IMPLEMENT
CONSULTING GROUP

The AI innovation opportunity

How Ireland can scale innovative digital businesses with AI to close the innovation and competitiveness gap

An Implement Consulting Group study commissioned by Google

March 2025

The upcoming AI era calls for new ways of thinking about innovative businesses

This report examines a unique but highly important group of companies that we refer to as *innovative digital businesses*. Many of these companies have traditionally been described as “startups” or “tech businesses,” but we believe it is time to broaden these concepts and reframe how we talk and think about them.

More than startups

There is more to the story than just startups. Startups are important – it is where it all begins. Scaling these ventures is equally important. When innovative digital businesses grow, they often reach high levels of productivity. They commercialise new technology or applications and thereby diffuse innovation throughout the economy. This is key to competitiveness. Therefore, it is essential to support the growth journey and success rate of these innovative startups.

More than tech

Similarly, there is more to the story than just tech businesses. The innovation potential of the emerging AI era extends beyond technology companies or industries like IT and telecom. AI has the potential to create innovative businesses across all sectors of the economy and boost their productivity.

Innovative digital businesses are key to capturing the AI opportunity and closing Europe’s innovation and competitiveness gap

The creation of new innovative companies and the ability to scale them is crucial for closing Europe’s innovation and competitiveness gap, as highlighted in the Draghi report.

We are entering a new era of AI-driven economic growth, which has the potential to elevate Europe’s long-term growth beyond its historical trend. AI holds such transformative power that it could reverse the declining productivity trend in most EU countries.

Innovative digital businesses are key to capturing the AI potential because they:

- Develop new AI tools and applications
- Enable businesses across all sectors to adapt and benefit from AI
- Demonstrate the value of AI by being early adopters and innovators
- Inspire other businesses to use AI technology smartly
- Put healthy competitive pressure on slower adopters

WHAT ARE INNOVATIVE DIGITAL BUSINESSES?

Innovative digital businesses are defined as businesses with scalable business models that are less than 30 years old. Most of these businesses either have digital technology at their core or are heavily enabled by it. To identify these businesses, we use Dealroom/TechIreland data. The analysis focuses on companies headquartered in Ireland which are further classified as startups (2–49 employees), scaleups (50–500 employees), or grownups (over 500 employees).

SUMMARY

AI can supercharge Ireland's ecosystem of innovative digital businesses, boosting innovation and economic resilience

Irish innovative digital businesses create high-value jobs, diversify the economy and drive innovation

Ireland has a strong ecosystem of around 1,900 innovative and digital businesses, employing 47,000 people and accounting for 4% of private sector job growth since 2017. Ireland surpasses most European countries in the number of innovative digital businesses, but lags behind European and global leaders in scaling and retaining them.

Innovative digital businesses make an outsized contribution when they scale

Innovative digital businesses create high-value jobs with 40% higher wages, drive innovation, and diversify the Irish economy, making it more resilient. They enhance Ireland's strengths in health, pharma, and cybersecurity by bringing new products and services to the market.

On average, innovative digital businesses are just as productive as indigenous Irish firms (i.e. excluding multinationals). However, when innovative digital businesses succeed in scaling, they have an outsized contribution to the economy, and their employees are 25% more productive than indigenous Irish firms on average.

AI opens new opportunities

As pointed out in the Draghi report, Europe largely missed out on the digital revolution led by the internet. Now, we are on the verge of an AI-driven productivity boom. This opens up new possibilities to innovate and build more effective businesses:

- AI can supercharge Ireland's ecosystem of innovative digital businesses by reducing the time required for research and development.
- Innovative digital businesses act as catalysts for broader AI innovation and adoption by being early adopters, adapters and developers.

> The core problem in Europe is that new companies with new technologies are not rising in our economy.
>
> **Mario Draghi** in The Future of European Competitiveness

If Ireland successfully scales and retains innovative digital businesses to be on a par with leading OECD countries, this could:

- **Create 14,000 more high-value jobs,** supporting the future competitiveness of the Irish workforce.
- **Contribute EUR 1.8 billion annually** to the economy.
- **Generate positive knowledge spillovers through the diffusion of AI innovations to the rest of the economy.** Innovations from startups are roughly 50% more likely to be radical than innovations from incumbent firms and they drive around 26% of productivity growth in the economy.

Better framework conditions are needed for innovative digital businesses to be fit for the AI-powered future:

People. Growing, attracting and retaining the people with business and AI-relevant talent and ideas.

Technology. Providing access to state-of-the-art AI tools, digital infrastructure, and compute power.

R&D. Accelerating R&D with AI.

Rules. Providing regulatory clarity and reasonable compliance costs.

Capital. Unlocking Europe's fragmented risk capital markets and increasing attractiveness for venture capital investment in the EU.

1

The economic role of innovative digital businesses

Innovative digital businesses play an outsized role in the Irish economy when they scale.

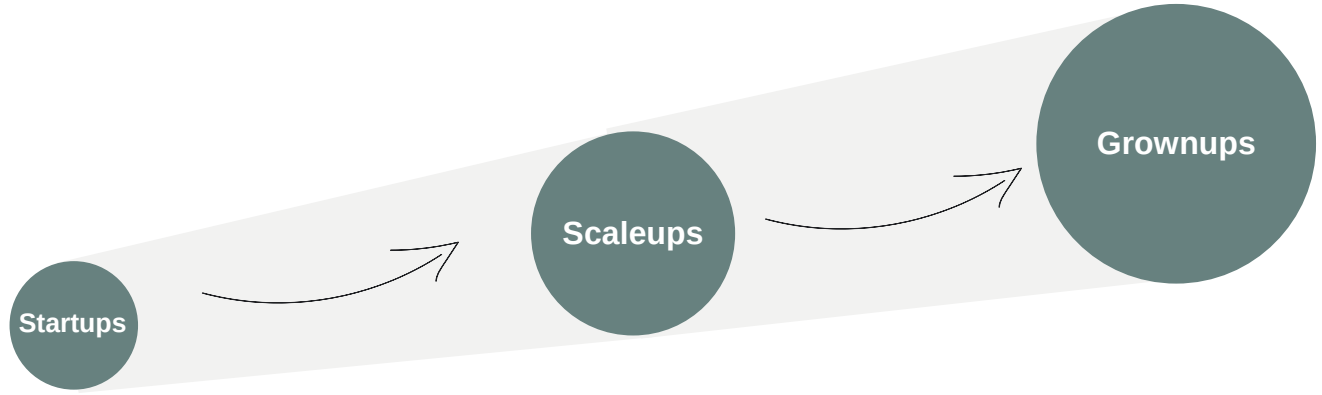
Innovative digital businesses are scalable and tech-enabled

This research defines innovative digital businesses as companies headquartered in Ireland with a scalable business model, less than 30 years old, and whose product and/or business model are inherently innovative.

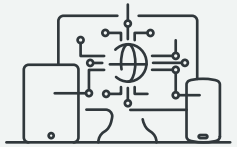
In most cases, these companies are tech-enabled, either utilising proprietary technology or software, or having business processes that are heavily enabled by technology. Examples include companies developing biotech solutions, working in cybersecurity or creating digital education platforms. It excludes companies whose primary goal is self-employment such as graphic designers, restaurants or law firms who are not venture-backable.

This study further categorises innovative digital businesses by employment size into three main stages: startups, scaleups, and grownups.

Innovative digital businesses



Innovative digital businesses designed to grow fast, employing 2–49 people.	Innovative digital businesses with scaled operation, employing 50–500 people.	Established and stable innovative digital businesses that have successfully scaled, employing more than 500 people.



Digital infrastructure provides the foundational technology and platforms necessary for innovative digital businesses to operate, innovate and scale efficiently. It includes:

- Data centres
- Cloud storage
- Computing capacity and graphics processing units (GPUs)
- AI/ML technologies and tools

Note: Data in this report is supplemented by resources provided by ScaleIreland, including the State of Startups survey 2024. The definition of innovative digital businesses is based on Dealroom/TechIreland.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data.

Ireland is home to around 1,900 innovative digital businesses, employing 47,000 people

Innovative digital businesses employ 47,000 people in Ireland, accounting for around 3% of private employment. Additionally, they employ 28,000 people outside Ireland.

- *Startups* employ 11,000 in Ireland and 5,000 outside Ireland.
- *Scaleups* employ 17,000 people in Ireland and a further 14,000 people abroad.
- *Grownups* employ 19,000 people in Ireland and have created 9,000 jobs in other countries.

The significant employment by digital innovative businesses in Ireland and abroad highlights their international reach and the facilitation of cross-border knowledge and expertise exchange.

37% of jobs in innovative digital businesses headquartered in Ireland are abroad

Employment in Irish innovative digital businesses
Thousand employees, 2023*

47,000 people are employed in innovative digital businesses in Ireland

28,000 people are employed outside Ireland by Irish-headquartered innovative digital businesses

Note: * The number of innovative digital businesses and their employment figures are based on latest "verified" employment data from Dealroom/TechIreland. A number of innovative digital businesses are likely not captured in this data, making this a conservative estimate of their count and employment.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data.

Europe and Ireland are not capturing enough venture capital investments in generative AI

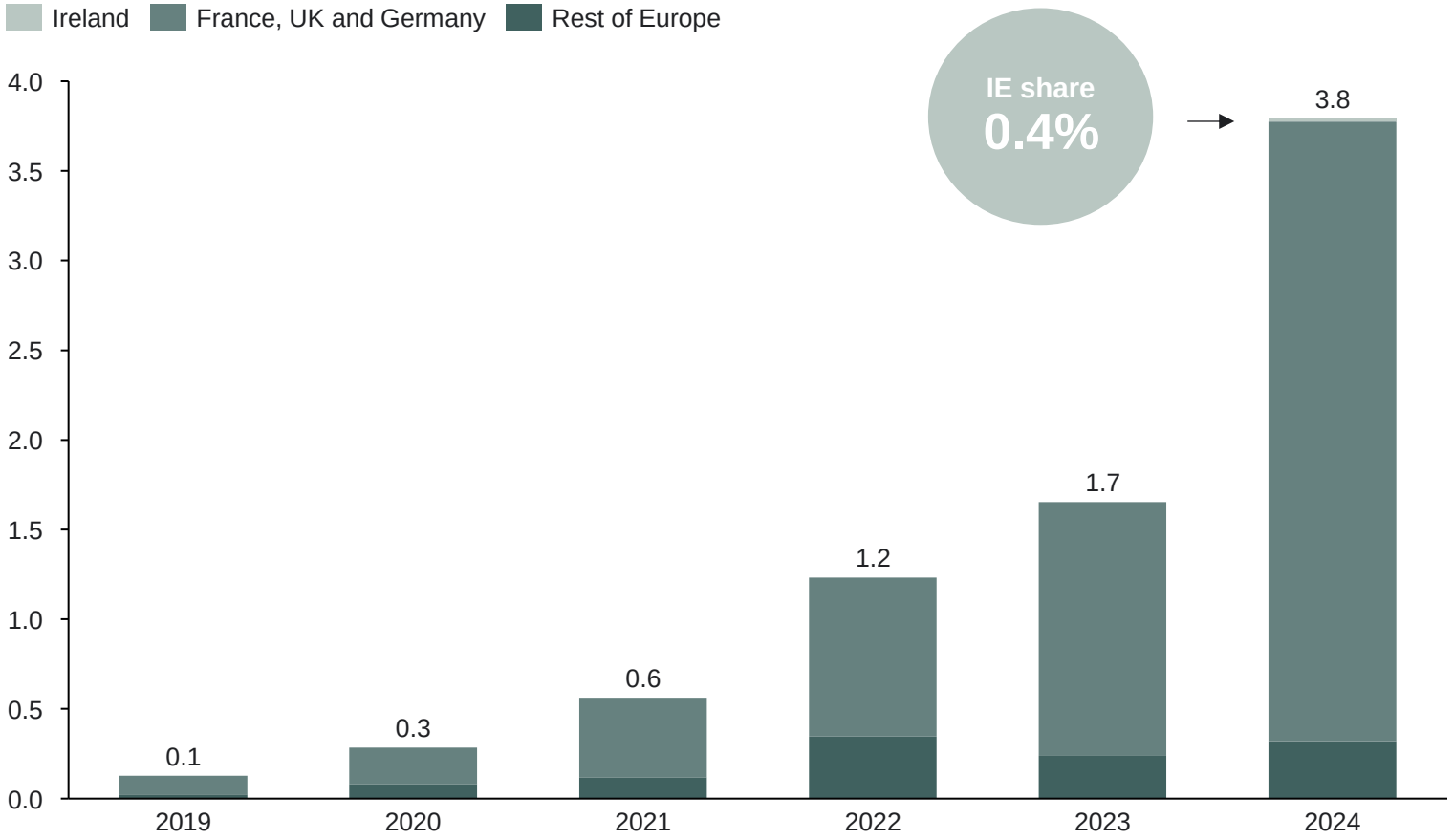
Generative AI venture capital investment reached around EUR 44 billion globally in 2024, but only EUR 3.8 billion (9%) was directed to Europe. Ireland captured only 0.4% of this European investment despite representing around 2.3% of the European economy.

