chips (ASICs)** which are simple, single-purpose chips used for performing repetitive processing routines such as scanning a barcode; and **system-on-a-chip devices (SoCs),** which can integrate functions such as graphics, audio, camera, video and Wi-Fi in a single chip.

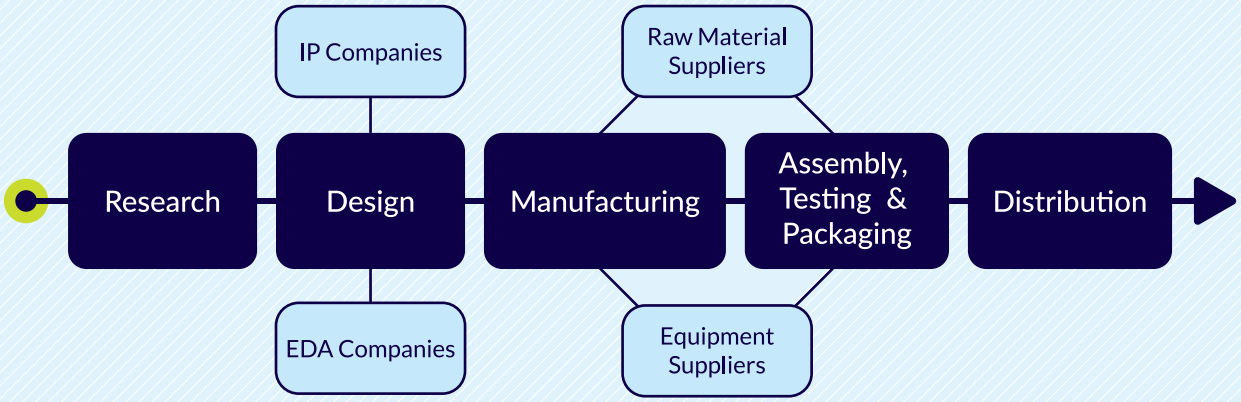
While semiconductors in their own right make up a relatively small share of global trade (accounting for around 3.5% of global exports and 4.25% of global imports in 2021), due to their use as inputs in manufacturing, they are at the core of a much larger proportion of economic activity, making the sector's performance integral to the outlook for the global economy.[2]

1. Global Semiconductor Alliance and Accenture, Globality and Complexity of the Semiconductor Ecosystem, 2020
2. Department of Finance, Economic Insights – Summer, July 2023

2.2 The Semiconductor Value Chain – From Research to Distribution

The semiconductor industry is broadly divided into several different stages and functions, often referred to as the semiconductor value chain, comprising distinct segments which have a broad global spread.

The Semiconductor Value-Chain



Source: Semiconductor Industry Association, via JRC Technical Report, 2022

Research and Development:

This segment of the value chain is focused on the innovation of products and processes, and establishing IP rights associated with those developments. This stage, which is closely tied in with the design stage, involves an ecosystem of universities, research bodies, start-ups, and IP companies.

Design:

The design phase is responsible for designing and creating the blueprints for semiconductor chips. These designs determine how the chip will function and its power and performance characteristics. This stage typically involves:

- **Fabless Companies:** These companies focus solely on chip design and outsource manufacturing to specialised foundries. Fabless companies rely on their Intellectual Property as their main asset - design representing the highest value-added element of the semiconductor manufacturing chain. Examples include NVIDIA, Qualcomm, AMD, Broadcom, and Apple.
- **Integrated Device Manufacturers (IDMs):** Some companies manage both the design and manufacturing of chips. Examples include Intel, Samsung Electronics, and Micron.
- **Electronic Design Automation (EDA):** These companies provide the software tools for chip design and include companies such as Cadence Design Systems, Siemens, and Synopsys.

Manufacturing:

The manufacturing of semiconductors is a capital-intensive process that involves producing wafers (i.e., thin slices of silicon or other semiconductor materials) and fabricating them into functional chips. This phase requires extremely advanced technology and facilities, known as fabs (fabrication plants). Economies of scale are also critical to manufacturing and high-volume production is a prerequisite of success. There are two primary types of manufacturing players:

- **Foundries:** Foundries specialise in producing chips designed by other companies (fabless companies). They typically do not design their own chips but are capable of manufacturing at extremely high levels of efficiency. Major foundries include Taiwan Semiconductor Manufacturing Company (TSMC), GlobalFoundries, Semiconductor Manufacturing International Corporation (SMIC) and Samsung Foundry. TSMC is the leader in advanced chip manufacturing, especially for high-performance semiconductors like processors for smartphones and AI applications.
- **IDMs:** These companies design, manufacture and sell their own chips. This enables the company to operate without the need for third-party design or foundry partners

Assembly, Testing, and Packaging:

Once semiconductor chips are manufactured, they need to be packaged and tested to ensure they meet quality standards. This process includes:

- **Assembly:** Attaching the semiconductor chip to a package and connecting it to external pins or contacts.
- **Testing:** Verifying the performance and functionality of the chips.
- **Packaging:** Protecting the chip and making it easier to integrate into semiconductor products.
- **Heterogeneous Integration:** The integration of materials, chips, chiplets and chip components has emerged as a critical step to provide enhanced functionality (such as integrated power management, optical interconnects, sensors) and improved operating characteristics in the aggregate system.

Distribution and Sales:

After semiconductors are manufactured and tested, they are sold to various industries. The distribution network includes:

- **Original Equipment Manufacturers (OEMs):** Companies such as Apple, Samsung, Sony, and Huawei that incorporate semiconductor chips into their products.
- **Original Design Manufacturers (ODMs):** These are companies that design and manufacture products for other brands. They often work closely with semiconductor companies to integrate chips into products like smartphones and computers.
- **Distributors and Retailers:** A range of firms distribute semiconductors to smaller manufacturers and service providers across different sectors.

Materials and Equipment:

The semiconductor manufacturing process depends on specialised materials and equipment. Manufacturing the machinery and equipment used in the production process for semiconductors is a complex task and this activity underpins the entire industry – both IDMs and foundries depend on their equipment. These companies do not produce chips themselves. The key materials required by the industry include:

- **Silicon (or other semiconductor) Wafers:** The base material used to create chips.
- **Photomasks:** Used in photolithography to pattern chip designs on wafers.
- **Chemicals and Gases:** Essential for the fabrication process.

Key equipment manufacturers include companies like ASML (which produces photolithography machines), Applied Materials, Lam Research, and Tokyo Electron. ASML's extreme ultraviolet (EUV) lithography machines are critical for producing the most advanced chips.

Semiconductor Value Chain

- Geopolitical risk: Exposure to geopolitical risk
- Inventory risk: Risk of excess inventory attributable to demand forecasting errors (Finished semiconductors and finished end product)
- Semiconductor intellectual property (IP)
- Semiconductor products
- Semiconductor manufacturing equipment

Smartphone manufacturing - An example of the Global Semiconductor Value Chain. Source: Ernst & Young, 2023,

2.3 Emerging Challenges, Geopolitical Considerations and Future Patterns in the Semiconductor Industry

The semiconductor industry has been the focus of increasing public and policy discourse over the past several years due to its role in the functioning of the modern economy and growth in demand for semiconductors globally. The industry is experiencing a period of extraordinary change, driven by technological innovation, shifting market demands, significant geopolitical factors and issues of economic security, along with efforts to strengthen the global supply chain. With ongoing digital transformation trends, new markets for the chip industry are constantly emerging in sectors such as Internet of Things, space, automotive, defence and supercomputers.

Four key areas of risk facing the global semiconductor supply chain[3]:

1. Economic shifts that result in demand spikes or supply gluts can impact sales and production.
2. Environmental factors like natural disasters or extreme weather can disrupt semiconductor supply chains.
3. Technological risks, including cyber threats, can compromise manufacturing and data security in the sector.
4. Geopolitical developments including trade disputes and restrictions may hinder the global flow of materials.

Recent global semiconductor shortages, highlighted during the COVID-19 pandemic, led to product delays and factory closures across various sectors, including automotive and healthcare devices. This underscored the industry's reliance on a small number of suppliers. Supply chain concerns and geopolitical tensions have led to increased efforts in "reshoring" semiconductor production as part of evolving industrial policies.

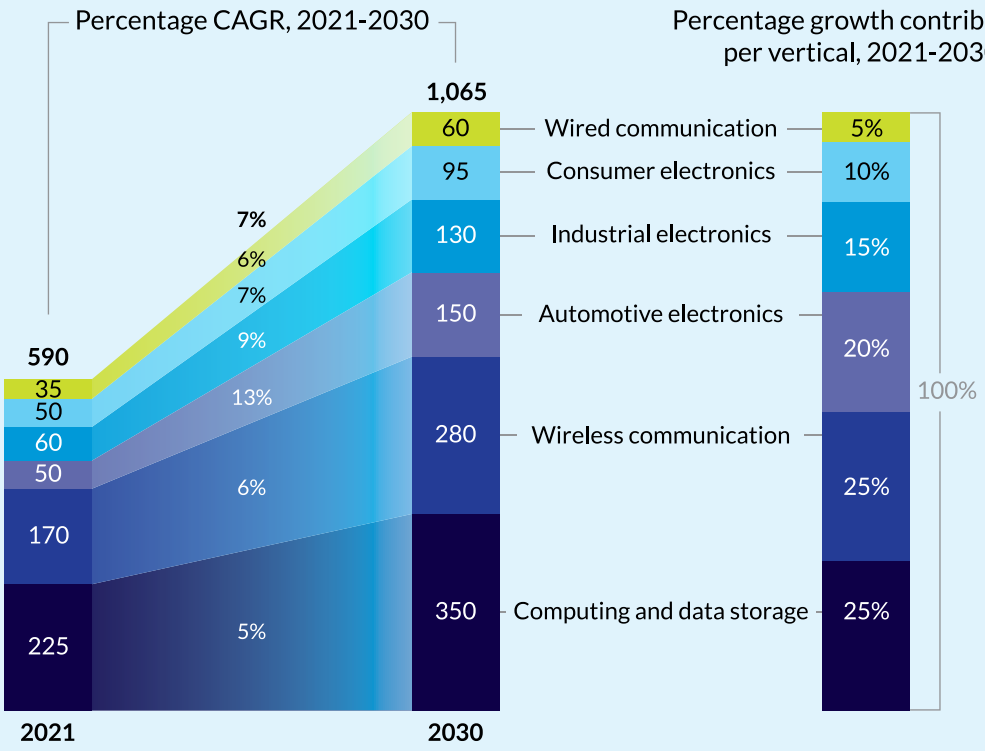
To address the significant capital costs associated with expanding semiconductor capacity, incentive packages for chip production have been introduced by major powers in the sector, including initiatives like the US Chips and Science Act 2022 and the Made in China 2025 fund. As a result, the environment for semiconductor investment has become increasingly competitive as regional economies vie for investment.

3. AD Little, Localising the Semiconductor Value Chain, (2024)

Due to these factors, the concept of open strategic autonomy has gained prominence among EU policymakers. In essence, open strategic autonomy refers to the capacity of the EU to act without being dependent on other countries in strategically important policy areas such as defence, technology, energy, and trade.

Amidst the complex challenges the sector faces, there is also great opportunity. Looking ahead, the Semiconductor Industry Association expects the demand for chips will continue to grow as they become an ever-greater presence in essential technologies.[4] McKinsey analysis outlines that "as the impact of digital on lives and businesses has accelerated, semiconductor markets have boomed", forecasting the growth of the industry from approximately €600 billion to €700 billion today to €1 trillion by 2030.[5] This growth will be driven by certain sectors, each with unique needs and requiring specific types of semiconductors tailored to its activity ("verticals"). Among the significant verticals are the automotive, data storage, and wireless industries which are driving significant capital investment in the industry.

Global Semiconductor Market Value by Vertical, Indicative, $ billion



Source: McKinsey & Company, 2022. Note: Figures are approximate.

4. Semiconductor Industry Alliance, State of the US Semiconductor Industry (2023)
5. Burkacky, O., Dragon J., & Lehmann, N., The semiconductor decade: A trillion-dollar industry (2022)

CASE STUDY

AMD

Growing R&D Capability to Advance the Next Wave of Computing for the AI Era

"For nearly three decades, Ireland has been a flagship European R&D centre developing adaptive computing solutions, drawing from a strong and highly skilled workforce. By further investing and expanding our presence in Dublin and Cork, we are committed to continuing to both drive innovation in Ireland and to support the European semiconductor ecosystem."

Ruth Cotter,
Senior Vice President and
Chief Administrative Officer, AMD.

Advanced Micro Devices (AMD), a global leader in high-performance and adaptive computing, has a significant and long-standing presence in Ireland. This presence began in 1994 with the establishment of Xilinx's operations in Dublin — a company AMD acquired in 2022 to broaden its product portfolio and best serve its customers and partners, who require a variety of computing solutions in today's era of AI. Today, Ireland is home to one of AMD's largest R&D sites in Europe, playing a central role in the company's global innovation strategy.

Originally, AMD Ireland was established to support the company's manufacturing and operations for its growing European and Asian markets. Over time, the Irish operations evolved into key engineering and research and development centres, with teams in both Dublin and Cork. In 2001, the company expanded its Irish R&D footprint, and it was further strengthened in 2008 with the creation of a Global Customer Engineering Division.

Ireland is home to one of AMD's largest R&D sites in Europe, playing a central role in the company's global innovation strategy.

Recent Activity:

In 2017, AMD invested $40 million to expand its R&D and engineering operations in Ireland, creating over 100 new jobs.

In 2023, AMD reaffirmed its commitment to Ireland with the announcement of a four-year investment of up to $135 million (€126 million).

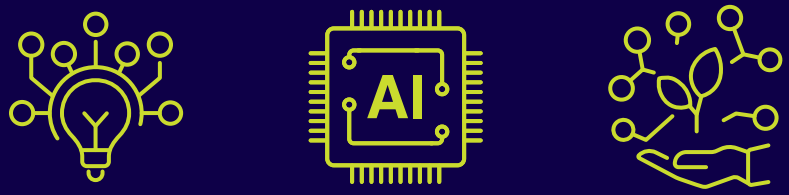
AMD's transition in Ireland from a manufacturing support base to a technology and innovation hub has been supported by IDA Ireland through multiple investment partnerships. In 2017, AMD invested $40 million to expand its R&D and engineering operations in Ireland, creating over 100 new jobs. These roles focused on developing high-value, commercially successful products, particularly for the telecommunications, healthcare, and automotive sectors.

In June 2023, AMD reaffirmed its commitment to Ireland with the announcement of a four-year investment of up to $135 million (€126 million). This investment aims to fund a series of strategic R&D projects and create up to 290 new highly skilled engineering and research roles, as well as a range of additional business support positions.

