IMPLEMENT
CONSULTING GROUP

The AI innovation opportunity

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

June 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 – they are where it all begins. However, for both investors and the broader economy, it is essential that a sufficiently large number of these ventures succeed and grow into larger, profitable, and highly productive companies, as their success enhances competitiveness and spreads new technologies throughout society.

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 catalyse the creation of new innovative businesses across all sectors of the economy while boosting their productivity.

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

The creation of new innovative companies and the ability to scale them is crucial for closing Norway’s innovation and competitiveness gap, as also highlighted in the Norwegian Government’s Perspective Report (Perspektivmeldingen 2024).

We are now on the brink of a new era of AI-driven economic growth, which has the potential to elevate Norway’s long-term growth beyond its historical trend. AI holds such transformative power, and innovative digital businesses are key to capturing the potential because they:

- Develop new AI tools and applications
- Enable businesses across all sectors to adapt and benefit from AI
- Demonstrate AI’s value by being early adopters and innovators
- Inspire other businesses to use AI technology smartly
- Create 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 data. The analysis focuses on companies headquartered in Norway which are further classified as startups (2–50 employees), scaleups (51–500 employees), or grownups (over 500 employees).

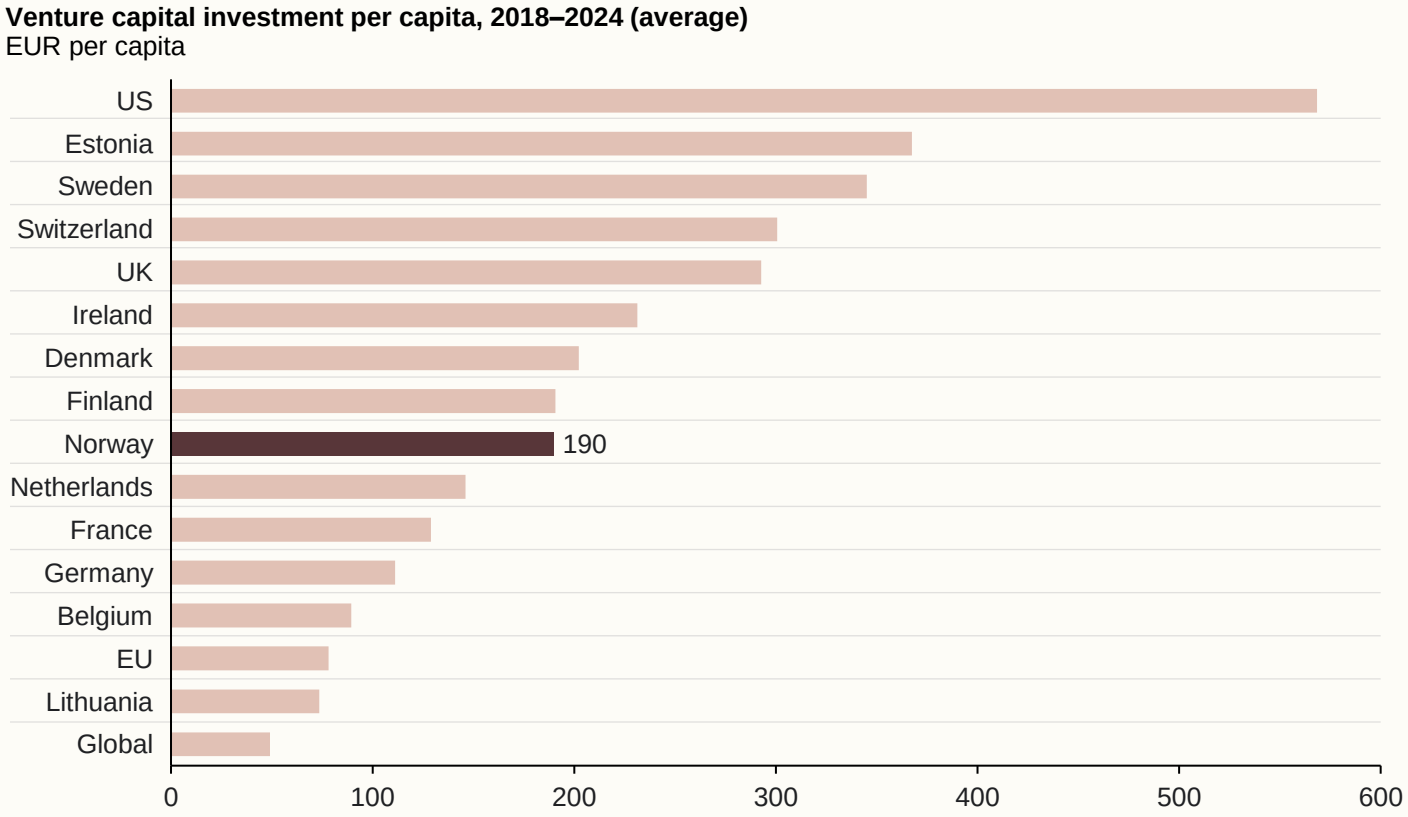
Investment in innovative digital businesses in Norway is modest but growing

~1,000
innovative digital businesses

27,000
jobs in innovative digital businesses

5%
of net private sector job creation since 2017, which is less than in Denmark (11%) and Sweden (13%).

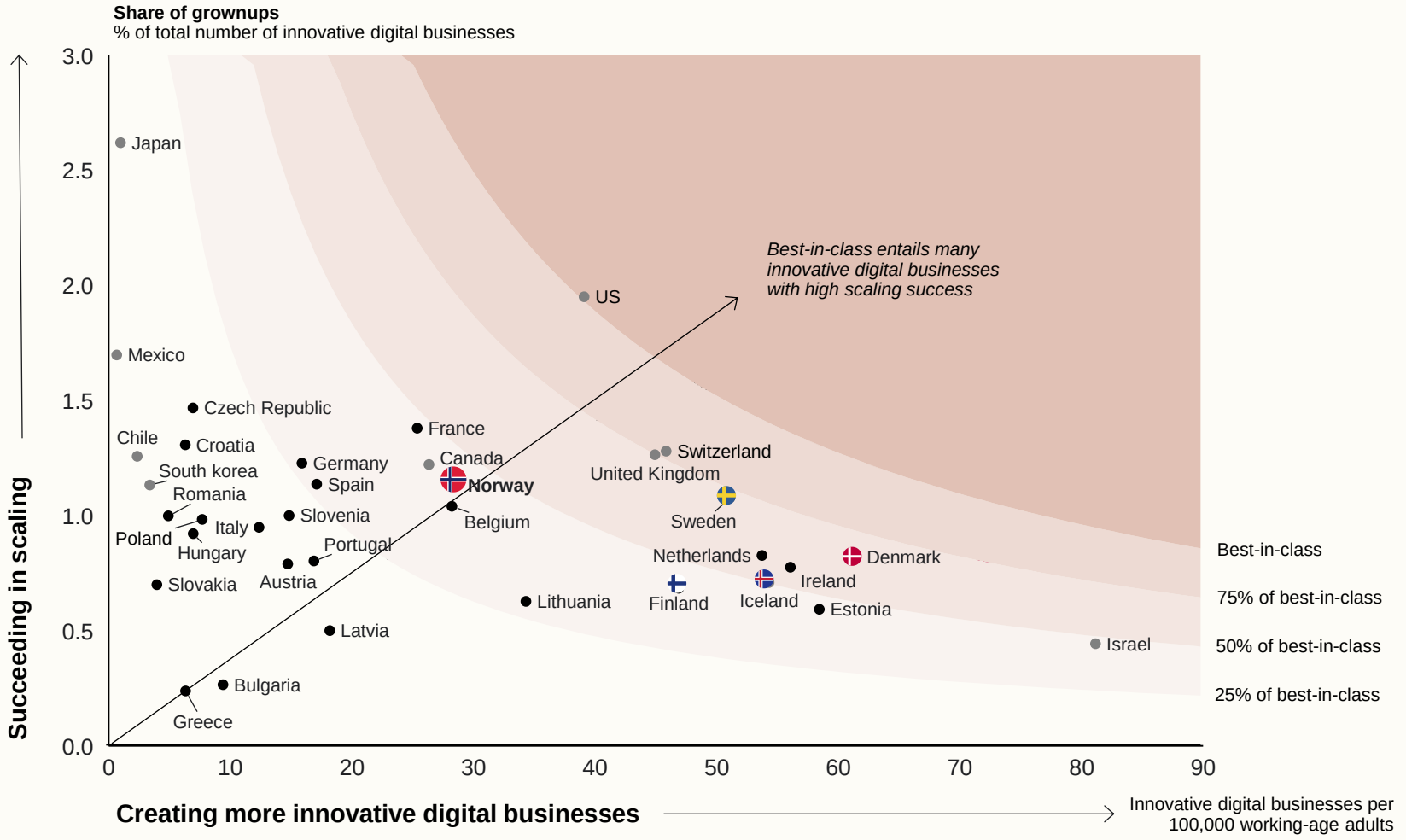
Norway is behind other similarly advanced European countries on VC investment per capita…



Norway needs more and better innovative digital businesses to be on a par with the best

Compared to its Nordic peers, Norway is trailing behind on entrepreneurial activity.

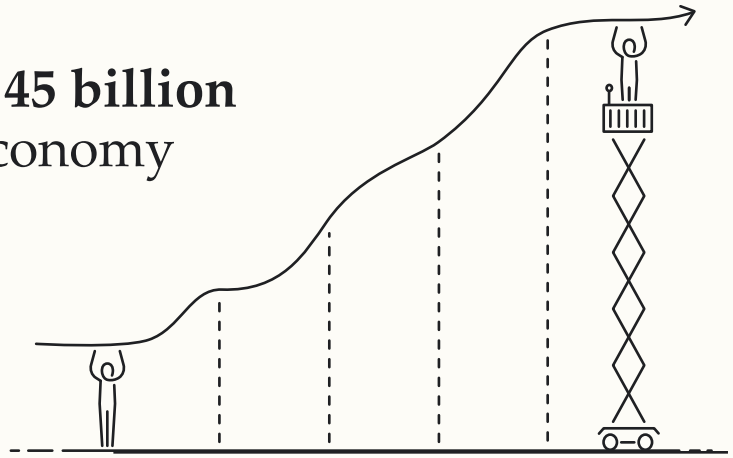
To unlock the economic growth and diversification of the economy, Norway must increase the number and scaling success of innovative digital businesses.



AI opens new opportunities to grow innovative digital business, potentially creating 33,000 high-value jobs

If Norway scales innovative digital businesses to the levels of leading OECD countries, this could:

- Create **33,000 more high-value jobs**, supporting the future competitiveness of the Norwegian workforce
- Contribute **NOK 45 billion** annually to the economy



In addition, more successful innovative digital businesses benefit society through positive spillovers. They:

- Create transformative innovations
- Propel AI adoption across the economy

SUMMARY

Scaling innovative digital businesses and unlocking AI opportunities requires access to advanced AI models and infrastructure, eased regulatory burdens, and talented people

Norway's strengths and challenges in creating a supportive environment for innovative digital businesses:

People

A digitally skilled workforce is essential for growing digital innovative businesses and Norway could benefit from enhancing the skills of the workforce to aid skills and labour shortages.

Tech

Access to open, flexible and secure cloud platforms and AI tools and models is critical for growing efficient innovative digital businesses. However, Norway ranks moderately on connectivity in DESI and 12th among European peers in AI infrastructure, according to the Tortoise Global AI Index.

R&D

AI has the potential to accelerate applied research and scientific breakthroughs. Norway lags behind its peers in R&D investment, but the government is prioritising innovation with a NOK 1.3 billion investment in AI research by 2030 (KI-milliarden).

Rules

While it is easy to start a new business in Norway, regulatory barriers for AI make it especially hard for young innovative digital businesses to grow.

Capital

The lower levels of venture capital investment in Norway are a symptom of a low expected risk-adjusted after-tax return.

1

The economic role of innovative digital businesses

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

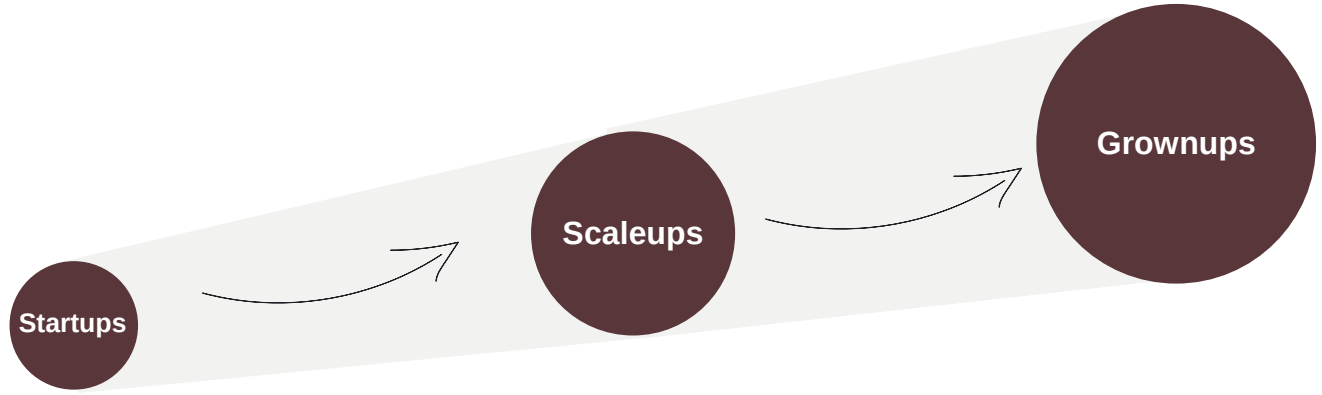
Innovative digital businesses are scalable and tech-enabled

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

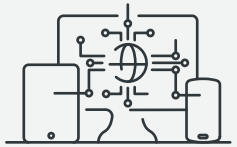
In most cases, these companies are tech-enabled, either utilising proprietary technology or software, or having business processes that are heavily enabled by technology. Examples include companies developing climate tech solutions, offering software as a service (SaaS), or specialising in hard tech. The definition excludes companies whose primary goal is self-employment, as these are not venture-backable.

