IMPLEMENT
CONSULTING GROUP

The AI innovation opportunity

How the Netherlands 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 – 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 create innovative businesses across all sectors of the economy and boost their productivity.

Innovative digital businesses are key to capturing the AI opportunity

As we enter a new era of AI-driven economic growth, AI could significantly boost Europe’s long-term growth and reverse the declining productivity trend in many 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 AI’s value by being early adopters and innovators
- Inspire smart AI usage in other businesses
- Create 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 the Netherlands which are further classified as startups (2–50 employees), scaleups (51–500 employees), or grownups (over 500 employees).

SUMMARY

AI can supercharge the Netherlands' ecosystem of innovative digital businesses, boosting productivity and competitiveness

The Netherlands has a well-developed ecosystem of innovative digital businesses

The Netherlands is home to around 6,100 innovative digital businesses, employing 150,000 people and accounting for 7% of net job creation in the private sector since 2017.

The Netherlands' strong history of commercialising new technology in industries like semiconductors is reflected in its position as one of the most productive EU countries.

Sustaining high productivity levels requires that Dutch businesses scale successfully

Innovative digital businesses that succeed in scaling have an outsized contribution to the economy, being 90% more productive than other Dutch businesses on average. However, the Netherlands trails behind European and global leaders in scaling innovative digital businesses into large productive companies. Furthermore, Dutch innovative digital businesses are challenged by low levels of capital flows toward generative AI ventures, highlighting the importance of keeping up with rapidly growing technology developments.

AI opens new opportunities

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

- AI can boost the Netherlands' ecosystem of innovative digital businesses by enhancing the productivity of research and development.
- Innovative digital businesses act as catalysts for broader AI innovation and adoption by being early adopters, adapters and developers.

However, all economies are trying to make the most of the AI opportunity. To stay competitive, the Netherlands needs to be at the forefront of AI adoption and innovation.

> 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 the Netherlands successfully scales innovative digital businesses to be on a par with leading OECD countries, this could:

- **Create 53,000 more high-value jobs,** supporting the future competitiveness of the Dutch workforce.
- **Contribute EUR 8.1 billion annually** to the economy.
- **Enhance the diffusion of AI innovations to the rest of the economy.** Startups have a roughly 50% higher chance of transformative innovations than incumbent firms and drive 26% of productivity growth across the economy.

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

People. Growing, attracting and retaining 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

Innovation leads to economic growth through smarter and more efficient use of production factors such as labour and thus increases productivity, which creates new opportunities and improves our international competitive position.

The Dutch Government in the National Technology Strategy

Innovative digital businesses are scalable and tech-enabled

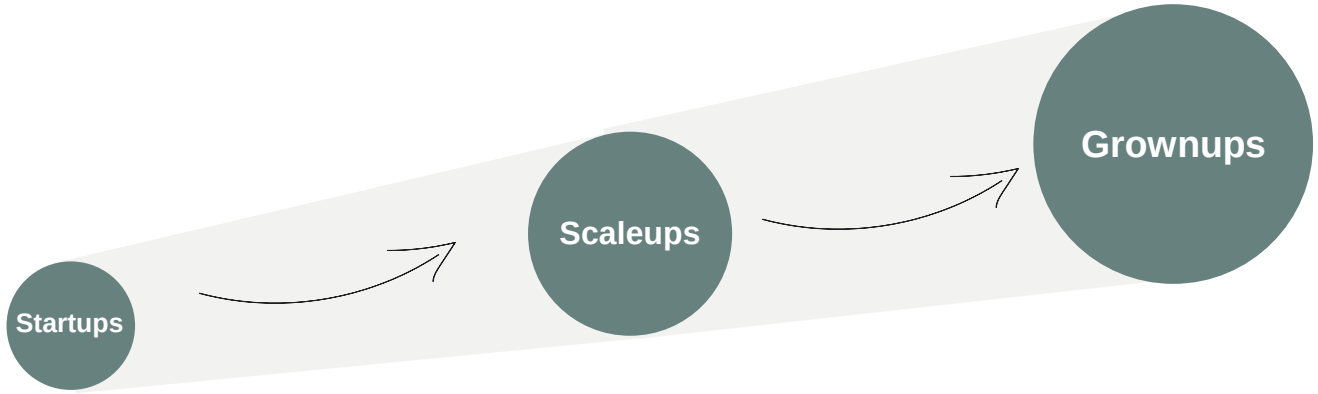
This research defines innovative digital businesses as companies headquartered in the Netherlands with a scalable business model, less than 30 years old, and whose product and/or business model are inherently innovative.

In most cases, these companies are tech-enabled, either utilising proprietary technology or software, or having business processes that are heavily enabled by technology.

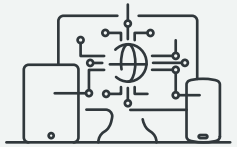
This study categorises innovative digital businesses by employment size into three main stages: startups, scaleups, and grownups.

> 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

Innovative digital businesses



Innovative digital businesses designed to grow fast, employing between 2–50 people.	Innovative digital businesses with scaled operation, employing between 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).

The Netherlands has a well-developed ecosystem of innovative digital businesses

The Dutch ecosystem of innovative digital businesses boasts one of Europe's strongest digital innovation hubs, particularly excelling in the semiconductor ecosystem, with many companies involved in design, production equipment, assembly and system integration.

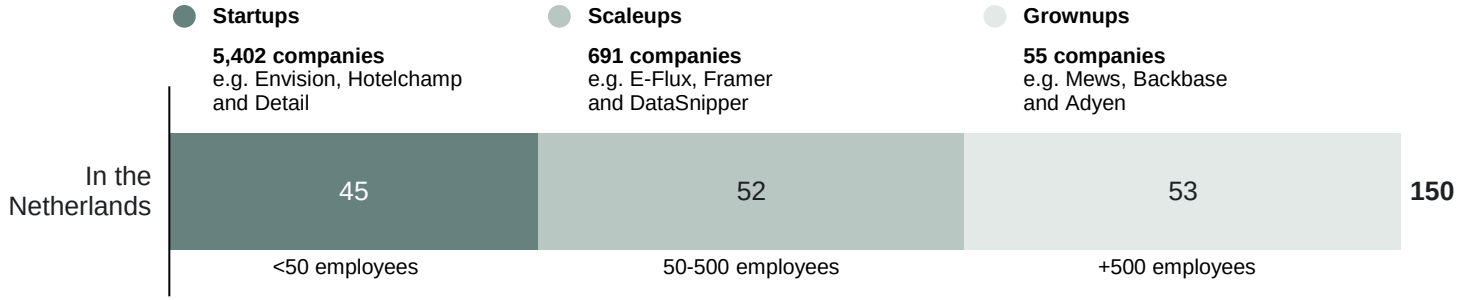
The Netherlands is home to around 6,100 innovative digital businesses which employ 150,000 people domestically, accounting for 2% of private employment. Additionally, they employ around 110,000 people outside the Netherlands.

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

~45% of jobs in innovative digital businesses headquartered in the Netherlands are abroad

Employment in Dutch innovative digital businesses
Thousand employees

150,000 people are employed in innovative digital businesses in the Netherlands



113,000 people are employed outside the Netherlands by Dutch-headquartered innovative digital businesses

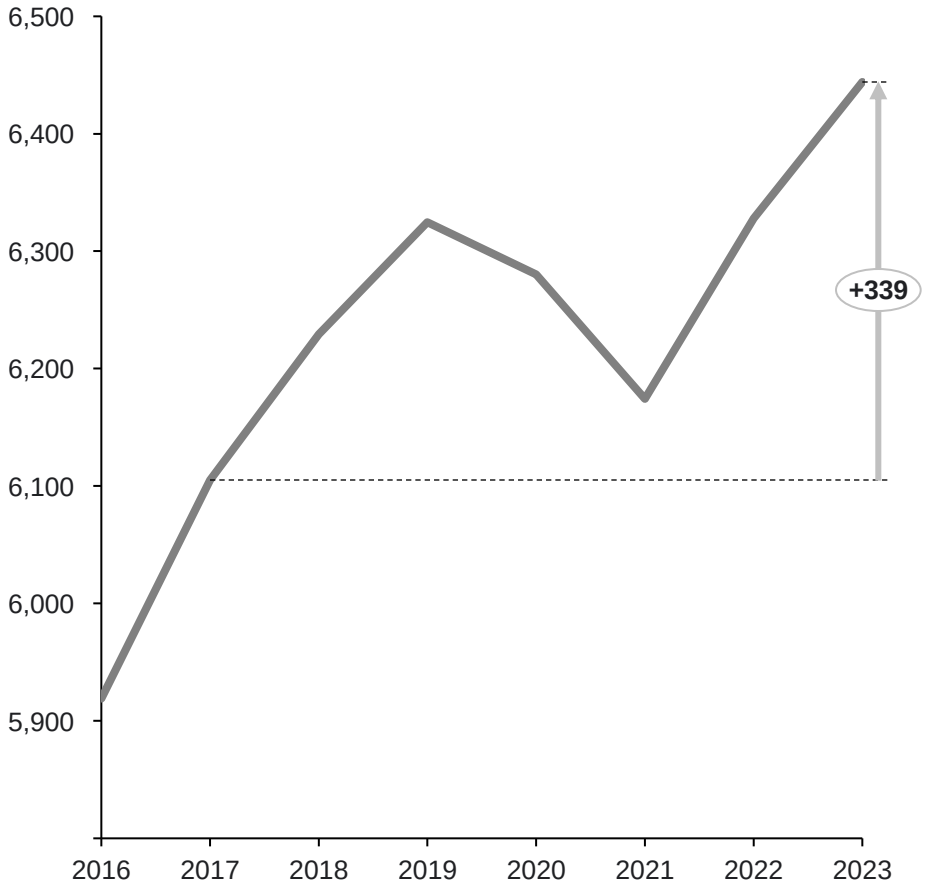
Note: The number of innovative digital businesses and their employment figures are based on companies with "verified" employment data from Dealroom. A number of innovative digital businesses are likely not captured in this data, making this a conservative estimate of their count and employment. Our definition of startups, scaleups and grownups differs from that proposed in State of Dutch Tech 2024, which is based on funding.
Source: Implement Economics based on Windsor (2024) using Dealroom data.