The R&D projects will focus on cutting-edge areas such as data centres, networking, embedded systems, and AI technologies. They include initiatives designed to advance 6G wireless communications and future generations of AMD's AI product offerings. Ireland's skilled workforce, strategic European location, and strong research ecosystem have been key enablers of AMD's growth. The company draws on Ireland's talent base in engineering and computer science and collaborates with national research centres and universities to sustain innovation in high-performance and adaptive computing.

AMD's evolution in Ireland demonstrates how multinational technology companies can shift from operational support roles to core innovation functions within the semiconductor value chain. It also illustrates Ireland's ability to host high-impact, export-oriented R&D in a sector defined by rapid technological advancement and global competition.

As AMD continues to expand its high-performance and adaptive computing capabilities for its customers and partners around the world, Ireland remains a vital centre of design and innovation for its global operations.



YieldHub

YieldHub, based in Limerick, is a leading provider of yield management solutions for the semiconductor industry. Since its inception in 2005, YieldHub has been dedicated to empowering semiconductor companies to enhance yield, reduce waste, and accelerate time-to-market. Their cloud-based platform offers a comprehensive suite of tools designed to streamline operations, uncover root causes of yield issues and automate routine data tasks.

Key to Success

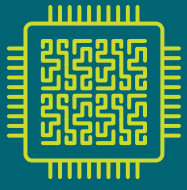
A key aspect of YieldHub's success is its application to advanced semiconductor technology. The platform's database design is scalable, capable of handling data from a few gigabytes to terabytes, which is essential for analysing tens of millions of units efficiently. This scalability ensures that as companies grow, they do not need to worry about storage or changing software. YieldHub's powerful tools enable real-time monitoring, advanced outlier detection and operational equipment efficiency (OEE) tracking, providing engineers with the insights needed to make informed decisions quickly.

Making Headlines

YieldHub has recently made headlines for its significant impact on the global semiconductor industry. The company has been recognised for its expansion into Asia, winning two awards at the Asia Matters Business Awards 2024. YieldHub was honoured in the categories of High Potential Asia Market Expansion and Technology Exporter of the Year.

Workforce

YieldHub's workforce has grown to over 50 employees, with a focus on supporting local university graduates through internships and employment opportunities. With a strong foundation in semiconductor technology and a focus on delivering transformative yield management solutions, YieldHub is poised to remain a leader in the semiconductor industry.



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The Policy Context – European Chips Act – Bolstering Resilience and Enhancing Competitiveness

3.1 The Rationale Behind the European Chips Act

The European Chips Act (Regulation (EU) 2023/1781) was developed and entered into force in 2023. The Chips Act aims to foster semiconductor production in the European Union, reduce external dependencies, and to meet the EU's Digital Decade target to double the EU's global market share to 20% in 2030.

Centred on a three-pillar structure, the Chips Act provides derogations to State aid rules for key facilities, reallocates €3.3 billion (0.02 % of GDP) from existing EU funds to relevant projects, complemented by €2.9 billion, and seeks to rationalise investment by Member States. The European Commission intends to mobilise €43 billion (0.3% of GDP) in public and private funds through the Act, with €11 billion coming from repurposing existing funds. EU subsidies are also provided for investment in new, first-of-a-kind facilities.

3.2 The Three Pillars of the European Chips Act

The Chips Act is structured around three pillars governed by the European Semiconductor Board:

European Semiconductor Board (Governance)

PILLAR 1
Chips for Europe Initiative

Pillar 1 supports technology capacity building and large-scale innovation across the EU to enable the development and deployment of cutting-edge and next generation semiconductor and quantum technologies.

The Chips for Europe Initiative combines funding from the EU, Member States, and the private sector through the Chips Joint Undertaking. The Initiative also involves the establishment of competence centres, located across Europe, to provide access to technical expertise and experimentation.

PILLAR 2
Security of Supply

Pillar 2 creates a framework to ensure security of supply by attracting increased investment and production capacity in semiconductor manufacturing as well as in advanced packaging, testing and assembly.

Under this pillar, undertakings granted the status of Integrated Production Facility or Open EU Foundry by the Commission are considered to be in the public interest, and Member States may, in principle, apply support measures including State aid subject to normal case-by-case State aid assessments.

PILLAR 3
Preparedness and Monitoring

Pillar 3 establishes a mechanism for co-ordinating market surveillance and crisis response between Member States and the Commission.

The aim of Pillar 3 is to strengthen collaboration with and between Member States, monitor the supply of semiconductors, estimate demand, anticipate shortages, trigger the activation of a crisis phase, and deploy a dedicated toolbox of emergency measures.

Overview of the European Chips Act. Source: European Commission

Following the publication of the Chips Act, the European Commission published its **Recommendation on critical technology areas for the EU's economic security,** which put forward a list of ten critical technology areas, including advanced semiconductor technologies. The Recommendation notes:

Semiconductors, microelectronics, and photonics are essential components of electronic devices in critical areas such as communications, computing, energy, health, transportation and defence and space systems and applications. Due to their huge enabling and transformative nature and their use for civil and military purposes, remaining at the forefront of building and further developing these technologies is crucial for economic security.[6]

Operating in parallel to the European Chips Act, Important **Projects of Common European Interest (IPCEIs)** are large-scale, multi-country projects for global state-of-the-art innovation to address market or systemic failures in particular sectors.

IPCEIs can be used to provide aid to promote the execution of an important project of common European interest or to remedy a serious disturbance in an economy of a Member State in a manner compatible with the internal market and State aid rules. The **IPCEI on Microelectronics and Communication Technologies (IPCEI ME/CT),** concerns research and development projects covering microelectronics and communication technologies across the whole value chain from materials and tools to the chip designs and manufacturing processes. This is the first IPCEI in which Ireland is directly participating, through Analog Devices (ADI) in Limerick.

The Draghi Report on the future of European competitiveness, published in September 2024, emphasises the need for the EU to address its innovation and productivity performance, high energy costs and ensure economic security.[7] The report outlines total investments in industrial deployment, and approximately €100 billion have been announced in the EU since the proposal for a European Chips Act, mostly supported by Member States under State aid control. However, the report notes, there is a risk that a fragmented approach leads to weak co-ordination of priorities and demand requirements, lack of scale for domestic producers, and in turn less ability to invest in more innovative semiconductor segments.

The Draghi Report also outlines several recommendations specific to the semiconductor value chain, including a strategy based around four elements:

- Funding for innovation and the establishment of testing labs near existing centres of excellence.
- Providing grants or R&D tax incentives for fabless companies active in chips design and foundries in selected strategic segments.
- Supporting the innovation potential of mainstream chips.
- Coordinating EU efforts in back-end 3D advanced packaging, advanced materials and finishing processes

The report also proposes a centralised EU budgetary allocation dedicated to semiconductors supported by a new "fast-track" IPCEI. Use of this tool would entail co-financing from the EU budget and shorter approval times for semiconductor projects.

These developments have created a wealth of opportunity for EU Member States to strengthen Europe's global position in the semiconductor market, and for Ireland to build upon our already strong position to become a major player on a global scale.

6. European Commission, Recommendation on critical technology areas for the EU's economic security for further risk assessment with Member States C (2023) 6689 final, 2023

7. European Commission, The Draghi Report: A competitiveness strategy for Europe (Part A) (2024)

CASE STUDY

Analog Devices

Powering Ireland's Semiconductor Innovation

"Ireland has been a critical innovation centre for ADI, thanks to its strong academic and research organisations, business ecosystem, and progressive government leadership."

Vincent Roche,
CEO and Chair, Analog Devices.

Since establishing its European headquarters in Limerick in 1976, Analog Devices, Inc. (ADI) has been a key contributor to Ireland's semiconductor success story. With over 1,900 employees in Ireland today and now with key R&D sites in Limerick, Cork and Dublin, ADI has built a thriving ecosystem that integrates advanced R&D, manufacturing, and global business leadership. Ireland has become one of ADI's most strategically important locations, helping the company innovate in mission-critical domains including healthcare, energy, automotive, and industrial automation.

ADI has recently deepened its long-standing commitment to Ireland with two major investments. In 2022, the company launched ADI Catalyst, a €100 million innovation accelerator focused on co-developing software and AI-driven solutions with customers and ecosystem partners. Catalyst is a collaborative platform driving advances in Industry 4.0, connectivity, energy systems, and electrification.

In 2023, ADI announced a further €630 million investment to expand its R&D and wafer production capabilities in Limerick. This development will triple ADI's European wafer capacity and create up to 600 new jobs. As part of the EU's Important Projects of Common European Interest (IPCEI) on Microelectronics and Communication Technologies, the project strengthens Europe's technological sovereignty, supports cross-border innovation, and contributes to building more resilient, self-sufficient semiconductor supply chains.

ADI in Ireland:

Over 1,900 employees across Ireland.

Key R&D sites in Limerick, Cork, and Dublin.

€100 million innovation accelerator focused on co-developing software- and AI-driven solutions with customers and ecosystem partners.

€630 million investment to expand its R&D and wafer production capabilities in Limerick.

Deep partnerships with research institutions including Tyndall, University of Limerick, and TUS.

ADI's long-standing success in Ireland would not have been possible without the outstanding support of the Irish Government, particularly the Department of Enterprise, Trade and Employment (DETE) and IDA Ireland. IDA's role has been foundational — not only in attracting ADI to Ireland nearly five decades ago, but also in enabling its ongoing growth through world-class support for innovation, talent development, and infrastructure.

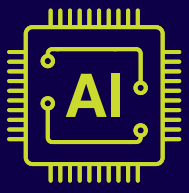
The company's continued investment is a direct reflection of Ireland's pro-innovation policies, stable business environment, and highly capable government partners. Sustained Government support will remain critical to future investment decisions as ADI continues to scale its global innovation footprint.

One of the unique strengths of ADI's Irish operations is the co-location of research, design, and advanced manufacturing. This integration allows for faster product development cycles, closer collaboration with customers, and rapid scaling of high-reliability semiconductor solutions. Ireland is now a global innovation hub within ADI's network, with expertise spanning power management, RF and microwave, data conversion, and software-defined instrumentation.

Ireland's academic excellence has also played a central role in ADI's innovation model. The company maintains deep partnerships with Tyndall, University of Limerick, TUS and other research institutions, supporting joint R&D, PhD programmes, and future skills initiatives. These collaborations help ADI turn research into real-world products and strengthen Ireland's talent pipeline in key technology areas.

Ireland's unique blend of technical talent, Government partnership, and global connectivity makes it an ideal base for advanced semiconductor investment. ADI's experience illustrates how sustained collaboration between industry, academia, and government can deliver long-term strategic value.

As Ireland builds its national semiconductor strategy, ADI stands as a proven example of how multinational leaders can anchor high-value activities here — creating jobs, enhancing supply chain resilience, and advancing Europe's technological leadership. With the right policy environment and continued government collaboration, ADI sees strong potential for further investment and innovation in Ireland.



Mbryonics

Mbryonics is a Galway-based start-up at the forefront of transforming satellite communications, datacoms and 5G wireless sectors through cutting-edge wireless optical transport and Coherent Photonic-Optical (CPO) transceiver technologies, ensuring high-speed, secure communication infrastructures in space, air and on land.

The company is dedicated to building the internet in space, focusing on the development and deployment of cutting-edge optical communication systems for space applications. Mbryonics leverages its expertise in advanced manufacturing, assembly, integration and testing to create innovative solutions that meet the demanding requirements of the space industry.

Key Achievements

One of Mbryonics' significant achievements is being selected as the optical terminal provider for DARPA's Space-BACN Programme. This selection underscores the company's capability to deliver high-performance optical communication systems that are essential for the next generation of space-based networks. Mbryonics is also a key player in the OIP4NWE project, which aims to establish a photonics innovation hub in the West of Ireland, further solidifying its position as a leader in the photonics industry.

StarCom

The company's flagship product, StarCom, is designed to offer ultra-lightweight and reconfigurable optical communication solutions. StarCom features advanced materials and optical freeform design, providing a large field of view that enables robust pointing, acquisition and tracking. This product is highly customisable, with options for data rates, waveforms, optical power, field of regard and polarisation, making it suitable for a wide range of applications in space communications.

Workforce

Mbryonics boasts a team of over 50 employees, including 25 PhDs, with a strong emphasis on diversity, as 25% of the team members are female.

In 2024, Mbryonics was approved for a recommended investment of €17.5 million from the European Innovation Council (EIC) Accelerator. This will allow the company to establish a significant manufacturing, assembly and testing facility for optics and photonics in the West of Ireland over the next five years.

The company also plans to focus its efforts on innovative freeform optics and photonic integrated circuits manufacturing techniques, leading to advancements in process efficiency, supply chain management and sustainability.

4

Ireland's Semiconductor Ecosystem


Ireland's Success in the Semiconductor Industry
Ireland as a Location of Choice for Investment
Ireland's Success in the Semiconductor Industry
Challenges Facing Ireland's Semiconductor Industry

4.1 Ireland's Success in the Semiconductor Industry

The past several decades has seen an influx of semiconductor multinationals of varying sizes locating in Ireland, and 15 of the top 30 global semiconductor companies currently operate in Ireland. Ireland has also earned a reputation as a design hub for the sector, with three of the top five global electronic design automation companies located here. Ireland is in the top three FDI locations in Europe across capital investment, projects and semiconductor jobs created for the period 2020-23.

In terms of chip manufacturing, Ireland is home to advanced semiconductor manufacturing facilities, with companies like Intel focusing on the fabrication of leading-edge microprocessors and ADI focusing on integrated circuits, bridging the physical and digital worlds. These facilities produce chips used in a wide variety of products, from personal computers to automotive systems. ADI is one of the world's foremost manufacturers of higher-node, analog-to-digital devices, supplying the automotive, consumer electronics and life sciences industries.

Alongside traditional chip manufacturing, Ireland, through Tyndall National Institute located in University College Cork, has capabilities in semiconductor packaging and testing, essential for ensuring the performance and reliability of chips used in consumer electronics and industrial applications.

In addition to the success of the FDI sector, experienced engineers and skilled graduates have enabled a constant stream of semiconductor start-ups to develop, bolstered by supports such as a well-regarded industry driven electronics systems Skillnet training programme. As a result, Ireland has an extensive and technology-rich semiconductor industry, comprising over 80 indigenous and foreign subsidiary companies across the full microelectronics value chain. This ecosystem subsists of advanced manufacturing, R&D, chip design, and a growing focus on niche areas such as quantum and photonics.