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

Innovative digital businesses



Innovative digital businesses designed to grow fast, employing 2–50 people.	Innovative digital businesses with scaled operations, 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: The definition of innovative digital businesses is based on Dealroom.
Source: Implement Economics based on Windsor (2024) using Dealroom data and Draghi (2024).

Norway is home to around 1,000 innovative digital businesses, employing 27,000 people

Innovative digital businesses employ 27,000 people in Norway, accounting for 1.5% of private employment. Additionally, they employ 17,000 people outside Norway.

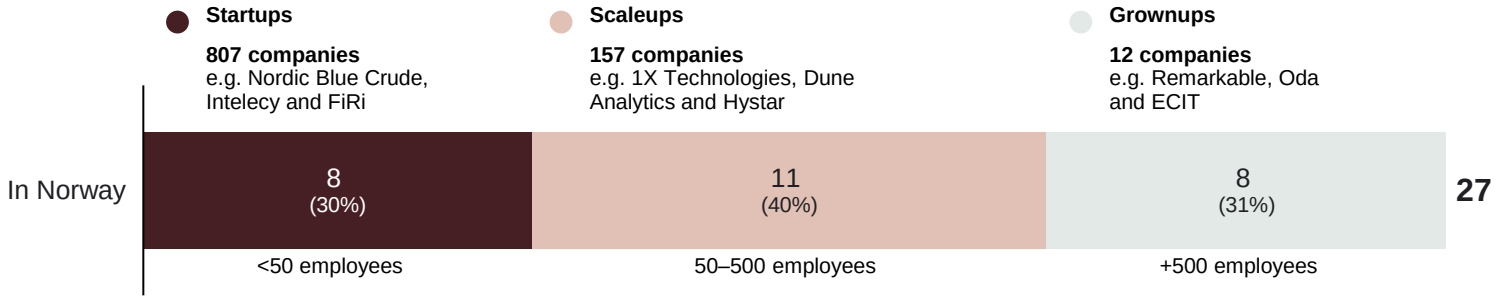
- *Startups* employ 8,000 people in Norway and 4,000 abroad.
- *Scaleups* employ 11,000 people in Norway and a further 9,000 people abroad.
- *Grownups* employ 8,000 people in Norway and have created 3,000 jobs abroad.

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

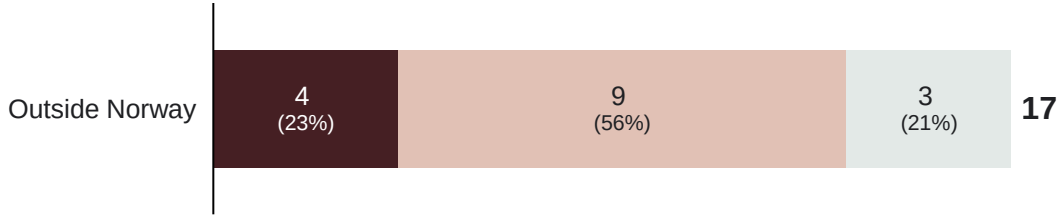
~40% of jobs in innovative digital businesses headquartered in Norway are abroad

Employment in Norwegian innovative digital businesses
Thousand employees

27,000 people are employed in innovative digital businesses in Norway



17,000 people are employed *outside* Norway by Norwegian-headquartered innovative digital businesses



Note: The number of innovative digital businesses and their employment figures are based on companies with "verified" employment data from Dealroom. 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 data.

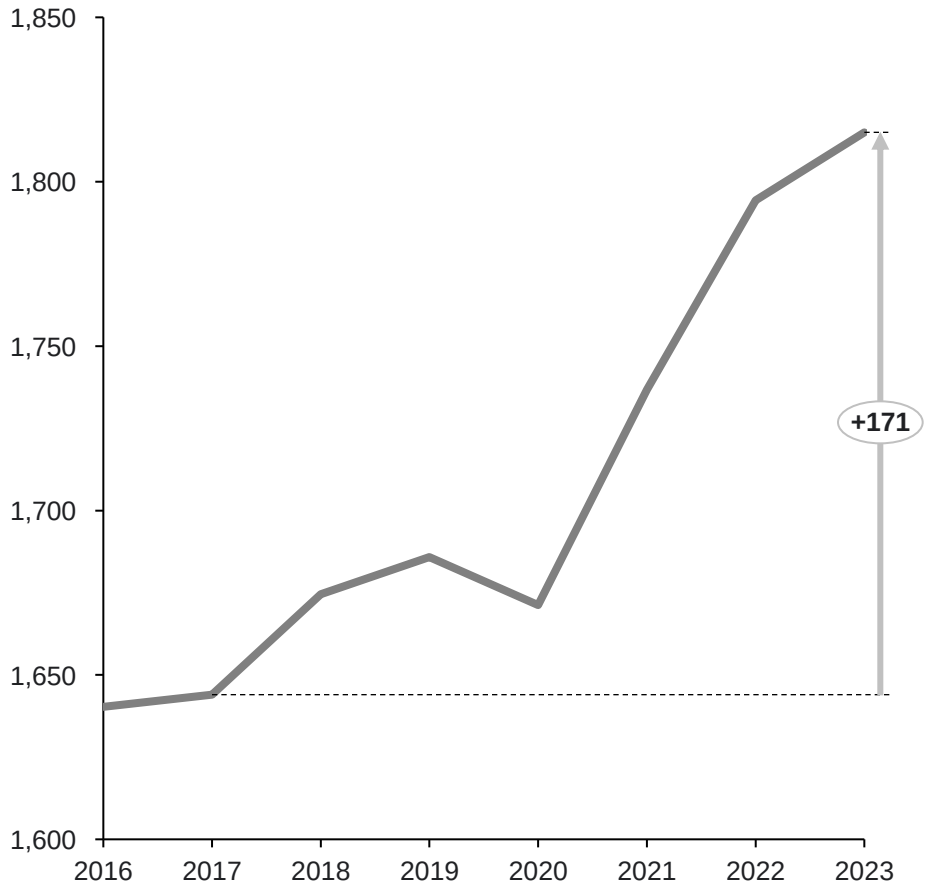
Innovative digital businesses have created 5% of all new private sector jobs in Norway

Innovative digital businesses in Norway have been creating jobs much faster than other private businesses. Since 2017, these digital businesses have grown by 7% each year, compared to only 2% in other private businesses.

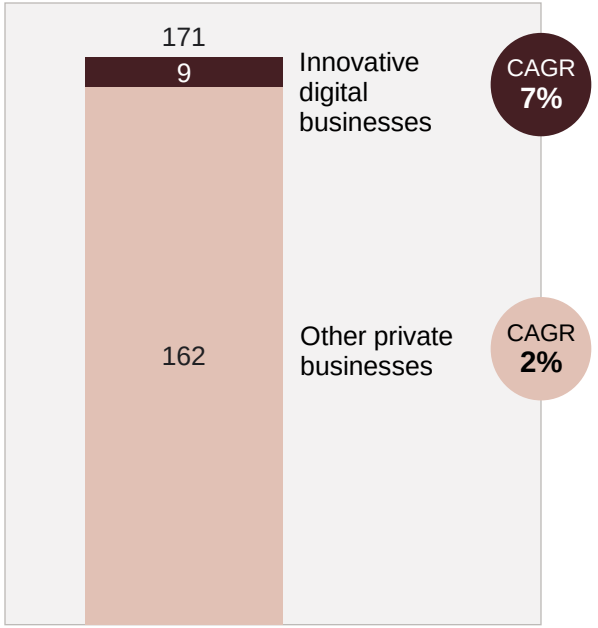
Overall, private sector jobs in Norway have increased by 171,000 since 2017. Out of these, 9,000 new jobs came from innovative digital businesses, making up 5% of net private sector job creation in Norway. This is a significant contribution considering that innovative digital businesses only account for 1.5% of private employment.

Innovative digital businesses create fewer jobs in Norway compared to similar Nordic countries. In Denmark, these businesses account for 11% of new private sector jobs, and in Sweden, they account for 13%.

Norwegian private sector employment
Thousand persons



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



Note: CAGR is the compound average growth rate. Calculations are based on Orbis data for companies with available employment data.
Source: Implement Economics based on Windsor (2024) using Dealroom data, Bureau van Dijk's Orbis database and Eurostat.

Investment in innovative digital businesses in Norway is modest but growing

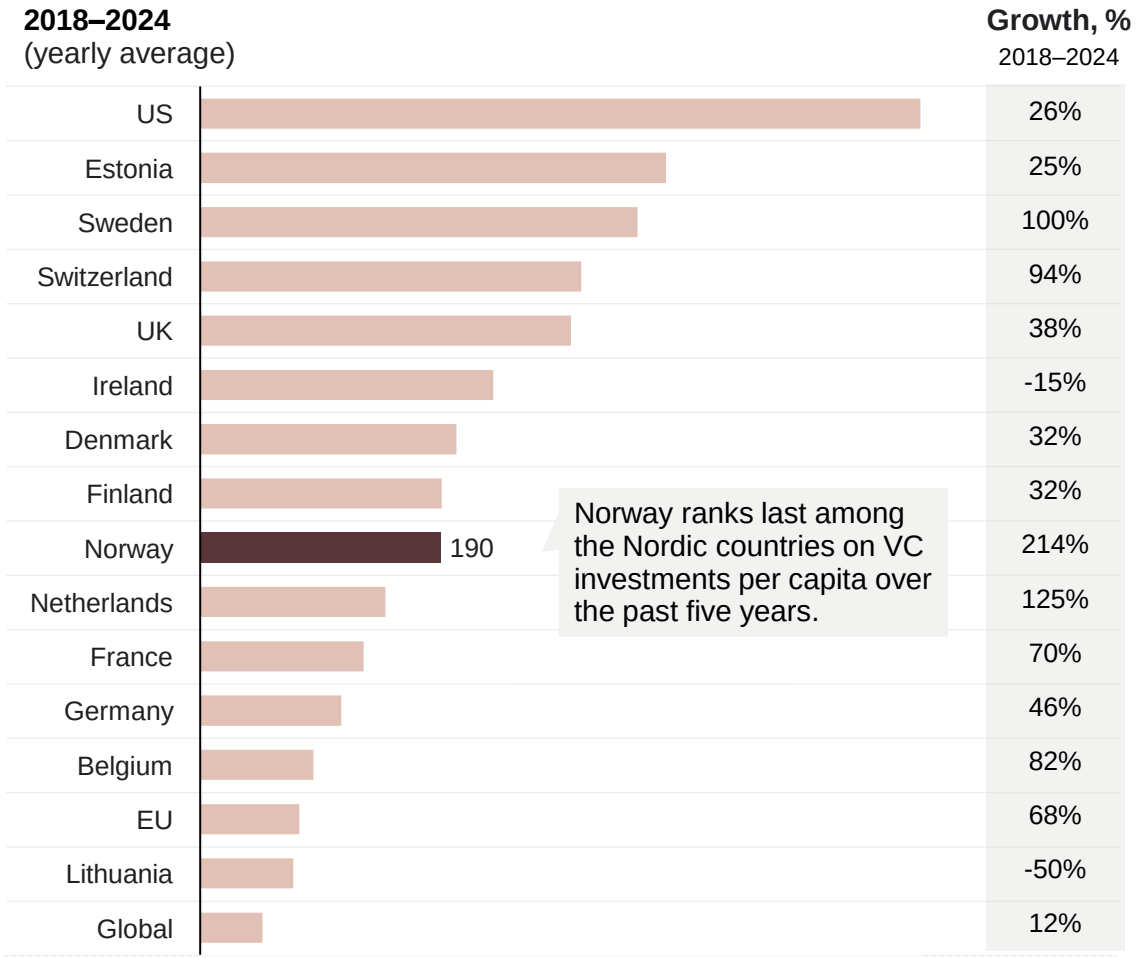
Norway ranks last among Nordic countries on VC investments per capita over the past five years, while attracting more capital than the EU average.

However, VC investments in Norway have grown by over 214% since 2018, surpassing innovation hubs like the UK and Switzerland. Performance in 2024 was also strong, exceeding peers over the past five years.

Despite these achievements, Norway and the rest of Europe still lag behind the US, the global leader in VC investment.

59% of early-stage investment in Norway comes from local investors, a much higher share than Nordic countries on average.

VC investment per capita
EUR per capita



Source: Implement Economics based on Dealroom and World Bank.

The growing entrepreneurial activity in Norway has yet to translate to higher productivity

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

Although many innovative digital businesses are on steep learning curves, as well as being restrained by resources, they are almost as productive as the average Norwegian business, excluding oil and gas.