Most European VC funding is concentrated in a few nations: France, the UK, and Germany.

Europe risks falling behind in generative AI; increased funding is crucial to fully seize the opportunities AI presents.

9% of global generative AI VC funding was directed to Europe in 2024

Generative AI VC investment in Europe
EUR billion



Source: Implement Economics based on Dealroom/TechIreland.

Innovative digital businesses have created 4% of all new private sector jobs in Ireland

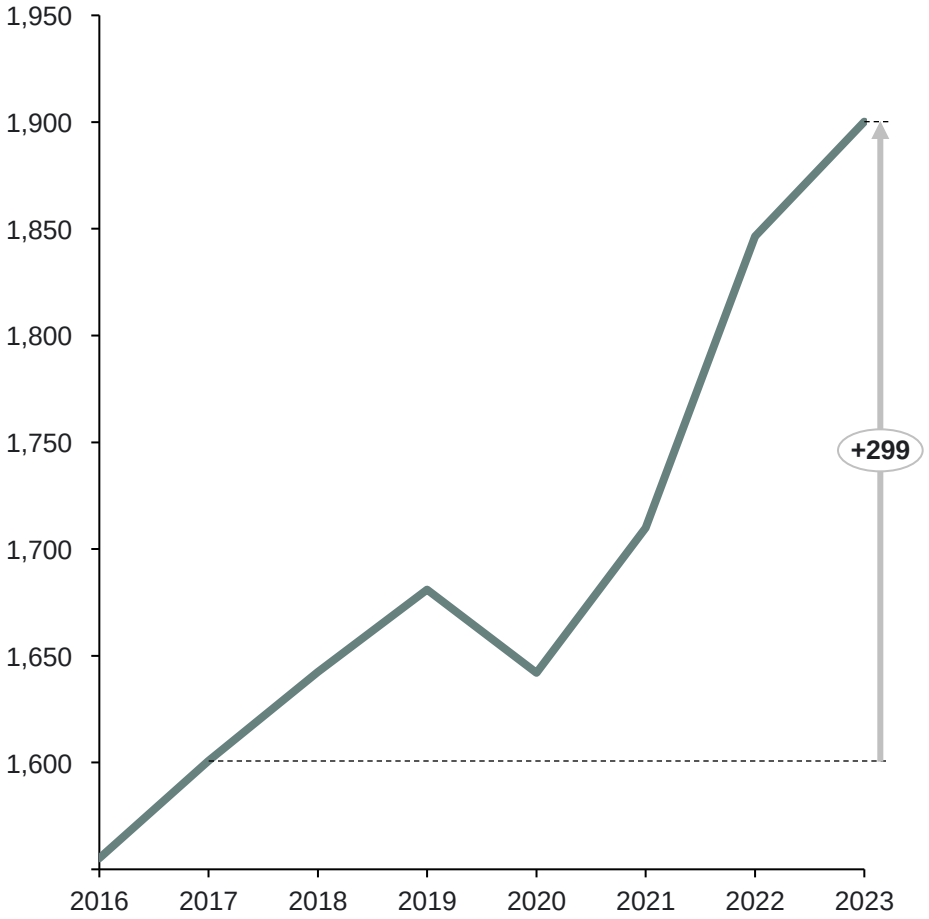
Private sector employment in Ireland has grown by 299,000 jobs since 2017.

Innovative digital businesses were responsible for 13,000 of these new jobs, corresponding to 4% of all new private sector jobs in Ireland.

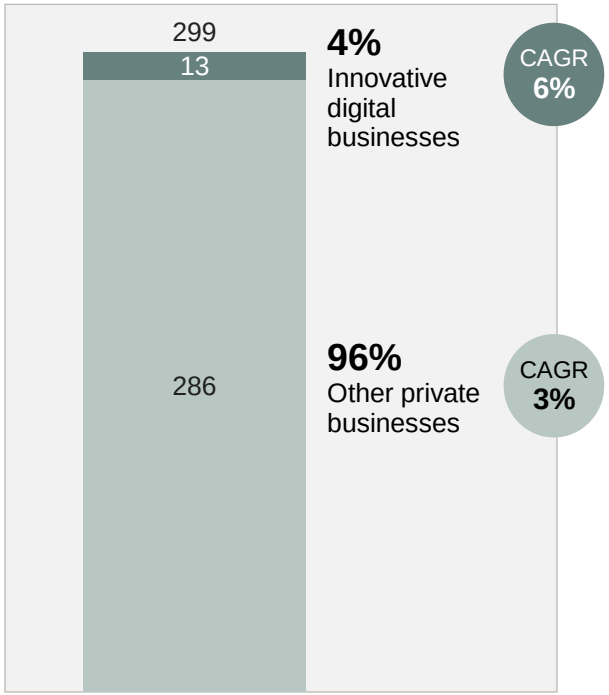
The pace of job growth in innovative digital businesses has outpaced other private businesses in this period, growing at an average of 6% per year since 2017. By contrast, job growth in other private businesses was 3% per year in the same period.

However, innovative digital businesses in Ireland create fewer jobs compared to other EU countries. In Denmark, these businesses account for 11% of new jobs, and in Sweden, they account for 13%.

Irish private sector employment
Thousand persons



Net job creation in the private sector from 2017 to 2023
Thousand persons



Note: Calculations based on Orbis data for companies with available employment data.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data, Bureau van Dijk's Orbis database and Eurostat.

Innovative digital businesses create high-value jobs

On average, innovative digital businesses pay higher wages than other Irish businesses.

Despite many Irish innovative digital businesses being restrained by resources and on steep learning curves, they are almost as productive as indigenous businesses on average (i.e. excluding multinationals).

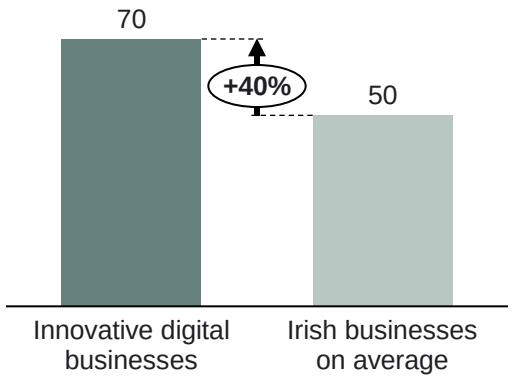
When innovative digital businesses scale into grownups, however, their productivity exceeds that of indigenous businesses on average.

Many of these innovative businesses are early adopters of cutting-edge technologies and distribute (AI-powered) innovative solutions to other entities in the economy. Thus, while the current productivity level for today's group of innovative digital businesses does not exceed Irish businesses on average, this may change if a few more of these succeed in growing to scale. Furthermore, these businesses generate value through their positive knowledge spill-over effects, driven by their experimentation and adoption of AI technology.

Irish innovative digital businesses …

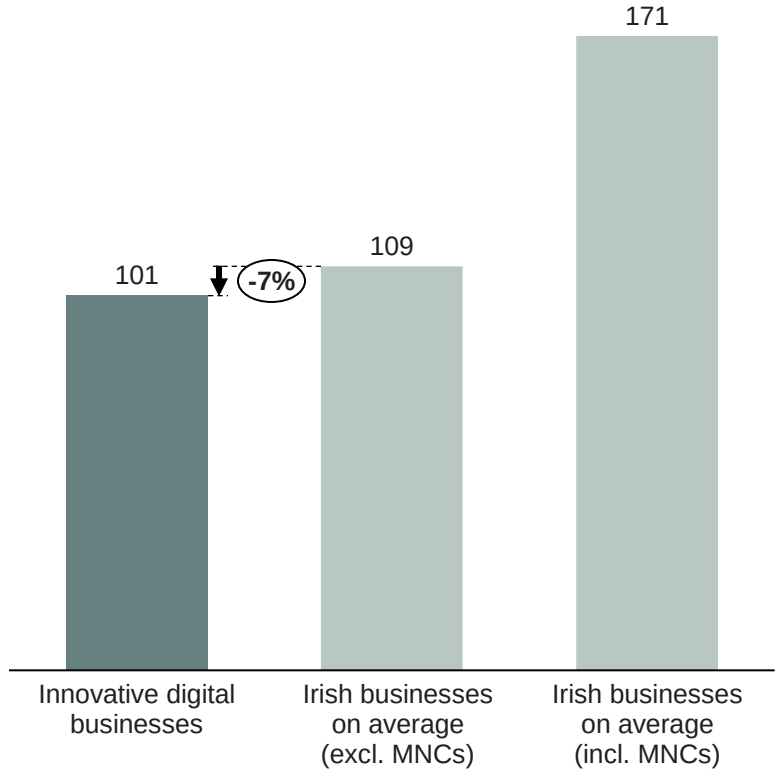
… pay higher wages

Median wages
EUR (thousand) per employee, 2023*



… and are almost as productive

Average labour productivity
EUR (thousand) per employee, 2023*



Note: *Based on latest available data in Dealroom/TechIreland and Orbis. Value added at the company level is approximated as the sum of EBITDA and remuneration to employees.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data and Bureau van Dijk's Orbis database.

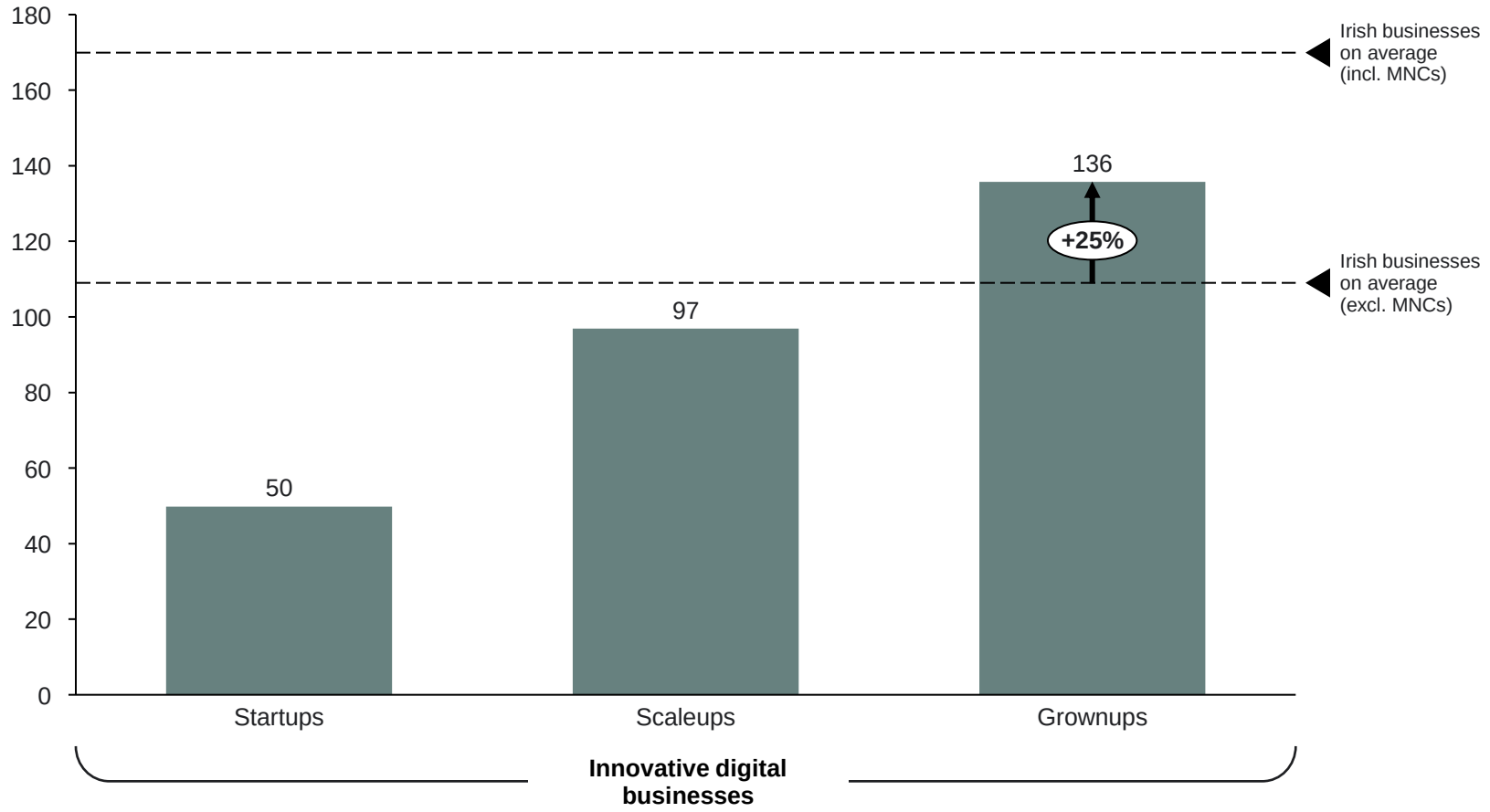
Innovative digital businesses make an outsized contribution when they scale

Employees in successful grownups were 25% more productive than in Irish businesses on average, when excluding large multinational companies.