The semiconductor industry in Ireland is a significant driver of economic growth and major employer. More broadly, the Irish semiconductor industry is a vital part of the global semiconductor supply chain. Ireland has emerged as a major hub for semiconductor research, development, and manufacturing, driven by strong investment from global semiconductor companies. As a result, Ireland is a centre for semiconductor technology, with over 100 semiconductor and communication companies based here.

Ireland is currently home to:

15
of the **top 30**
global semiconductor companies.

3
of the **top 5**
global electronic design automation companies.

Ireland is ranked in the top

3
FDI locations
across capital investment, projects and semi conductor jobs created for the period 2020-23.

4.2 Ireland as a Location of Choice for Investment

Ireland's success to date is built on its consistently strong value proposition and a solid foundation of:

- A stable economic and political environment.
- A decades-long track record in the chips industry, stretching back to the 1970s, as well as an equally impressive history of success in related industries, including cyber, ICT software and ICT hardware, as well as a host of other high-tech sectors.
- Expertise in the building and operation of semiconductor manufacturing facilities, developed as a result of the well-established semiconductor industry.
- A highly skilled workforce - Ireland has a highly educated workforce, with strong expertise in engineering, physics, and materials science. Universities across Ireland's third-level sector offer comprehensive, specialised courses in semiconductor-related fields, feeding into the industry.
- Tailored Government support - the Irish Government has long supported the semiconductor sector (and, indeed, the broader technological sector) through favourable tax policies, investment incentives, and grants. Ireland's pro-enterprise corporate tax rate also supports competitiveness and makes it an attractive location for multinational companies to establish manufacturing and R&D operations.
- Geography - Ireland benefits from excellent transport links to Europe and North America, making it an ideal location for global companies. The country's robust industrial infrastructure, including ports, airports, and telecommunications, further enhances its attractiveness as a base for semiconductor manufacturing.
- EU Membership - Ireland offers significant advantages due to its membership of the European Union, providing seamless access to the EU Single Market of over 450 million consumers. Firms based in Ireland can benefit from the EU's extensive network of bilateral trade agreements with key global markets—including Japan, South Korea, Canada, and Vietnam — which facilitate reduced tariffs, regulatory alignment, and smoother supply chain integration. This strategic position enhances Ireland's appeal as a gateway for semiconductor companies looking to serve both European and global markets efficiently and competitively. Ireland's unwavering commitment to EU membership and our position as an English-speaking country in the EU following the UK's exit from the EU has enhanced its status as a key hub for semiconductor and other tech companies looking to maintain access to European markets.

Ireland has the opportunity now to build on existing strengths in this area. With our strong semiconductor base, broad capability across academia and research institutes, industry product development and wafer fabs, we are ideally placed to support and leverage the aspirations of the European Chips Act in and for Ireland.

4.3 The Value of Ireland's Semiconductor Sector

Ireland's thriving semiconductor and microelectronics cluster directly employs over 20,000 people. Of these, approximately 6,500 are engaged in highly skilled technical roles and another 3,000 are engaged in research and development.[8] The sector also generates indirect employment in areas like logistics, services, and education, as well as in local businesses that supply to semiconductor companies.

Data from the Department of Finance highlights the importance of the semiconductor industry to Irish trade and to the overall economy.[9] The industry has grown in importance in recent years as evident in Ireland's growing trade balance in semiconductors, driven by an increase in exports. The sector accounted for approximately 6% of total goods exports in 2022 compared with around 3% over the previous decade, and annual exports are valued at more than €13 billion. The industry is a particular driver of growth in the Dublin and Cork regions, where most Irish-based semiconductor companies are located. The analysis notes that Irish semiconductor trade is driven by processors, a type of logic chip which accounted for more than 90% of this sector's trade in 2022.

4.4 Challenges Facing Ireland's Semiconductor Industry

Notwithstanding this solid foundation, a series of challenges persist. The semiconductor sector in Ireland is heavily dependent on global supply chains. While companies in Ireland have strong capabilities, securing consistent supplies of raw materials and components remains a major focus for stakeholders. The sector is also highly competitive, with other regions, notably East Asia, heavily investing in semiconductor manufacturing and research and development. Ireland needs to continue innovating and investing in new technologies to remain competitive.

Sustained policy action is required across several cross-sectoral fronts to maintain Ireland's attractiveness as a place to do business, and to enhance our international competitiveness. There are particular issues related to many areas of physical infrastructure, including energy, water/wastewater, the availability of affordable housing and the wider placemaking agenda. In all of these areas, a systemic approach to infrastructure planning, environmental permits, and related areas is essential to support delivery. The Government has already decided to bring forward the deadline for implementing the Programme for Government commitment to publish a new whole of Government Action Plan for Competitiveness and Productivity, with a key focus on reform. This plan will cover industrial policy, reducing the cost and regulatory burden on business, investing in infrastructure, digital regulation and reform, energy reform, international trade and research and development, and innovation.

8. Tyndall Institute, Ireland's role in the global semiconductor industry, 2024
9. Department of Finance, Economic Insights – Summer, 2023

CASE STUDY

Cadence

Building a European R&D Hub in Cork

"The timing and scale of this Cadence investment is a real boost to Cork's growing reputation as a specialised R&D hub. Due to our proximity to the University College Cork and Munster Technological University as well as to Ireland's largest ICT research centre, The Tyndall Institute, the region provides an amazing engineering and computer science talent pool to draw from."

Steven Hollands,
Software Engineering Group Director and Cork Site Leader, Cadence.

Cadence Design Systems is a global leader in electronic design automation (EDA), providing the software and services that underpin the design of integrated circuits and complex systems on chips (SoCs). Headquartered in San Jose, California, Cadence employs over 10,000 people worldwide and plays a critical role in enabling semiconductor innovation across the industry.

Cadence's presence in Ireland dates back to 1997, when the company established a site in Dublin to provide shared services across finance, engineering, and IT. However, the company's strategic footprint in Ireland expanded significantly in 2019 with the opening of a second site in Cork. This has since become Cadence's primary location in Ireland and now serves as its international headquarters.

Cadence at a Glance:

Headquartered in San Jose, California.

Over 10,000 employees worldwide.

European R&D Centre of Excellence located in Cork.

Rapidly scaled engineering team of close to 250 high value roles.

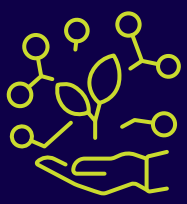
Cork was selected due to its rich engineering talent pool, proximity to major research institutions, and vibrant technology ecosystem. The city is home to Tyndall National Institute, Ireland's largest ICT research centre, as well as University College Cork and Munster Technological University. These institutions contribute to a strong pipeline of skilled graduates in computer science, electronics, and photonics — key disciplines for Cadence's advanced design software.

In 2020, despite the challenges of the COVID-19 pandemic, Cadence designated its Cork site as its European R&D Centre of Excellence. Over the following three years, the company scaled its engineering team rapidly, creating close to 250 high-value roles. The Cork-based team is now deeply involved in the global development of Cadence's next-generation EDA tools, which are used by semiconductor companies worldwide in applications ranging from 5G communications and consumer electronics to automotive, aerospace, and healthcare.

Cadence also supports academic research and talent development in Ireland. In 2022, the company announced funding for researchers at Insight, the Research Ireland centre for data analytics, to explore new approaches in quantum-speed processing for advanced chip and system design. This research engagement reflects Cadence's commitment to continuous innovation and to strengthening Ireland's role in future-focused semiconductor technologies.

The company's rapid growth in Ireland shows how high-value R&D activities can be successfully established and scaled outside of traditional manufacturing centres. Cadence's Cork site is a model of collaborative innovation, combining close ties to academia, a growing engineering workforce, and integration into the global semiconductor design ecosystem.

Cadence's investment confirms Ireland's potential to attract and retain core design and software development functions in the semiconductor value chain — a strategic objective in positioning Ireland as a centre of excellence in next-generation microelectronics.



Altratech

The Cork-based company Altratech designs advanced biosensors and semiconductor chips for rapid DNA testing, specialising in multianalyte point-of-care diagnostics. This start-up is enabling precise molecular diagnostics to be conducted outside traditional clinical environments, achieved by integrating advanced silicon chip technology with cutting-edge nanotechnology.

Altratech in Numbers:

17 scientists and engineers with expertise in microfluidics, chip design, biology, physics, and chemistry.

40 proprietary international patents, with an additional 12 patent applications filed.

Approximately US$20 million raised, receiving funding from the EU MEDLoC, the EU Horizon 2020 and the US BARDA DRIVE programmes.

€10.5 million in funding from the European Innovation Council.

An Innovative Approach

Their innovative approach combines several proprietary technologies to achieve exceptional specificity, sensitivity and multiplexing capability in a portable format. One of their key innovations is the digital CMOS sensor chip, which replaces optical detection with electronic detection. This chip uses fringe-field sensing to quantitatively detect single paramagnetic beads tethered by the target to the proprietary sensor. This technology allows for precise and efficient molecular detection.

Workforce

Altratech's multidisciplinary team of 17 scientists and engineers has expertise in microfluidics, chip design, biology, physics, and chemistry. The company's intellectual property is protected by a family of 40 proprietary international patents, with an additional 12 patent applications filed.

To date, Altratech has raised approximately US$20 million, receiving funding from the EU MEDLoC, the EU Horizon 2020 and the US BARDA DRIVe programmes. In 2024, they were approved for a recommended investment of €10.5 million from the European Innovation Council (EIC). This will allow the company to engage in clinical trials on HIV patients combined with significant scale-up in manufacturing and product development over the next three years.

5

Building on our Strong Ecosystem

With a sizeable presence in advanced manufacturing and R&D, Ireland is strongly positioned to play a pivotal role in the development of semiconductor technologies and to reap the benefits from increased research, development, and innovation in this area in the future. Given the cross-sectoral impact semiconductors have, it is critical that Ireland capitalises on its underlying strengths in this sector to derive maximum benefit.

To support and grow Ireland's presence, a collaborative approach from across industry, academia, semi-state and utility bodies and Government is required. This will allow for informed, evidence-based planning to prepare businesses to navigate challenges, to seize opportunities, and to plan for the future of the industry. The purpose of Strand 1 is to ensure that the correct framework policies are in place to promote this collaboration between stakeholders.

5.1 Mapping the Ecosystem

The semiconductor ecosystem is intricate and involves interaction among various participants. Disruptions in the semiconductor value chain impact the broader economy. Understanding the semiconductor value chain is important for developing knowledge about its scale and function within the economy and for providing accurate market intelligence that can inform and shape Government policy.

In line with the European Chips Act, and as part of this Strategy's development, the Department of Enterprise, Trade and Employment (DETE) has completed a comprehensive mapping exercise to provide a more thorough understanding of all relevant undertakings active in Ireland's semiconductor ecosystem and identify Ireland's key semiconductor market actors. This is available on the Department's website. The goal of this mapping exercise is to give an overview of the actual industry footprint in Ireland to better inform targeted actions to further grow and deepen the sector. This work provides the foundation for future work in reviewing links between stakeholders in the sector and to foster integration. A clearer understanding of the semiconductor ecosystem will also enable Ireland to engage fully with discussions and opportunities at the EU and OECD level, while positioning Ireland as a leader in the sector.

5.2 Supporting Investment in Manufacturing

Europe is competing for investment from existing and new industry players. As we work to improve Ireland's competitiveness and attractiveness for investment, we must provide as much certainty, clarity, and predictability for investors as possible.

In recognition of the importance of the sector and significant developments such as the European Chips Act, working closely with key partners and stakeholders, IDA Ireland has established a dedicated semiconductor unit to co-ordinate the agency's activities in this regard. IDA Ireland will continue to target strategic investments in the semiconductor industry to ensure growth and security of supply. IDA Ireland will also promote the existing Irish semiconductor engineering and construction capability and use this skillset to attract additional semiconductor manufacturers to locate their facilities in Ireland.

5.3 Developing Next Generation Sites with IDA Ireland

The timely provision of appropriate, innovative, cost-competitive property and infrastructure solutions, which meet the needs of a modern economy, remains essential to competing for and winning investments in strategic sectors. For example, the Mid-West Region is recognised as an established location of choice for advanced manufacturing operations across both life sciences and semiconductor and this value proposition is further enhanced by the Advanced Manufacturing Centre in the National Technology Park.

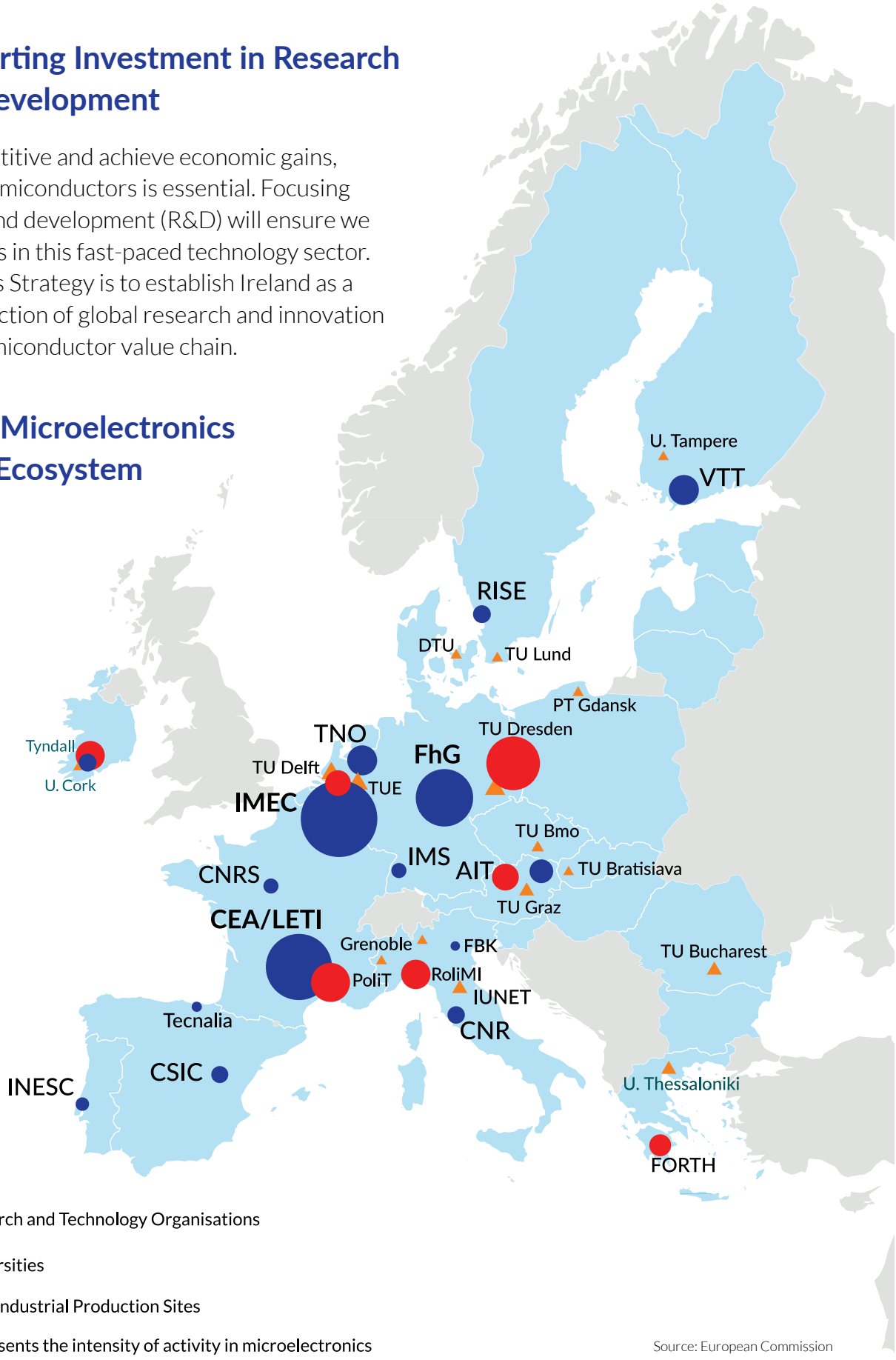
Semiconductor fabrication plants, or "fabs", require large sites due to their significant land use and the need for expansion space. In a challenging, competitive and uncertain global environment, the provision of plan-led, high-specification fully serviceable land banks with a full array of essential services and utilities in place will be a key aspect of investment decisions. Ireland's ability to compete for and win significant utility-intensive investments of scale is dependent on the ready availability of appropriate sites.