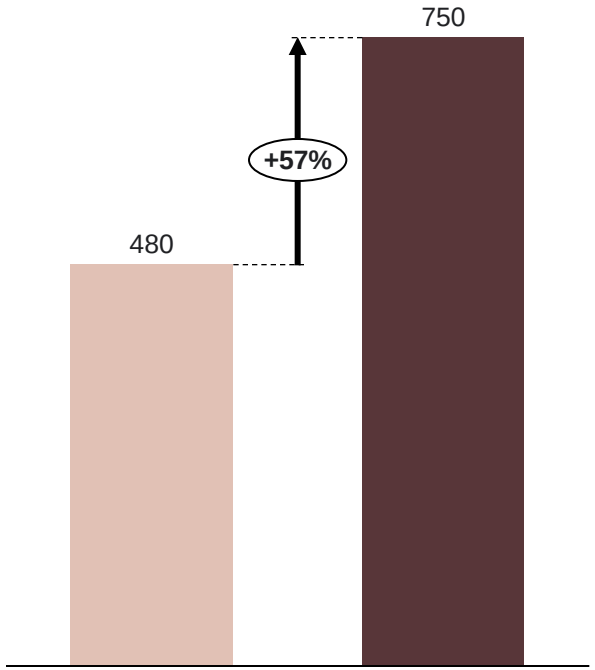
Many of these innovative businesses are early adopters of cutting-edge technologies and distribute (AI-powered) innovative solutions to other entities in the economy.

Thus, while the current productivity level for today's group of innovative digital businesses does not exceed 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 spillover effects, driven by their experimentation and adoption of AI technology.

Norwegian innovative digital businesses …

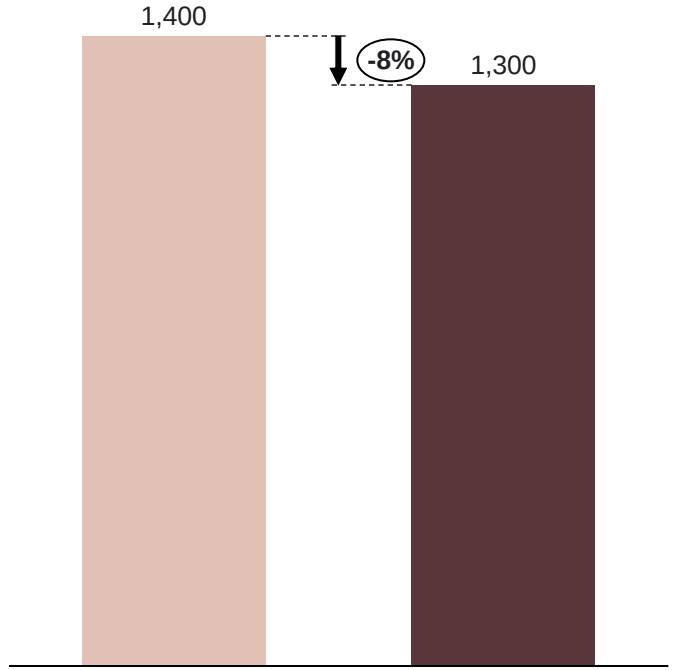
… pay higher wages

Median wages
NOK (thousand) per employee, 2023*



… but are not yet achieving higher productivity

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



Note: * Based on latest available data in Dealroom and Orbis. Calculations based on companies in Dealroom and Orbis with available financial data. 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 data and Bureau van Dijk's Orbis database.

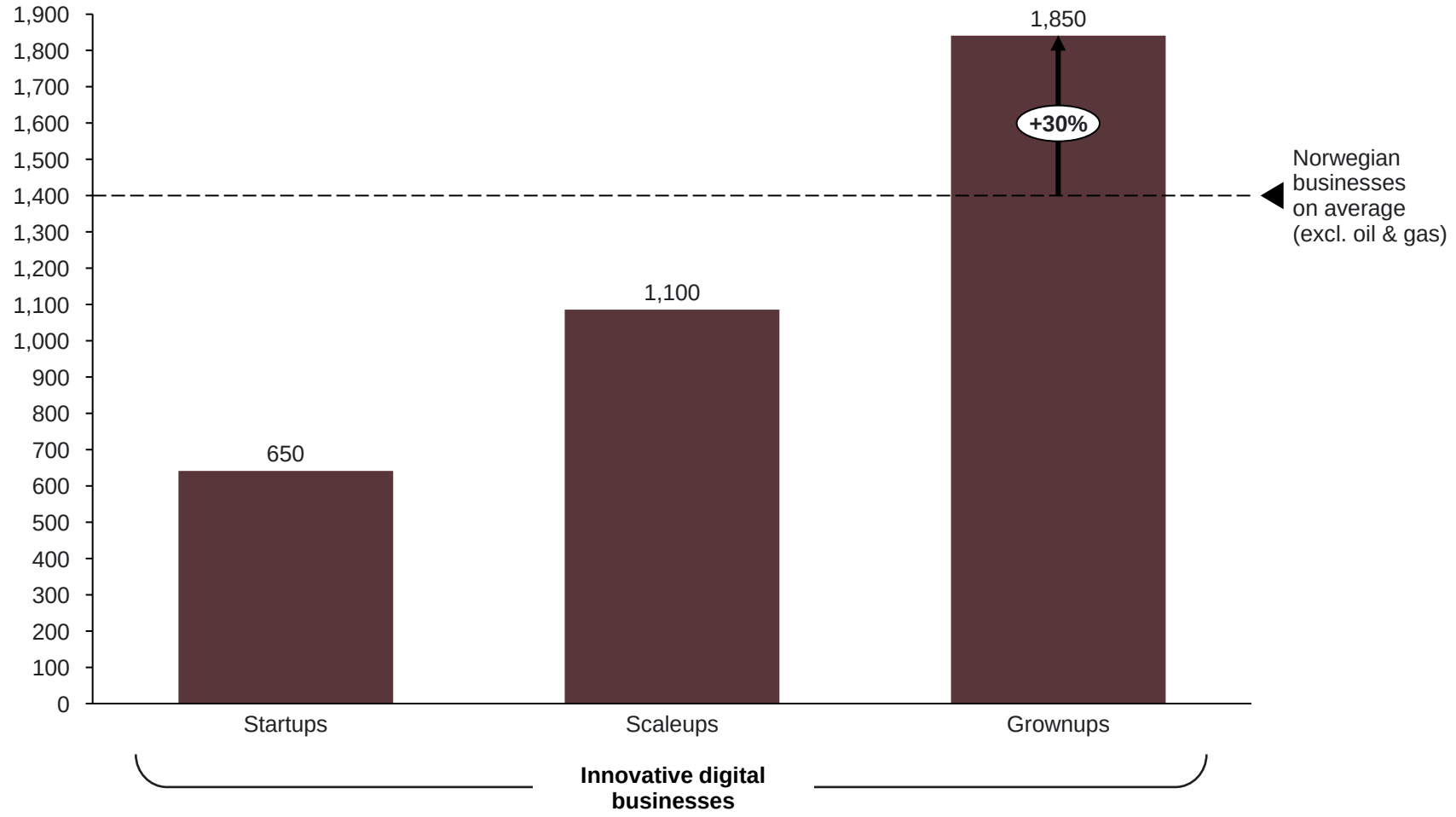
Successful scaling of innovative digital businesses boosts productivity

The labour productivity of Norwegian innovative digital businesses depends on their ability to scale into grownups.

Labour productivity is lower in startups and scaleups than Norwegian businesses on average. However, when innovative digital businesses succeed in scaling and becoming grownups, their labour productivity is 30% higher than Norwegian businesses on average.

Thus, while all innovative digital businesses begin as startups, the outsized contribution depends critically on enough of them succeeding in becoming grownups.

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



Note: * Based on latest available data in Dealroom and Orbis. Calculations based on Orbis data with available financial data. 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 data and Bureau van Dijk's Orbis database.

Europe and the Nordics 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.

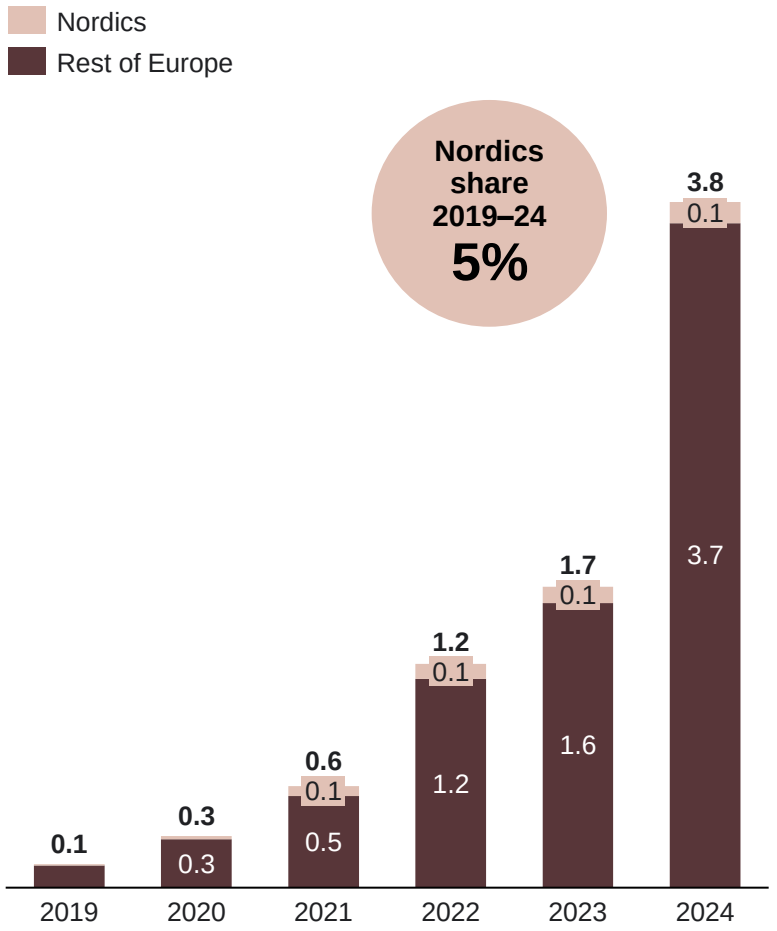
Since 2019, only 5% of the European total has been captured by the Nordics, although they constitute around 7% of European GDP.

Within the Nordics, Sweden leads with EUR 228 million in generative AI VC investments since 2019.

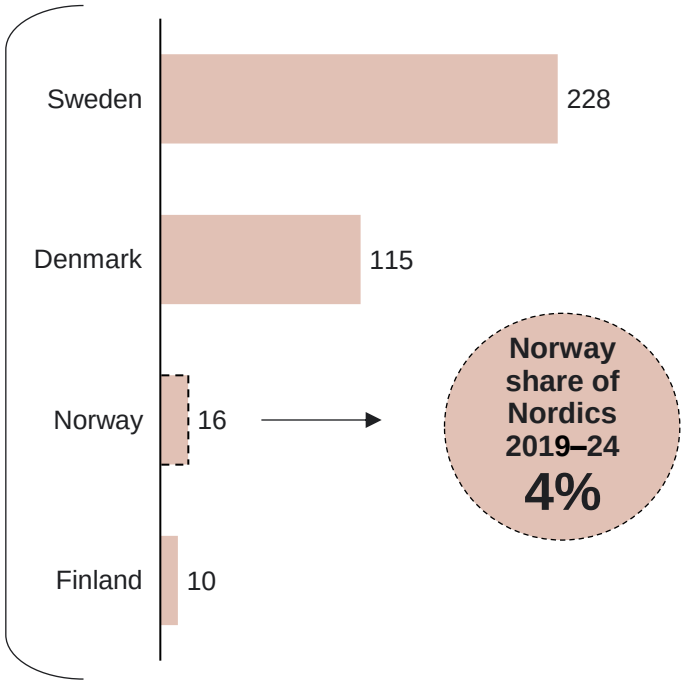
Norway has only captured EUR 16 million in the same period, which is less than a tenth of the investment in Sweden.

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

Generative AI VC investment in Europe
EUR billion



Generative AI VC investment in the Nordics
EUR million cumulated 2019–2024



Source: Implement Economics based on Dealroom.

> Research, development and innovation are crucial for Norwegian companies to assert themselves internationally over time.
>
> **Det Kongelige Finansdepartement** in Perspektivmeldingen 2024

2

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.