Labour productivity was lower in startups and scaleups than in businesses on average, which can be caused by several factors, including rapid headcount growth, steep learning curves on operating models, resource constraints or market development.

Thus, while all innovative digital businesses begin as startups, their outsized contribution hinges on them succeeding in becoming grownups.

Average labour productivity by business size
EUR (thousand) per employee, 2023*



Note: * Based on latest available data in Dealroom/TechIreland and Orbis. Value added at the company level is approximated as the sum of EBITDA and remuneration to employees. Labour productivity is generally lower in startups and scaleups compared to businesses on average due to their focus on growth and innovation, which often involves significant resource allocation to research and development, experimentation, and market expansion, rather than optimising operational efficiency or achieving economies of scale.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data and Bureau van Dijk's Orbis database.

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Innovative digital businesses use AI to innovate and grow

Innovative digital businesses are major drivers of radical innovation and play a crucial role in the early adoption and diffusion of new technologies like generative AI.

> Ireland has become a global digital technology hub, with pioneering Irish innovators playing a pivotal and disruptive role in transforming industry across many sectors.
>
> **Government of Ireland** in Ireland's National AI Strategy Refresh 2024

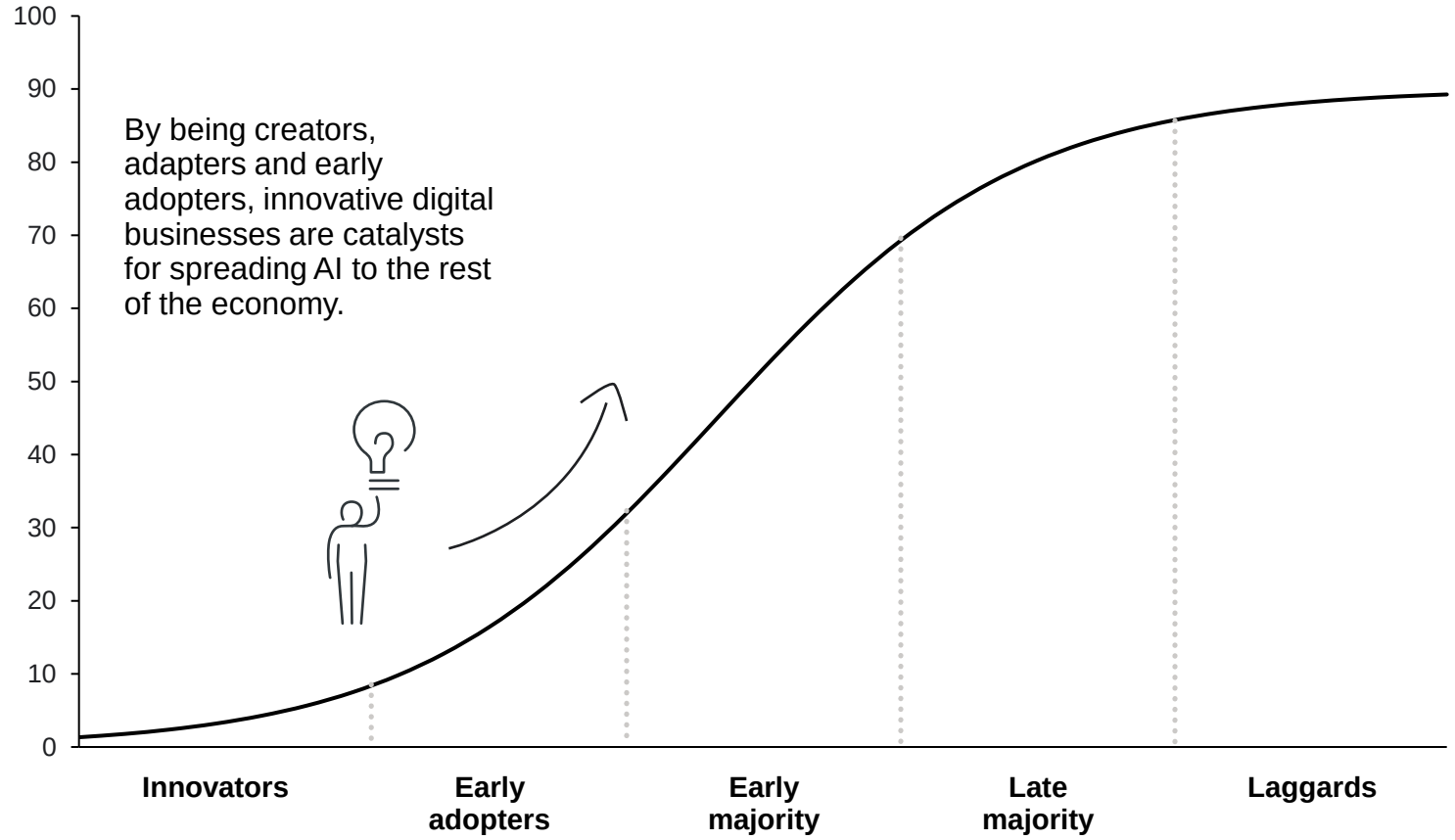
Innovative digital businesses propel AI adoption across the economy

The coming AI era holds significant economic potential for Ireland.

Innovative digital businesses develop new AI tools and adapt existing ones, enabling other businesses across sectors to benefit from the new technology. For example, SoapBox Labs integrates AI speech recognition technology into educational platforms for children's learning purposes. The company licenses its AI, making the technology accessible to other businesses.

> I firmly believe in the opportunity of a small, open economy like Ireland to harness AI for our greater good, in business, in the economy and in wider society.
>
> **Dara Calleary, Minister of State for Trade Promotion, Digital and Company Regulation,** in the Irish Government's National AI Strategy Refresh 2024

Diffusion of AI technologies in Europe
%



Note: The figure shows generative AI adoption expressed as a share of economy-wide firms exposed to AI automation.
Source: Implement Economics based on Bruegel (2021) and the Irish Government's National AI Strategy Refresh 2024.

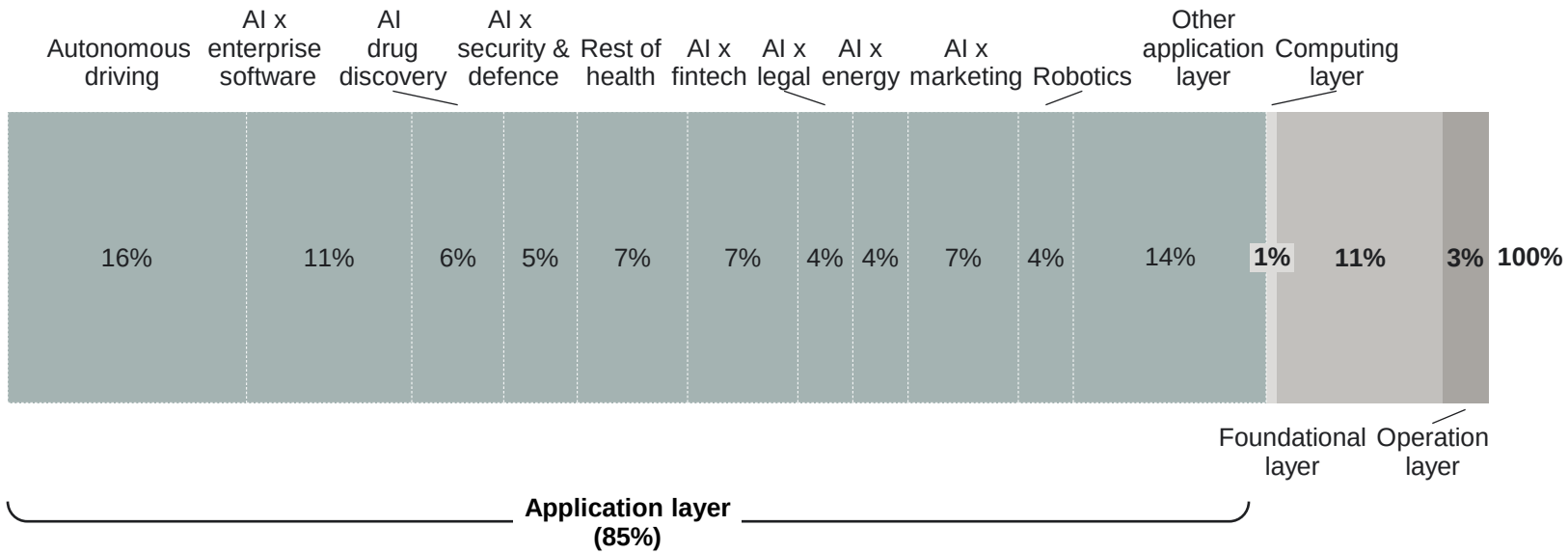
Innovative digital businesses can use AI to transform sectors across the economy

85% of European AI venture capital funding is directed toward the application layer of AI, focusing on real-world uses and integration into diverse sectors of the economy.

This investment trend reflects AI's transformative potential beyond traditional tech, reaching areas such as transportation, security, and healthcare.

By prioritising practical applications, these investments aim to drive meaningful changes that enhance productivity, safety, and quality of life across multiple industries, underscoring AI's role in reshaping the broader economic landscape.

AI VC funding in Europe by segment (2023/24)
Share of VC funding



Note: Dealroom/TechIreland data as of 12th June 2024
Sources: Implement Economics based on Dealroom/TechIreland.

Four out of five European innovative digital businesses use generative AI

Realising the productivity potential of AI hinges on Irish and European businesses' ability to adopt and develop AI and other technologies. Recent survey results from Notion Capital indicate that innovative digital businesses are early adopters and adapters of generative AI.

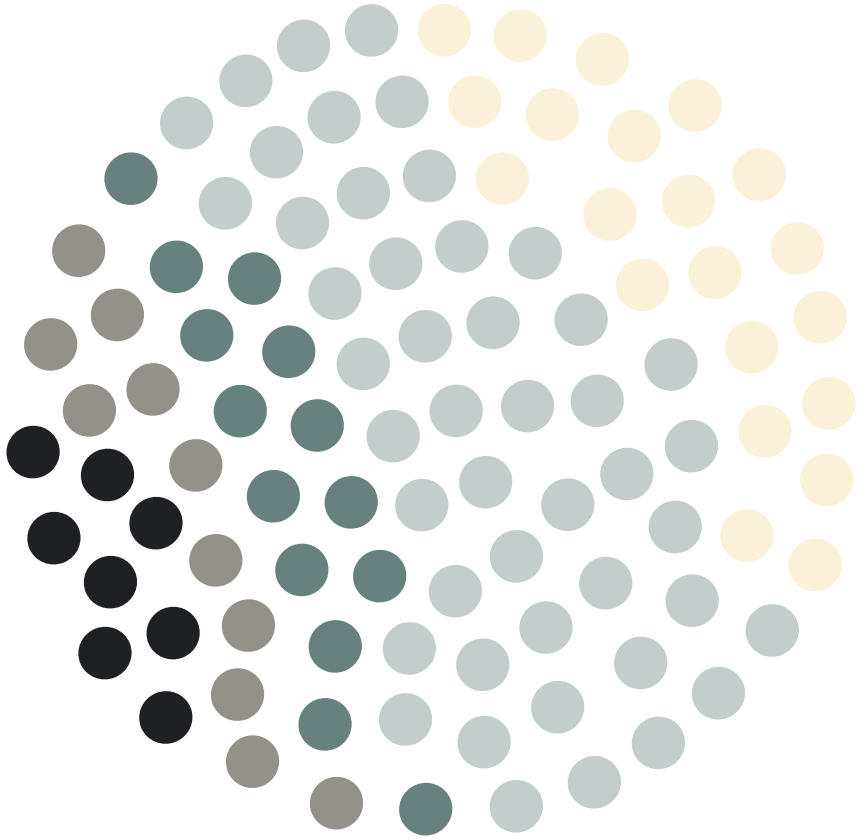
Use of generative AI in European innovative digital businesses
% of respondents

Notion Capital poll

Focusing on *generative AI*

79% of European innovative digital businesses use generative AI. (73% in Ireland). This covers…

- … **46%** who have **experimented** with or **partially adopted** generative AI (44% in Ireland).
- … **14%** who have **fully adopted** generative AI. (15% in Ireland)
- … **11%** who have **adopted and actively adapted** generative AI technology to suit business needs. (4% in Ireland)
- … and **8%** who have **generated** new AI technologies to serve business needs. (10% in Ireland)



21% do not use generative AI (27% in Ireland).