Substantial cross-Government and interagency collaboration will be required to ensure the successful delivery of these sites. Accordingly, IDA Ireland will work with DETE and other Government partners, including the utility providers, to develop sites of strategic scale (i.e., 500+ acres) and importance to accommodate manufacturing investments from the sector.

5.4 Supporting Investment in Research and Development

To stay competitive and achieve economic gains, investing in semiconductors is essential. Focusing on research and development (R&D) will ensure we remain leaders in this fast-paced technology sector. The aim of this Strategy is to establish Ireland as a leading jurisdiction of global research and innovation across the semiconductor value chain.

European Microelectronics Research Ecosystem



Size represents the intensity of activity in microelectronics

Source: European Commission

The work to establish Ireland as a leader in innovation is supported by Taighde Éireann-Research Ireland, whose semiconductor and related research covers national research priority areas. This work is carried out across Research Ireland's Research Centres, particularly the manufacturing centres:

- **IPIC** is Ireland's centre of excellence for research, innovation and PhD training in photonics. IPIC's core research programme is focused on integrated photonics, spanning areas from photonics theory right through to device and system development and fabrication, enabled through its in-house laboratories and semiconductor fabrication facilities at Tyndall National Institute. IPIC works closely with over 30 industry partners to develop their next generation products, across Ireland's high growth technology sectors such as ICT and MedTech, supporting their attraction to and growth in Ireland. In addition, IPIC commercialises disruptive technologies through start-up companies and co-ordinate the Photonics Ireland National Technology Platform.

- **AMBER's** research is focused on four thematic areas one of which is material for ICT. The primary focus of AMBER's materials for ICT research is on a materials roadmap and future process development to enable vertical stacking of compute, memory, and communications functionalities in a single chip.

Moreover, the **Research Ireland Research Infrastructure Programme** supports the research community in building and sustaining the required infrastructural capacity to accomplish high-quality, high-impact and innovative research.

Through this programme, Research Ireland has funded core national infrastructure, including fabrication facilities, an Irish Quantum technology facility at Tyndall National Institute; in situ transmission electron microscopy for observing material structure and dynamics at the nm-scale in environmental conditions and under external stimuli at the University of Limerick and infrastructure for atomic scale visualisation and characterisation facilities at University College Cork, Maynooth University and Dublin City University respectively.

Government will continue to develop Ireland as a hub of innovation for the semiconductor industry, providing support and access to finance for SMEs and encouraging further investment in R&D. To achieve this, we will maintain a focus on the ecosystem as a whole, engaging with stakeholders from all points of the value chain to understand their needs, and to develop Ireland's value proposition for companies starting up, spinning out, expanding or investing.

A range of sector-specific funding is available through Enterprise Ireland's network of Technology Gateways and Technology Centres. These Gateways and Centres are eligible to apply for equipment supports, based on demonstrated industry need. Industry in turn can then use the funded equipment at market rates or engage in research and innovation (R&I) projects, funded through Enterprise Ireland's Innovation Vouchers and Innovation Partnership Programme.

The Digital Europe Programme is an EU funding programme focused on bringing digital technology to businesses, citizens, and public administrations. The Digital Europe Programme supports projects in five key capacity areas: in supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society, including through European Digital Innovation Hubs (EDIHs).

Ireland has four EDIHs, established in 2023: FactoryXChange, Data2Sustain, ENTIRE and CeADAR. EDIHs help companies, particularly SMEs, to become competitive as well as helping public service organisations to become more efficient through digital transformation by acting as "one stop shops" providing access to technical expertise and experimentation; financing advice; training and skills development necessary for a successful digital transformation; and information on the innovation ecosystem and networking opportunities.

The MCCI Technology Centre's research teams are based in six of Ireland's universities: Tyndall National Institute, University College Cork; University College Dublin; Munster Technological University; University of Limerick; and Maynooth University. They work with industry on technological advances for the growth of the semiconductor sector.

Enterprise Ireland will engage with MCCI with view to exploring how this long-established Technology Centre can further develop and pivot to contribute to the increased levels of chips-related industry collaboration envisaged in this Strategy.

Enterprise Ireland will also focus on activities to generate deeptech spin-outs, leveraging the Commercialisation Fund as well as the expertise of Tyndall's Entrepreneurs in Residence programme. Enterprise Ireland has funded a portfolio of Commercialisation Fund projects in Tyndall over the past decade and will continue to support high-risk/high-reward spin-out projects with ongoing commercialisation support from assigned Enterprise Ireland Commercialisation Specialists.

Enterprise Ireland and Knowledge Transfer Ireland (KTI) will work proactively with research teams in Higher Education Institutes (including Tyndall National Institute, MCCI, IPIC and others) to identify, nurture and develop a strong pipeline of IP-rich deeptech spin-outs in semiconductors and related areas. KTI's KT Boost programme is providing funding to research teams in Higher Education Institutes which covers Technology Transfer Office staff costs, such as start-up development managers, along with related operational activities which will positively impact on the potential for increasing the quantity and quality of future spin-outs from Tyndall, MCCI and IPIC.

Enterprise Ireland will support MCCI establishing additional relationships with a wider base of SMEs which can avail of Enterprise Ireland Innovation Voucher and Innovation Partnership supports to foster collaboration, along with broader engagement in other sectors including Cyber and Medical Devices. In considering the next phase of funding for MCCI, Enterprise Ireland will agree targets/performance indicators and commensurate financing, which ensures alignment with this Strategy.

Enterprise Ireland will continue to ensure that its research and innovation programmes and supports are available and relevant to the semiconductor ecosystem, including in niche areas where Ireland and the EU can foster cross-sectoral opportunities including semiconductor technology as an enabling technology across sectors of strategic importance to Ireland and Europe, quantum chips, advanced packaging (chiplets, heterogeneous packaging), neuromorphic chips, and sensors.

The Government will also continue to support the Disruptive Technologies Innovation Fund (DTIF), which provides an important source of funding for companies and research institutions. DTIF funding can be used to leverage additional private sector investment in research into a range of technological advancements covered by the national Research Priority Areas, including semiconductors.

5.5 Fostering Collaboration to Promote Growth and Develop Potential

The capabilities and knowledge of Irish SMEs are highly regarded by international firms. We recognise the importance of encouraging a rich ecosystem for domestic companies and developing SMEs and start-ups to promote innovation and to position Ireland as an agile and responsive hub. This offers an array of potential opportunities, especially given the extensive international networks of large Irish firms. These networks hold the possibility of new FDI opportunities in the form of global suppliers, partners, collaborators, technology developers and co-developers.

We will encourage multinational companies to partner with Irish enterprise to foster a strong, mutually supportive sector. This will be achieved through close collaboration between IDA Ireland and Enterprise Ireland to strengthen linkages between the Agencies' respective client bases within the semiconductor sector. This work will help local firms become embedded in the value chains of this strategic sector to develop a well-represented and self-sustaining ecosystem. Enterprise Ireland will formally support Ireland's Competence Centre as the channel to the European Chips Act mechanisms for Irish SMEs and High Potential

Start-up Companies (HPSUs). This will be an important mechanism for SMEs to access pilot lines,, design Platforms (CAD Tools & Foundry Process Design Kits), training in next generation technologies, funding that is ringfenced under the European Chips Act, prototyping chip manufacturing, as well as the broader network of Competence Centres.

These connections should not be limited to companies within the semiconductor value chain. As this sector is crucial to the development and functioning of other sectors of the economy, an important element of growth will be developing synergies between the semiconductor industry and other ancillary industries in Ireland such as medical devices, pharmaceuticals, agriculture and food processing, financial services and within the ICT sector generally. To this end, the enterprise agencies will actively seek out opportunities for collaboration across sectors to drive innovation. In addition, DTIF operates as an important mechanism for fostering collaborations between the industrial and research sectors, and especially for harnessing the ability of SMEs to develop cutting-edge technological advancements in conjunction with other industry and research partners.

Research Ireland has a range of programmes to strengthen and build collaboration and partnerships between the public and private sector, including:

- **US-Ireland R&D Partnership Programme.** The US-Ireland R&D Partnership Programme is a unique initiative involving funding agencies across three jurisdictions: the US, Republic of Ireland and Northern Ireland.
- **Research Ireland's Strategic Partnership Programme.** The Strategic Partnership Programme is a flexible mechanism for academic researchers to build strategic collaborations with key stakeholders including industry and other funding agencies.

Tyndall's strategic plan includes a major building expansion to double its footprint over the next several years. Delivering this national infrastructure for semiconductors will contribute significantly to the further enhancement of the current R&D ecosystem and foster collaboration.

5.6 Developing Ireland's First National Cluster in Semiconductors

Clustering as an enterprise policy tool was recognised in the White Paper on Enterprise 2022-2030. More recently, it was recognised in the Programme for Government with a commitment to establish cluster organisations to facilitate collaboration and collective action among related companies, as well as partnerships with higher education institutions and public sector bodies under a new National Clustering Programme (NCP).

Funding of €384,000 was secured in the 2025 Budget to support the National Clustering Programme in 2025. This is the first time DETE has a dedicated funding stream for clustering. It is proposed to take a pragmatic approach and focus the piloting on one or two established clusters which demonstrate the key elements for a national cluster in line with international best practice as identified in the TCI Peer Review Report which DETE commissioned. It was undertaken by three international clustering experts from The Competitiveness Institute (TCI). This approach will assist in building an evidence base for securing funding for up to five national clusters under the National Clustering Programme in 2026. As with all public moneys, funding under the NCP will have to comply with State aid rules.

Strand 1: Building on Our Strong Ecosystem

Objective		Deliverable		Responsibility
1.1	Ensure that Ireland has an appropriate policy landscape to support growth in the semiconductor sector.	1.1.1	Publish a comprehensive mapping of the Irish semiconductor ecosystem encompassing the FDI, indigenous and RD&I sectors, as well as related supporting sectors such as semiconductor construction and engineering.	DETE
		1.1.2	Establish Semiconductor Advisory Council to ensure that a multi-stakeholder approach is taken in the implementation of this Strategy and to the identification of opportunities. Building on the mapping exercise, the Council will identify opportunities to grow the industry in Ireland, highlight further actions to support growth, and identify any policy or funding gaps requiring intervention from Government.	DETE
1.2	Develop Ireland's position as a key player in the global semiconductor industry.	1.2.1	Develop an international brand and value proposition which promotes all aspects of the semiconductor sector in Ireland, including construction capability, manufacturing expertise, product design, tool maintenance, R&D capacity, and enterprise support.	IDA Ireland, Enterprise Ireland
		1.2.2	Utilising and building upon existing overseas network, promote Ireland as a prime location for investment from MNCs globally.	IDA Ireland
		1.2.3	Exploit the strengths and support the continued development of the Irish semiconductor engineering and construction sector.	IDA Ireland; Enterprise Ireland

Strand 1: Building on Our Strong Ecosystem

Objective		Deliverable		Responsibility
1.3	Grow semiconductor-related investments.	1.3.1	Develop and deliver a proposal for large-scale next generation sites, with all of the necessary utilities and services to secure and accommodate major semiconductor investments.	IDA Ireland; Cross-Government
		1.3.2	Enhance funding to support the expansion of collaborative R&D capability and capacity in semiconductor technologies, supporting Enterprise Ireland and IDA Ireland clients.	IDA Ireland; Enterprise Ireland; Research Ireland
		1.3.3	Support the preparatory work envisaged for future decision-making with regard to the proposed expansion of the Tyndall National Institute, a key element of the national infrastructure for semiconductors.	DFHERIS
		1.3.4	Engage with MCCI with view to exploring how the Technology Centre can develop and pivot to contribute to increased levels of spin-outs, leveraging expertise of Tyndall's Entrepreneurs in Residence and EI's Commercialisation fund.	Enterprise Ireland
1.4	Foster collaboration across the Irish semiconductor ecosystem to promote growth and develop potential.	1.4.1	Drive and support cross-agency projects in the semiconductor industry, including through, for example, the Disruptive Technologies Innovation Fund to strengthen collaboration and deepen linkages between Irish-based MNCs and SMEs.	IDA Ireland; Enterprise Ireland
		1.4.2	Exploit opportunities presented by fast evolving sectors, including quantum technologies, photonics, compound semiconductors, AI and MedTech by facilitating interactions with key actors in the semiconductors sector.	IDA Ireland; Enterprise Ireland
		1.4.3	Support the development of a national semiconductor cluster - Ireland's first cluster - under the National Clustering Programme.	DETE

CASE STUDY

Infineon

Expanding Design and Applications Engineering in Ireland

"Infineon Ireland really cares about their employees, customers and business. Employees are constantly motivated to grow, and everyone has the opportunity to flourish in their work and personal experience, which is a win-win for both. One of the things that I like the most is our team's supportive and co-operative style in both work and social-related aspect of the job, which I find to be the perfect work-life balance."