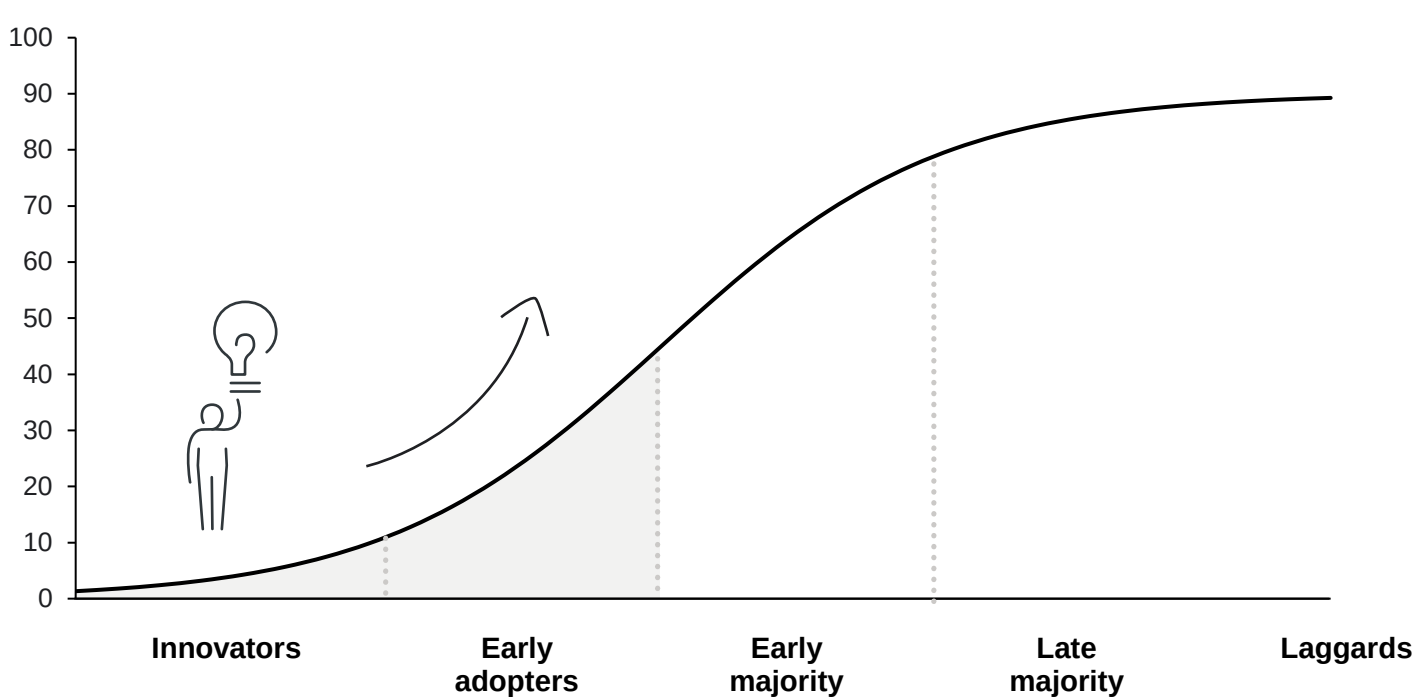
Innovative digital businesses propel AI adoption across the economy

The coming AI era holds major economic potential for Norway.

Locally grown innovative digital business and access to the best AI models is crucial for accelerating AI adoption in Norway.

Innovative digital businesses play a pivotal role in developing new AI tools and adapting existing ones, enabling other businesses across sectors to leverage the benefits of advanced technology.

Diffusion of AI technologies in Europe



In Norway, innovative digital businesses make AI technology more accessible while demonstrating its value to other businesses, fostering its diffusion across industries.

For instance, Cognite provides AI-powered solutions designed to transform heavy-asset industries such as oil and gas, energy, and shipping.

Boost.ai offers an AI platform that helps businesses automate customer service tasks, providing scalable virtual agents.

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).

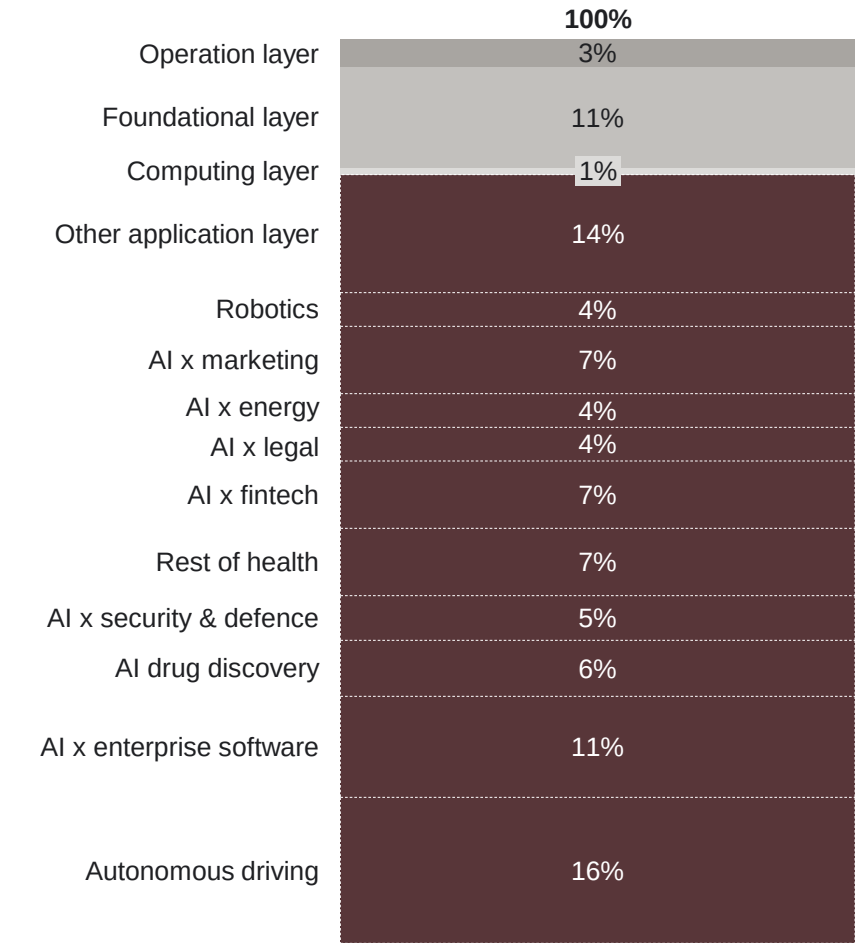
Innovative digital businesses can use AI to transform sectors across the economy

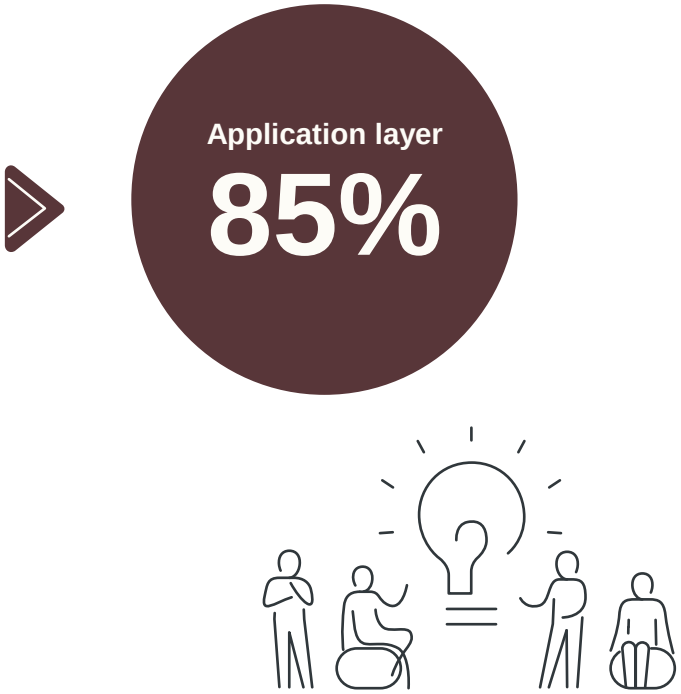
85% percent of European AI venture capital funding is directed toward the application layer of AI, focusing on real-world uses and integration into diverse sectors of the economy.

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 data as of 12th June 2024
Source: Implement Economics based on Dealroom.

Four out of five European innovative digital businesses use generative AI

Realising the productivity potential of AI hinges on Norwegian 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. Generative AI is based on large language models that can interact in and create text, images, code, and sound **–** examples include Gemini and ChatGPT.

Notion Capital poll

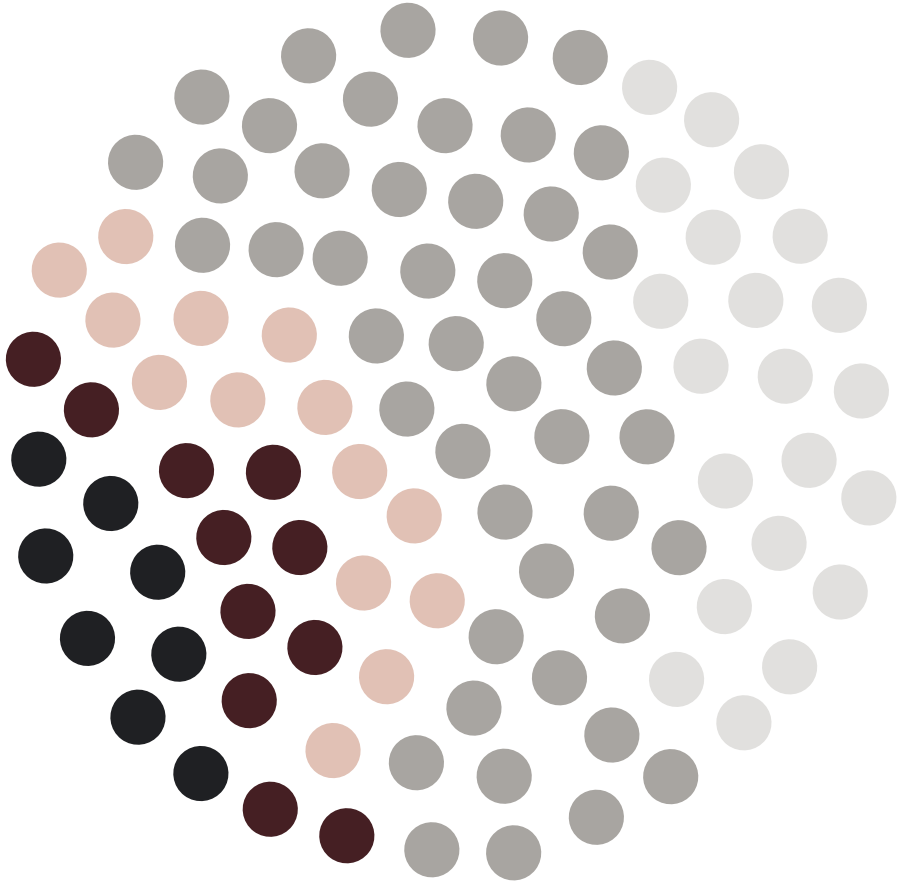
Use of generative AI in European innovative digital businesses
% of respondents

Focusing on *generative AI*

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

- ... **46%** who have **experimented** with or **partially adopted** generative AI (49% in Norway).
- … **14%** who have **fully adopted** generative AI. (15% in Norway)
- … **11%** who have **adopted and actively adapted** generative AI technology to suit business needs. (9% in Norway)
- … **8%** who have **generated** new AI technologies to serve business needs. (6% in Norway)

… while **21%** do not use generative AI. (21% in Norway)



Note: Sample size of n=1095 in Europe and n=47 in Norway for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

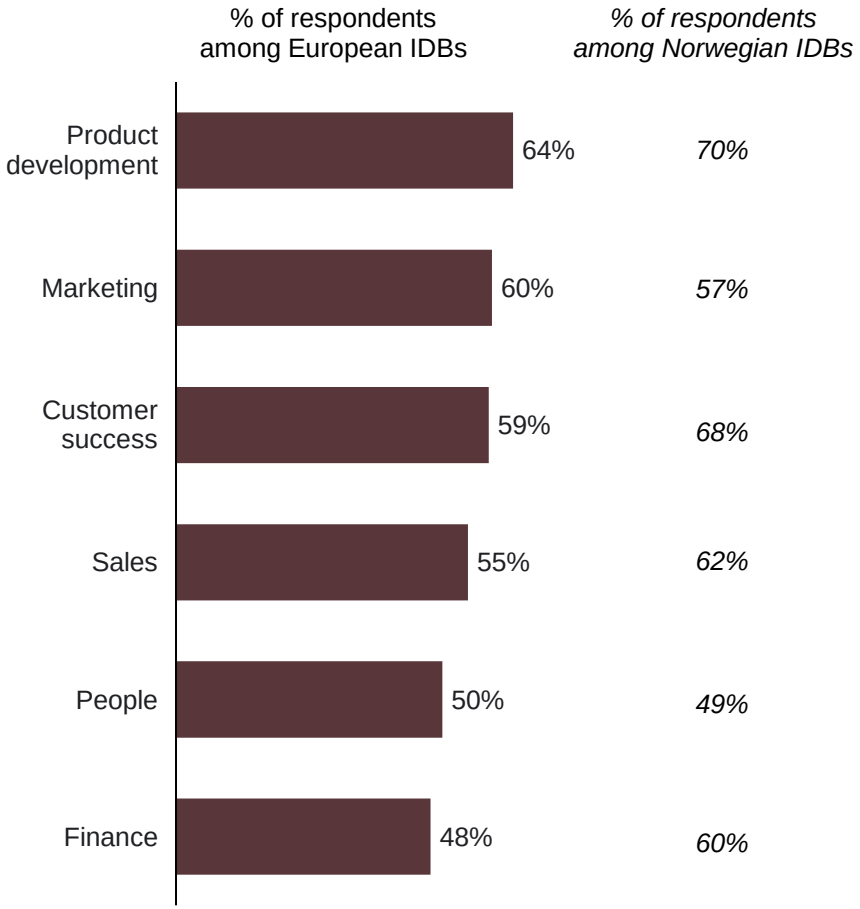
AI boosts value creation and efficiency in innovative digital businesses

Surveyed innovative digital businesses (IDB) in Europe and Norway use AI to create value across several key business functions. For example, 64% of European respondents state that AI has positively influenced their product development, while 60% state it has improved their marketing.