Note: Notion Capital survey conducted in summer 2024. Sample size of n=1095 in Europe and n=48 in Ireland
Source: Implement Economics based on Notion Capital survey (2024).

AI boosts value creation and efficiency in innovative digital businesses

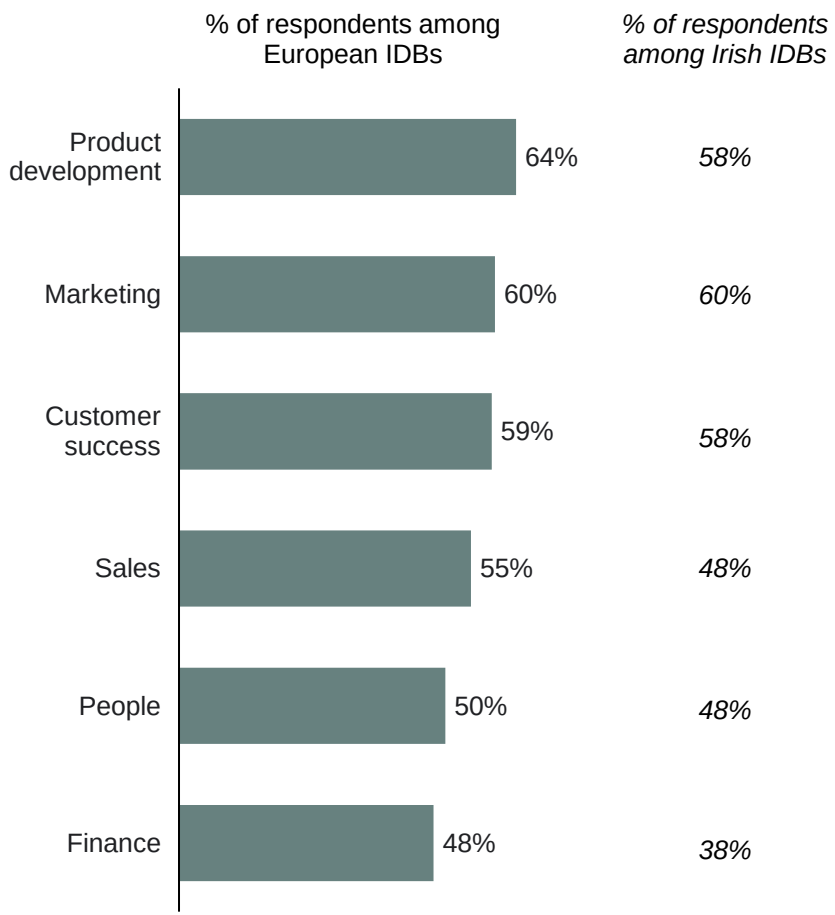
A recent survey compiled by Notion Capital shows that AI can enhance product development, sales and marketing, with 64% of European innovative digital businesses (IDB) reporting that AI has positively influenced product development and 60% noting improvements in marketing.

In addition, surveyed innovative digital businesses report that AI has improved efficiency across multiple areas, helping optimise and streamline operations. For example, 60% of European respondents report improved data processing and 51% point to improvements in routine task automation.

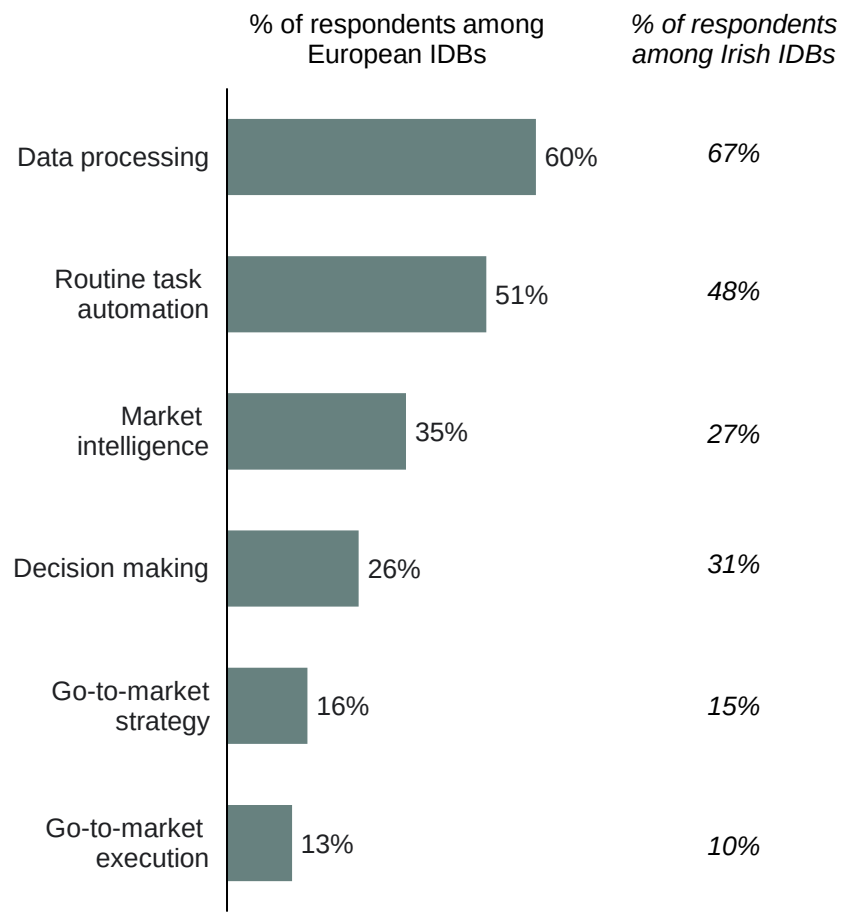
83% of CEOs in surveyed Irish tech startups and scaleups think that AI will have a positive impact on their business.

ScaleIreland in State of Start-Ups Survey 2024

How has AI influenced the following value creation activities in your company?
% of respondents answering *slight positive impact* or *significant positive impact*



In which areas, if any, has AI improved efficiency in your company?
% of respondents



Note: Notion Capital survey conducted in summer 2024. Sample size of n=1095 in Europe and n=48 in Ireland.
Source: Implement Economics based on Notion Capital survey (2024), ScaleIreland (2024) and TechIreland (2024) Innovation Island Pulse 2024.

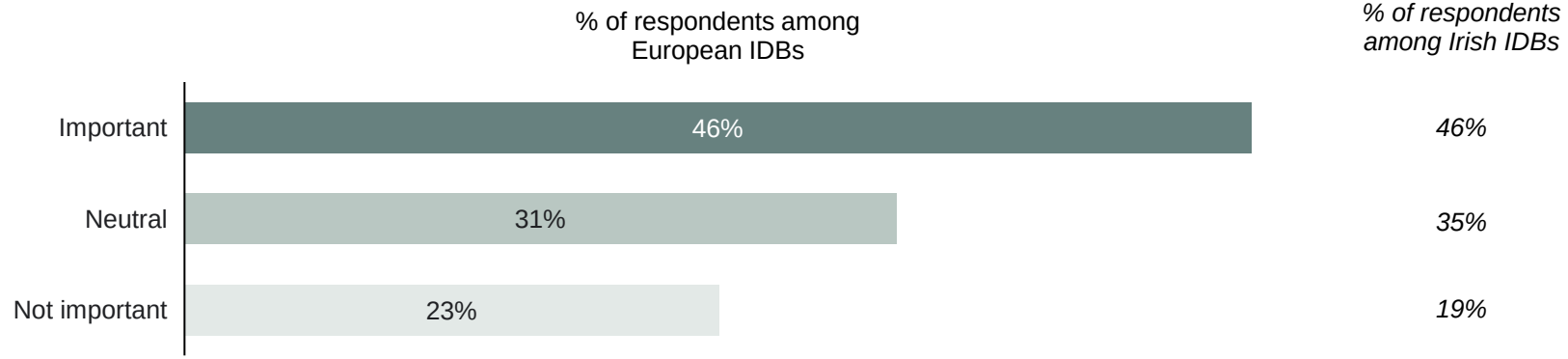
Innovative digital businesses benefit from global access to AI technology

Generative AI is a general-purpose technology with broad application across industries and countries. While the majority of foundational AI models (73%) are developed in the US, according to the Draghi report, companies worldwide can benefit from them.

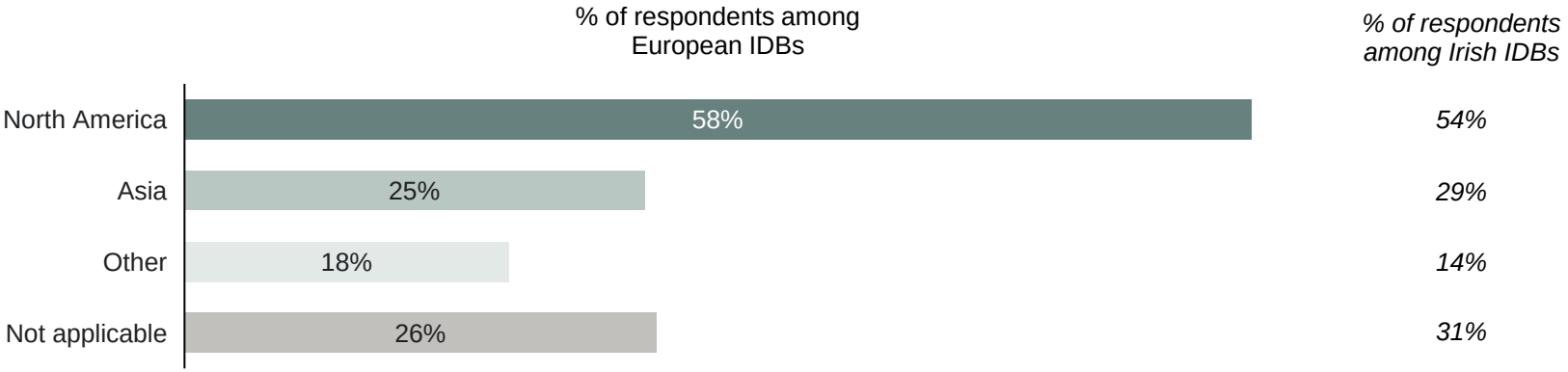
European innovative digital businesses have reported that they benefit from AI models developed outside Europe, with 46% saying that access to cutting-edge AI technologies from non-European companies is important for their business. Most respondents (58%) source these technologies from North America.

According to ScaleIreland, Irish startups anticipate an uplift in productivity from AI, with 49% of Irish tech startup CEOs stating they think it will increase productivity. TechIreland finds that Irish companies primarily use generative AI tools for fine-tuning models and code compilation. Access to pre-trained models enables efficient AI application development, reducing the risk and cost of training models from scratch.

To what extent is access to cutting-edge AI technologies built by companies outside of Europe important to your business?
% of respondents



If important to your business, from which continent(s) are you sourcing cutting-edge AI technologies?
% of respondents



Note: Notion Capital survey conducted in summer 2024. Sample size of n=1095 in Europe and n=48 in Ireland. A foundational AI model is a large, pre-trained model designed to perform a wide range of tasks, serving as a versatile base that can be fine-tuned or adapted for specific applications in various domains.
Source: Implement Economics based on Notion Capital survey (2024), Draghi (2024) and TechIreland (2024) Innovation Island Pulse 2024.