Briseida Moreno,
Global Customer Logistics Management, Infineon.

Infineon Technologies, a global leader in power semiconductors and system solutions headquartered in Germany, has been steadily expanding its presence in Ireland. While Infineon does not operate a manufacturing facility in Ireland, its investment focuses on high-value design and applications engineering — core elements of the semiconductor innovation cycle that support global product development.

Infineon's Irish operations are based in Dublin City Centre, Sandyford and Cork, employing over 200 team members engaged in supply chain, technical marketing and R&D activities. The Irish R&D locations have grown into centres of excellence for applications and systems engineering, with particular focus on automotive and industrial markets. These functions are critical to Infineon's global operations, as they enable customer-specific design, rapid prototyping, and integration of Infineon's components into complex end-user systems.

Infineon Ireland:

Over 200 team members across supply chain, technical marketing and R&D activities.

Home to Infineon's largest customer logistics management team.

A bridge for R&D across Europe and beyond.

The Infineon Ireland R&D team is closely involved in developing solutions for electric vehicles, renewable energy systems, and industrial automation — all areas where power electronics play a key role. The site also engages in system architecture design, embedded software development, and functional safety engineering, reflecting the increasing convergence of hardware and software in modern semiconductor applications.

A distinctive feature of Infineon's Irish locations is their customer-facing nature. As well as being home to the largest customer logistics management team for Infineon's supply chain, application engineers work directly with global clients to adapt and optimise Infineon's products for specific systems and use cases. This positions Ireland as an important bridge between core R&D in Germany and customer deployment across Europe and beyond.

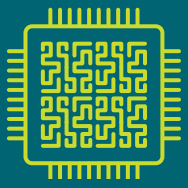
In recent years, Infineon has expanded its Irish activities through both organic growth and strategic acquisitions. In 2020, Infineon acquired Cypress Semiconductor. The integration of the two teams has strengthened Infineon's capabilities in microcontroller applications and connectivity solutions — essential technologies in smart mobility and Industry 4.0.

Infineon is also an active participant in collaborative research and innovation in Ireland. The company engages with national and EU-funded research projects and maintains links with academic institutions, particularly in areas such as power electronics, embedded systems, and energy efficiency. These collaborations help Infineon access specialist knowledge while contributing to skills development and technology transfer.

The Infineon Ireland sites exemplify how Ireland can host strategic semiconductor functions outside of manufacturing. Infineon's investment shows that systems-level engineering, software development, and customer integration are increasingly central to competitiveness in the semiconductor sector. These activities also offer high-skilled employment opportunities and help embed multinational companies more deeply into Ireland's innovation landscape.

Infineon's growth reflects the success of Ireland's long-term strategy to attract design and application engineering roles — a crucial component of the global semiconductor value chain and a strong foundation for future expansion in areas such as power systems and electrification.

Equal1



Based in Dublin, Equal1 is a pioneering company in the quantum computing space, focusing on leveraging silicon technology to address significant industry challenges. Its mission is to solve issues related to scaling qubits and error correction, crucial for the advancement of quantum computing. Equal1 has developed a quantum-on-chip processor which integrates qubits, control and error correction on a single chip, utilising standard CMOS technology. One of its key innovations is the adaptive error logic embedded in each tile, enabling rapid and parallel error correction.

Innovative Technology

Equal1's technology has a wide range of applications, including molecular simulation, which can accelerate drug discovery from years to days, climate modelling, which advances material science for carbon capture and storage and AI training, which increases efficiency for training large language models by 99.99%. The team at Equal1 is composed of world-leading experts in silicon, quantum and software.

Milestones

The company has achieved significant milestones, including three generations of quantum-on-chip silicon and a robust patent portfolio with 28 US patents and 14 pending. These patents cover core cryoCMOS technology, quantum device structure and more.

Competitive Edge

Equal1's competitive edge lies in the efficiency of its quantum-on-chip processors, which are 130 times smaller than competing solutions, their scalability, capable of integrating 1 million on-chip qubits, and their cost-effectiveness, leveraging existing semiconductor investments for lower funding requirements.

Bell-1 is a quantum-on-chip processor which integrates qubits, control and error correction on a single chip, utilising standard CMOS technology.

Bell-1

Equal1 recently launched its Bell-1 product, marking a significant milestone in the quantum computing industry. Bell-1 is a quantum-on-chip processor which integrates qubits, control and error correction on a single chip, utilising standard CMOS technology. This innovative approach allows for the scaling of millions of qubits, making Bell-1 one of the most powerful and efficient quantum computers available. The product features adaptive error logic embedded in each tile, enabling rapid and parallel error correction, which is crucial for maintaining high fidelity in quantum operations.

6

Developing Skills and Harnessing Existing Talents

6.1 Overview of Ireland's Skills Infrastructure

Ireland's ability to realise its ambitions for its semiconductor industry will depend on access to a diverse, rich base of talent and capabilities.

Ireland has been extremely successful to date in creating and maintaining an ICT skills pipeline, initially guided by the National Skills Strategy and through the STEM Education Policy Statement 2017-2026, the National ICT Skills Action Plans, and Technology Skills 2022. In cases where skills needs cannot be met by the educational system, Ireland's dynamic employment permits and visa regimes continue to target highly skilled, in-demand workers.

Ireland's semiconductor industry is already characterised by close collaboration between industry and academia to meet its skills needs. Initiatives from Research Ireland, the MIDAS Skillnet and other Skillnet Business Networks, including Technology Ireland ICT Skillnet and Cobotics Skillnet, has resulted in a suite of valuable industry-specific training and upskilling supports which are available to businesses.

6.2 Skills Needs in the Semiconductor Industry

The challenge of ensuring ongoing access to a broad talent pool is not unique to the semiconductor sector. Ireland's talent market remains highly competitive with recruiters continuing to have difficulty in hiring for certain roles, particularly across science, engineering, and technology.[10]

This issue is present on a global scale. To facilitate projected growth in semiconductor output, Deloitte predicts that the global semiconductor workforce, estimated at 2 million in 2021, will need to grow to 3 million by 2030, adding approximately 100,000 annually.[11] In 2022, 6% of European enterprises had hard-to-fill vacancies for jobs requiring ICT specialist skills, 3.4% more than in 2014.[12] Meanwhile, McKinsey analysis shows that the semiconductor industry in the US is experiencing a surge in demand across three distinct labour pools (i.e., construction craft labourers, engineers, and technicians), while faced with considerable attrition and recruitment challenges. This retention challenge partially stems from new entrants to the workforce opting to pursue roles in digital and analytics, rather than in manufacturing.[13]

The semiconductor ecosystem comprises several subsectors along the value chain, each with their own unique skills needs. This was highlighted in the 2021 MIDAS Skillnet report on skills needs for the electronics sector, which identified a need for talent across a broad spectrum of technical skills.[14] The report surveyed 68 companies across the Irish electronics sector on issues relating to various aspects of their resource and skills needs: 82% of respondents agreed with the statement that "future trends in electronics will have the effect of increasing hiring needs", and 79% considered that future trends will require skill levels to improve a lot or a great deal.

The semiconductor sector is experiencing unprecedented demand and projected to grow exponentially in the years to come. Paired with the training opportunities available nationally and at EU level through the Chips for Europe Initiative, the sector offers an abundance of possibility for those who wish to enter it. It remains vital for industry to promote an understanding of the sector among prospective talent based on these opportunities. Ireland must be agile and ensure it is well-positioned from a skills perspective to respond to opportunities as they arise. As the already complex semiconductor industry evolves, PhD-level expertise will be increasingly valued for its theoretical depth and problem-solving capabilities, skills and talent investments must be targeted across all levels of qualification and study.

10. SOLAS, Difficult-to-fill vacancies survey (2023)
11. Deloitte, 2023 Semiconductor Industry Outlook (2022)
12. European Commission Representation in Ireland, European Year of Skills: Putting skills at the top of the agenda in Ireland and the EU, 22 November 2023
13. McKinsey & Company, New tactics for new talent: Closing US semiconductor labor gaps (2024)
14. MIDAS, Electronics Sector Resources & Skills Needs (2021)

6.3 Establishing Skills Needs for Ireland's Semiconductor Sector

Ireland has already taken significant steps to ensure a strong and responsive talent pipeline, but more work is needed to produce a strong talent base and, in an increasingly tight labour market, it is important that industry engagement continues to inform the formation and deployment of these programmes.

The challenge is to target and develop the appropriate skills to enable the semiconductor sector to grow in line with targets set at European level. While the semiconductor sector faces exponential growth and an increasing need for skilled workers, effective provision of these skills requires a deep understanding of exactly what skills are needed, and in what areas of the sector.

To date, there has not been a quantitative study of skills needs for Ireland's semiconductor sector. The Expert Group on Future Skills Needs (EGFSN) and Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) will conduct a bespoke study on skills needs for Ireland's semiconductor sector which will provide Government, academia and industry with the evidence base needed to make impactful, informed change to the skills pipeline. The study will develop a roadmap for skilling and upskilling for the sector. Actions designed to raise awareness of the opportunities in the industry will be considered as part of this exercise, as should the potential for encouraging and supporting overseas placement for students as part of key third-level courses. The study will also consider all-island skills development opportunities, measures to promote diversity within the sector and an exploration of the human-centric element of the industry, to better understand what makes successful people and a successful culture within organisations.

The OECD Skills Strategy for Ireland identified a need for greater collaboration across Government in the formation of skills policies. Recommendation No. 6 of the OECD's strategy calls for the establishment of "a vision for long-term strategic skills needs in Ireland to inform and strengthen further education and training and higher education performance frameworks and funding models".[15] Reflecting this objective, we will leverage the Advisory Council on Semiconductors to ensure that skills for the semiconductor sector are mainstreamed in the development of a whole-of-Government approach to skills policy.

Proactive engagement at EU level will also be key to taking advantages of opportunities, again depending on a unified, collaborative approach. Cross-government communication will be vital in ensuring that opportunities are seized as they emerge at EU level, including but not limited to those under the Digital Europe and Horizon Europe programmes.

The MIDAS report found that the MIDAS Electronics Systems Skillnet should engage with its member companies to deliver an expanded and broader offering of short training courses aligned to the needs of industry, as well as carrying out more data gathering to define content for new modules. Industry groups and related organisation such as Engineers Ireland, for example must also prioritise outreach and branding efforts to foster an understanding of the sector and the career opportunities it offers to prospective talent.

The accessible, industry-informed nature of the MIDAS Skillnet makes it a valuable resource to those seeking a career in the semiconductor sector, and to a broader industry base for which diversity is a key area of potential. Continued work to promote participation in this programme through Skillnet Ireland and MIDAS is a potential gateway for a diverse range of workers with an interest in microelectronics.

Alongside the provision of training, factors such as attrition from undergraduate courses, retention in the sector, and gender disparity also impact the availability of high-level digital skills and are core to ensuring a steady stream of talent into the semiconductor sector. These are among the issues that will be examined by DFHERIS in the development of a successor to the Technology Skills 2022 Strategy.

While emerging sectors such as quantum and AI rely on a ready supply of semiconductors to operate, they also require workers from the same broad talent base, particularly at Masters and PhD levels. This offers both a challenge – greater competition for skills – but also an opportunity, namely, the greater number of roles available to prospective entrants, resulting in an enhanced supply. Future analysis of skills needs will assist understanding the interdependencies of these sectors to ensure future enterprise and skills policy reflects the enabling nature of the semiconductor sector. This will be achieved through engagement between DETE and the EGFSN on the upcoming semiconductor skills study.

15. OECD, Skills Strategy for Ireland (2023)

6.4 An Irish Competence Centre in Semiconductors

The European Chips Act envisages the establishment of at least one Competence Centre in Semiconductors in each Member State to promote the use of semiconductor technologies, to provide access to design and pilot line facilities, as well as to address skills gaps across the EU. DETE is supporting an Irish Competence Centre in Semiconductors to facilitate access for Irish stakeholders to design services and tools as well as pilot lines, and to facilitate access to a network of Competence Centres across Europe.

The Irish Competence Centre will work closely with industry, research and technology organisations, universities, and the public sector to contribute to skills development and provide access to joint programmes, pilot lines and design services and tools. The Competence Centre will facilitate the development of skills, talent and training and will act as a hub for the ecosystem. Through the Competence Centre we will build on our strengths by enhancing the relationship between infrastructure, industry, and RD&I capability.

DETE will ensure that opportunities as part of the Chips for Europe Initiative are accessible for businesses of all sizes within the industry, to bring greater diversity of expertise and depth of innovation to the knowledge base of the semiconductor ecosystem in Europe.

To this end, DETE held an open call for expressions of interest in April 2024. Following assessment of expressions of interest, DETE nominated I-C3 (a consortium comprising University College Cork via Tyndall National Institute, MIDAS, and University College Dublin) to operate as Ireland's Competence Centre under the Chips for Europe Initiative. DETE has provided administrative support to I-C3 in their application to the Chips Joint Undertaking alongside a national letter of intent to support I-C3, providing matched funding with the EU, which was submitted in October 2024. The application has since received approval, and the Competence Centre is expected to be operational in Q2 2025.

6.5 Promoting our Capabilities in Construction and Engineering

In promoting an Irish brand and value proposition our track record represents an invaluable tool. Ireland's capabilities in semiconductor engineering and construction make us a crucial player in the global semiconductor supply chain and offers an opportunity to utilise this expertise to leverage future investment. Over 200 companies have been identified as key players across engineering and construction services underpinning advanced technology construction projects (including data centres, biopharma, and semiconductor capital projects). There exists a huge opportunity to position this cohort of companies to scale themselves internationally across global projects as well as being utilised to enhance and underpin the value proposition for investing into Ireland. An initiative is currently being developed by Enterprise Ireland, IDA Ireland and Engineers Ireland to develop and market this capability.

With advanced manufacturing facilities, strong R&D capacity, a skilled workforce, and proven expertise in building state-of-the-art fabs, Ireland is well-placed to expand its role in the semiconductor industry, both regionally and globally.

These strengths not only attract continued foreign investment but also contribute to the resilience and growth of the European semiconductor ecosystem. In order to capitalise on these capabilities, Ireland's strengths in this area should be promoted by our enterprise agencies to both existing and prospective leading-edge companies.