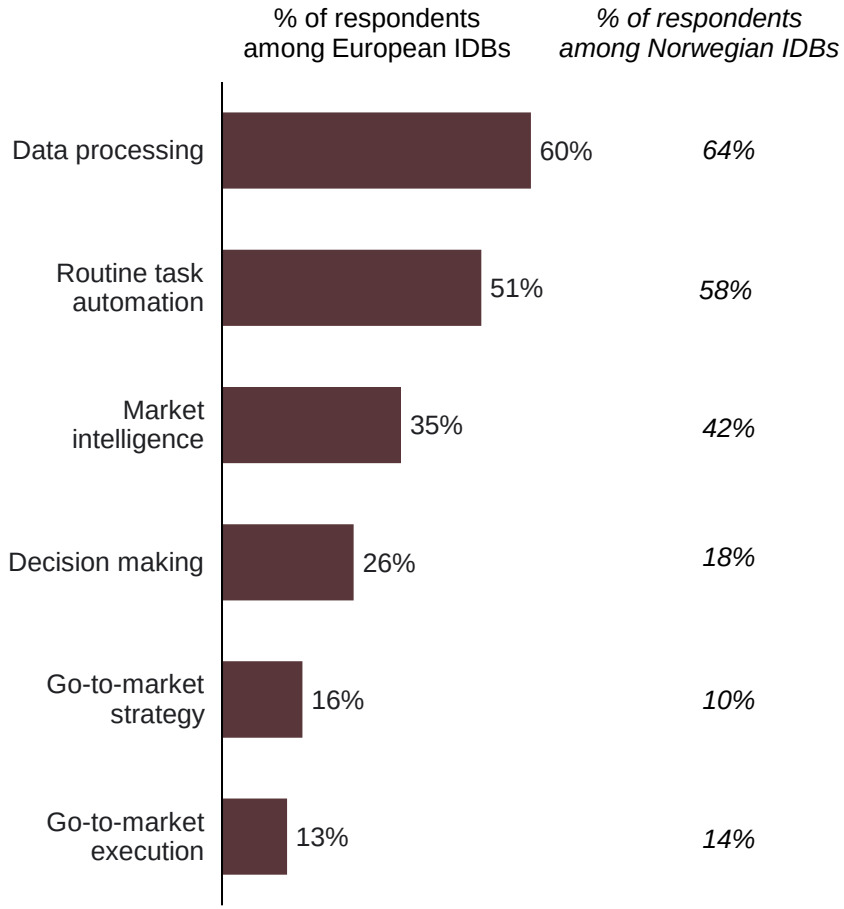
In addition, surveyed innovative digital businesses report that AI has improved efficiency across multiple areas, helping to optimise and streamline operations. For example, 60% of European respondents report improved data processing and 51% point to improvements in routine task automation.

Responses from Norwegian innovative digital businesses are similar to average response rates across Europe. To ensure a large sample size, European polling results are reported.

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: Sample size of n=1095 in Europe and n=47 in Norway for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

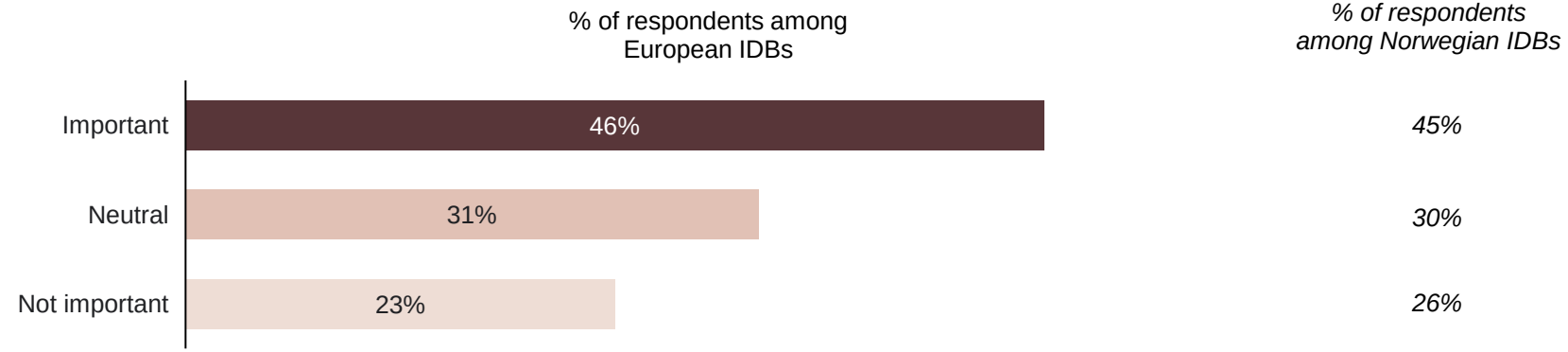
Innovative digital businesses benefit from global access to AI technology

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.

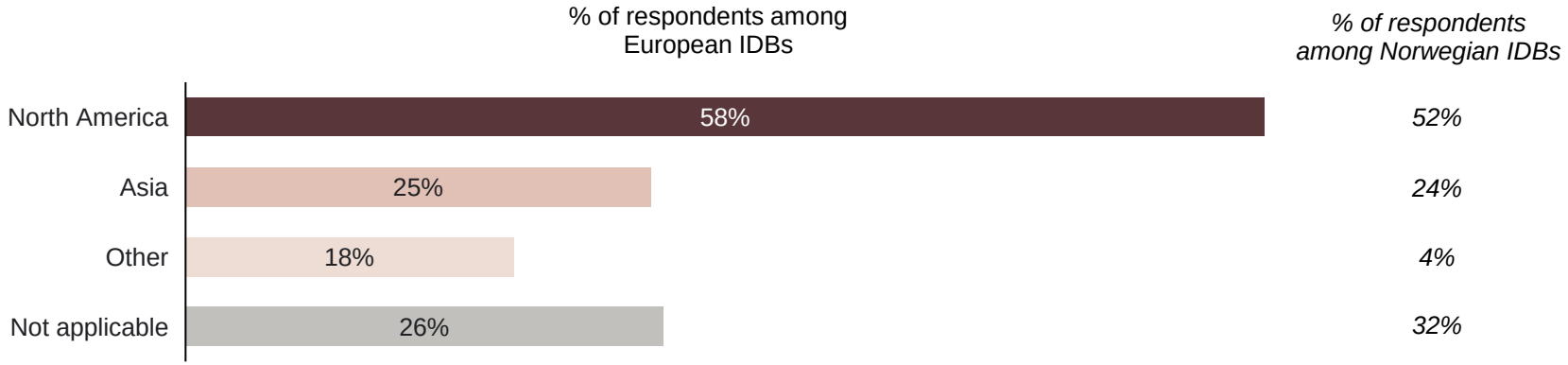
European innovative digital businesses state that they benefit from AI models developed outside Europe, with 46% saying that access to cutting-edge AI technologies from non-European companies is important for their business. Most respondents (58%) source these technologies from North America.

Access to these pre-trained models allows innovative digital businesses to develop AI applications efficiently without 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: Sample size of n=1095 in Europe and n=47 in Norway for Notion Capital survey. 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. Responses from Norwegian innovative digital businesses are similar to average response rates across Europe. To ensure a large sample size, European polling results are reported.
Source: Implement Economics based on Notion Capital survey (2024) and Draghi .

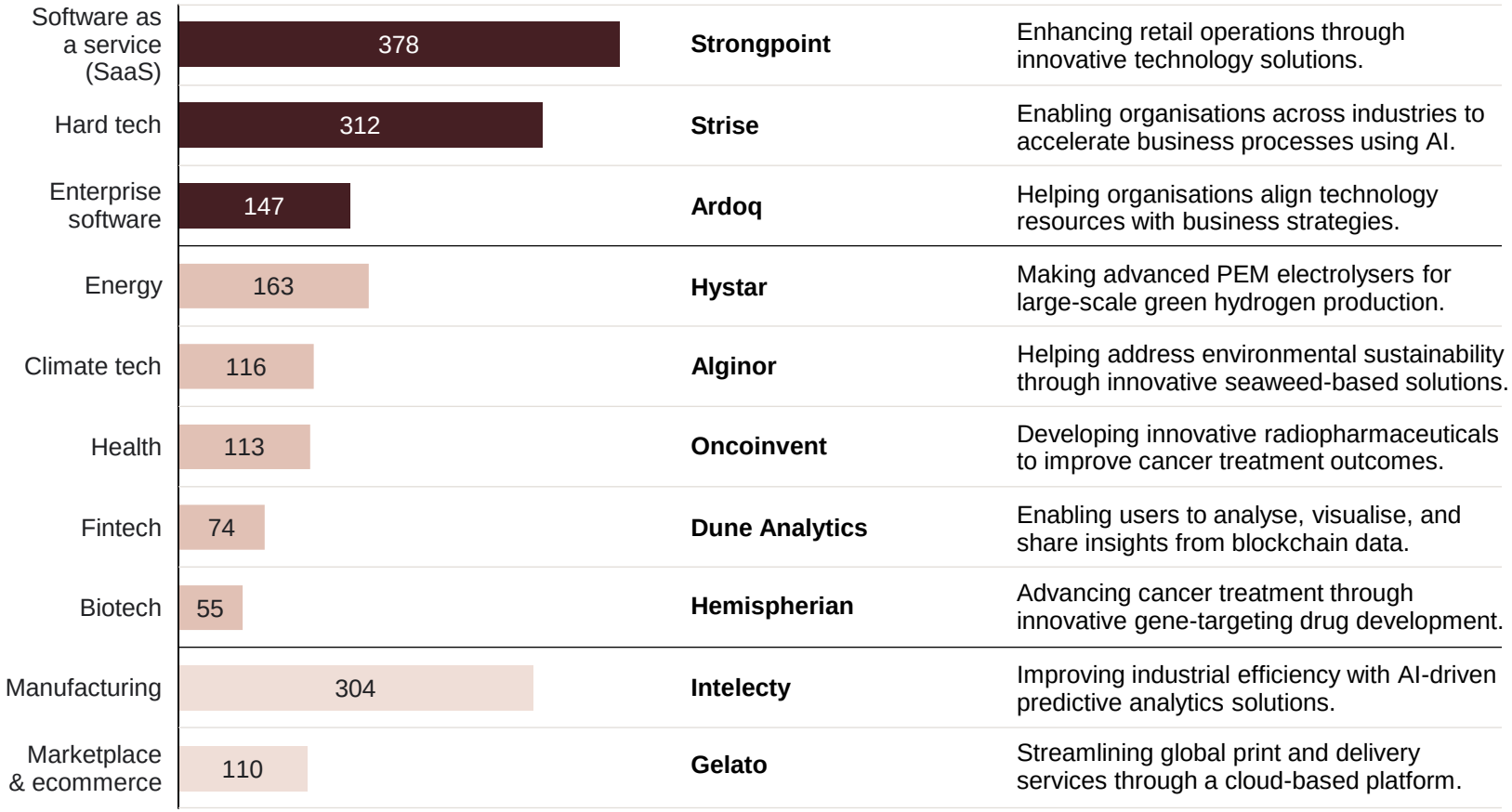
Innovative digital businesses work to solve societal challenges

Innovative digital businesses bring new products to the market and are often tech-enabled with proprietary technology, software, or tech-driven business processes. The innovative digital businesses are active across many domains and the opportunities with AI reach far beyond the tech sector.

These businesses are either using proprietary technology/software or have business processes that are heavily enabled by digital technology. In Norway, 378 of them work within software as a service (SaaS), 312 work in hard tech and 304 in manufacturing.

Many of them work to address societal challenges, including 163 in energy, 113 in health and 55 in biotech.

Focus areas of Norwegian 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)	**Strongpoint**	Enhancing retail operations through innovative technology solutions.
Hard tech	**Strise**	Enabling organisations across industries to accelerate business processes using AI.
Enterprise software	**Ardoq**	Helping organisations align technology resources with business strategies.
Energy	**Hystar**	Making advanced PEM electrolysers for large-scale green hydrogen production.
Climate tech	**Alginor**	Helping address environmental sustainability through innovative seaweed-based solutions.
Health	**Oncoinvent**	Developing innovative radiopharmaceuticals to improve cancer treatment outcomes.
Fintech	**Dune Analytics**	Enabling users to analyse, visualise, and share insights from blockchain data.
Biotech	**Hemispherian**	Advancing cancer treatment through innovative gene-targeting drug development.
Manufacturing	**Intelecty**	Improving industrial efficiency with AI-driven predictive analytics solutions.
Marketplace & ecommerce	**Gelato**	Streamlining global print and delivery services through a cloud-based platform.

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 data.