Innovative digital businesses have created 7% of all new private sector jobs in the Netherlands

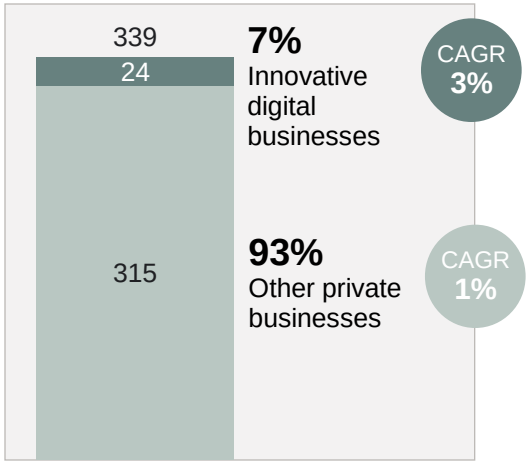
Innovative digital businesses in the Netherlands have been creating jobs faster than other private businesses. Since 2017, jobs in these digital companies have grown by 3% each year, while other private businesses have only grown by 1% per year.

Overall, private sector jobs in the Netherlands have increased by 339,000 since 2017. Out of these, 24,000 new jobs came from innovative digital businesses, making up 7% of net job creation in the private sector.

Dutch private sector employment
Thousand persons



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



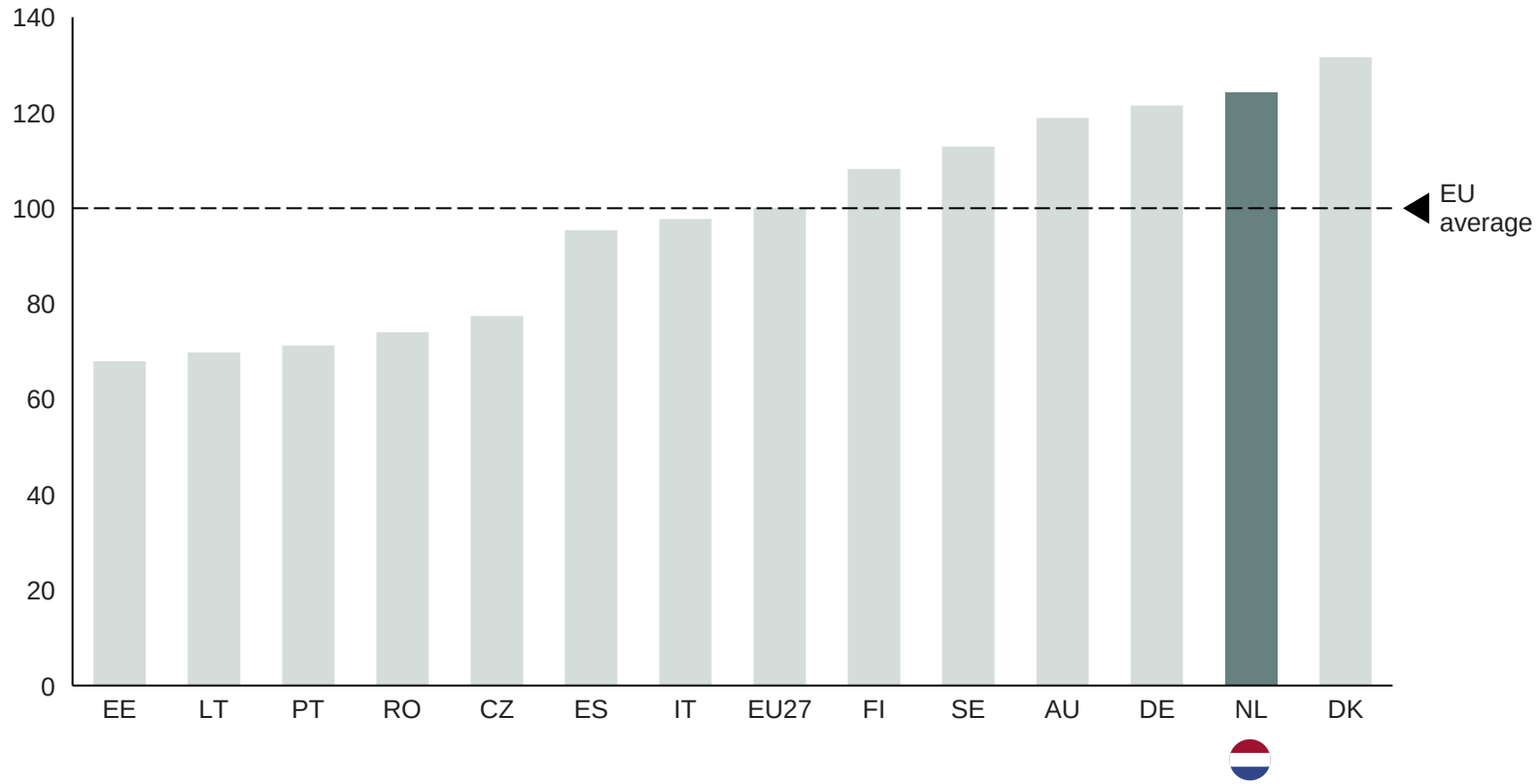
Note: Calculations based on Orbis data for companies with available employment data.
Source: Implement Economics based on Windsor (2024) using Dealroom data, Bureau van Dijk's Orbis database and Eurostat.

The Netherlands' strong history of commercialising new technology is reflected in high productivity

Average labour productivity in the Netherlands is the second highest in the EU and 24% above the EU average.

The high productivity level reflects the Netherlands' strength in technology commercialisation, establishing it as a key innovation hub in Europe.

Nominal hourly labour productivity
Index, EU27=100



Source: Implement Economics based on Eurostat.

Innovative digital businesses create high-value jobs

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

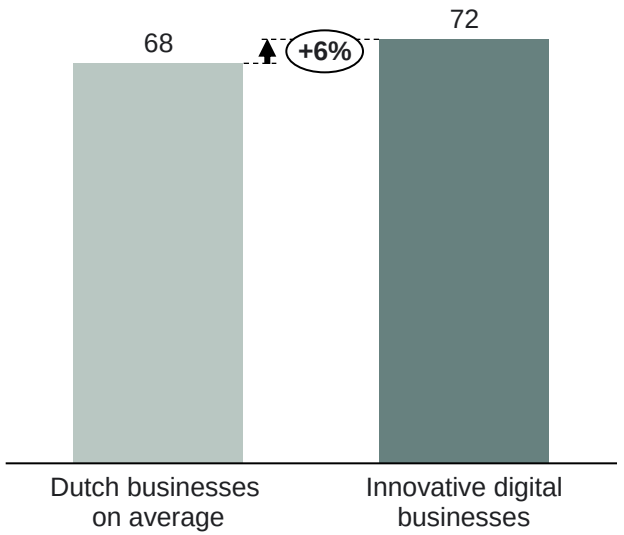
More importantly, they have 19% higher labour productivity than Dutch businesses on average, significantly contributing to the competitiveness of the Dutch economy.

If the Netherlands creates the right conditions for innovative digital businesses to grow, this holds major potential to boost productivity.

Dutch innovative digital businesses …

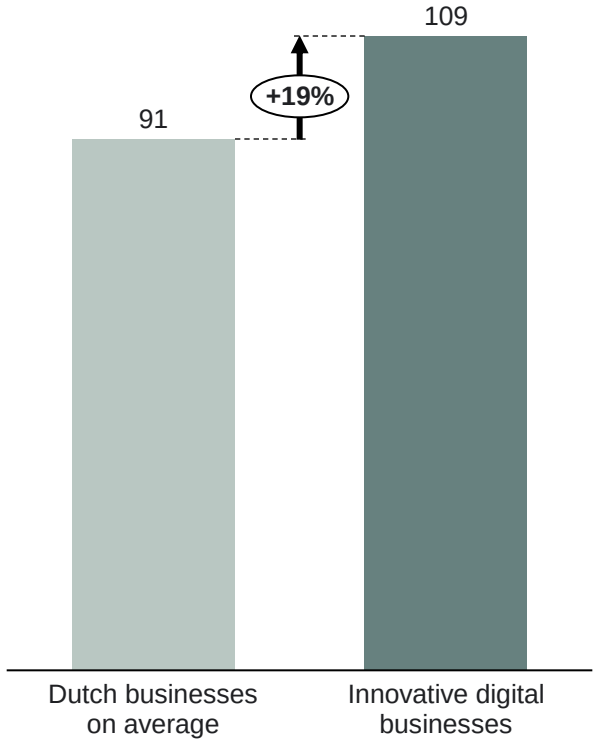
… pay higher wages

Median wages
EUR (thousand) per employee



… and are more productive

Average labour productivity
EUR (thousand) per employee



Note: 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.