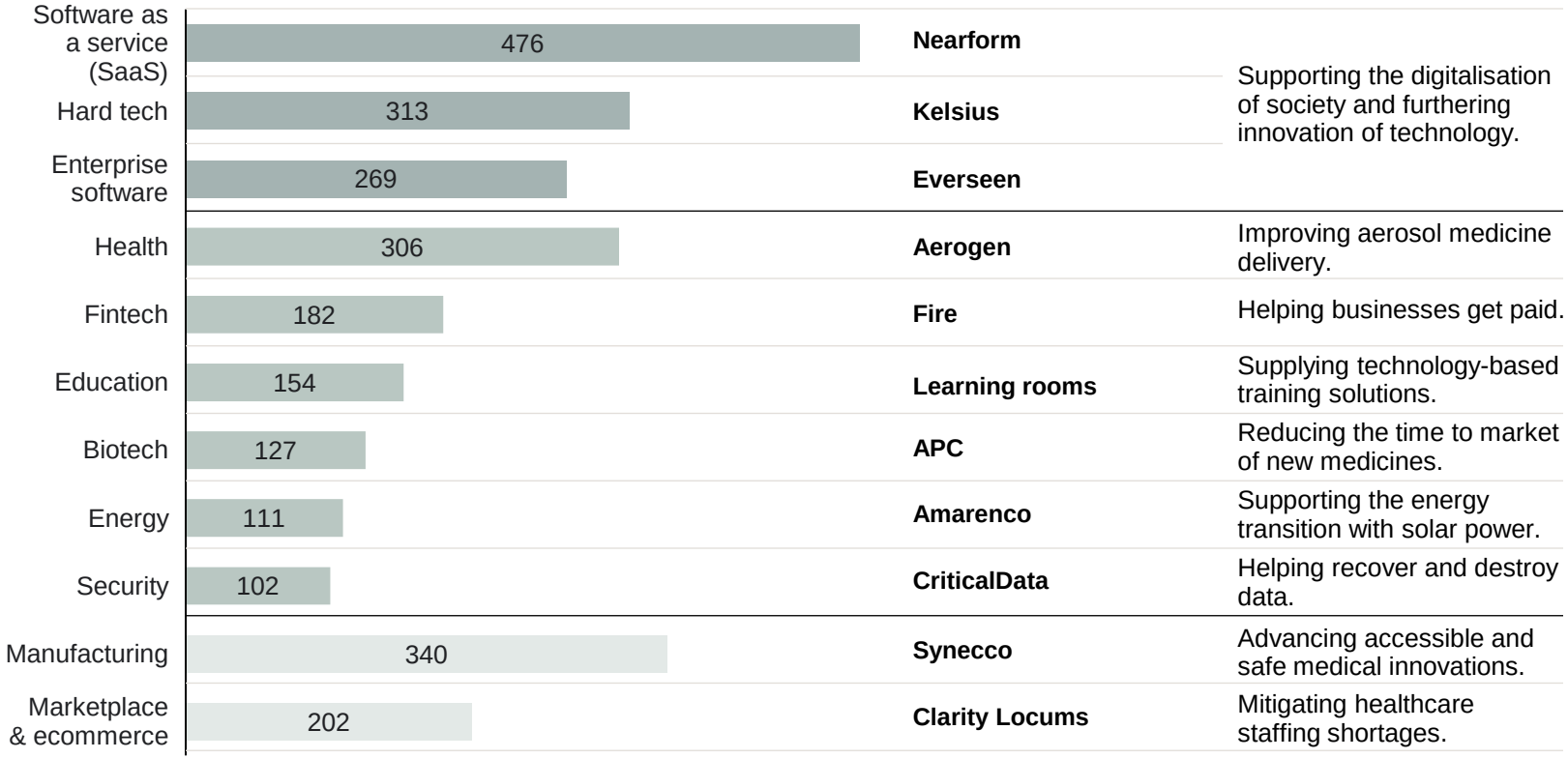
Innovative digital businesses work to solve societal challenges and diversify the Irish economy

Ireland has strong competencies within technology, pharmaceuticals, and medtech. Innovative digital businesses contribute to these strongholds and to economic diversity by bringing new products and ideas to the market. Key areas include:

- **Tech:** Supporting digitalisation and innovation in Software as a Service (SaaS), hard tech, and enterprise software.
- **Healthcare:** Innovating within pharmaceuticals, therapies and diagnostic tools.
- **Education:** Improving educational outcomes and providing technology-based education solutions.
- **Security:** Enhancing cybersecurity efforts.
- **Marketplace & Ecommerce:** Enhancing customer services and making markets more efficient.

> A key strength of the Irish ecosystem is our ability to create progressive futures, helping organisations transform at scale […]
>
> **Dave Feenan,** ICT Skillnet, in TechIreland Innovation Pulse 2024

Focus areas of Irish innovative digital businesses
Number of innovative digital businesses operating in the focus area
Note that each business can be active in multiple areas



	Company example	Addressing societal challenges by…
Software as a service (SaaS)	**Nearform**	Supporting the digitalisation of society and furthering innovation of technology.
Hard tech	**Kelsius**	
Enterprise software	**Everseen**	
Health	**Aerogen**	Improving aerosol medicine delivery.
Fintech	**Fire**	Helping businesses get paid.
Education	**Learning rooms**	Supplying technology-based training solutions.
Biotech	**APC**	Reducing the time to market of new medicines.
Energy	**Amarenco**	Supporting the energy transition with solar power.
Security	**CriticalData**	Helping recover and destroy data.
Manufacturing	**Synecco**	Advancing accessible and safe medical innovations.
Marketplace & ecommerce	**Clarity Locums**	Mitigating healthcare staffing shortages.

Note: Categories are not mutually exclusive, i.e. businesses may be working within multiple business areas. Calculations are based on self-reported tags of companies' business areas.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data, Draghi (2024), TechIreland (2024) Innovation Island Pulse 2024, Government of Ireland (2024). Irish Government's National AI Strategy Refresh.

Innovative digital businesses are key to innovation and diffusion of new technologies to the rest of the economy

These findings pertain to innovative digital businesses in developed economies.

Academic studies show that …

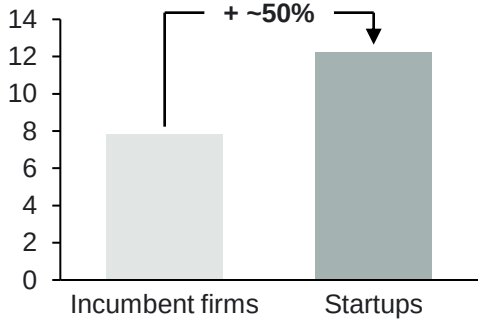
… innovations from startups are more radical and disruptive …

~50% higher chance of radical innovations than incumbent firms.

Startups, and hence innovative digital businesses, are more likely to introduce transformative innovations compared to incumbent firms.

These “outlier inventions”, defined as innovations within the top 5% of the citation distribution*, can be transformative due to their profound impact on business processes and industries.

Likelihood that innovations are radical
% outlier inventions



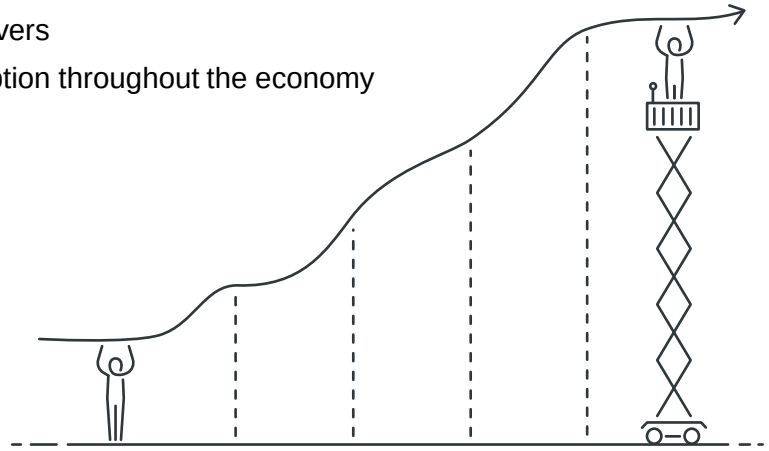
> Startups will generate innovations that are more radical and disruptive than those of incumbent firms.
>
> **Kolev et al. (2022)**

… and these innovations have positive spillover effects on the rest of the economy

26% of productivity growth in the economy is estimated to be driven by new businesses.

The entry of new businesses drives positive change by bringing new ideas to the market and creating competitive pressures that:

- Incentivise incumbents to innovate
- Create knowledge spillovers
- Push technological adoption throughout the economy



Note: These metrics are based on various academic studies with different definitions of market entrants, startups and high growth businesses. While these definitions differ slightly from ours, they are closely correlated, making the results both indicative of broader trends and applicable to our definition of innovative digital businesses. Based on US business level data, Akcigit & Kerr (2018) estimate that 25.7% of aggregate growth due to innovation is driven by new entrants, defined as businesses entering the census data during the sample period.
* The citation distribution reflects how often inventions are referenced in patents, academic papers, or other influential documents, serving as a measure of their significance and influence. Being at the upper end of this distribution suggests that these inventions stand out as transformative, shaping business processes and reshaping industries with their impact.
Source: Implement Economics based on Kolev et al. (2022) and Akcigit & Kerr (2018).

3

The potential of scaling innovative digital businesses

Successful scaling of innovative digital businesses holds major economic potential for the Irish economy.

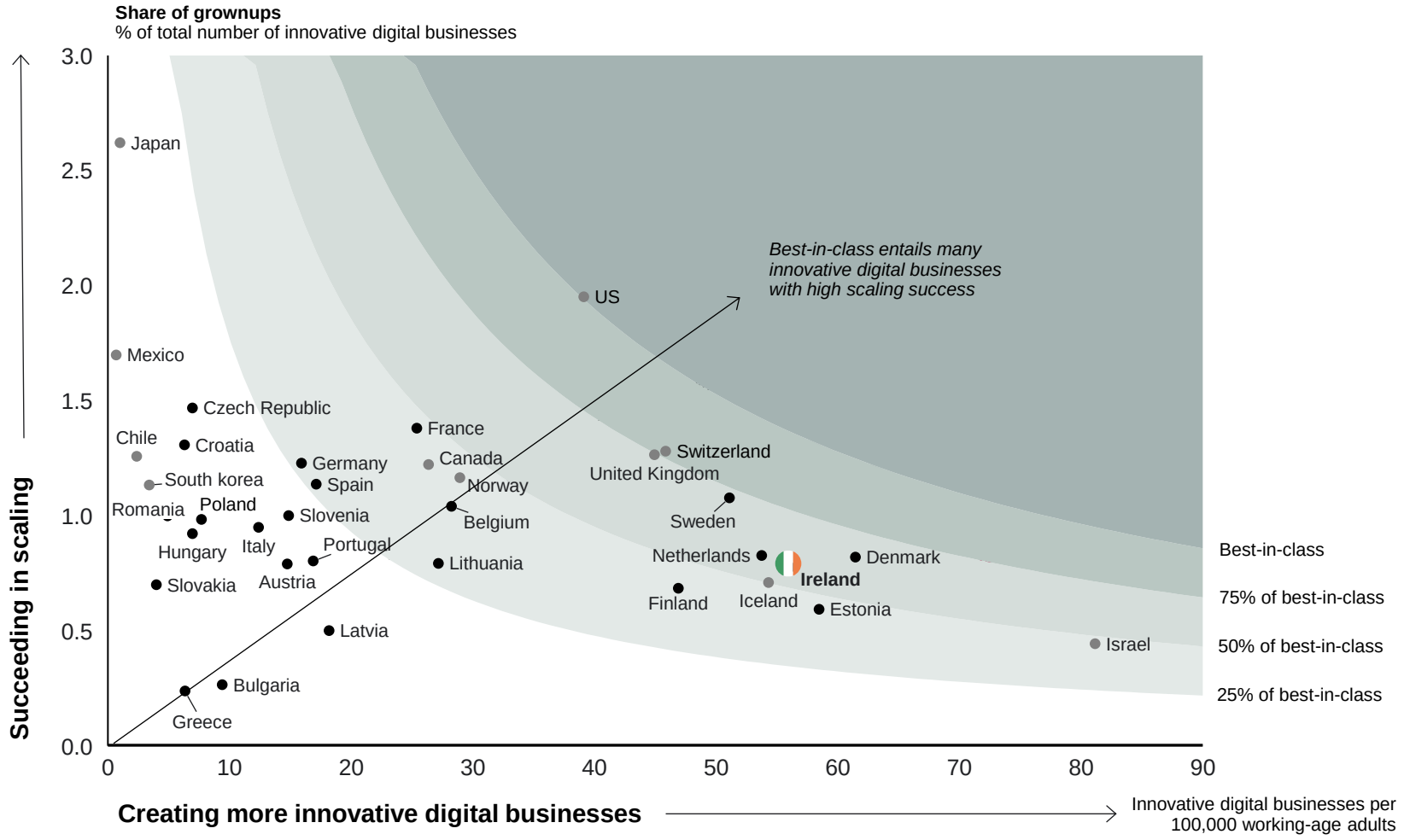
> Europe cannot afford to remain stuck in the ‘middle technologies and industries’ of the previous century. We must unlock our innovative potential. This will be key not only to lead in new technologies, but also to integrate AI into our existing industries so that they can stay at the front.
>
> **Mario Draghi** in The Future of European Competitiveness

Ireland has strong entrepreneurial activity but must improve scaling success to match leading countries

Ireland outperforms most other EU countries on the number of innovative digital businesses with 56 innovative digital businesses per 100,000 working-age adults compared to the EU average of 19.