Strand 2: Developing Skills and Talent

Objective		Deliverable		Responsibility
2.1	Ensure that we have the skills and talent needed to support the development and growth of the sector.	2.1.1	Establish Ireland's Competence Centre in Semiconductors (comprising MIDAS, University College Dublin and Tyndall National Institute), operating under the Chips for Europe Initiative. Once established, the Competence Centre will work to: 1. Provide access to technical expertise and experimentation in the area of semiconductors; 2. Assist companies, SMEs in particular, to approach and improve design capabilities and developing skills; 3. Connect and be an active participant in the European network of Competence Centres in Semiconductors, acting as an access point to other nodes of the network.	DETE, Enterprise Ireland
		2.1.2	Through the Expert Group on Future Skills Needs, examine future skills needs for the semiconductor industry. Recommendations may include those designed to raise awareness of opportunities within the sector.	DETE
		2.1.3	Double the number of enterprises undertaking design activities and the number of designers working in the semiconductor sector. The outcomes from the EGFSN study on semiconductor skills will be essential in this context.	IDA Ireland, Enterprise Ireland
		2.1.4	Based on the outcomes from the EGFSN study, prioritise the needs of the semiconductor sector in future reviews of eligible occupations under the Critical Skills Employment Permit system.	DETE
		2.1.5	Subject to 2.1.2, examine potential to a) expand upskilling opportunities to meet the needs of industry, for example through increasing throughput in the MIDAS Skillnet, and via other industry-led training provision and b) develop targeted action to increase the semiconductor talent pipeline across Levels 7-10 in the Higher-Level Qualification Framework.	MIDAS, DFHERIS

CASE STUDY

Intel

A Strategic Semiconductor Anchor in Ireland

"Intel's commitment to Ireland spans over three decades, and our continued investments in our Leixlip facility is a testament to that dedication. Being at the forefront of Intel's transformation journey, while shaping the future of semiconductor technology in Europe is an incredible opportunity."

Joe English,
VP Foundry Technology and Manufacturing, Fab 34 Factory Manager, Intel Ireland.[16]

Intel is Ireland's largest industrial investor and employer in the technology sector, with a long-standing presence that has significantly shaped the country's role in the global semiconductor industry. Since establishing its Irish operations in 1989, Intel has invested over €30 billion in its Leixlip campus, located in County Kildare. The site hosts advanced manufacturing facilities, including some of the most sophisticated semiconductor fabrication technologies in Europe.

As the European Union seeks to increase its semiconductor autonomy, Intel Ireland offers a proven model of strategic investment, global integration, and national benefit — demonstrating how long-term industrial partnerships can anchor a country's position in the global semiconductor landscape.

The cornerstone of Intel's operations in Ireland is its wafer fabrication plant. This facility has evolved through successive generations of process technology, most recently with the development of Intel's new Fab 34, a cutting-edge EUV enabled production facility. The investment in Fab 34 — over €17 billion — marks one of the largest private sector investments in the history of the Irish state and positions Ireland at the forefront of advanced chip manufacturing in Europe.

16. Source: https://www.intel.ie/content/www/ie/en/company-overview/intel-leixlip.html

Intel Ireland: A Snapshot

Ireland's largest industrial investor and employer in the technology sector, employing thousands of engineers, technicians, and support staff across the country.

Since establishing its Irish operations in 1989, Intel has invested over €30 billion in its Leixlip campus.

The investment of €17 billion in Fab 34 marks one of the largest private sector investments in the history of the Irish state.

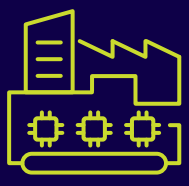
Intel Ireland is deeply integrated into the company's global supply chain, supporting both manufacturing and R&D. The site produces silicon wafers that are shipped to Intel's assembly and test sites around the world. Today the Leixlip campus is also home to the Neural Processing Unit (NPU) Group, originating from Intel's acquisition of the Irish start-up Movidius in 2016. The group specialises in developing industry-leading, low-power AI technology and software for Intel's Client Computing Group.

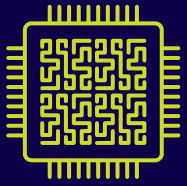
Beyond its internal functions, Intel plays a strategic role in shaping the broader Irish semiconductor ecosystem. The company is a founding member of MIDAS Ireland, the national industry association for microelectronics, and actively contributes to skills development, policy dialogue, and industrial collaboration. It has long-standing partnerships with Irish universities and research institutes, particularly in the areas of process technology, advanced packaging, and materials science.

Intel's investment in talent is also noteworthy. The company employs thousands of engineers, technicians, and support staff in Ireland, and continues to invest in training and upskilling to meet the demands of increasingly complex manufacturing processes. It supports STEM outreach, and collaborative initiatives with higher education institutions to build Ireland's talent pipeline.

Intel's scale and technological depth make it a cornerstone of any national semiconductor strategy. It provides Ireland with advanced manufacturing capability, critical mass in skills and infrastructure, and global visibility. Moreover, Intel's presence has helped attract a cluster of suppliers, service providers, and related industries, contributing to regional economic development and sectoral resilience.

As the European Union seeks to increase its semiconductor autonomy, Intel Ireland offers a proven model of strategic investment, global integration, and national benefit — demonstrating how long-term industrial partnerships can anchor a country's position in the global semiconductor landscape.





Eblana Photonics

Eblana Photonics, based in Dublin, is a leading company in the field of advanced photonics technology. The company specialises in the design and manufacture of high-performance semiconductor lasers for a wide range of applications, including telecommunications, sensing, and scientific research.

The integration of semiconductor technology allows Eblana to manufacture lasers that are not only highly efficient but also scalable and cost-effective.

The Discrete Mode (DM) laser platform developed by Eblana Photonics is a key differentiator in the market, offering unique advantages such as narrow linewidth, high stability and low noise. These features make Eblana's lasers ideal for demanding applications where precision and reliability are paramount. The company's product portfolio includes lasers operating at various wavelengths, tailored to meet the specific needs of different industries and applications.

Semiconductors for Innovation

Eblana Photonics' use of semiconductor technology is a cornerstone of its innovative approach to photonics. By leveraging their proprietary DM laser platform, Eblana has been able to produce high-performance semiconductor lasers that offer exceptional precision and reliability. The DM laser platform utilises advanced semiconductor fabrication techniques to create lasers with narrow linewidths, high stability and low noise, which are critical for applications requiring high accuracy and consistency.

Technology

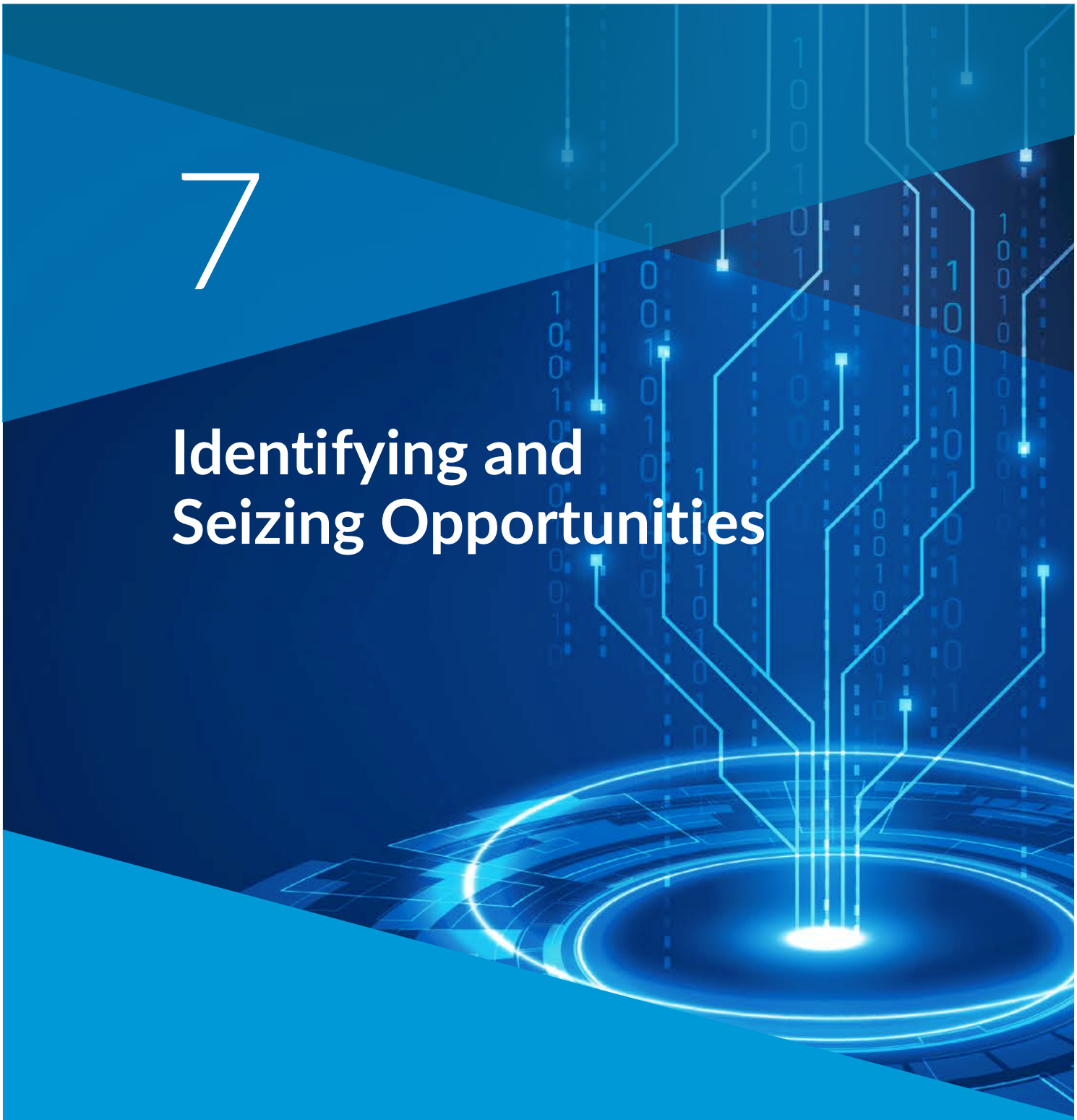
The integration of semiconductor technology allows Eblana to manufacture lasers that are not only highly efficient but also scalable and cost-effective. This is particularly important for industries such as telecommunications where the demand for high-speed, reliable optical communication systems is continually growing. Additionally, the use of semiconductor technology enables Eblana to produce lasers at various wavelengths, tailored to meet the specific needs of different applications, from environmental monitoring to medical diagnostics.

Workforce

The team at Eblana Photonics is composed of highly skilled professionals with expertise in photonics, semiconductor technology and optical engineering. This multidisciplinary team works collaboratively to push the boundaries of laser technology and develop solutions that meet the evolving needs of their customers.

7

Identifying and Seizing Opportunities



7.1 Winning Investment and Growing the Sector

The European Chips Act presents a wealth of new opportunities for development across the semiconductor ecosystem. Ireland is well-positioned to pursue these opportunities and beyond, taking an active role abroad to win investments, create partnerships, and ensure our domestic sector can fully avail of all the supports available.

Pillar 2 of the European Chips Act creates a framework to ensure security of supply by attracting increased investment and production capacity in semiconductor manufacturing as well as in packaging and advanced testing and assembly. Pillar 2 introduces the designation of 'first-of-a-kind' facility as a requirement for funding, meaning a new or substantially upgraded facility for the manufacture of semiconductors production of key equipment or components thereof used in semiconductor manufacturing. The facility must provide innovation with regard to the manufacturing process or final product that is not yet substantively present or committed to be built within the Union.

Under this Pillar, first-of-a-kind undertakings granted the status of Integrated Production Facility or Open EU Foundry by the Commission are considered to be in the public interest, and Member States may provide support measures, including fast-tracking of planning permit-granting procedures. DETE is working with colleagues in the Department of Housing, Local Government and Heritage to align approaches in implementing this aspect of the European Chips Act.

In tandem, IDA Ireland will work with existing and prospective leading-edge companies in the semiconductor manufacturing sector to identify and develop opportunities to support fabrication facilities under Pillar 2. As a priority and utilising a whole-of-government approach, Ireland will aim to secure a new manufacturing investment of scale from a world leading chip manufacturer, targeting at least one investment in both leading-edge and trailing-edge semiconductors. Ireland will also seek to secure a new advanced packaging and test facility, helping to build competence in this critical domain and to complete the presence of all elements of the value chain from R&D and design, to manufacturing and ATP.

7.2 Enhancing Access to Opportunities for Domestic Enterprises

Providing access to scaling opportunities for indigenous enterprise in the semiconductor sector is critical for driving innovation, economic growth, and enhancing the country's technological leadership. As key players in the supply chain, Ireland's start-ups and SMEs contribute to the development of advanced technologies and processes that support larger manufacturers and global markets. Scaling these businesses strengthens Ireland's semiconductor ecosystem by fostering greater agility and adaptability, allowing for quicker responses to market demands and technological advancements.

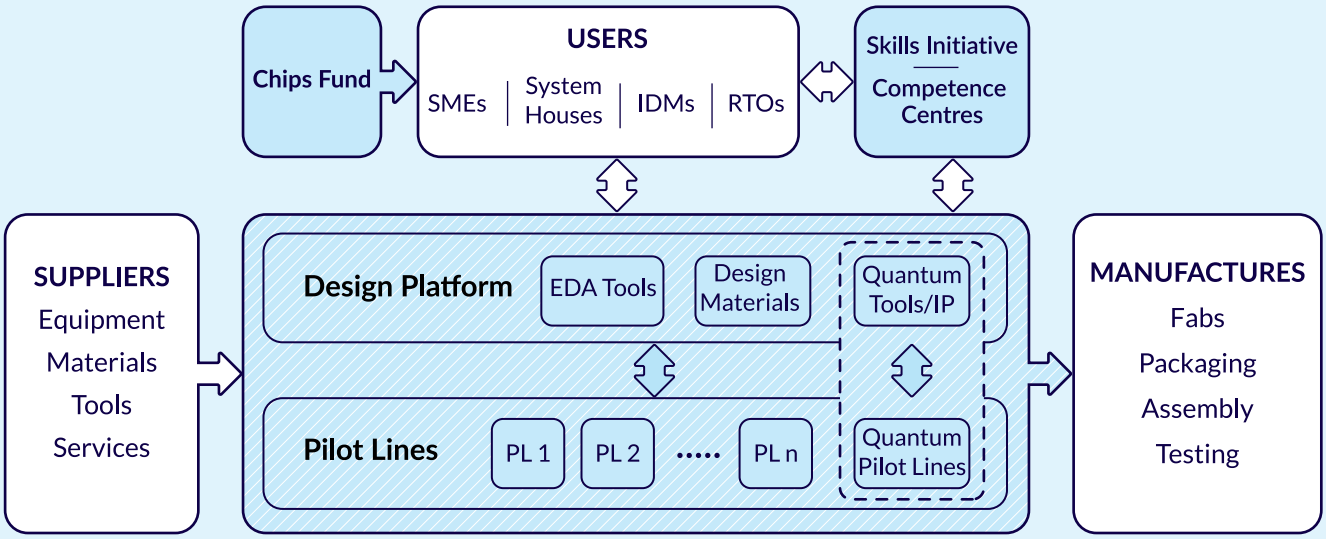
While Ireland's sector is vibrant with talent and a culture of innovation, the current endpoint for many start-ups and SMEs across the Irish enterprise landscape is acquisition by MNCs. It is imperative that start-ups and spin-outs can access support mechanisms to continue to grow.