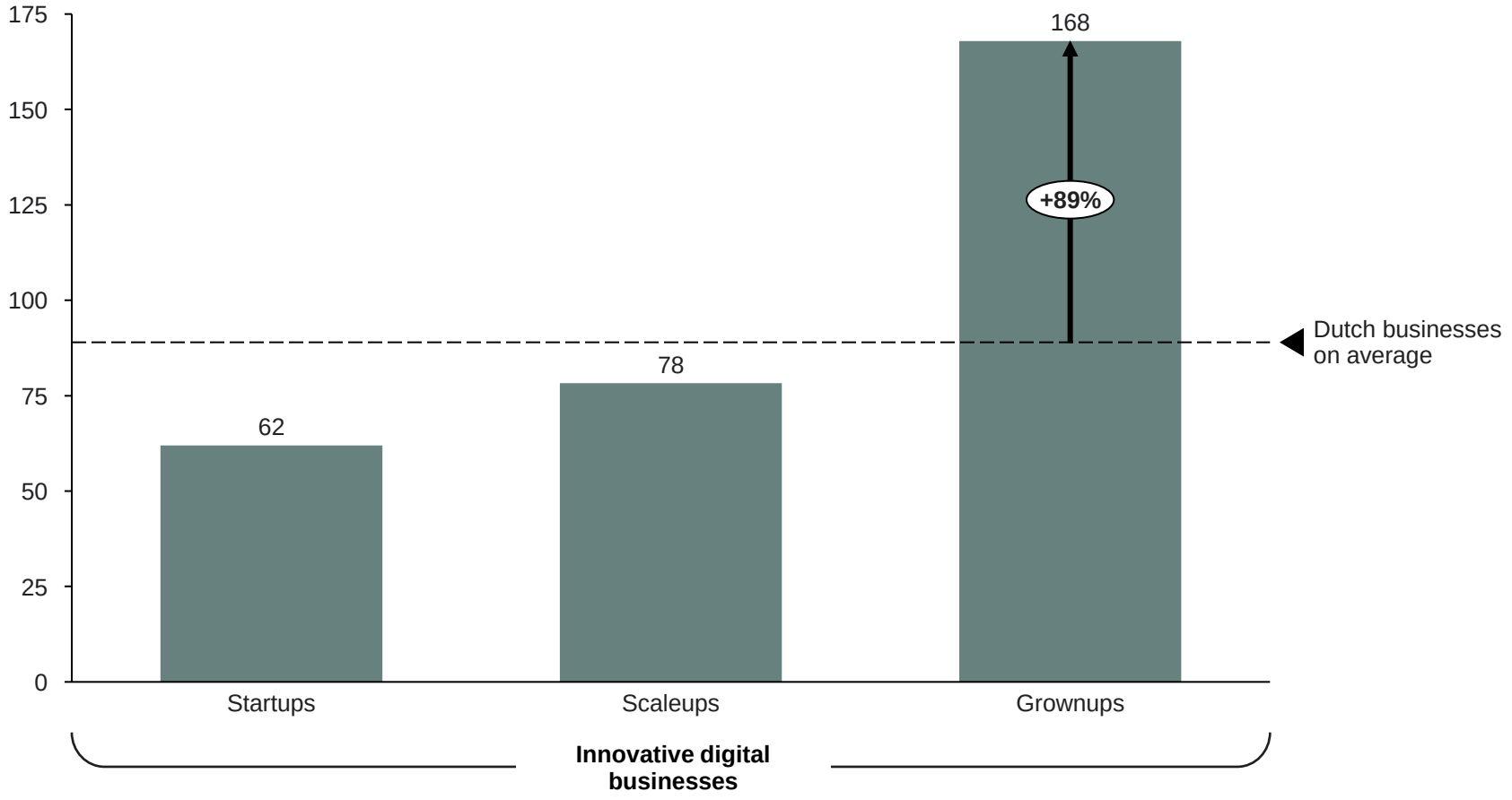
Sustaining high productivity levels requires that businesses scale successfully

Successful grownups allow workers to produce almost twice as much (+89%) as in Dutch businesses on average.

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

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

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



Note: 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 Netherlands are not capturing enough venture capital investments in generative AI

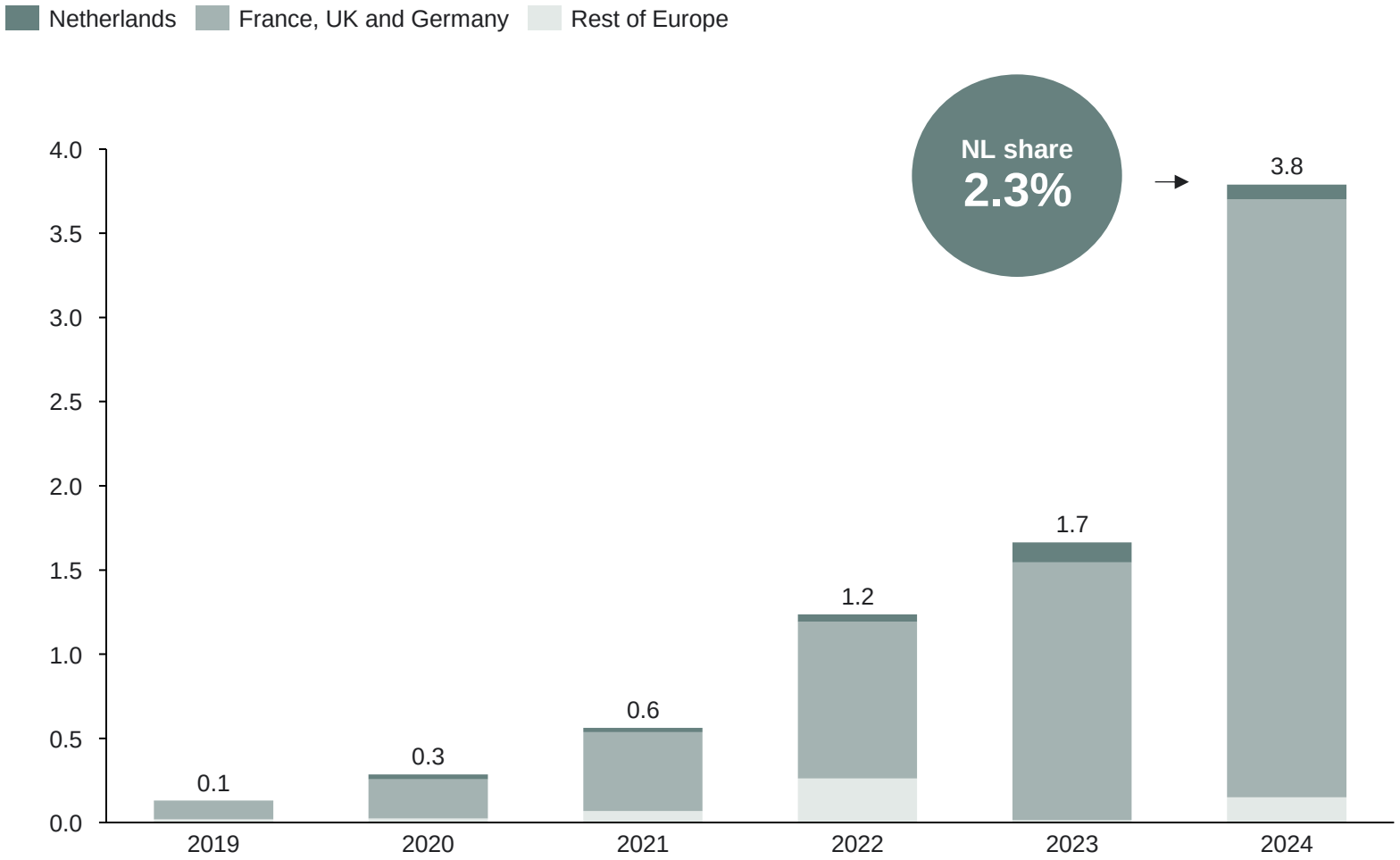
Generative AI venture capital investment reached around EUR 44 billion globally in 2024, but only EUR 3.8 billion (9%) was directed to Europe. The Netherlands captured a mere 2.3% of this European investment, despite accounting for 6.3% of the European economy.

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

Europe risks falling behind in generative AI, and increased funding is essential to harness the AI opportunity.

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

Generative AI VC investment in Europe
EUR billion



Note: European economy refers to Gross Value Added in Europe.
Source: Implement Economics based on Dealroom.

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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.

Innovative digital businesses propel AI adoption across the economy

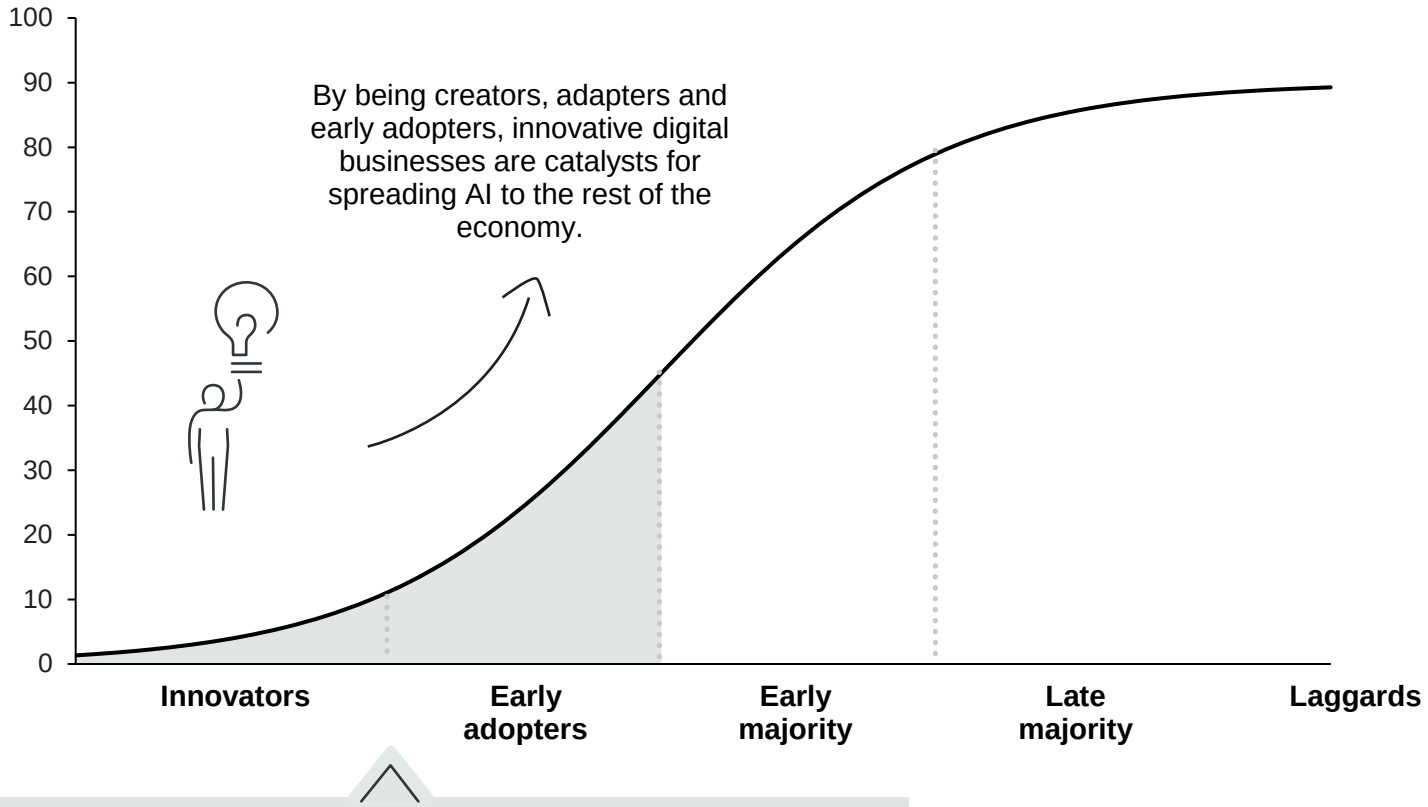
The coming AI era holds considerable economic potential for the Netherlands.