Ireland can unlock significant economic growth by improving the success rate in terms of the share of innovative digital businesses reaching the grownup scale.

The success of these businesses will also be crucial for capturing the AI opportunity because they are instrumental in the adoption, adaption and development of AI.



Note: The scatter plot shows the complete dataset from Dealroom/TechIreland to ensure comparability.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data and Eurostat.

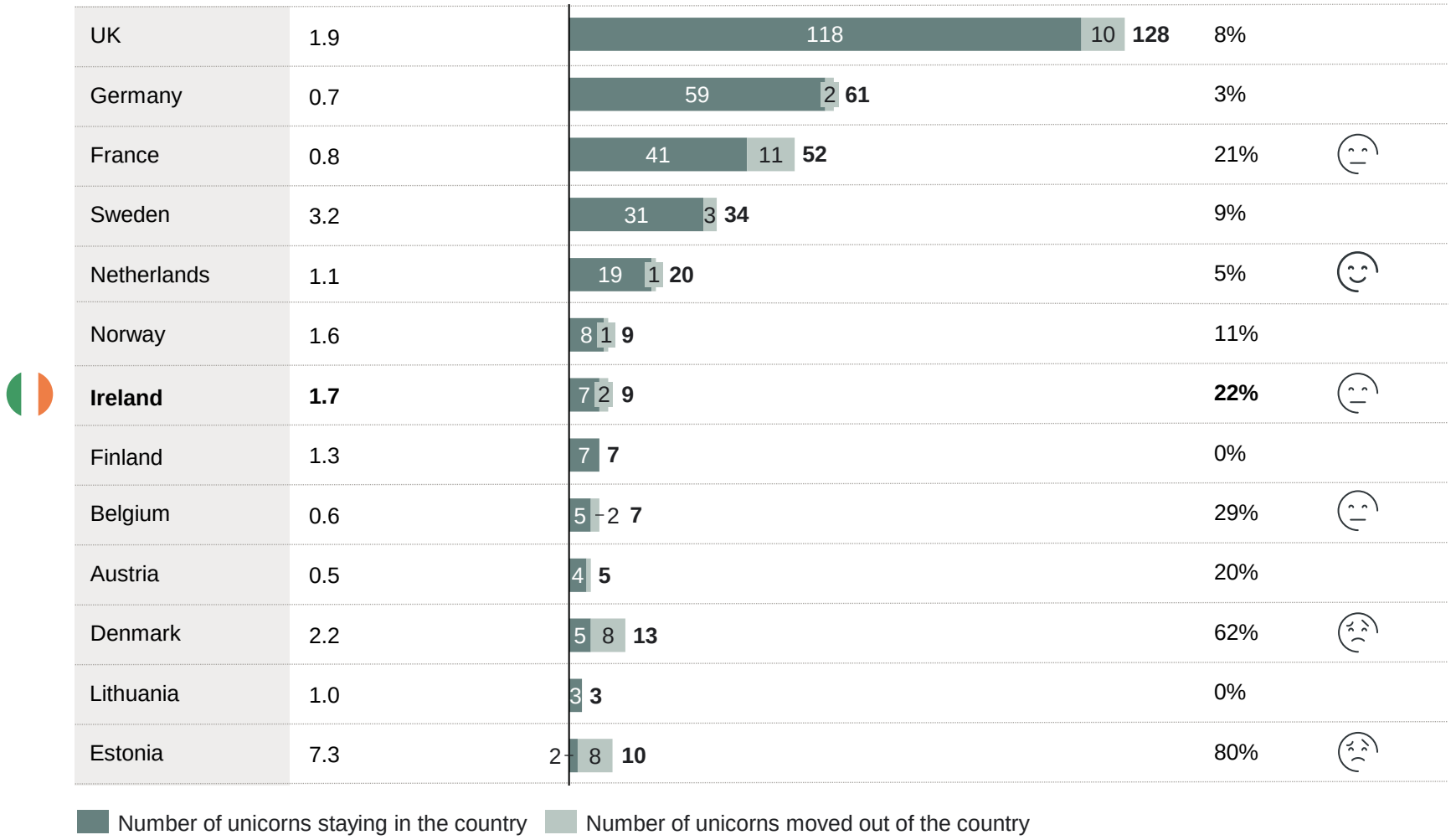
Ireland matches peers in unicorn creation

Ireland has created nine unicorns since 2000. Unicorns are privately-held startups valued at over USD 1 billion without being listed on the stock market.

While seven of these Irish-founded unicorns remain headquartered domestically, two - Fleetmatics and Intercom - have relocated their headquarters abroad. This represents 22% of all Irish-founded unicorns since 2000, a higher percentage compared to 9% of Swedish unicorns and 8% of British unicorns.

Ensuring the growth and retention of these innovative businesses offers substantial economic potential for Ireland.

> […] many innovative companies end up seeking out financing from US venture capitalists (VCs) and see expanding in the large US market as a more rewarding option than tackling fragmented EU markets.
>
> **Mario Draghi**
> in The Future of European Competitiveness



Note: Unicorns as of February 2025. Many unicorns in Finland have been sold to US or Chinese companies, while keeping their HQs in Finland, contributing to Finland's strong record of retaining unicorns.
Source: Implement Economics based on Dealroom/TechIreland, World Bank Group and Draghi (2024).

Ireland can unlock significant economic growth through innovative digital businesses

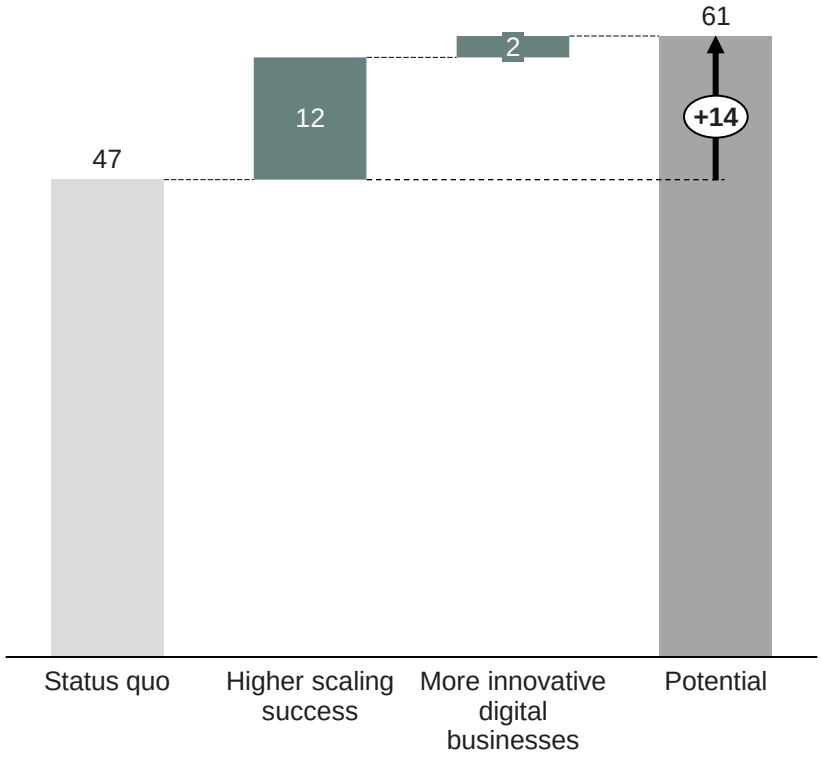
Ireland can unlock significant economic growth by improving the scaling success of startups and making it attractive for them to stay in Ireland.

If Ireland can transform more startups into grownups, reaching the same relative levels as the three leading OECD countries, it could create 14,000 jobs and contribute EUR 1.8 billion annually to the Irish economy.

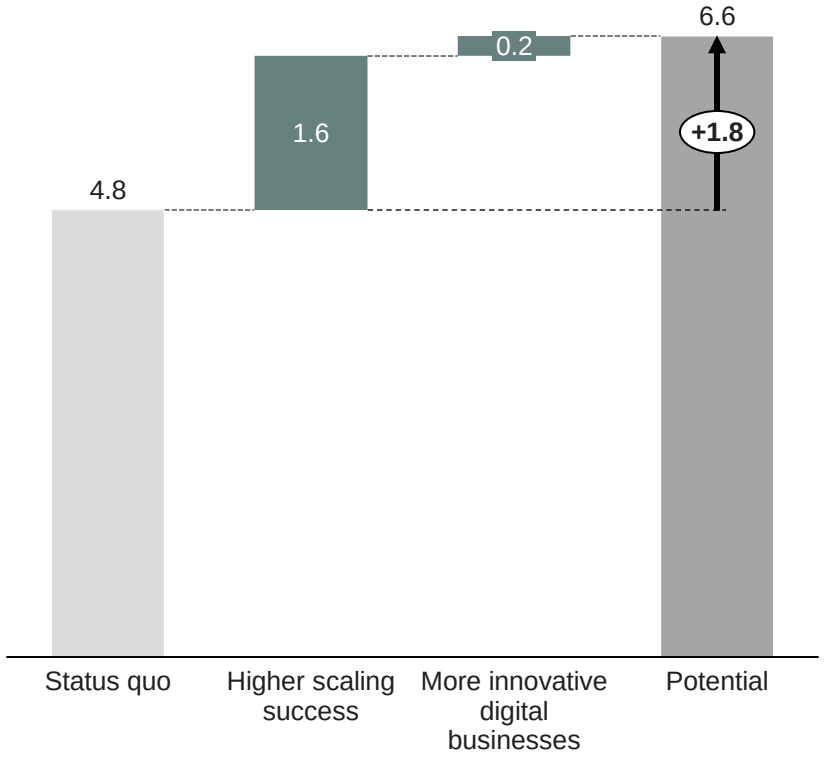
If these businesses succeed in scaling, it could also have significant spillover effects from the diffusion of AI to the rest of the economy.

The workers in the new jobs may otherwise have been employed in average-productivity jobs. Accounting for this implies that the overall net impact on the Irish economy is EUR 0.3 billion.

Jobs
Thousand



Annual GVA* in innovative digital businesses
EUR billion



Note: Higher scaling success is defined as performance corresponding to the average of the top three OECD countries (UK, Switzerland and the US). Likewise, the scenario of "More innovative digital businesses" is defined by the average performance of the top three OECD countries (Ireland, Denmark and Estonia). *GVA: Gross Value Added. This report's calculations do not presuppose a given timeline to achieve the potential.
Source: Implement Economics based on Windsor (2024) using Dealroom/TechIreland data and Bureau van Dijk's Orbis database.

4

The way forward

> AI presents opportunities completely unlike those we have experienced before […]. There are clear economic opportunities for both our international competitiveness and also at individual business level.
>
> **Ireland's National AI Strategy Refresh 2024**

Moving forward, Ireland should focus on five key challenges

Innovative digital businesses need:		Ireland's strengths and challenges in creating a supportive environment for innovative digital businesses:
People	Growing, attracting and retaining the people with business and tech talent and ideas	The Irish workforce is generally well-equipped, but skills shortages highlight the need for continuous upskilling, as well as the need to attract foreign labour to grow innovative digital businesses and realise the full potential of AI.
Tech	Accessing state-of-the-art AI tools, digital infrastructure and compute power	Access to open, flexible and secure cloud platforms and AI tools/models is critical for growing efficient innovative digital businesses. Ireland's digital infrastructure is generally solid, but continuous improvement is needed to support the AI-powered economy.
R&D	Accelerating R&D with AI	AI has the potential to accelerate scientific breakthroughs and innovation by helping scientists to stay on top of the latest developments, analysing data and simulating experiments. Ireland is currently trailing behind peers on innovation R&D investment.
Rules	Regulatory clarity and reasonable compliance costs	Regulatory barriers make it hard for innovative digital businesses to grow. This is especially true for small businesses.
Capital	Unlocking Europe's fragmented risk capital markets and increasing the attractiveness of venture capital investment in the EU	The lower levels of venture capital investment in Europe are a symptom of a low expected risk-adjusted after-tax return.