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

Academic studies show that …

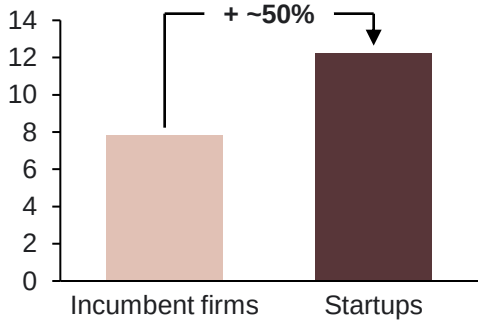
… startups create more radical and disruptive innovations …

~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 of radical innovations
% outlier inventions



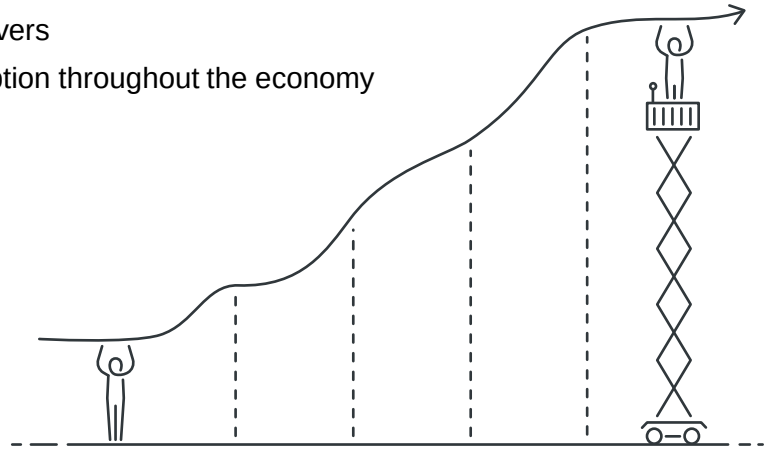
> Startups generate innovations that are more radical and disruptive than those of incumbent firms.
>
> **Kolev et al. (2022)**

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

26% of aggregate productivity growth 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.
Source: Implement Economics based on Kolev et al. (2022) and Akcigit & Kerr (2018).

3

The importance of scaling innovative digital businesses

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

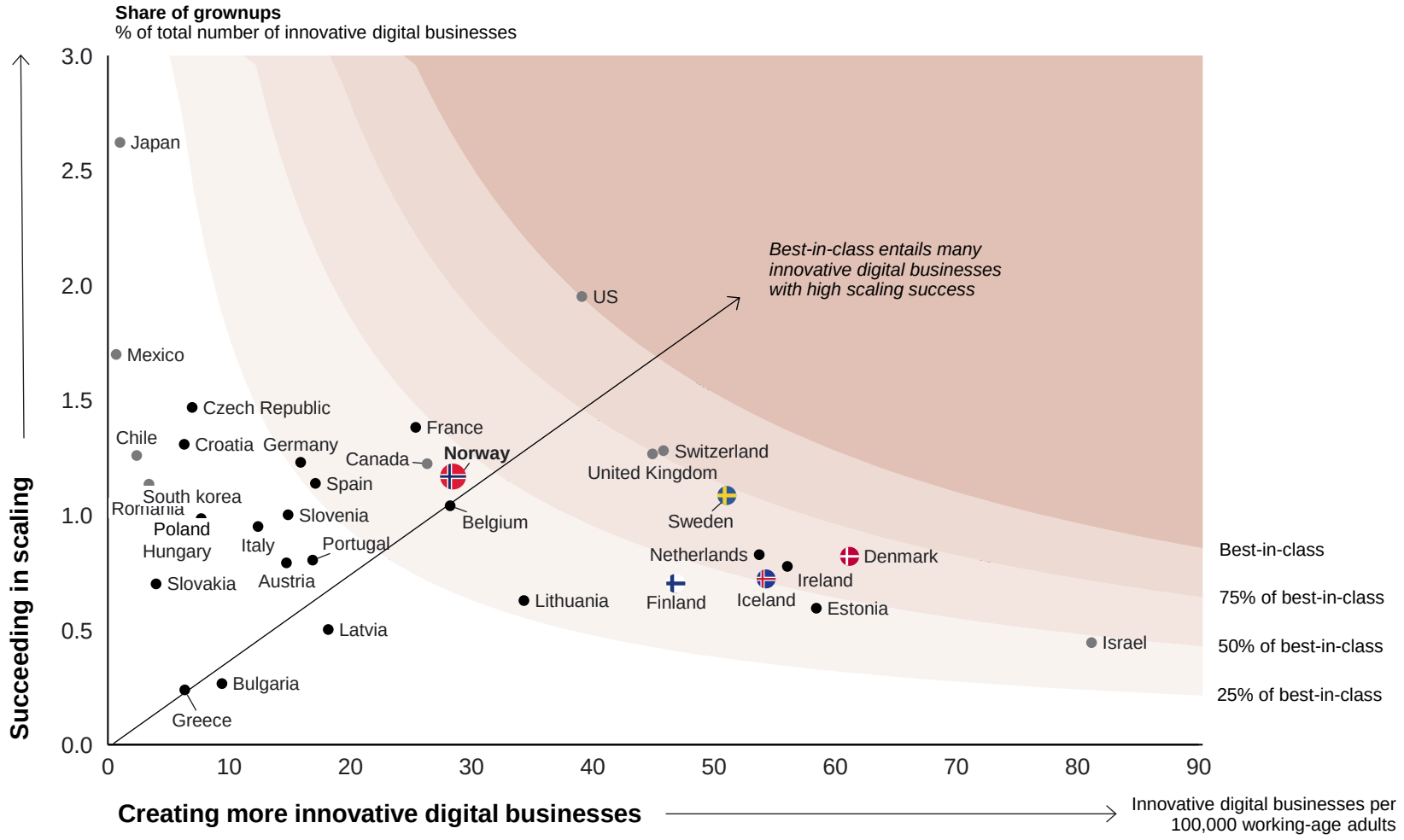
Norway needs more and better innovative digital businesses to be on a par with the best

Compared to its Nordic peers, Norway is trailing behind on entrepreneurial activity, measured as innovative digital businesses per 100,000 working-age adults.

Although the percentages of these businesses that scale into grownups matches the European average, this is a modest performance considering the low entrepreneurial activity.

To unlock the economic growth and diversification of the economy, Norway must increase the number and scaling success of innovative digital businesses.

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



Source: Implement Economics based on Windsor (2024) using Dealroom data and Eurostat.

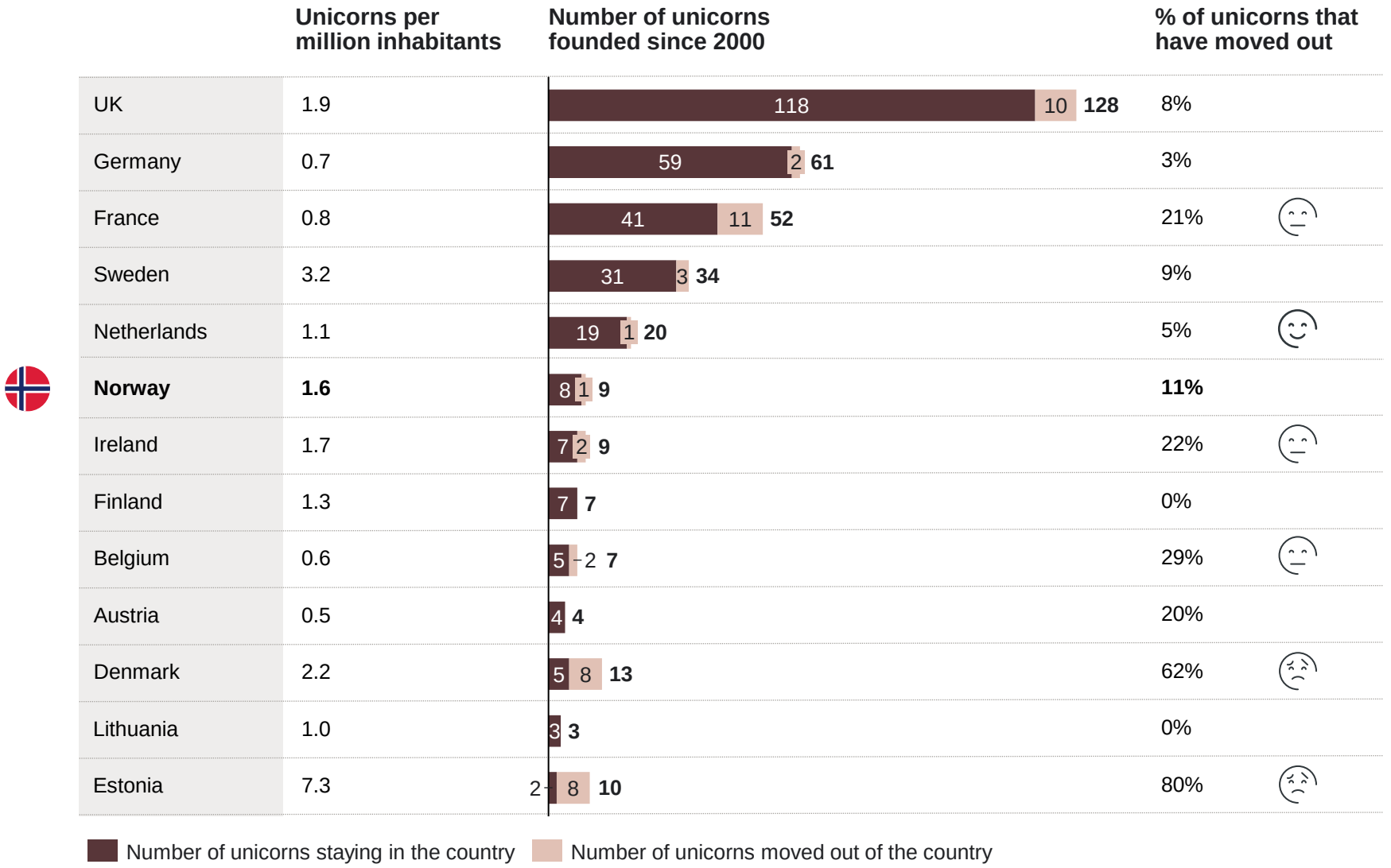
Norway is good at retaining its unicorns

Since 2000, Norway has produced 9 unicorns (1.6 per million people), which is less than peers Sweden (3.2) and Denmark (2.2). Unicorns are startups that reach a valuation of USD 1 billion.

Only one of Norway's nine unicorns has moved abroad, which is on a par with Sweden (three out of 34) and significantly lower than Denmark (eight out of 13).

Growing and retaining more of these quickly scaling innovative businesses holds large economic potential for Norway.

> … 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



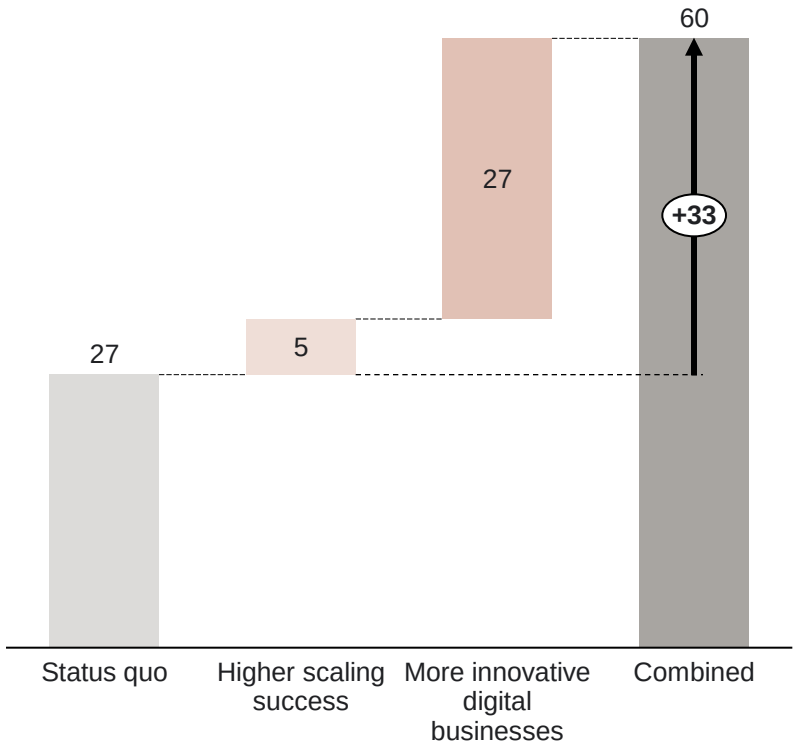
Note: Unicorns as of February 2025. Many unicorns in Finland have been sold to US or Chinese companies, while keeping their HQs in Finland, contributing to Finland's strong record of retaining unicorns.
Source: Implement Economics based on Dealroom, World Bank Group and Draghi (2024).