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

Innovative digital businesses are also early adopters of AI, demonstrating its value and making it easier for other businesses to start using it.

> … AI-driven start- and scaleups are crucial for bringing innovative solutions to market.
>
> **Techleap** in AI Scaling Challenges for Dutch Founders

Diffusion of AI technologies in Europe
%



Innovative digital businesses find new ways of using AI tools and create new ones. This enables other businesses across sectors to benefit from the new technology. For example, in the Netherlands Refreshworks develops AI solutions and supports AI training that enables its clients to equip their employees with appropriate AI skills.

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), Techleap (2024) and EU-Startups (2024).

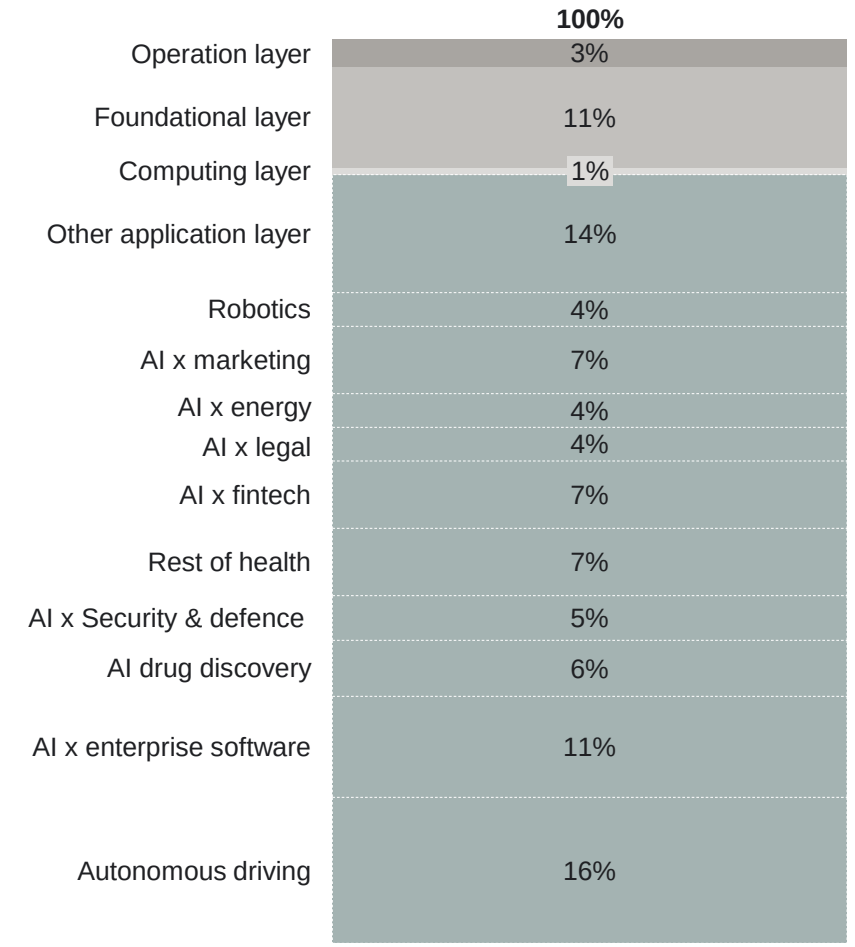
Innovative digital businesses can use AI to transform sectors across the economy

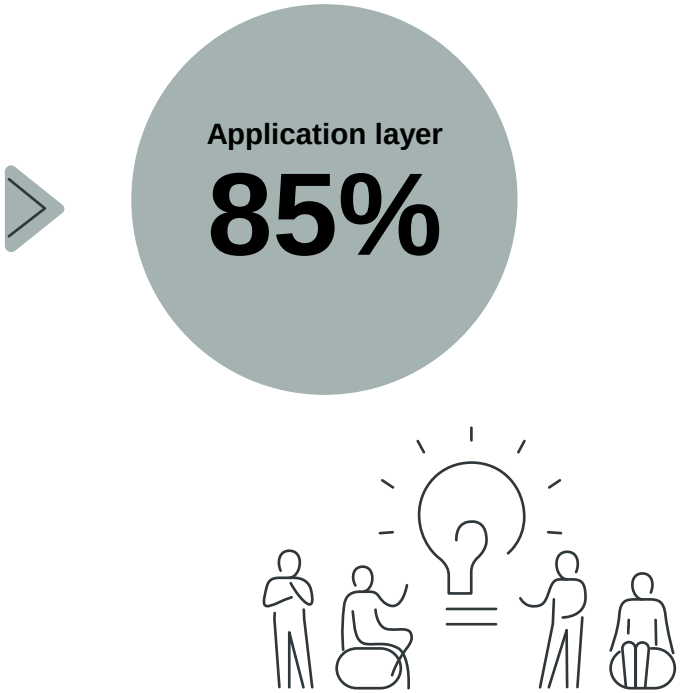
85% percent of European AI venture capital funding is directed toward the application layer of AI, focusing on real-world uses and integration into diverse sectors of the economy.

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





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

Four out of five European innovative digital businesses use generative AI

Realising the productivity potential of AI hinges on the ability of businesses in the Netherlands and Europe 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.

Notion Capital poll

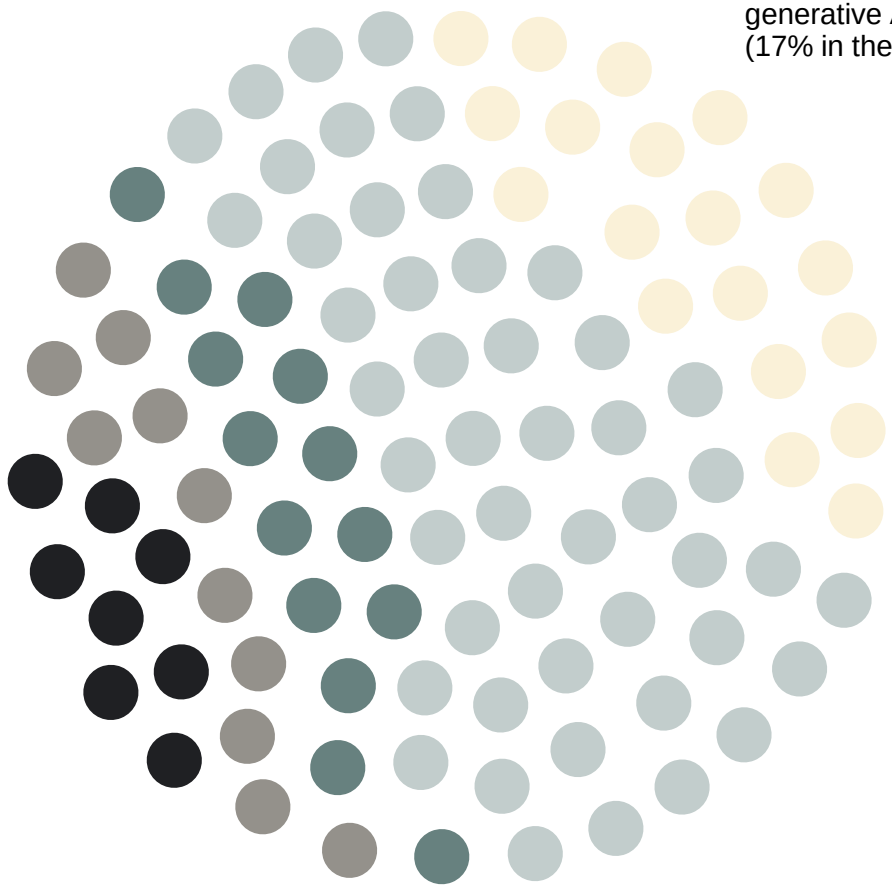
Use of generative AI in European innovative digital businesses
% of respondents

Focusing on *generative AI*

79% of European innovative digital businesses use generative AI. (81% in the Netherlands). This covers…

- ... **46%** who have **experimented** with or **partially adopted** generative AI. (47% in the Netherlands)
- … **14%** who have **fully adopted** generative AI. (16% in the Netherlands)
- … **11%** who have **adopted and actively adapted** generative AI technology to suit business needs. (12% in the Netherlands)
- … and **8%** who have **generated** new AI technologies to serve business needs (8% in the Netherlands)

while **21%** do not use generative AI. (17% in the Netherlands)



Note: Sample size of n=1095 in Europe and n=51 in the Netherlands for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