Growing, attracting and retaining the people with business and tech talent

The Irish workforce holds key potential for AI-driven economic growth, but businesses are still struggling with their search for talent

People

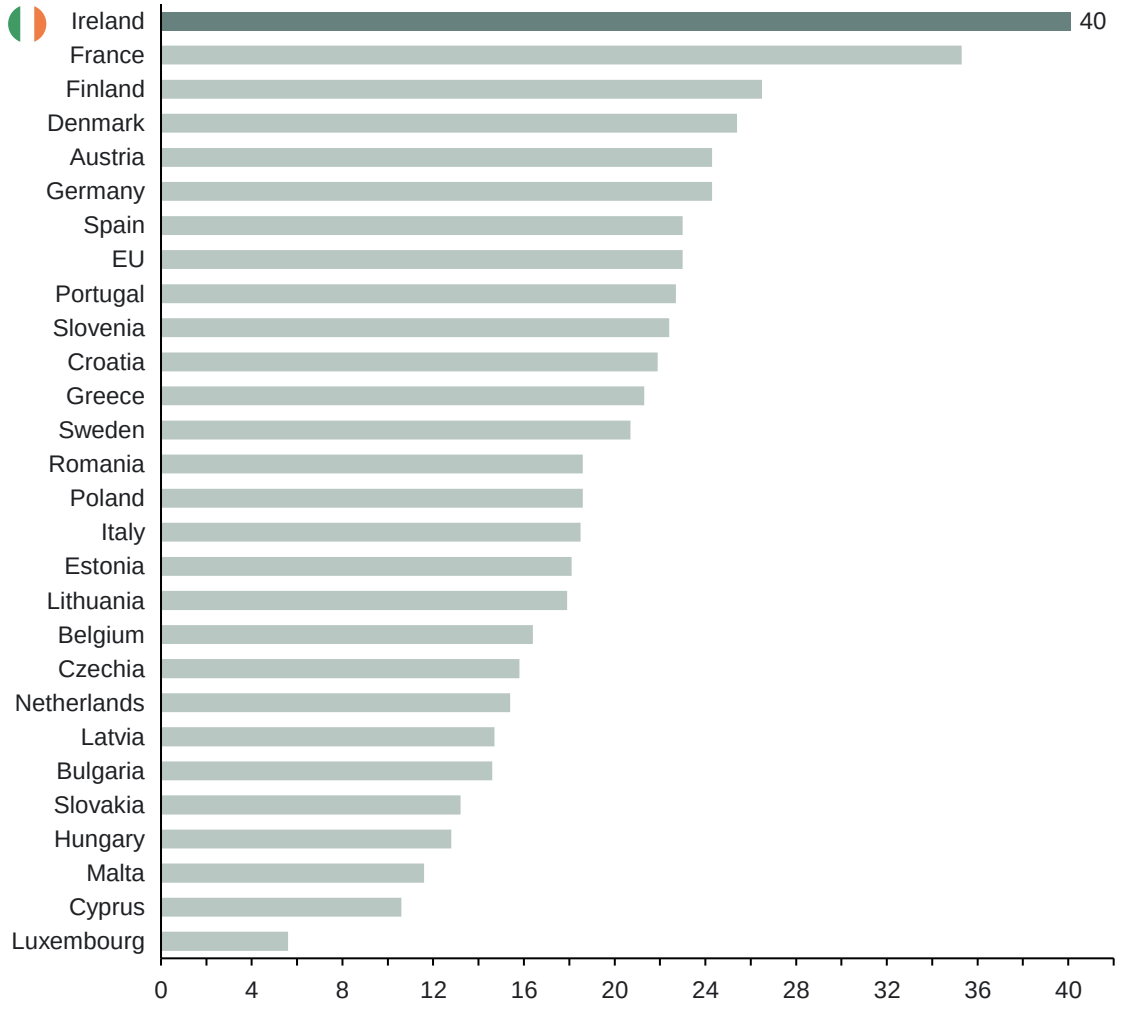
A skilled workforce is essential for growing innovative digital businesses. Using and innovating on top of cutting-edge technology like AI requires a well-educated workforce with strong technical capabilities, creative problem solving skills and specialised AI skills.

The Irish workforce is digitally enabled and well-educated, ranking 1st on human capital in DESI, with 40% of the adult population having above-basic digital skills (EU average 36%), while having the largest share of STEM graduates compared to European peers. However, skill shortages remain a challenge, with 30% of startups surveyed by ScaleIreland reporting a lack of technology expertise in their organisations.

Attracting highly skilled labour will be key to developing innovative digital businesses in the future. Ireland has a strong track record in the EU of highly skilled labour immigration, with 61% of foreign citizens having attained tertiary education compared to the EU average of 27%.

The potential of generative AI is especially large for highly educated individuals because it can significantly free up time from mundane tasks such as coding and writing, allowing more time for creative thinking and problem solving.

Graduates in STEM
Per 1,000 of population aged 20-29, 2022



Source: Implement Economics based on OECD Employment Outlook (2023), World Economic Forum's Future of Jobs report (2023), ScaleIreland (2024) Eurostat, and DESI (2022).

Accessing state-of-the-art AI tools and compute power

Ireland's strong digital infrastructure is a solid starting point for growing innovative digital businesses

Tech

AI innovation and adoption hinges on access to state-of-the-art AI tools and digital infrastructure as AI models need significant amounts of data and compute capacity to train and operate effectively.

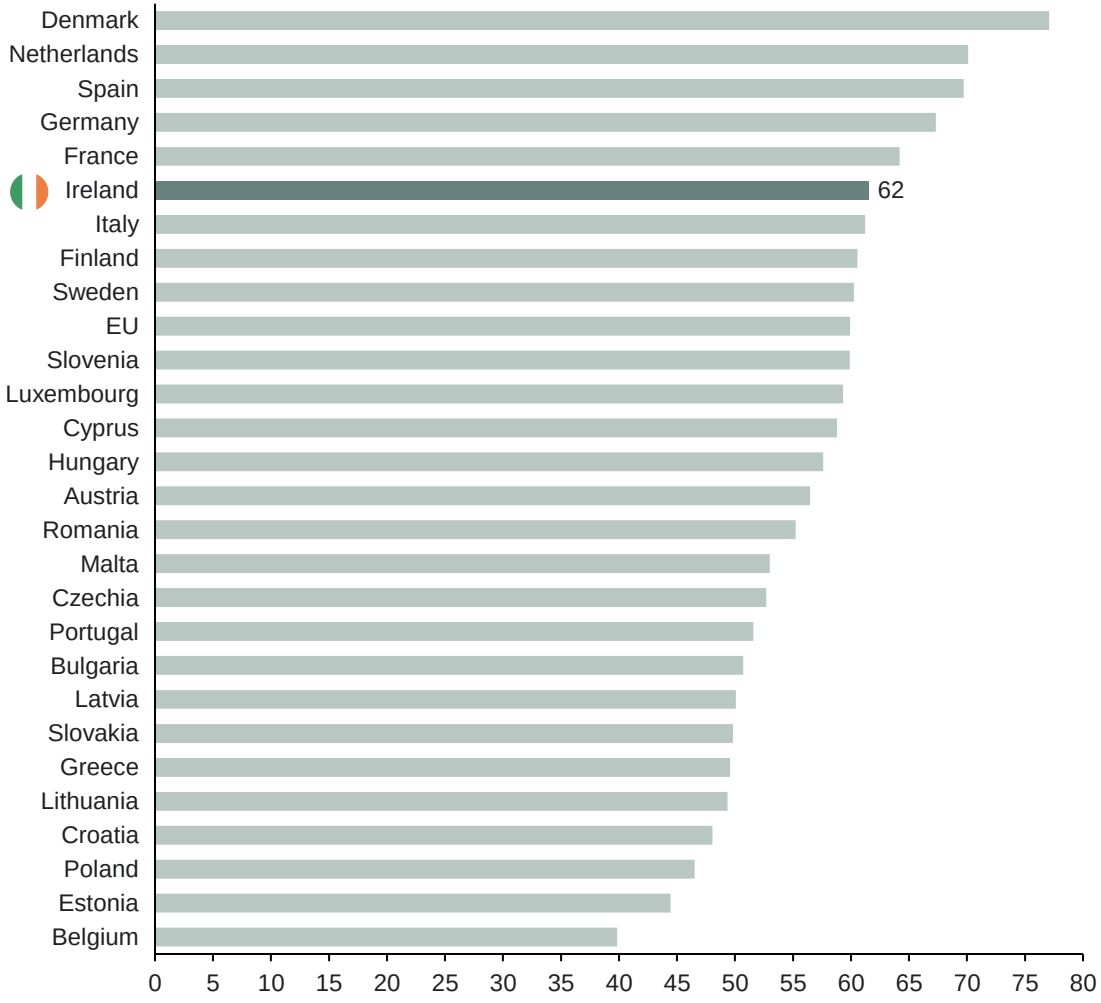
Access to open, flexible and secure digital infrastructure is critical for startups that usually cannot afford large upfront investments or in-house IT expertise. Digital infrastructure includes data centres, cloud and compute power.

Ireland has strong and sustainable digital infrastructure, ranking 6th on connectivity in DESI and 7th among EU countries on AI infrastructure in the Tortoise Global AI Index.

However, capturing the AI opportunity requires significant expansions in the digital infrastructure. IDC predicts that global data centre demand will nearly triple by 2027, highlighting the need for more and smart investments in digital infrastructure.

> Data access and computing power are critical for developing AI solutions that are robust, scalable, and capable of addressing complex societal challenges, from healthcare to climate change.
>
> **Enrico Letta** in Much More Than a Market, 2024

DESI 2022, Connectivity
Score (index)



Note: The connectivity index is measured as the total score of fixed broadband take-up, fixed broadband coverage, mobile broadband and broadband prices.
Source: Implement Economics based on the European Commission, The Digital Economy and Society Index (2022), Tortoise Global AI Index and Letta (2024).

Accelerating R&D with AI

AI has the potential to lift R&D productivity significantly

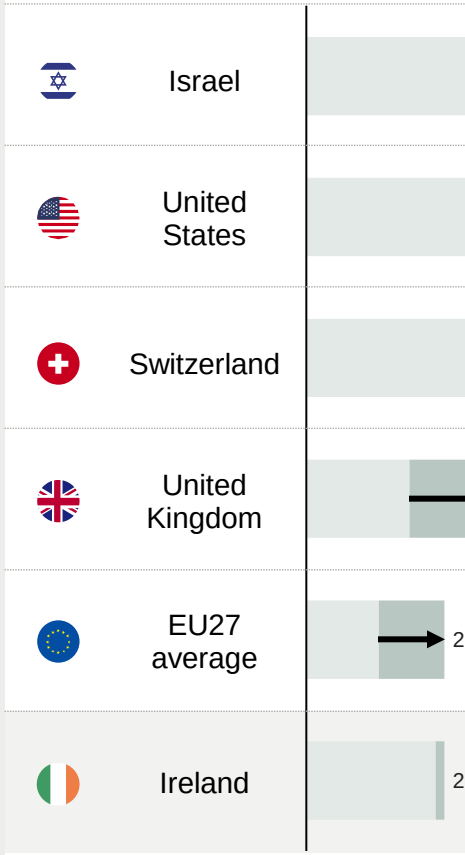
R&D

The productivity of research in general has been declining for the past century, while the number of researchers has increased.

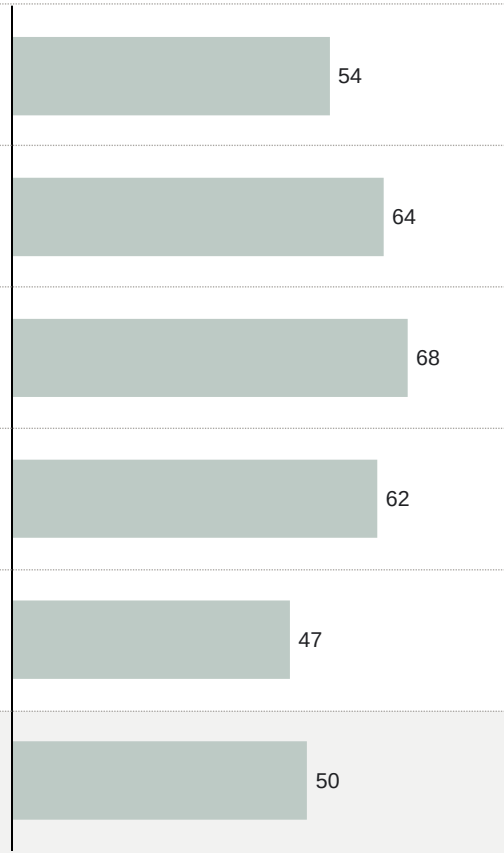
Ireland's R&D spending matches the EU average, but trails behind the UK. Ireland invests below the EU average on business enterprise expenditure on R&D (BERD) as a percentage of GDP. According to the WIPO Global Innovation Index, Ireland performs moderately in innovation, scoring slightly above the EU average.