Norway can unlock significant economic growth through innovative digital businesses

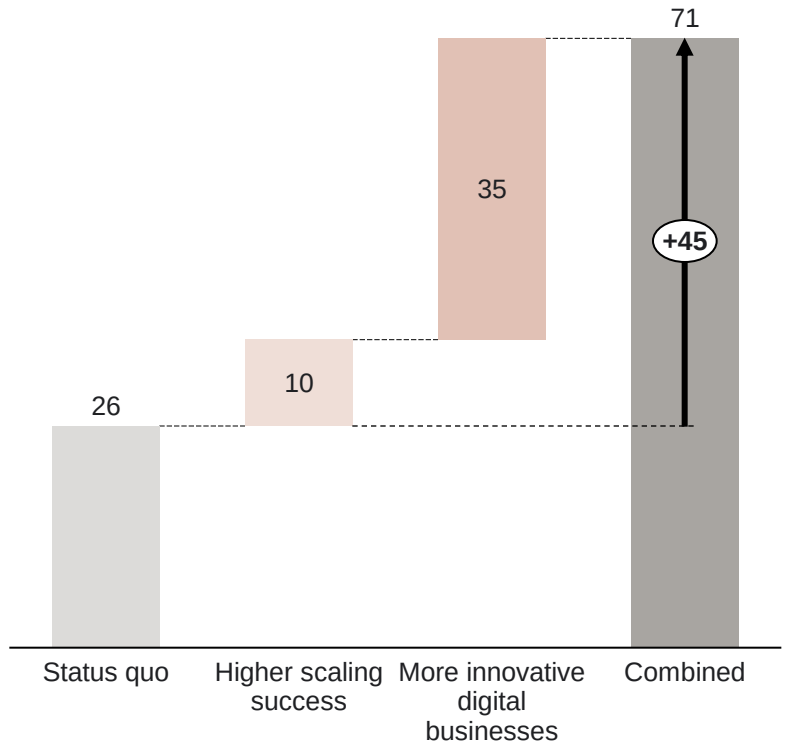
More and better innovative digital businesses could create 33,000 high-value jobs and contribute almost NOK 45 billion annually to the Norwegian economy. The impact stems from:

- **Higher scaling success of innovative digital businesses.** Transforming more startups into higher-productivity grownups, reaching the same success rate as the three leading OECD countries, could create 5,000 high-value jobs and add NOK 10 billion annually to the Norwegian economy.
- **More innovative digital businesses.** If Norway can grow more innovative digital businesses, reaching the entrepreneurial activity of the three leading OECD countries, these new innovative digital businesses could support 27,000 jobs and contribute NOK 35 billion annually to the Norwegian economy.

Jobs
Thousand



Annual GVA* in innovative digital businesses
NOK 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 data and Bureau van Dijk's Orbis database.

4

The way forward

> The business sector shall have favourable framework conditions for developing and using AI.
>
> **Norway's National Digitalisation Strategy 2024–2030**

Enhancing talent, innovation capabilities and digital infrastructure is needed to grow competitive businesses and capture the AI opportunity

Innovative digital businesses need…	Norway'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	A digitally skilled workforce is essential for growing digital innovative businesses and Norway could benefit from enhancing the skills of the workforce to aid skills and labour shortages.
Tech Accessing state-of-the-art AI tools, digital infrastructure and compute power	Access to open, flexible and secure cloud platforms and AI tools and models is critical for growing efficient innovative digital businesses. However, Norway ranks moderately on connectivity in DESI and 12th among European peers in AI infrastructure, according to the Tortoise Global AI Index.
R&D Accelerating R&D with AI	AI has the potential to accelerate applied research and scientific breakthroughs by synthesising knowledge, analysing data and simulating experiments. Norway lags behind its peers in R&D investment, but the government is prioritising innovation with a NOK 1.3 billion investment in AI research by 2030 (KI-milliarden).
Rules Regulatory clarity and reasonable compliance-costs	While it is easy to start a new business in Norway, regulatory barriers for AI make it especially hard for young innovative digital businesses to grow.
Capital Increasing the attractiveness of venture capital investment in Norway	The lower levels of venture capital investment in Norway are a symptom of a low expected risk-adjusted after-tax return.

More talent is needed to drive innovation and capture the AI potential in Norway

People

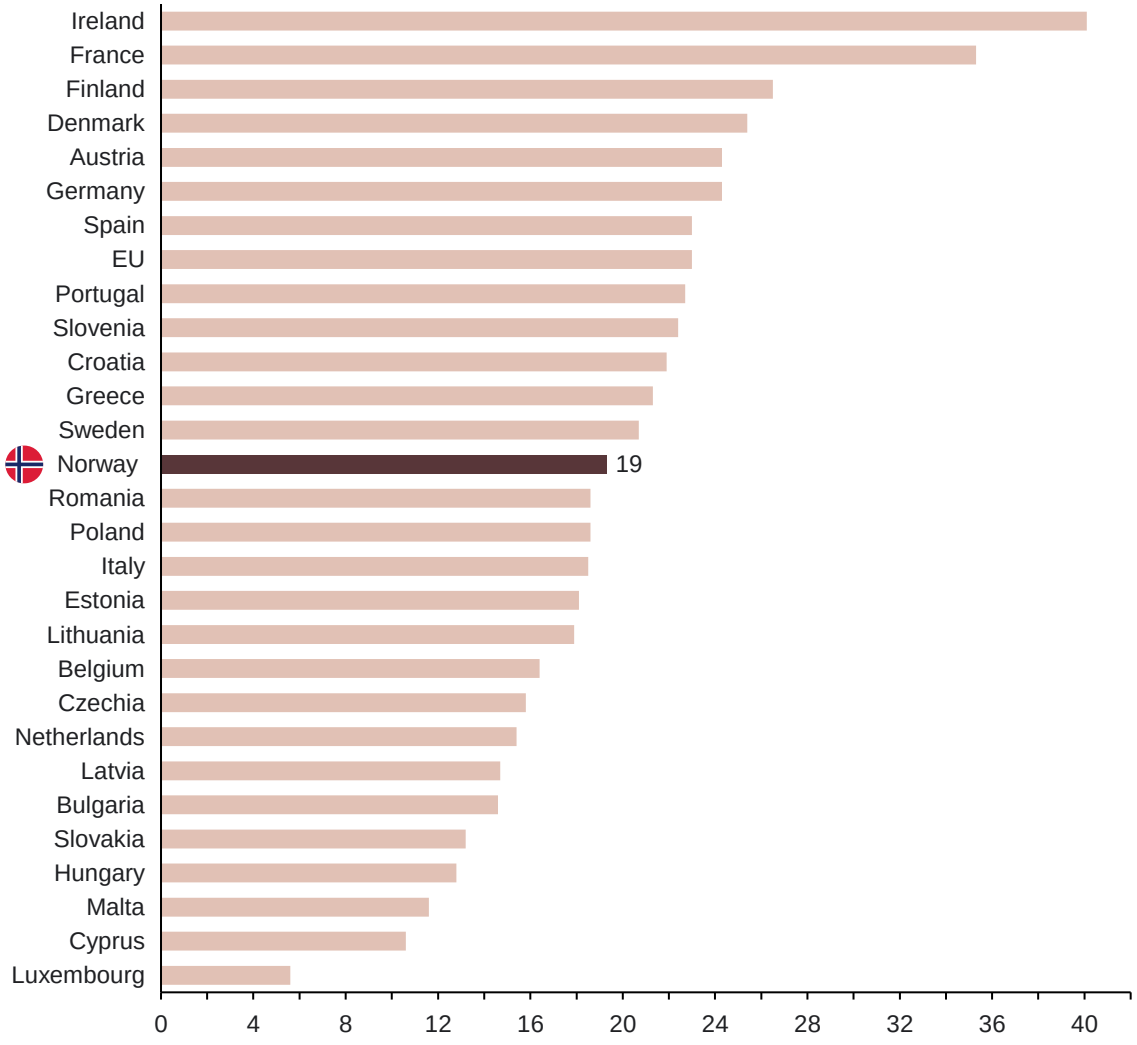
A skilled workforce is essential for growing innovative digital businesses. Using and innovating on top of cutting-edge technology like AI requires a well-educated workforce with strong technical capabilities, creative problem-solving skills and specialised AI skills.

Norway is lacking talent. Norway scores above the EU average on human capital in DESI while trailing behind in terms of the amount of STEM graduates. Competition for labour is high in Norway, and there is a significant mismatch between the skills needed and those available. The NHO's 2023 Skills Barometer indicates that 46% of companies struggled to recruit the required expertise, and a recent survey by the Norwegian Labour and Welfare Administration shows a shortfall of around 70,000 employees.

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.

The competencies of the current Norwegian workforce could benefit from attracting more international talent, if they are to succeed with the digital transition.

Graduates in STEM, 2021
Per 1,000 of population aged 20–29



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

Norway needs to enhance digital infrastructure to grow and scale innovative digital businesses

Tech

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.

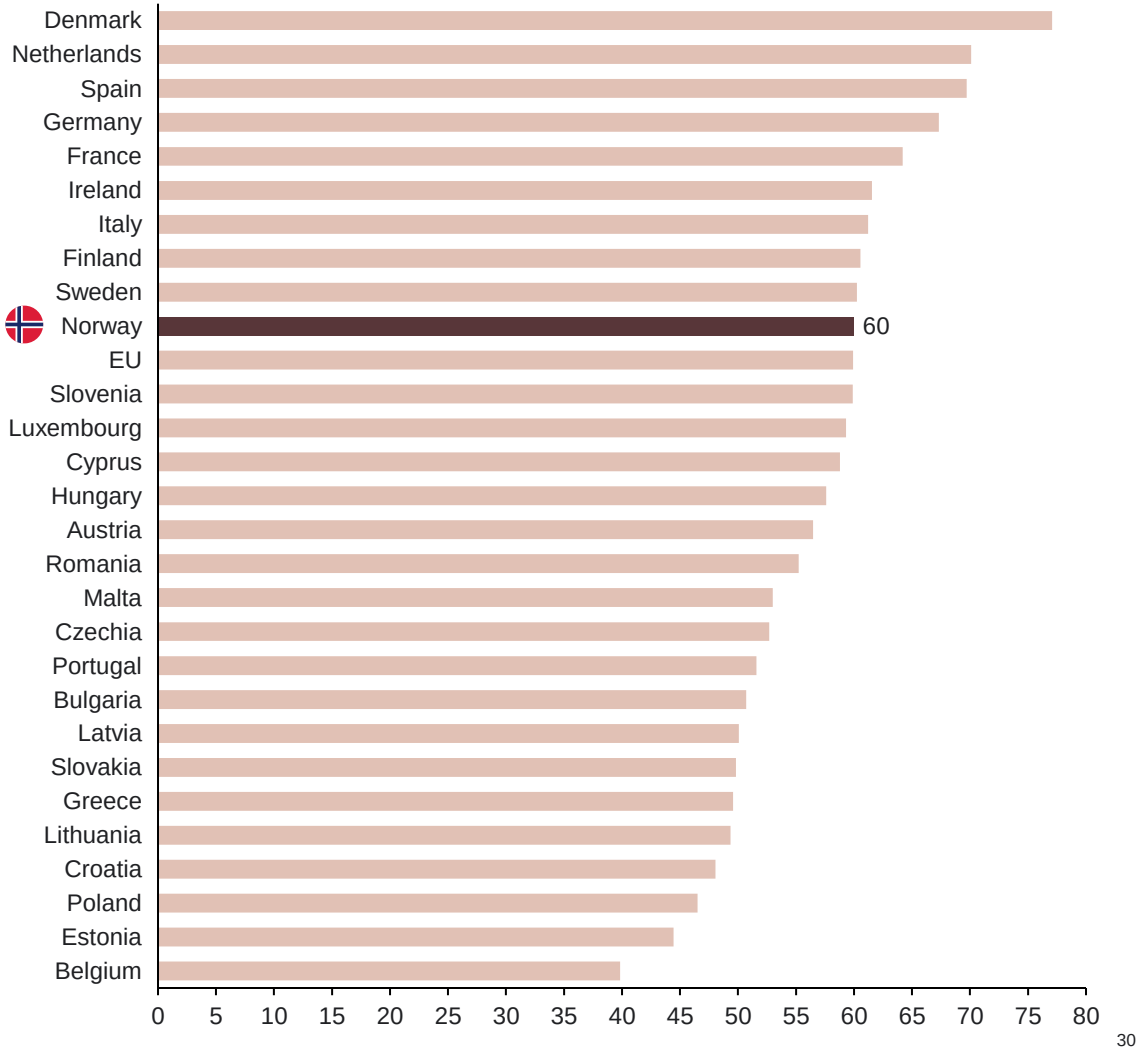
Access to top-performing AI/ML tools like Google Vertex and Hugging Face is central for Norwegian innovative digital businesses. According to Notion Capital polling, 46% of European Innovative Digital Businesses already rely on international models, mostly from North America.

Norway's digital infrastructure is lagging behind its European peers. Norway scores moderately on connectivity in DESI and ranks 12th in AI infrastructure among European peers in the Tortoise Global AI Index.

Capturing the AI opportunity requires investment in the digital infrastructure. IDC predicts that global data centre demand will nearly triple by 2027, highlighting the need for more and smarter 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) and Letta (2024).

Norway is behind its peers on innovation capacity

R&D

Norway's innovation capacity lags behind its Nordic peers, with R&D spending below the EU average and moderate performance in the WIPO Global Innovation Index (GII). To generate innovation-driven growth, Norway should prioritise increasing R&D investment. The government already plans to invest NOK 1.3 billion in AI-related research towards 2030 (known as *KI-milliarden*).