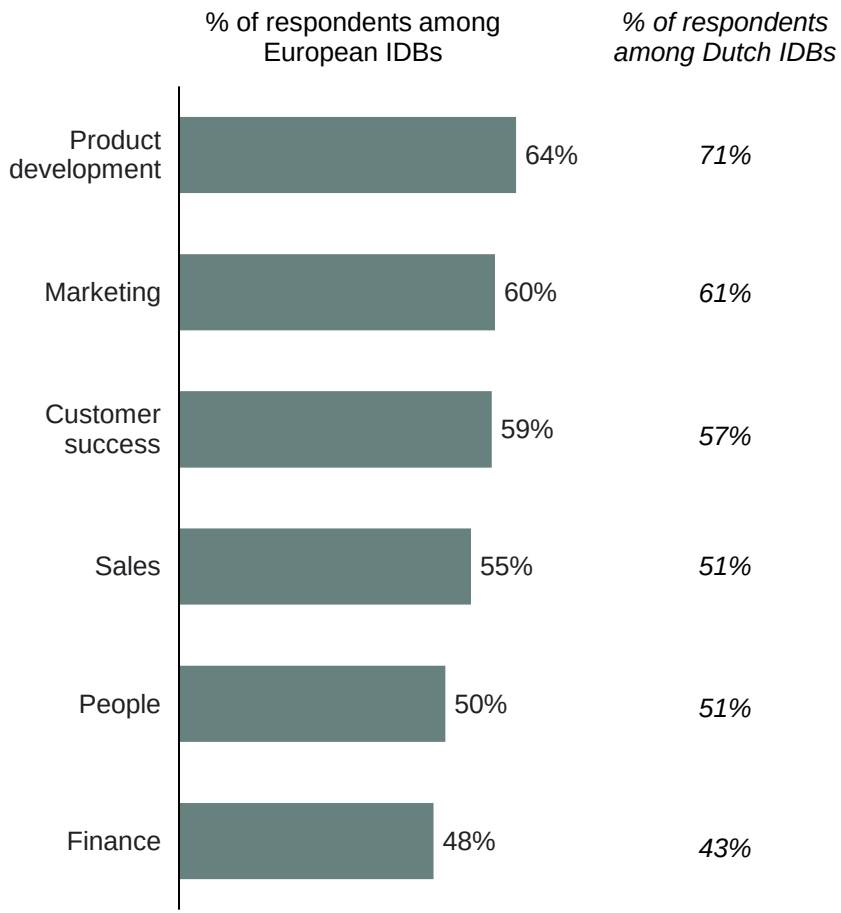
AI boosts value creation and efficiency in innovative digital businesses

Surveyed innovative digital businesses in Europe and the Netherlands 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.

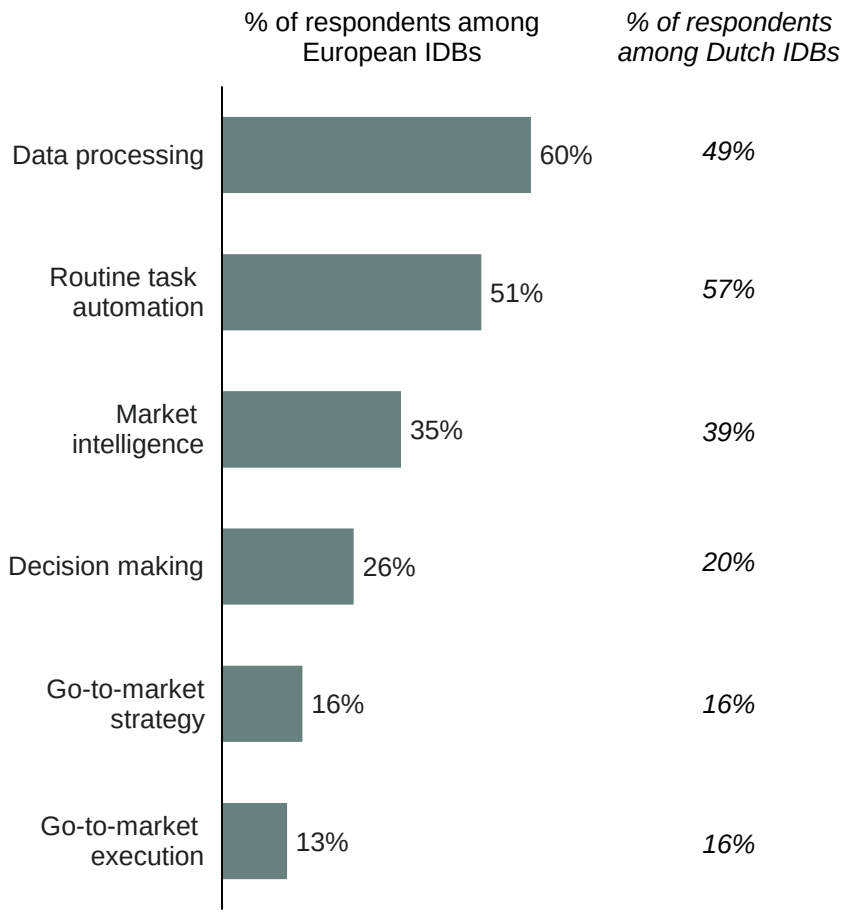
In addition, surveyed innovative digital businesses report that AI has improved efficiency across multiple areas, helping to optimise and streamline operations. For example, 60% of European respondents report improved data processing and 51% point to improvements in routine task automation.

Responses from Dutch 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=51 in the Netherlands for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

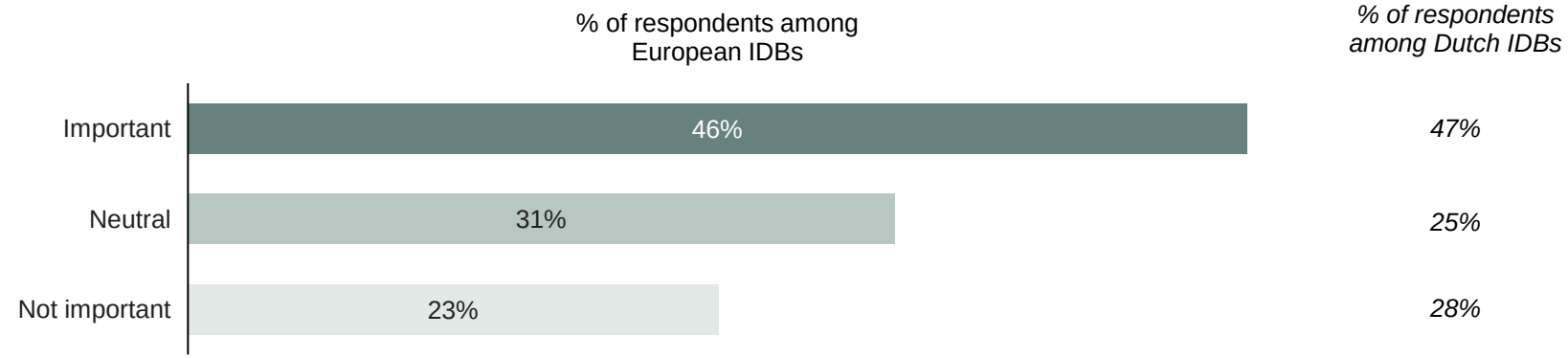
Innovative digital businesses benefit from global access to AI technology

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.

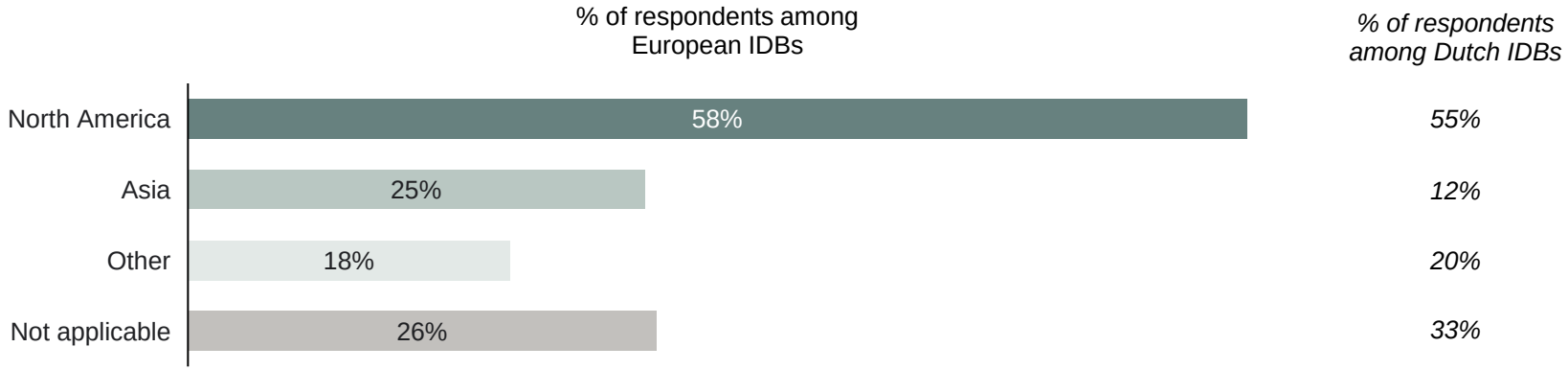
European innovative digital businesses state that they benefit from AI models developed outside Europe, with 46% saying that access to cutting-edge AI technologies from non-European companies is important for their business. Most respondents (58%) source these technologies from North America.

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=51 in the Netherlands 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 Dutch 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 (2024).