Leveraging AI could be a key advantage for Ireland, as AI has the potential to accelerate scientific breakthroughs by addressing the growing complexity of scientific knowledge and vast volumes of research literature. By adopting generative AI, Ireland could enhance R&D productivity, enabling researchers to stay current and identify breakthrough opportunities.

Research and development expenditure
% of GDP



WIPO Global Innovation Index (GII) 2023
Index



Source: Implement Economics based on the European Commission, OECD Economic Surveys: Ireland (2019), DESI, European Innovation Council, OECD Main Science and Technology Indicators database, Bloom et al. (2020), Philippon (2022) and Goldman Sachs (2023).

Regulatory clarity and reasonable compliance costs

Regulatory barriers to scaling are particularly burdensome for small and fast-growing innovative digital businesses

Rules

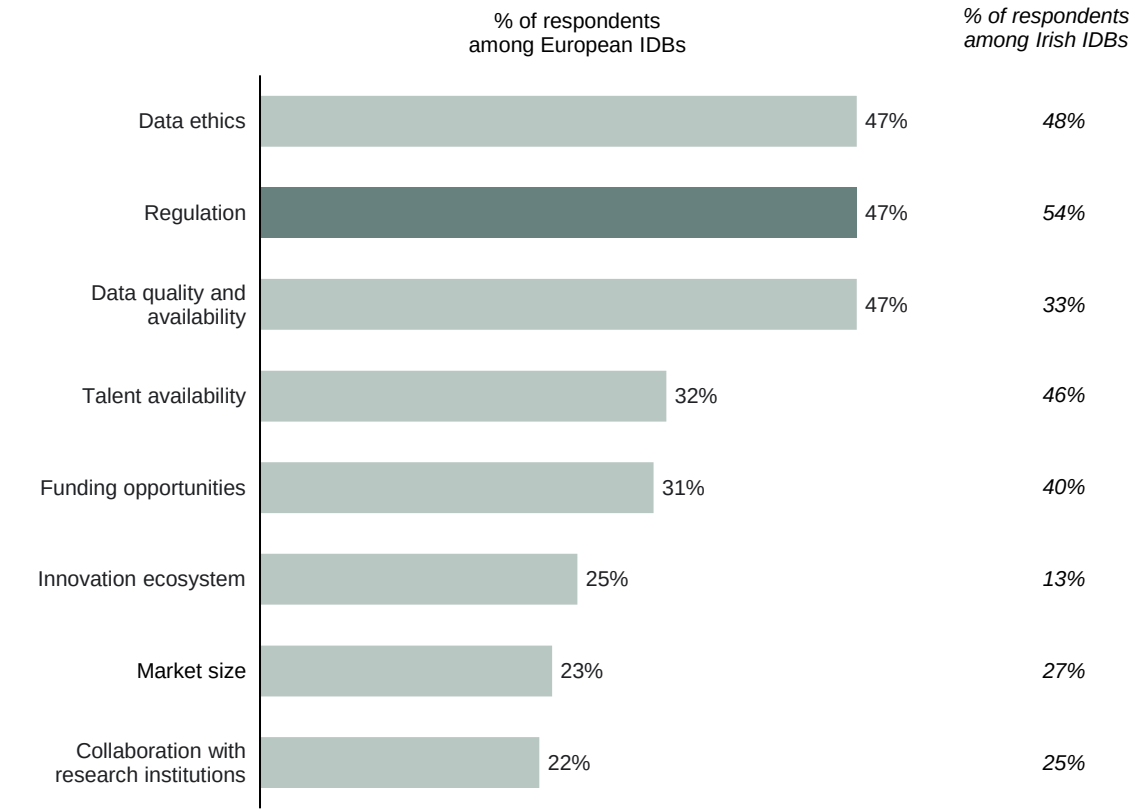
The complexity of EU regulation hampers innovation and investment. The EU now has around 100 tech-focused laws and over 270 regulators active in digital networks across EU Members.

Compliance costs are substantial and particularly burdensome for small businesses. GDPR enforcement alone led to an 8% reduction in profits for affected businesses, with small tech companies experiencing double the impact.

Regulatory uncertainty delays AI innovation and adoption. 54% of surveyed Irish innovative digital businesses see regulation as an obstacle to developing cutting-edge AI technologies. Large companies like Apple, Meta and OpenAI have also announced AI product delays or cancellations due to regulatory ambiguity.

> […] innovative companies that want to scale up in Europe are hindered at every stage by inconsistent and restrictive regulations.
>
> **Mario Draghi** in The Future of European Competitiveness

What are the main challenges faced by European startups developing cutting-edge AI technologies?
% of respondents



Note: Sample size of n=1095 in Europe and n=48 in Ireland for Notion Capital survey.
Source: Implement Economics based on iapp (2024), Draghi (2024), Bruegel (2014), Chen et al. (2022), Euronews, and survey by Notion Capital (2024)

Unlocking Europe's fragmented risk capital markets

Increase the attractiveness of investing in Europe's innovative digital businesses

Lower levels of venture capital investment in Europe are a symptom of a low expected risk-adjusted after-tax return

Europe is not lacking money. In 2022, EU household savings were EUR 1,390 billion, compared to EUR 840 billion in the US, according to the Draghi report.

But Europe attracts around USD 100 billion less in venture capital investment than the US. Venture capital is the main source of financing for innovative digital businesses, especially those aiming to grow aggressively towards the "grownup" scale. According to ScaleIreland four out of five surveyed Irish startups and scaleups find it difficult to attract capital.

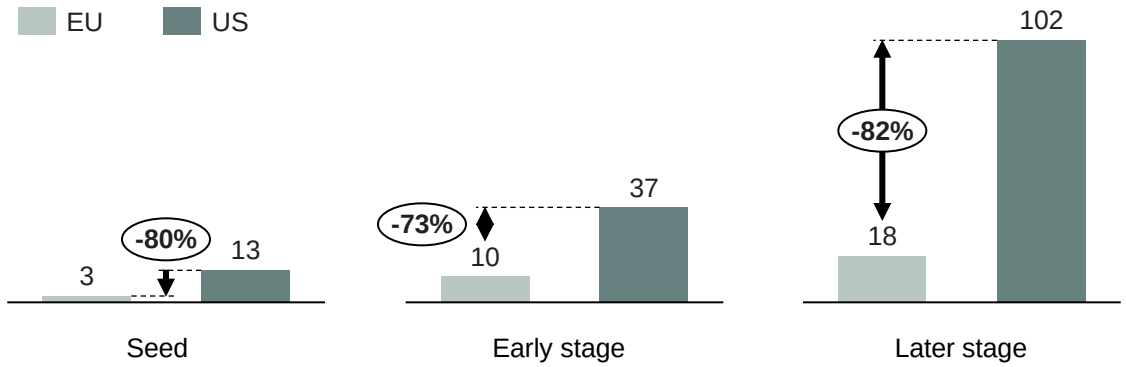
Europe's fragmented capital markets hamper the flow. Different rules in each EU country make it difficult for investors in one country to fund projects in another. This prevents the EU from using its full scale to create large investment funds that can support risky projects.

Regulatory uncertainty and excessive regulatory costs are a further negative element. Unclear rules and higher regulatory burdens reduce the expected return on the capital needed to scale up Europe's innovative digital businesses.

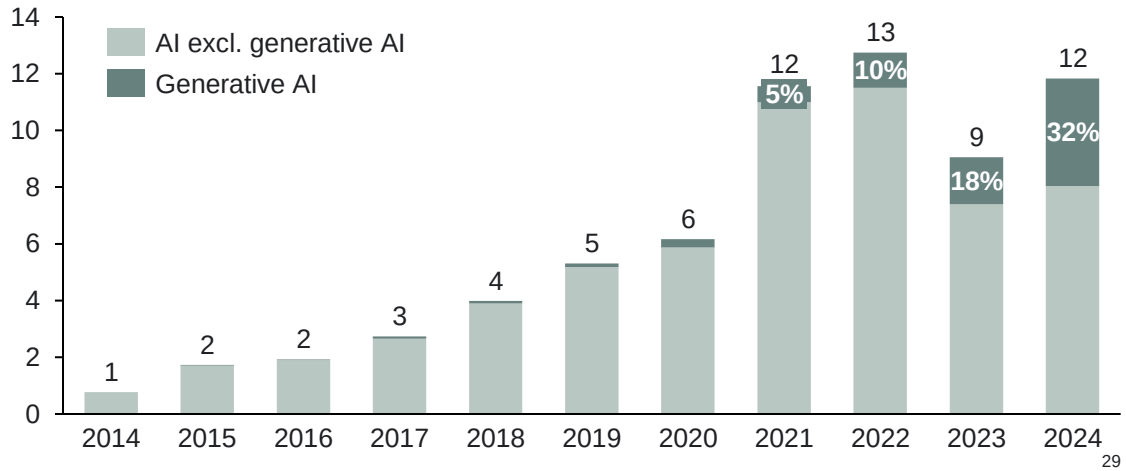
Capital

> Access to growth capital remains the key intervention. Extending runways for startups, particularly in tough market conditions, trumps everything else.
>
> **Alan Gleeson, CEO, Contento Ltd** in Innovation Island Pulse 2024 by TechIreland

Venture capital investment by development stage
USD billion, 2023



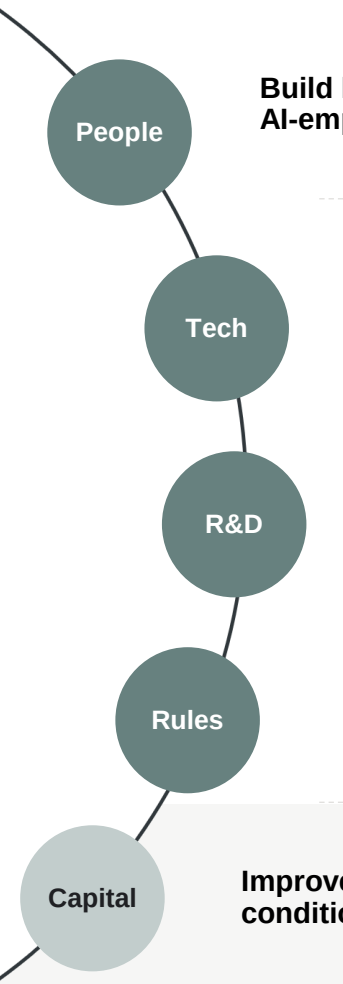
Europe AI venture capital investment
EUR billion



Source: Implement Economics based on Draghi (2024), TechIreland (2024), ScaleIreland (2024) and data from Dealroom/TechIreland.

Unlocking the potential of digital innovative businesses with AI

Five key recommendations for the Irish Government to help innovative digital businesses become better prepared for the AI-powered future:



Build human capital and an AI-empowered workforce	• Build an AI-empowered workforce by investing in human capital, education and training systems. This means treating AI as a core component of the education system. • Focus training and upskilling on areas where AI enhances and augments the capabilities of workers, so that workers are trained to work together with the new technology. The aim should be to *improve the marginal productivity of workers* rather than replace them.
Invest in AI infrastructure and compute power	• Ensure the right incentives and regulation for public and private entities to invest in AI infrastructure and compute capacity such as graphics processing and supercomputers needed to drive the powerful AI models. • Enable trusted cross-border data flows in trade agreements and ensure regulatory interoperability and non-discrimination in the EU.
Enable innovation and invest in AI research and development	• Invest in long-term public AI research and encourage private investment in basic and applied research at national and EU level. Make AI tools available to entrepreneurs and scientists so they can use AI in support of other discoveries and innovations. • Support innovation on top of already developed foundational models and findings, e.g. by leveraging the new EU AI innovation package.
Create conducive and aligned AI regulation	• Avoid siloed approaches to AI regulation to minimise the risk of misalignment and fragmentation through increased international co-operation. • Adopt a risk-based approach to AI regulation to provide clarity to developers, adopters and users about which uses are disallowed.
Improve framework conditions to attract capital	• Speed up the creation of a Capital markets union. • Strengthen the above framework conditions by investing in skills, R&D, sustainable digital infrastructure and ensuring regulatory clarity.

Note: For more details on policies, see OECD AI principles, OECD AI Observatory, EU's ethics guidelines for trustworthy AI, EU's AI innovation package, Google's AI principles and paper on "An Opportunity Agenda for AI". For more details on carbon free energy and digital decarbonisation, see European perspective and global perspective.

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