Enterprise Ireland will drive this work, through the provision of Commercialisation Fund supports, through its Seed and Venture Capital Scheme 2025-2029, which will invest in venture capital funds investing in deeptech companies, and via the advice and guidance offered by Enterprise Ireland's EIC team to deeptech companies applying for EIC Accelerator and EIC Step investment. This combination will solidify Ireland's position as a key hub for semiconductor innovation and manufacturing in Europe, while also ensuring long-term economic stability and competitiveness.

7.3 Participating in Chips for Europe Pilot Lines

The Chips for Europe initiative aims to enhance technological capacity building and to foster innovation in cutting-edge chip technology on a substantial scale. In part, this will be achieved through the establishment of European pilot lines – pre-commercial production lines – to test, experiment and validate semiconductor technologies and system design concepts, while reducing environmental impacts as much as possible. The programme promises to catalyse innovation and reinforce Europe's technological leadership on the global stage.

Components of the Chips for Europe Initiative



Source: European Commission

Pilot lines will accelerate process development, test and experimentation, and validation of design concepts. The pilot lines will be funded jointly by the EU, from Horizon Europe and Digital Europe Programme, the Member States, and private contributions. Their implementation is expected to bridge the gap from lab to fab and will be available to a wide range of users, including academia, industry (including start-ups, spin-outs and SMEs), and research institutions. The selection of four pilot lines by the Chips Joint Undertaking in April 2024 highlights the European commitment to driving technological innovation and excellence through the Chips for Europe Initiative.

As a result of the development of this Strategy, IDA Ireland is supporting the participation of Tyndall National Institute in three pilot lines to further strengthen the Irish semiconductor ecosystem and provide spillover effects to other sectors. This support is enabling Tyndall to leverage significant EU funding and to partner with global leaders in the sector, covering the full value chain from materials and devices to circuits and systems, and linking Ireland to the innovation capacity and capability that the pilot lines will create. This support will result in Tyndall receiving approximately €70 million of additional funding.

In May 2024 Tyndall National Institute was selected to take part in the **NanoIC Pilot Line**, in association with a consortium co-ordinated by IMEC in Belgium. This pilot line will be engaged in state-of-the-art research on systems-on-chip based on beyond-2nm logic nodes, providing opportunities for Irish leadership in this emerging field.

The second pilot line in which Tyndall participates is the **FAMES Pilot Line** co-ordinated by CEA-Leti. This pilot line focuses on advanced fully depleted silicon-on-insulator (FD-SOI) technologies targeting 7nm which will provide a path towards the next generation of high-performance, low-power semiconductor devices.

DETE, IDA Ireland and Tyndall will seek to engage in additional strategic pilot lines which align to this Strategy. For example, Tyndall is also participating in the **PIXEurope Pilot Line** for advanced photonic integrated circuits. This pilot line has recently entered negotiations with the Chips Joint Undertaking after a positive international evaluation.

This participation will be instrumental in providing a pipeline of future semiconductor manufacturing technologies to the large industry players in Ireland, as well as a range of benefits for the indigenous base, including fast prototyping, access to platform technologies for proprietary design, and access to capital equipment.

7.4 Pursuing Research Opportunities through Horizon Europe

Horizon Europe, led in Ireland by DFHERIS, is the EU's key funding programme for research and innovation to 2027 with a budget of €95.5 billion. A key tenet of the programme is to fully engage the EU's talent pool, boosting economic growth, promoting industrial competitiveness, and optimising investment impact within a strengthened European Research Area. Since the launch of Horizon Europe in 2021, Irish research and innovation organisations have been involved in 14 projects related to the topics of semiconductors and computer processors, receiving a combined €17.8 million in EU funding. Many more Irish researchers have received funding in related fields such as materials, engineering and advanced manufacturing techniques, which directly and indirectly contribute to breakthroughs in semiconductor technology.

Ireland has been very successful in winning EU funding to date. Tyndall National Institute secured €62 million between 2014 and 2020 in direct funding from EU Programmes such as Horizon 2020 and the European Regional Development Fund (ERDF). Irish-based partners in Tyndall projects have also secured a further €53 million in direct funding.

Tyndall's success rate in Horizon 2020 at 26% exceeded the national and EU average success rates, indicating the strength of Tyndall's approach and the capacity it has developed over many years to collaborate successfully with research and industry partners across Europe. This has continued into the Horizon Europe and Digital Europe programmes, with 71 projects funded to date, leading nationally in digital-focused topics.

There are numerous opportunities for securing funding for semiconductor-related research in Horizon Europe, including the Chips Joint Undertaking, as well as related activities under the European Research Council, Marie Skłodowska-Curie Actions and Research Infrastructures, as well as the European Innovation Council. Ireland has an established support network of National Contact Points, led by Enterprise Ireland, which supports researchers from academia and enterprise in applications to secure Horizon Europe funding.

DETE and DFHERIS will drive engagement with these programmes, identifying and capitalising on opportunities as they arise. This work will need to be paired with a strong flow of information between Departments and the relevant agencies to promote engagement across the board with these programmes. In parallel, consideration is required of how best to achieve measurable, tangible outputs from such funding – for example, targets relating to the number of start-ups per year emerging from key funding programmes could be developed.

DFHERIS, through the High-Level Group on Horizon Europe, will continue to explore synergies between EU and national funding instruments, while seeking to broaden the base of Irish organisations engaged in EU programmes. Horizon Europe's successor, FP10, will provide further opportunities to support this sector.

7.5 Important Projects of Common European Interest

Important Projects of Common European Interest (IPCEI) are a State aid tool that facilitate large-scale cross-border projects that significantly benefit the EU and help achieve the twin digital and green transitions by investing in breakthrough innovation and infrastructure. They combine both public and private knowledge and resources from across Europe to support projects where the technological or financial risk is too great for one company or Member State alone.

Ireland is one of 14 Member States with direct participants in the current IPCEI on **Microelectronics and Communication Technologies (IPCEI ME/CT)**. The IPCEI ME/CT connects a thriving ecosystem of innovative start-ups, SMEs, large enterprises, and research organisations from across the EU, with collaboration between participants a key element. A total of 68 projects from 56 companies form the IPCEI ME/CT.

The Irish participant, ADI, supported by IDA Ireland, is collaborating with several new partners from other Member States on their project and on the projects of other companies. Ireland's participation in the IPCEI ME/CT is an example of our ability and commitment to play our part in realising the ambitions of the EU to strengthen our capacity and capability in semiconductor production.

DETE will continue to monitor at the EU level for any emerging IPCEI opportunities in the semiconductor sector – for example in the area of advanced packaging. This is a key technology area within the wider semiconductor manufacturing value chain which requires investment and development of capability within Europe to maintain market relevance. Advanced packaging is recognised as an enabling technology to facilitate integration of semiconductor chips resulting in enhanced performance, energy efficiency and cost savings. There currently exists opportunity to enhance an area in which, at present, the EU does not have a critical mass of activity. An industry-led IPCEI in the area of advanced packaging is the appropriate vehicle to enable a pan-European consortium of scale with market-led output.

7.6 Building European and International Partnerships

Amid increasing competition to build and field new technologies, critical technologies are more and more a key part of foreign policy and diplomacy. Increasingly, countries are keen to work with international partners on critical technologies, including semiconductors. The global nature of the semiconductor supply chain and Ireland's position as an open economy means that it is particularly important for us to build bonds internationally to further develop the sector. Building partnerships will provide opportunities to mitigate potential risks and vulnerabilities through a more diverse and resilient supply chain. We will strengthen collaboration and partnerships with like-minded governments, recognising the global nature of semiconductor supply chains and the importance of co-ordinated action at an international level.

Much work is underway in this vein. **The European Semiconductor Board** was established under the European Chips Act to provide advice to the Commission, ensure consistent implementation of the Chips Act Regulation, and facilitate co-operation and the exchange of information among Member States. The Board will be consulted for the decisions of the Commission to grant the status of Integrated Production Facilities and Open EU Foundries under Pillar 2. It will also be responsible for addressing any issues relating to strategic mapping, monitoring, early warning and preventive actions, and crisis response under Pillar 3 of the Act.

The European Chips Act also established the **Chips Joint Undertaking** to oversee the delivery of the Chips for Europe Initiative under Pillar 1 of the Act. The Chips Joint Undertaking will produce an annual activity report, which will include key metrics to measure the initiative's reach and impact. Ireland will continue to be active on both the European Semiconductor Board and the Chips Joint Undertaking, ensuring that we maintain a strong voice in Europe on both policy and governance matters.

The OECD Semiconductor Informal Exchange Network was established in 2023 to exchange perspectives and share challenges related to semiconductors. The purpose of the group is to develop a better understanding of semiconductor ecosystems through more evidence, including on capacity investments, and international dialogue on policy initiatives and best practices regarding the semiconductor ecosystem. Ireland's membership of and active participation in the OECD Semiconductor Informal Exchange Network enables us to build bonds with likeminded countries in and outside the EU, sharing best practice and hearing perspectives from countries with operations along different segments of the chips value chain.

The European Semiconductor Regions Alliance (ESRA) was established in 2023 with the aim of promoting the growth and competitiveness of the semiconductor industry in Europe by sharing knowledge and best practices, fostering collaboration and innovation, supporting the development of strong, integrated and resilient value chains, and reducing unilateral dependencies, especially for critical raw materials. Ireland's membership of this alliance is led by DETE. We will also support the EU in collaborative efforts with third countries, such as through Memoranda of Understanding and Trade and Technology Councils, to develop opportunities to fortify supply chains and mitigate vulnerabilities.

The Chips for Europe Initiative, funded under both Digital Europe and Horizon Europe, provides an excellent opportunity for international partnership and cross-pollination. Under the Initiative, the international network of Competence Centres will provide access to technical expertise and experimentation in semiconductors, helping companies, SMEs in particular, to approach and improve design capabilities and developing skills. As previously referenced, Ireland's Competence Centre will facilitate access to pilot lines and to the design platform, and providing training and skills development.

Strand 3: Identifying and Seizing Opportunities

Objective		Deliverable		Responsibility
3.1	Identify and take advantage of opportunities arising from the European Chips Act.	3.1.1	Actively engage with existing and prospective leading-edge companies to win investments that contribute to the further development of the sector. The ambition should be to 1. Secure the development of at least one new Leading Edge fabrication facility in a regional location in either IDM or Foundry capacity; 2. Support existing manufacturing investments in Ireland; 3. Support first-of-a-kind investments where appropriate.	IDA Ireland
		3.1.2	Provide commercialisation support, access to finance and scaling pathways for technology start-ups and spinouts in the semiconductor sector through State-funded support mechanisms.	Enterprise Ireland
		3.1.4	Secure two additional trailing edge foundries.	IDA Ireland
		3.1.5	Secure one advanced packaging facility.	IDA Ireland
		3.1.6	Increase investment in the Tyndall National Institute with a view to unlocking further(industry) funding. Support Tyndall to partner with European research leaders in the Chips Joint Undertaking pilot lines.	IDA Ireland
		3.1.7	Exploit opportunities arising from EU instruments including Important Project of Common European Interest (IPCEI), Horizon Europe - including the Chips Joint Undertaking, and the Digital Europe Programme, and the Recovery and Resilience Facility (RRF).	DETE, DFHERIS, Enterprise Ireland, IDA Ireland

Strand 3: Identifying and Seizing Opportunities

Objective		Deliverable		Responsibility
3.2	Deepen International Cooperation	3.2.1	Build and deepen international relationships by developing partnerships with like-minded countries.	DETE
		3.2.2	Continue to promote Ireland's values and interests on the international level, including at the OECD Informal Semiconductor Exchange Network, and at the European Semiconductor Regions Alliance.	DETE
		3.2.3	Encourage industry participation in discussions at EU level, for example through participation on The Alliance on Processors and Semiconductor Technologies.	DETE
		3.2.4	Ensure that Ireland has an active voice on the European Semiconductor Board. Work to ensure efficient Governance of the Chips Act in a manner that best delivers on the objectives of the Act, and that supports growth of the Irish semiconductor industry.	DETE

CASE STUDY

Qualcomm

Scaling Advanced Design and Engineering in Cork

Qualcomm at a Glance:

Headquartered in San Diego, California.

Over 49,000 employees worldwide, with a team of over 650 in Cork.

Reported revenues of approximately $38.9 billion in 2024.

Qualcomm is a global leader in wireless technology and semiconductor innovation, known for developing many of the foundational technologies behind mobile communications. Headquartered in San Diego, California, the company employs over 49,000 people worldwide and reported revenues of approximately $38.9 billion in 2024.

Ireland plays a central role in Qualcomm's global operations, particularly in engineering, chip design, and IT infrastructure. Since 2013, Qualcomm Technologies has expanded significantly in Cork, now employing over 650 people. The Cork site houses key functions including an Integrated Circuit (IC) Design Centre of Excellence, first established in 2015. This centre has become an integral part of Qualcomm's System on Chip (SoC) and Intellectual Property (IP) organisation, with teams developing some of the company's most advanced semiconductor designs.

Recent Milestones:

In 2020, Qualcomm invested €78 million in a new office at Penrose Docks, Cork City.

A major milestone came in 2020 with Qualcomm's €78 million investment in a new office at Penrose Docks, Cork City.

In 2023, Qualcomm invested a further €119 million in its Cork site to expand its engineering capabilities in high-growth sectors such as automotive, hyperscale computing, gaming, medical technology, and education.

Ireland is also home to Qualcomm's EMEA IT Operations Centre, which supports the company's engineering organisation across Europe. This includes mission-critical functions such as security, networking, and database administration, ensuring the performance and reliability of Qualcomm's technology infrastructure.