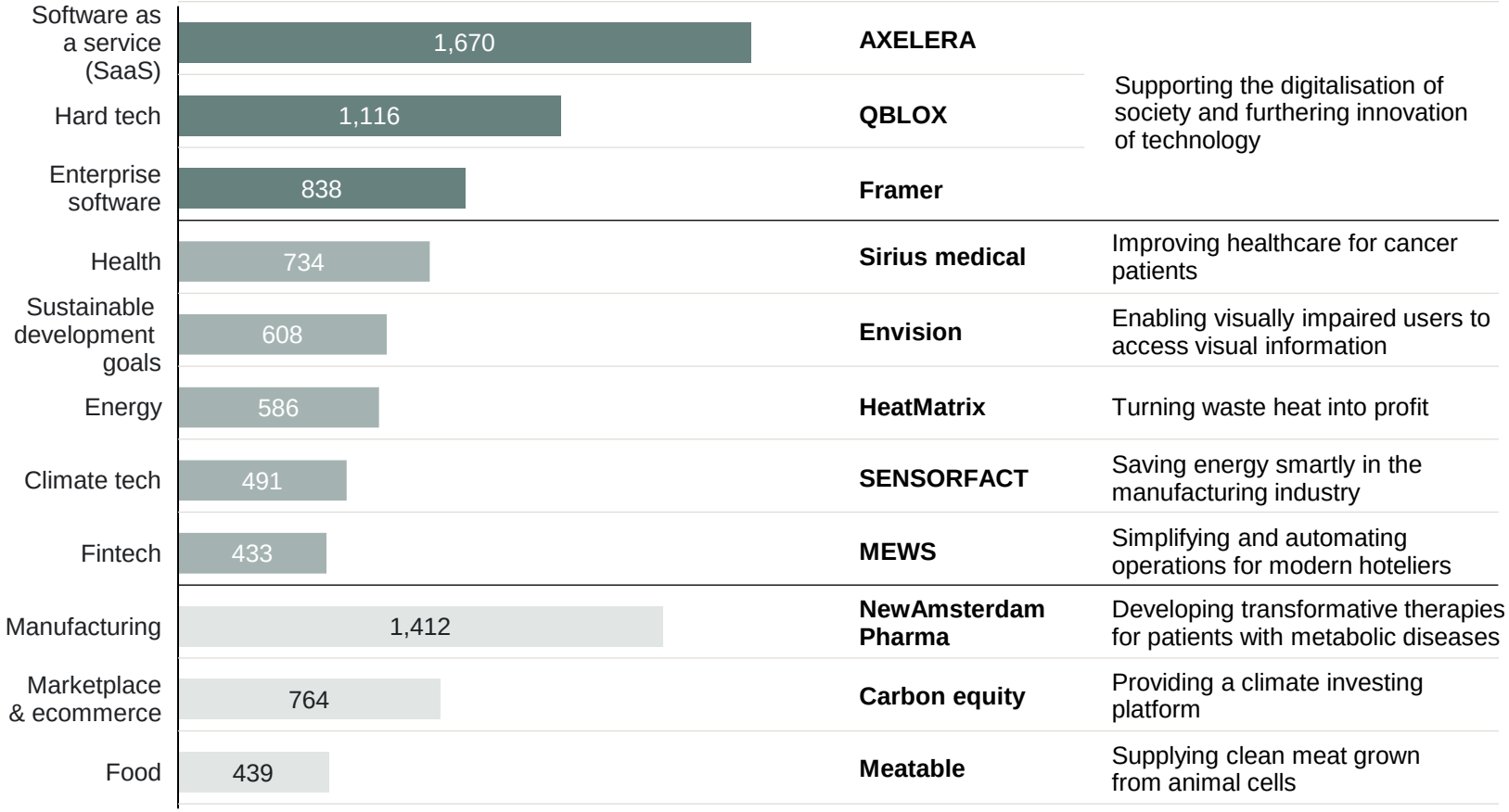
Innovative digital businesses work to solve societal challenges

The Netherlands has strong competencies in high tech, life sciences, energy and logistics among others. Innovative digital businesses contribute to these strongholds and 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.
- **Health:** Innovating within pharmaceuticals, therapies and diagnostic tools.
- **Climate tech and energy:** Accelerating the energy transition by developing renewable energy sources and supporting flexible energy consumption.

> Integrating AI 'vertically' into European industry will be a critical factor in unlocking higher productivity.
>
> **Mario Draghi** in The Future of European Competitiveness

Focus areas of Dutch 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…
AXELERA	Supporting the digitalisation of society and furthering innovation of technology
QBLOX	
Framer	
Sirius medical	Improving healthcare for cancer patients
Envision	Enabling visually impaired users to access visual information
HeatMatrix	Turning waste heat into profit
SENSORFACT	Saving energy smartly in the manufacturing industry
MEWS	Simplifying and automating operations for modern hoteliers
NewAmsterdam Pharma	Developing transformative therapies for patients with metabolic diseases
Carbon equity	Providing a climate investing platform
Meatable	Supplying clean meat grown from animal cells

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 and Draghi (2024).

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

Academic studies show that …

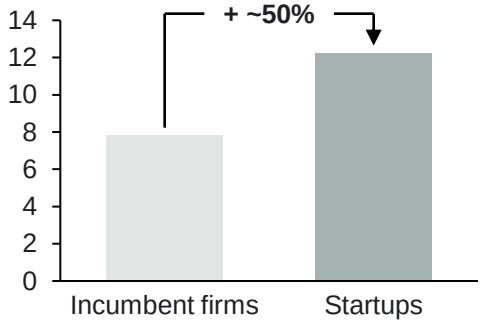
… startups create more radical and disruptive innovations …

~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



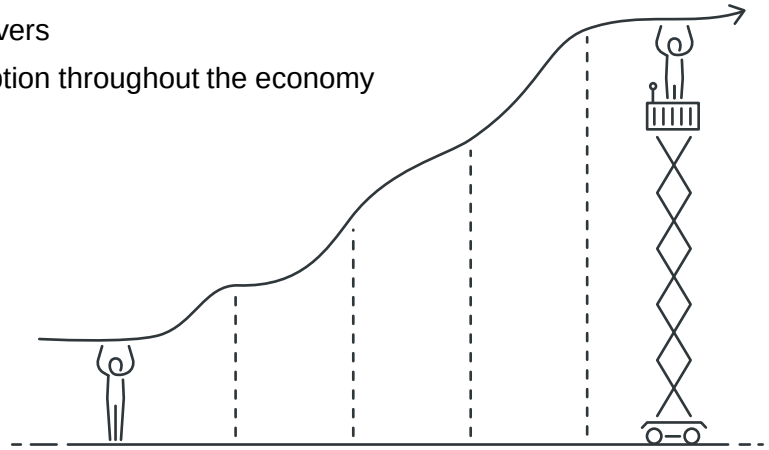
> Startups generate innovations that are more radical and disruptive than those of incumbent firms.
>
> **Kolev et al. (2022)**

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

26% of 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: Note that 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 potential of scaling innovative digital businesses

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

> For our future earning capacity and competitiveness, technological innovations and entrepreneurship will have to be stimulated to create opportunities and promote productivity and international competitiveness.
>
> **The Dutch Government** in the National Technology Strategy

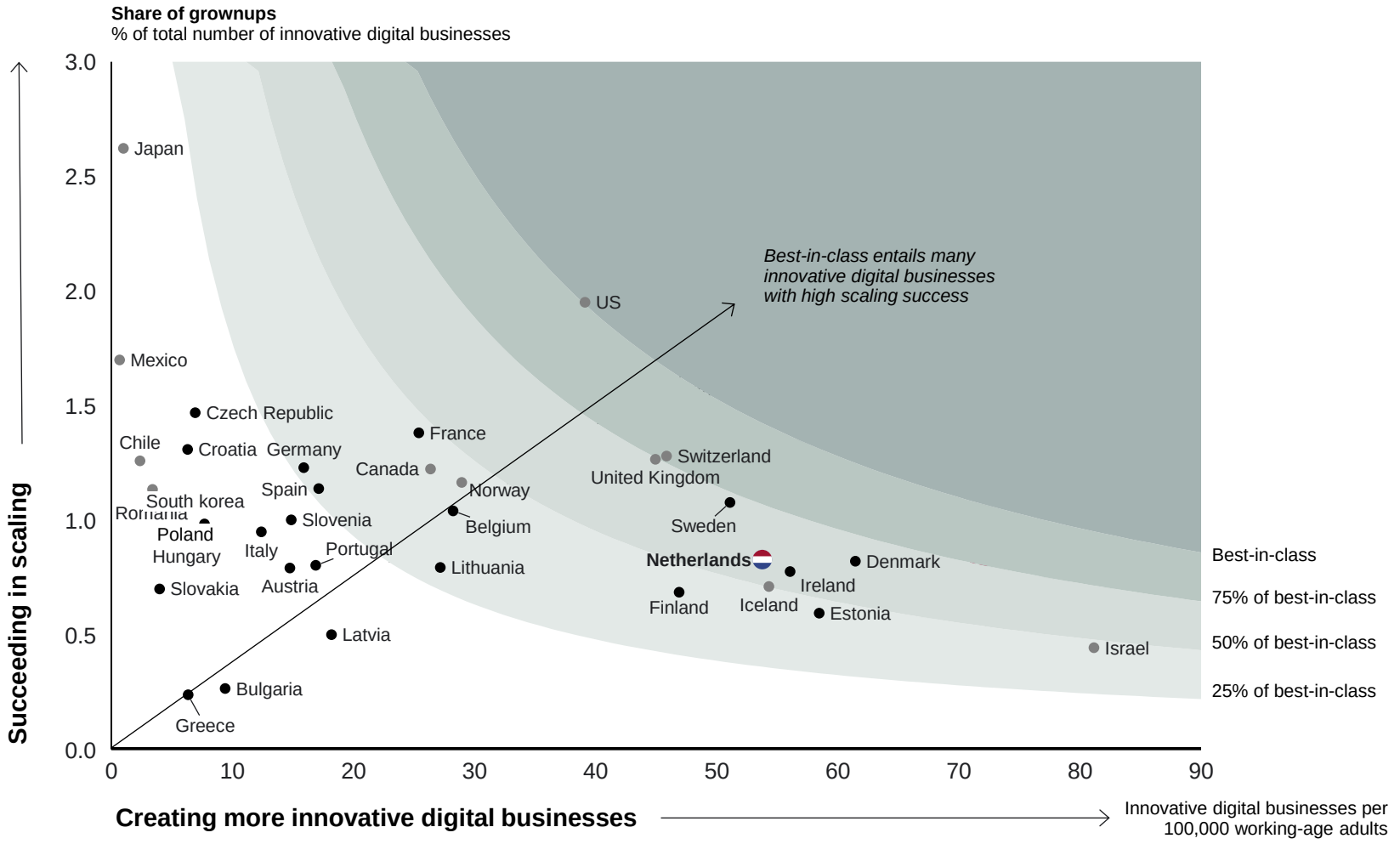
Untapped potential remains in the Dutch ecosystem of innovation digital businesses

The Netherlands outperforms most other EU countries on the number of innovative digital businesses, with 54 per 100,000 working-age adults compared to the EU average of 19. However, they lag in the share of those who have scaled into becoming grownups.