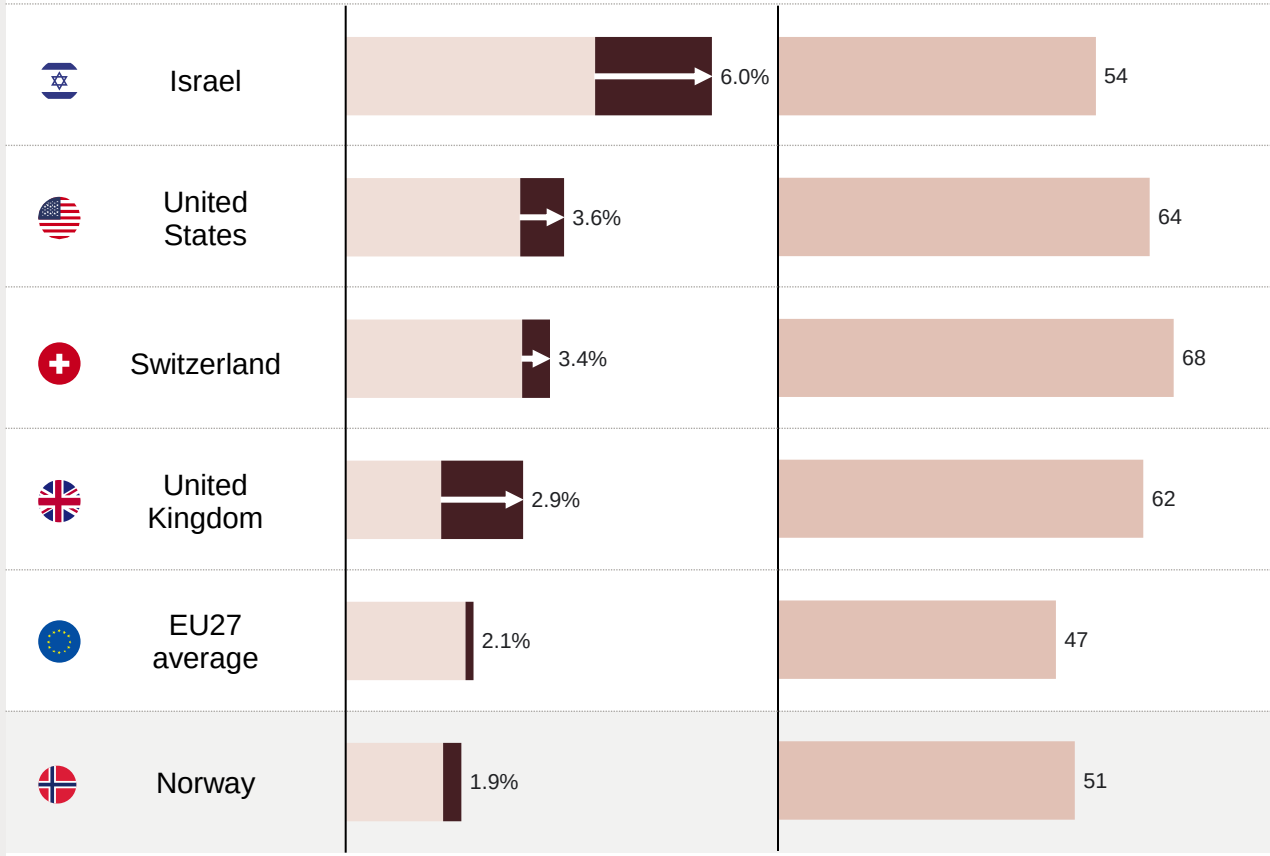
Innovation drives productivity growth, and the private sector plays a key role in fostering innovation in Norway. As companies scale, their investments in R&D tend to increase. Establishing favourable conditions for business investment and growth is essential in enhancing Norway's innovation capacity.

AI has the potential to accelerate applied research and scientific breakthroughs. For example, AI innovations like AlphaFold, an AI system developed by Google DeepMind, have revolutionised protein folding predictions. By adopting generative AI, Norway could enhance R&D productivity, enabling researchers to stay current and identify breakthrough opportunities.

Research and development expenditure
% of GDP

2012 | 2022 or latest available year

WIPO Global Innovation Index (GII) 2023
Index



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

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

Rules

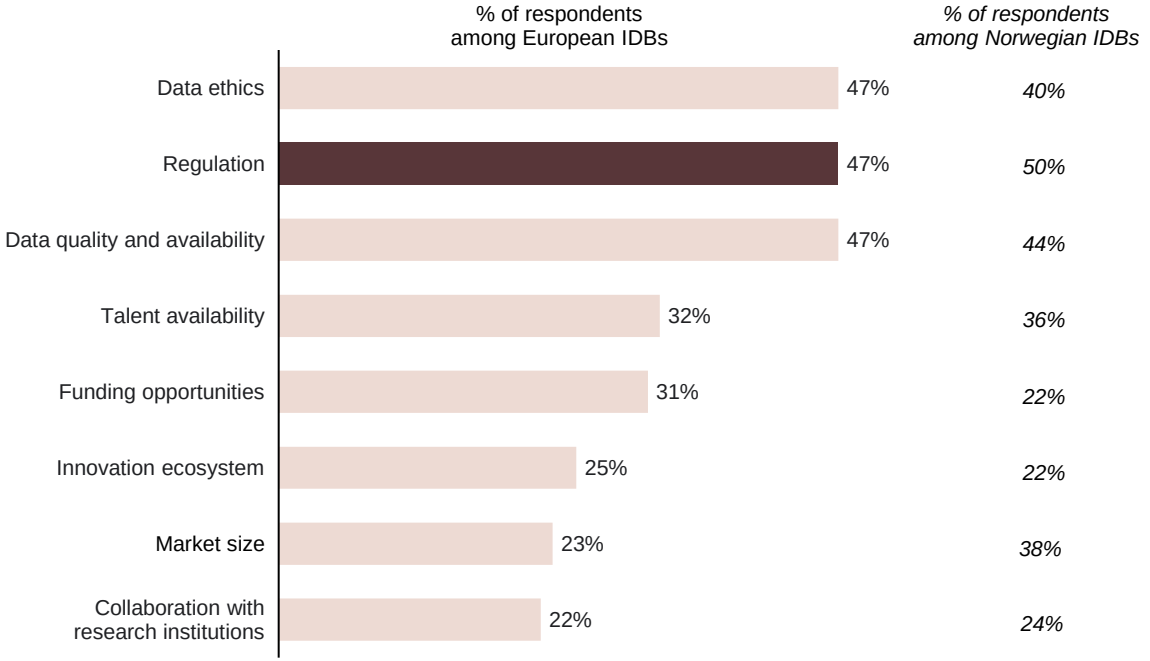
As part of the European Economic Area (EEA), Norway must comply with EU regulations, including the new AI regulation, which was welcomed by the Norwegian government.

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.

The cost of compliance with EU regulation is substantial and particularly burdensome for small businesses. GDPR enforcement alone led to an 8% reduction in profits by covered businesses, with small tech companies experiencing double the impact.

Regulatory uncertainty delays AI innovation and adoption. 47% of surveyed European innovative digital businesses see regulation as an obstacle to developing cutting-edge AI technologies. Large companies such as Google, Apple, Meta and OpenAI have also announced product delays or cancellations due to regulatory ambiguity.

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



> … 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

Note: Sample size of n=1095 in Europe and n=47 in Norway for Notion Capital survey. Norway is a member of the European Economic Area (EEA) and must comply with EU legislation related to the single market.
Source: Implement Economics based on iapp (2024), Draghi (2024), Bruegel (2014), Chen et al. (2022), Euronews,, and survey by Notion Capital (2024).

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.

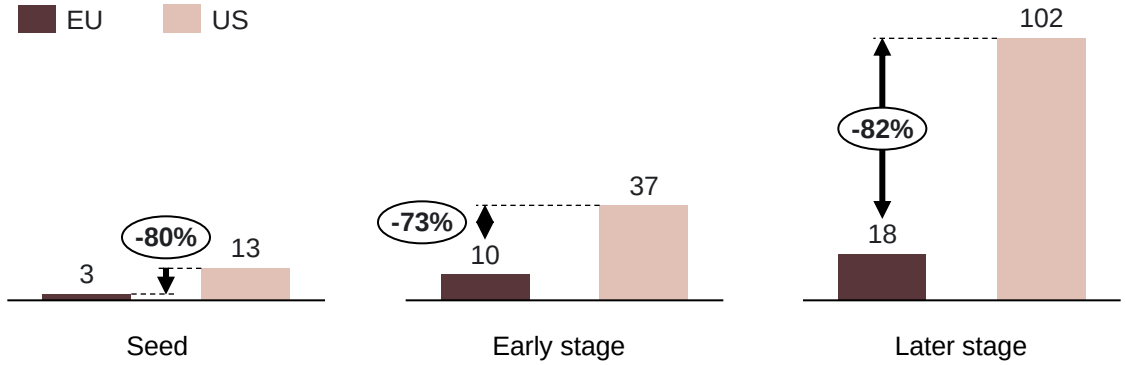
But Europe attracts around USD 100 billion less in venture capital investment than the US. Venture capital is the main source of financing for innovative digital businesses, especially those aiming to grow aggressively towards the "grownup" scale.

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.

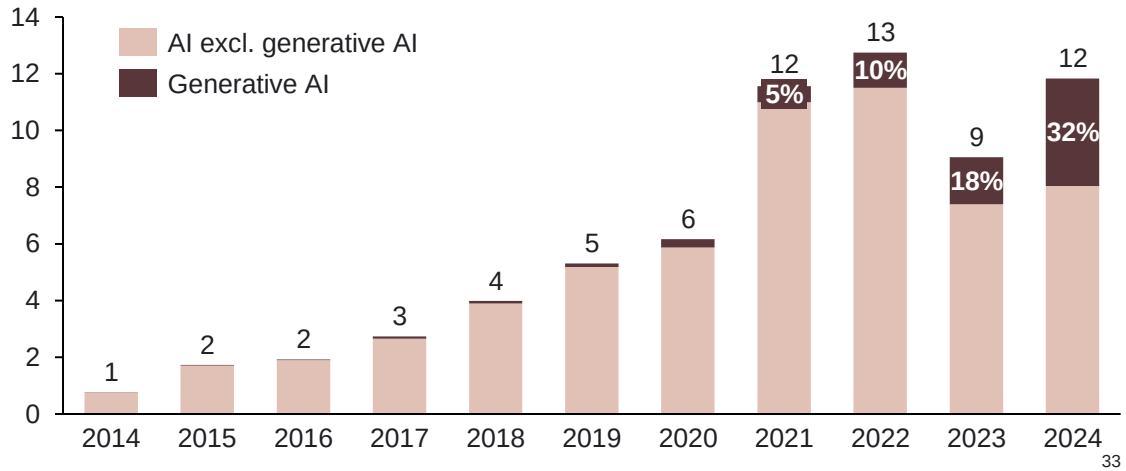
Regulatory uncertainty and excessive regulatory costs are a further negative element. Unclear rules and higher regulatory burdens reduce the expected return on the capital needed to scale up Europe's innovative digital businesses.

Capital

Venture capital investment by development stage
USD billion, 2023



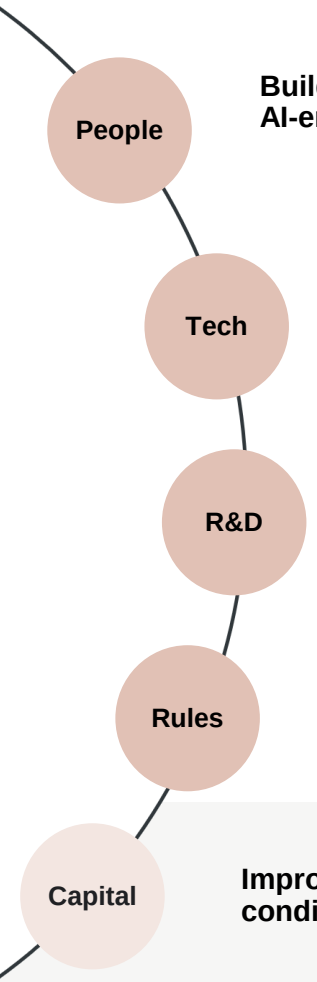
Europe AI venture capital investment
EUR billion



Source: Implement Economics based on Draghi (2024) and Dealroom.

Unlocking the potential of innovative digital businesses with AI

The Norwegian government can upgrade the existing framework conditions for innovative digital businesses to be fit 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 workers' capabilities, so that they 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 a 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	• Review the Norwegian taxation rules for innovative fast-growing venture-backed companies. • 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.

Disclaimer

This report (the “Report”) has been prepared by Implement Consulting Group (Implement). The purpose of this Report is to assess the economic opportunity of innovative digital businesses in Norway.

All information in the Report is derived from or estimated by Implement’s analysis using proprietary and publicly available information. Google (“The Company”) has not supplied any company data, nor does it endorse any estimates made in the Report. In addition to the primary market research and publicly available data, Implement’s analysis is based on third-party data provided by the Company. In preparing the Report, Implement has, without independent verification, relied on the accuracy of information made available by the Company. Where information has been obtained from third-party sources and proprietary research, this is clearly referenced in the footnotes. The Report is based on work conducted from August 2024 to February 2025. Implement will not make any representation or warranty as to the correctness, accuracy or completeness of the contents of the Report or as to the sufficiency and/or suitability thereof for the Company’s or the reader’s purposes, nor does Implement assume any liability to the Company, the reader or any other legal entities for any losses or damages resulting from the use of any part of the information in the Report. The information contained herein is subject to change, completion or amendment without notice. In furnishing the Report, Implement undertakes no obligation to provide the Company with access to any additional information.

Authors

- Martin H. Thelle
- Bodil Emilie Hovmand
- Hans Henrik Woltmann
- Nikolaj Tranholm-Mikkelsen
- Alexander Jagd Oure
- Sissel Marie Andersen