A major milestone came in 2020 with Qualcomm's €78 million investment in a new office at Penrose Docks, Cork City. This expansion introduced additional capabilities, including a state-of-the-art secure Security Penetration Lab. The Irish operation now covers a wide range of technical disciplines, including CPU design, system validation, power management, operations, and embedded system engineering. The team's skill set spans multiple programming languages — C, C++, Embedded C, System Verilog, RTL, and Python — reflecting the complex and multidisciplinary nature of modern chip design.

Qualcomm Technologies Ireland Ltd. deepens its impact through active engagement with Ireland's research and innovation ecosystem. It maintains strong relationships with leading academic and research institutions, including Tyndall National Institute and seven Irish and UK universities: University College Cork, Munster Technological University, University of Limerick, University of Galway, Queen's University Belfast, University College Dublin, and Trinity College Dublin. Qualcomm is also committed to STEM outreach and community engagement. It supports initiatives such as the First Robotics Lego STEM programme, and participates in national networks such as Cyber Ireland, MIDAS Ireland, and the American Chamber of Commerce Ireland (AmCham), promoting industry collaboration and workforce development.

In 2023, Qualcomm invested a further €119 million in its Cork site to expand its engineering capabilities in high-growth sectors such as automotive, hyperscale computing, gaming, medical technology, and education. This reinforces Ireland's role as a strategic design and engineering hub within the company's global network.

Qualcomm's Cork operations demonstrate how Ireland can support deep, technical, high-value functions in the semiconductor sector — extending beyond manufacturing to advanced research, design, and secure infrastructure.

Pilot Photonics

A key innovation of Pilot Photonics is its patented gain switching technique, which creates a flexible comb of coherent wavelengths.

Pilot Photonics is a pioneering company in the field of photonics, specialising in the development of advanced tuneable lasers and photonic integrated circuits (PICs). Pilot Photonics products include fast and low linewidth tuneable lasers, integrated comb lasers, CW-WDM laser arrays and high-speed lasers, all designed to meet the demanding requirements of modern optical communication systems.

Gain Switching Technique

A key innovation of Pilot Photonics is its patented gain switching technique, which creates a flexible comb of coherent wavelengths. This technology is encapsulated in monolithic III-V PICs, fabricated with Europe's leading foundries. The company's expertise in photonic integration allows it to design PICs for a wide range of applications, enhancing the scalability and performance of optical communication systems. Pilot Photonics also develops advanced drive and control systems for its comb laser PICs, ensuring precise and reliable operation.

An Integrated Approach

The use of semiconductor technology is central to Pilot Photonics' approach. By leveraging semiconductor fabrication techniques, the company can produce high-performance lasers and PICs that are both scalable and cost-effective. This integration of semiconductor technology enables Pilot Photonics to offer products with unique advantages, such as fast switching, wide tuning range and low linewidth, which are critical for applications requiring high precision and reliability. The company's commitment to semiconductor technology is reflected in its rigorous design verification and testing processes, ensuring that each product meets stringent quality standards.

Workforce

Pilot Photonics' team includes world-leading scientists, engineers and professionals who work collaboratively to drive innovation and excellence in their field. The company's vision is to continue advancing photonics technology, providing solutions that enable new possibilities in telecommunications, datacentre interconnects and beyond.

8

Implementing the National Semiconductor Strategy

Collaboration between stakeholders in the ecosystem is essential to facilitate knowledge sharing and to drive advancements. A high degree of co-ordination and a whole-of-Government approach is required to deliver on our ambition.

To achieve this, an Advisory Council on the Semiconductor Sector will be established to drive the implementation of this Strategy. The Council will be tasked with providing expert guidance, advice, and recommendations to Government on developments in the global semiconductor sector, providing insights on trends, opportunities, and challenges.

The Council will comprise experts from a spectrum of experience, bringing together the key stakeholders in Ireland's semiconductor sector to ensure the work coming from this Strategy is impactful and able to adapt in fast-evolving circumstances. Membership will include:

- Representatives from MNCs and SMEs
- Industry bodies
- Research organisations
- Relevant Government Departments, including DETE and DFHERIS
- Government Agencies, including IDA Ireland, Enterprise Ireland and Research Ireland.

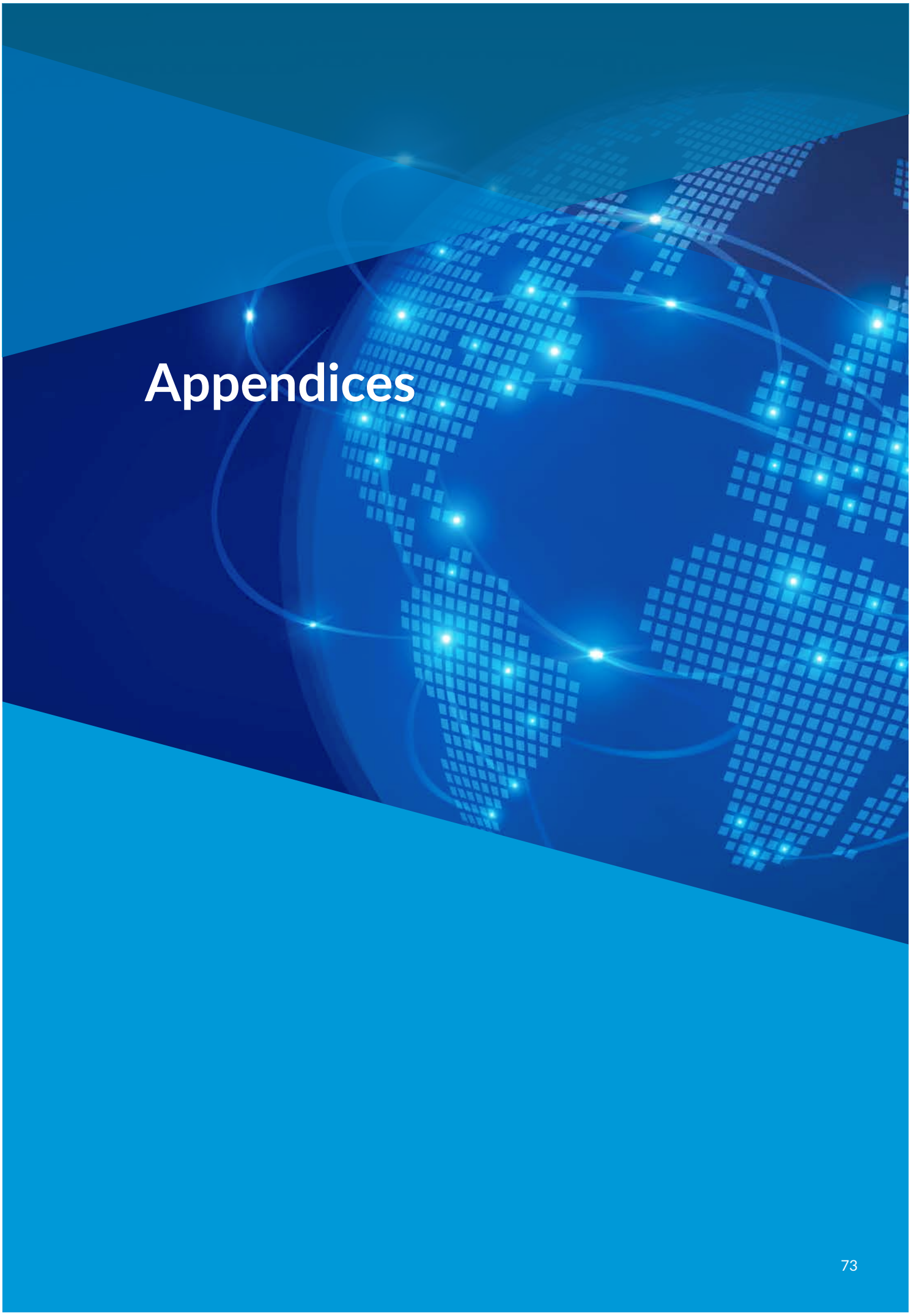
Meetings will address progress made against the objectives of the National Semiconductor Strategy focusing on issues such as:

- Continued ecosystem road-mapping
- Semiconductor manufacturing
- Skills and the talent pipeline
- International collaboration
- Scale-up of domestic semiconductor ecosystem.

DETE will provide secretariat support to the Council, which will meet regularly to provide progress updates on the deliverables set out in this Strategy, horizon-scan for threats and opportunities, identify new workstreams, and to advise Government on relevant policy development.

Glossary

Glossary of Terms	
ABSEI	Annual Business Survey of Economic Impact
AMBER	Advanced Materials and Bioengineering
CAGR	Compound Annual Growth Rate
CJU	Chips Joint Undertaking
CSO	Central Statistics Office
DETE	Department of Enterprise, Trade and Employment
DFHERIS	Department of Further and Higher Education, Research, Innovation and Science
DMI	Digital Manufacturing Ireland
DTIF	Disruptive Technologies Innovation Fund
EEE	Electric and Electronic Engineering
EGFSN	Expert Group on Future Skills Needs
EI	Enterprise Ireland
EU	European Union
IMEC	Interuniversity Microelectronics Centre
IPCEI	Important Projects of Common European Interest
IPIC	Irish Photonic Integration Centre
MCCI	Microelectronic Circuits Centre Ireland
MIDAS	Microelectronics Industry Design Association
MNC	Multinational Corporation
R&D	Research & Development
SME	Small and Medium Enterprise



Appendices

Appendix 1: Stakeholder Consultation

The Department of Enterprise, Trade and Employment invited submissions from the public in March 2024. In total 45 submissions were received from a broad range of stakeholders including MNCs, SMEs, industry groups, State agencies, academia and the research community, and local Government groups. The submissions made under this consultation are available on the DETE website.

Submissions were structured according to the following themes:

- **Aspirations for the sector** – What are stakeholders' aspirations for Ireland's semiconductor industry in the coming years?
- **Opportunities for the sector** – What do stakeholders identify as key opportunities for the sector to further develop?
- **Challenges facing businesses and the sector** – What are the key challenges facing individual businesses in the semiconductor sector? What are the overarching challenges facing Ireland's semiconductor sector as a whole?
- **Access to talent for businesses** – What skills needs (across the spectrum of training, education, and research) will arise for the sector in the coming years?
- **Barriers to development** – What barriers might prevent both individual businesses and the sector as a whole from meeting its aspirations?
- **Mitigation** – What are potential mitigating actions that could be taken (and by whom) to address the challenges and barriers identified?

Submissions were received from the following stakeholders:

Submission Name/Organisation
Advanced Micro Devices, Inc.
Atlantic Bridge
AMBER
American Chamber of Commerce
Analog Devices
Bosch
Cadence Design Systems Ireland
CONNECT SFI Research Centre, Trinity College
C. Skehan (Individual submission)
C. O'Shea (Individual submission)
D. Hobbs (Individual submission)
Dublin City University, School of Physical Sciences
E. Popovici (Individual submission)
Engineers Ireland
Enterprise Ireland
Firecomms
Fuinneamh Sceirde Teoranta
Galway County Council
IBM
I-Form Advanced Manufacturing Research Centre, University College Dublin
Infineon
Institute of Physics
Intel

Submission Name/Organisation
IPIC, SFI Centre for Photonics
Ireland South East Development Office
Kilkenny County Council
Kildare Chamber
KPMG
M. Finegan (Individual submission)
Microelectronic Circuits Centre Ireland
MIDAS
MIDAS SME subgroup
Movano Ireland Ltd.
Qualcomm
Research Ireland (formerly Science Foundation Ireland)
Skillnet Ireland
South East Technological University
Technology Ireland
T. Cummins (Individual submission)
Trinity College Dublin, Department of Electronic and Electrical Engineering
Tyndall National Institute
University College Cork, School of Engineering
University College Dublin, School of Electrical and Electronic Engineering
University of Limerick
WiSAR Lab, Atlantic Technological University

Appendix 2: The Irish Policy Context

While not semiconductor-specific, a range of interlinked national strategies and policy interventions serve to support the industry in Ireland. The most immediately relevant include:

- **The White Paper on Enterprise 2020-2030** which recognises that as a small, advanced economy, sustaining and building competitive advantage in strategic areas requires deliberate policy choices. The White Paper aims to deliver continued strong FDI performance and to strengthen the Irish-owned exporting sector. The success of this Strategy will build on this broader enterprise ecosystem.

- **The Regional Enterprise Plans** are developed by regional stakeholders and focus on undertaking collaborative initiatives that can help deliver enterprise growth in each of nine regions across Ireland. These 'bottom-up' Regional Enterprise Plans complement and build on core strategies of the enterprise agencies, the Local Enterprise Offices (LEOs), local authorities and the wider range of stakeholder directly involved in supporting enterprise development in the regions.

- **The National Smart Specialisation Strategy** for Innovation 2022 to 2027 focuses on regional strengths with an aim to foster innovation and support sustainable growth across the regions. Central to these efforts has been the support from the European Regional Development Fund (ERDF) with €396 million earmarked for regional investments. This funding has enabled several projects which align with the strategy's core priorities: digital transformation; green innovation; regional collaboration; and enhancing Ireland's research and innovation infrastructure.

- **Impact 2030: Ireland's Research and Innovation Strategy** commits to maximising the impact of research and innovation (R&I) activity. Specifically, Impact 2030 commits to prioritising research efforts on areas most likely to have the strongest economic and societal impact, including semiconductors and digital technologies.

- **Ireland's National Skills Strategy 2025 – Ireland's Future** creates a roadmap for the broader skills ecosystem. The Strategy is designed to benefit all people living in Ireland, companies operating here or planning to establish here, those working here, and those hoping to work here. The Strategy includes a range of actions designed to improve the supply of technology-related skills.

- **National AI Strategy Refresh 2024** builds on the foundations of its predecessor, continuing to emphasise the importance of trustworthy, person-centred AI development and use, while positioning Ireland as a leader in seizing AI's economic and societal benefits. It aims to balance innovation with proportionate regulation and trust-building measures.

- **Quantum 2030 – a National Quantum Technologies Strategy for Ireland** sets out a vision and pathway to Ireland being an internationally competitive hub in quantum technologies at the forefront of scientific and engineering advances, through research, talent, collaboration, and innovation by 2030. The Strategy identifies semiconductors as a key technology in the quantum revolution.

- **Harnessing Digital: The Digital Ireland Framework** recognises the importance of digitalisation and identifies digital leadership as a national priority. Ireland's digital transformation will rely on research, technological advances and digital innovation across the enterprise sector, the public sector and wider society. The framework highlights the importance of publicly funded research and working with industry to maximise economic opportunities in digital technologies.

Prepared by the Department of
Enterprise, Trade and Employment
gov.ie

Rialtas na hÉireann
Government of Ireland