This point is echoed in the 2025 Techleap report, which similarly points to the low scaling ratio of Dutch businesses.

The success of innovative digital businesses is essential for the Netherlands to capture the AI opportunity because they drive the development and adoption of the new technology.

> … compared to global innovation leaders like the US and China, Europe and the Netherlands are not moving fast enough.
>
> **Techleap** in State of Dutch Tech 2024



Source: Implement Economics based on Windsor (2024) using Dealroom data, Eurostat and Techleap (2024&2025).

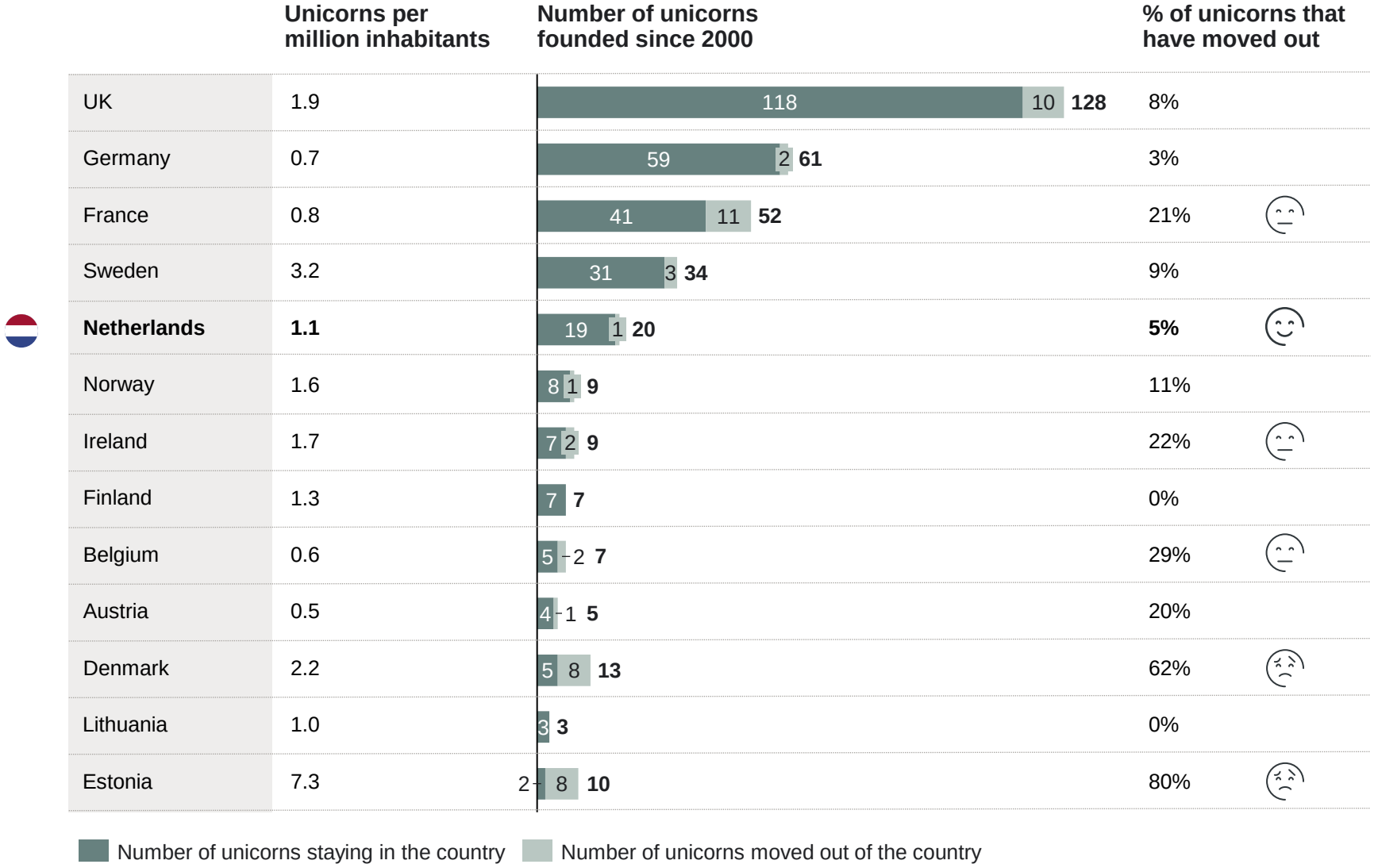
The Netherlands has a strong track record in retaining unicorns

Since 2000, the Netherlands has produced 20 unicorns (1.1 per million people), which is less than peers like Ireland (1.7) and Sweden (3.2). In the past two years, no Dutch unicorns have emerged, mirroring a decreasing global trend. Unicorns are startups that reach a valuation of USD 1 billion.

However, the Netherlands is good at retaining unicorns, with only one unicorn moving abroad, whereas other countries like Denmark and Estonia struggle to keep large innovative businesses as they scale.

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

> … 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).

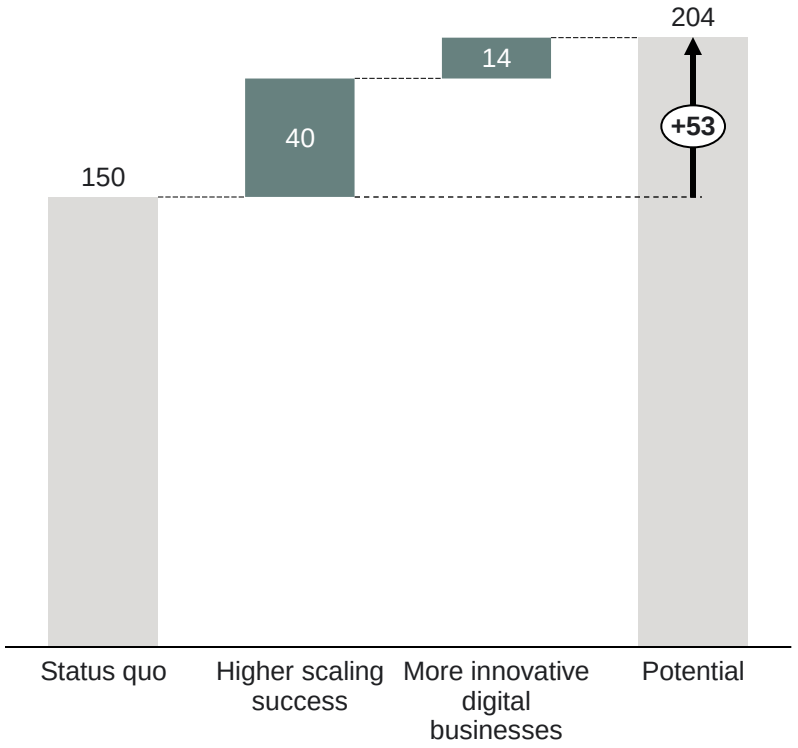
The Netherlands can unlock significant economic growth through innovative digital businesses

More and better innovative digital businesses could create 53,000 high-value jobs and contribute up to EUR 8.1 billion annually to the Dutch economy. The impact stems from:

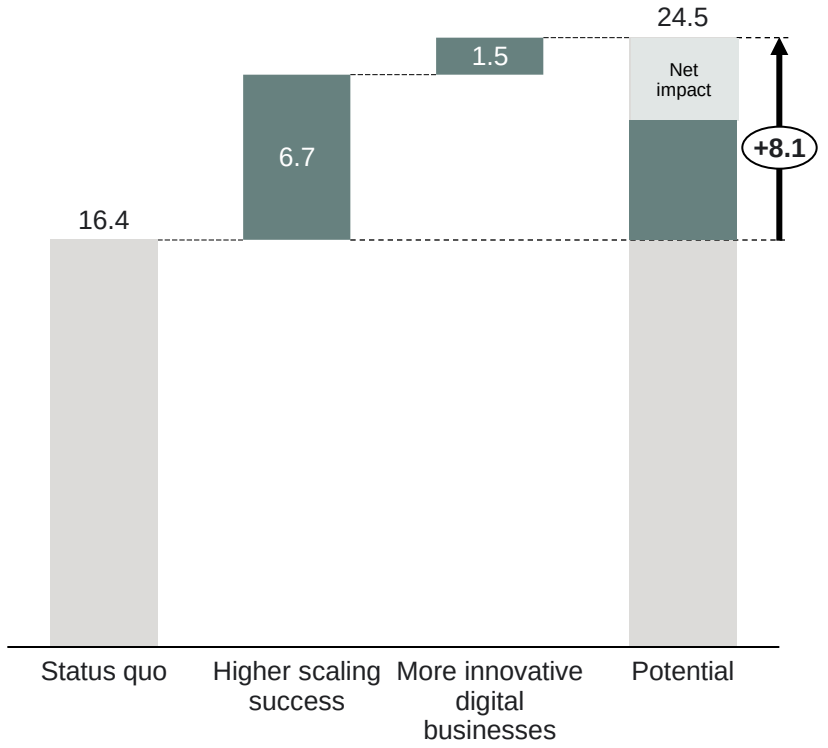
- **Higher scaling success of innovative digital businesses.** Transforming more startups into grownups, reaching the same success rate as the three leading OECD countries, could create 40,000 high-value jobs and add EUR 6.7 billion annually to the Dutch economy.
- **More innovative digital businesses.** If the Netherlands can grow more innovative digital businesses reaching the entrepreneurial activity of the three leading OECD countries, it could support 14,000 jobs and contribute EUR 1.5 billion annually to the Dutch 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 Dutch economy is EUR 3.3 billion. The relatively small size of the net impact is attributed to the modest difference in productivity levels between Dutch businesses on average and grownups.

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 data and Bureau van Dijk's Orbis database.

4

The way forward

> In the Netherlands, good ideas must be able to be scaled up, so that startups grow into scaleups and mature companies.
>
> **The Dutch Government** in the Government programme

Strong framework conditions provide potential for growing innovative digital businesses, but challenges remain

Innovative digital businesses rely on…	The Netherlands is generally well-positioned to grow 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 innovative digital businesses. The Netherlands currently lacks sufficient talent, emphasising the importance of attracting skilled professionals from abroad and investing in continuous upskilling initiatives.
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. Dutch digital infrastructure is a strong foundation for innovative digital businesses to grow, but to fully capture the AI opportunity, significant expansions in the digital infrastructure capacity are needed across Europe.
R&D Accelerating R&D with AI	AI has the potential to accelerate scientific breakthroughs and innovation by helping scientists stay on top of the latest developments, analysing data and simulating experiments. The Netherlands has a strong starting point, with close links between academia and startups.
Rules Regulatory clarity and reasonable compliance costs	Regulatory barriers make it especially hard for innovative digital businesses to grow, particularly 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.

Skill shortages are a key growth obstacle for innovative digital businesses

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.

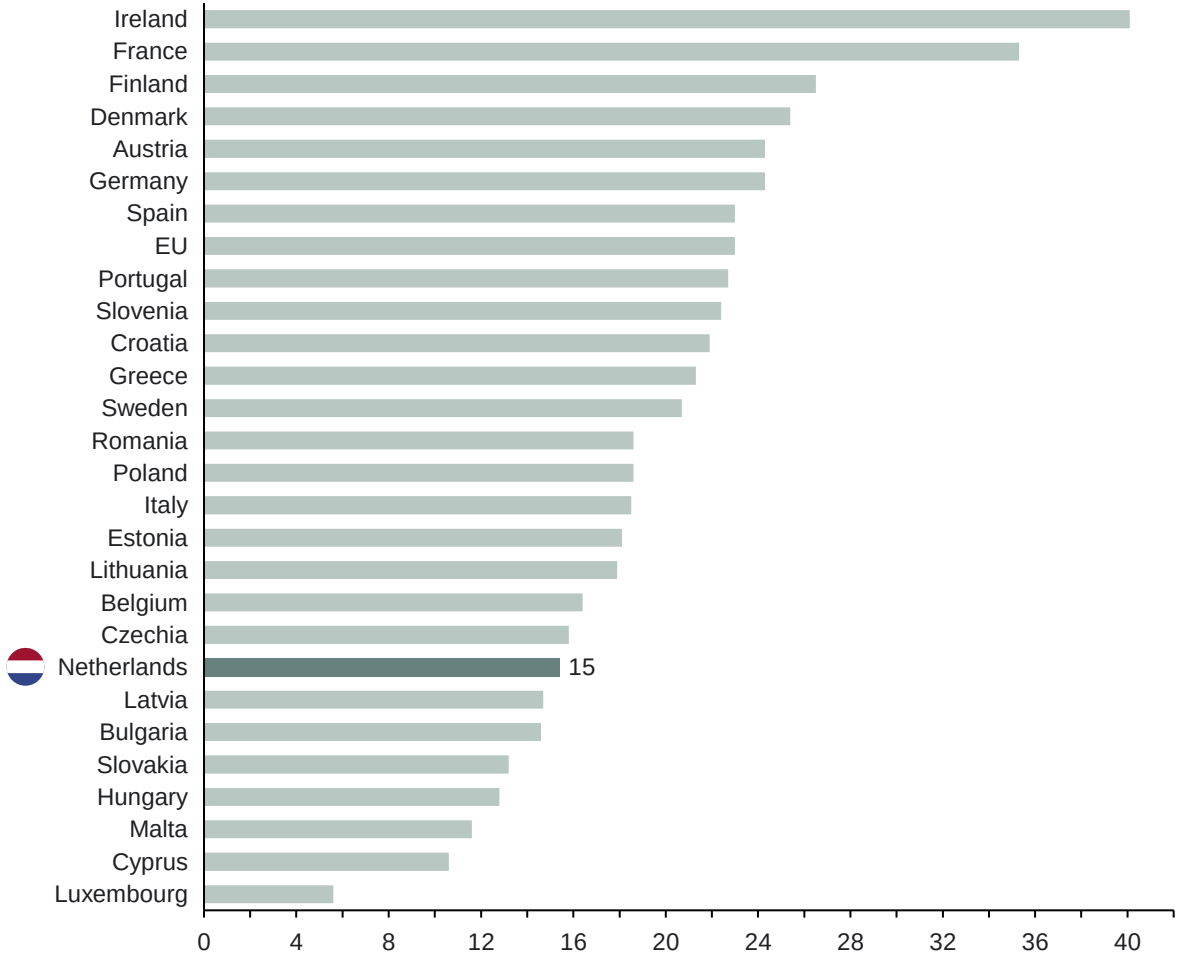
The Netherlands lacks workers with the right talent. In the State of Dutch Tech Report 2024, talent is reported by Dutch tech ventures as among the main challenges, and the Netherlands has below-average STEM graduates compared to European peers.

Attracting candidates with appropriate skills will be key to developing innovative digital businesses in the future. A fifth of innovative digital businesses report a lack of talent as a growth barrier and the Dutch job vacancy rate is the highest in Europe. Startups are highly dependent on foreign talent, making up ~30% of the startup workforce in the Netherlands.

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.

> …hard to fill vacancies and a lack of local talent are still limiting growth.
>
> **Teachleap** in the State of Dutch Tech 2024

Graduates in STEM, 2022
Per 1000 of population aged 20-29



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

Robust digital infrastructure puts the Netherlands in a strong position to grow and scale 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.

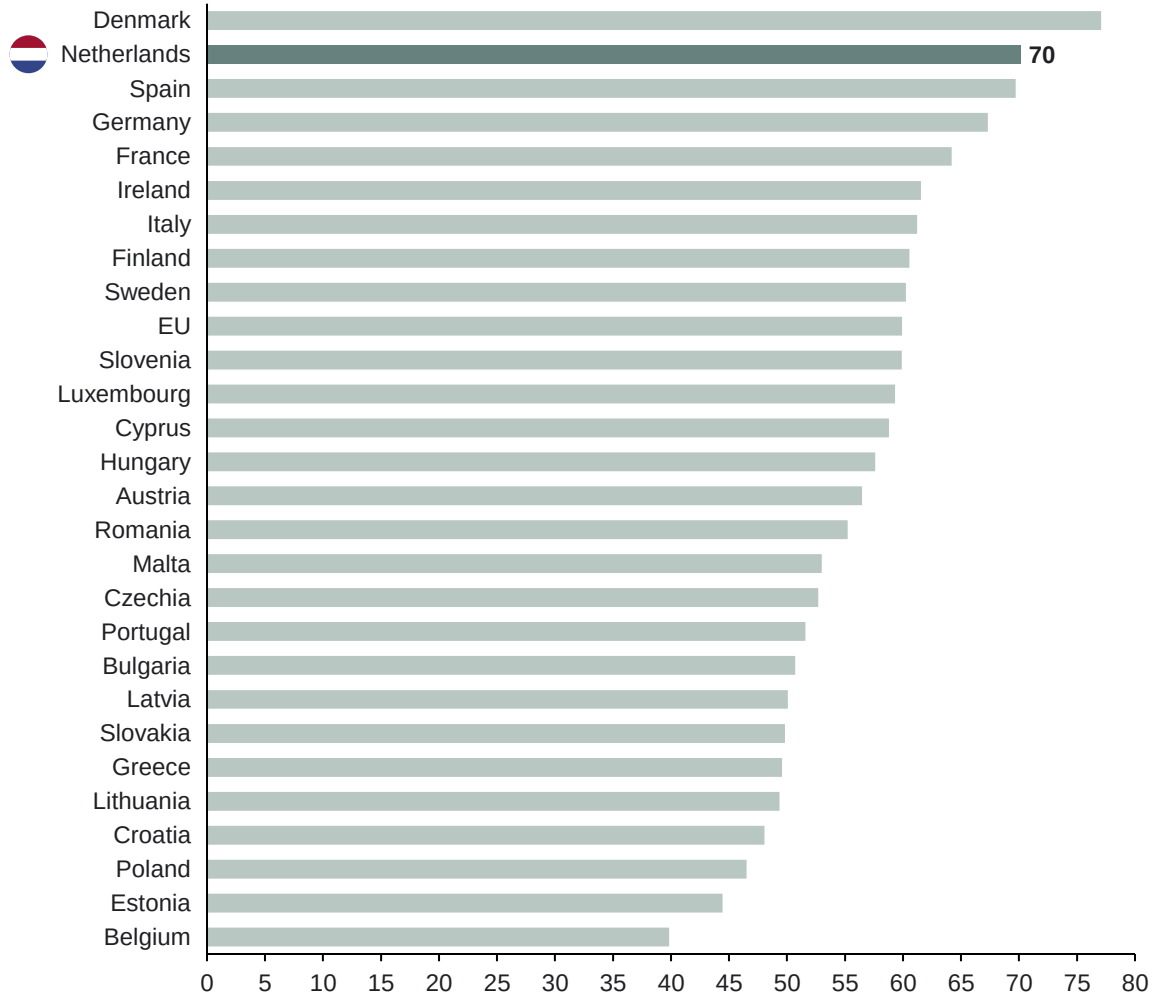
Access to open, flexible and secure digital infrastructure is critical for startups that usually cannot afford large upfront investments or in-house IT expertise. Digital infrastructure includes data centres, cloud and compute power.

The Netherlands has a strong digital infrastructure, ranking 2nd on connectivity in DESI, as well as hosting one of the largest global internet exchanges, AMS-IX, and being one of five so-called hyperconnected places in Europe. The advanced digital infrastructure in the Netherlands makes them well equipped to grow more and larger innovative digital businesses.

However, capturing the AI opportunity requires significant expansions in the digital infrastructure in Europe. According to IDC, the global demand for data centres is expected to nearly triple by 2027, underscoring the necessity for increased investments. The IEA estimates that Europe accounts for just 16% of global data centres.

> 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

Connectivity, DESI 2022
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 ASML, Dutch Data Center Association, Ministerie van Economische Zaken en Klimaat, European Commission and The Digital Economy and Society Index (2022) and Letta (2024),

AI has the potential to significantly lift R&D productivity

R&D

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

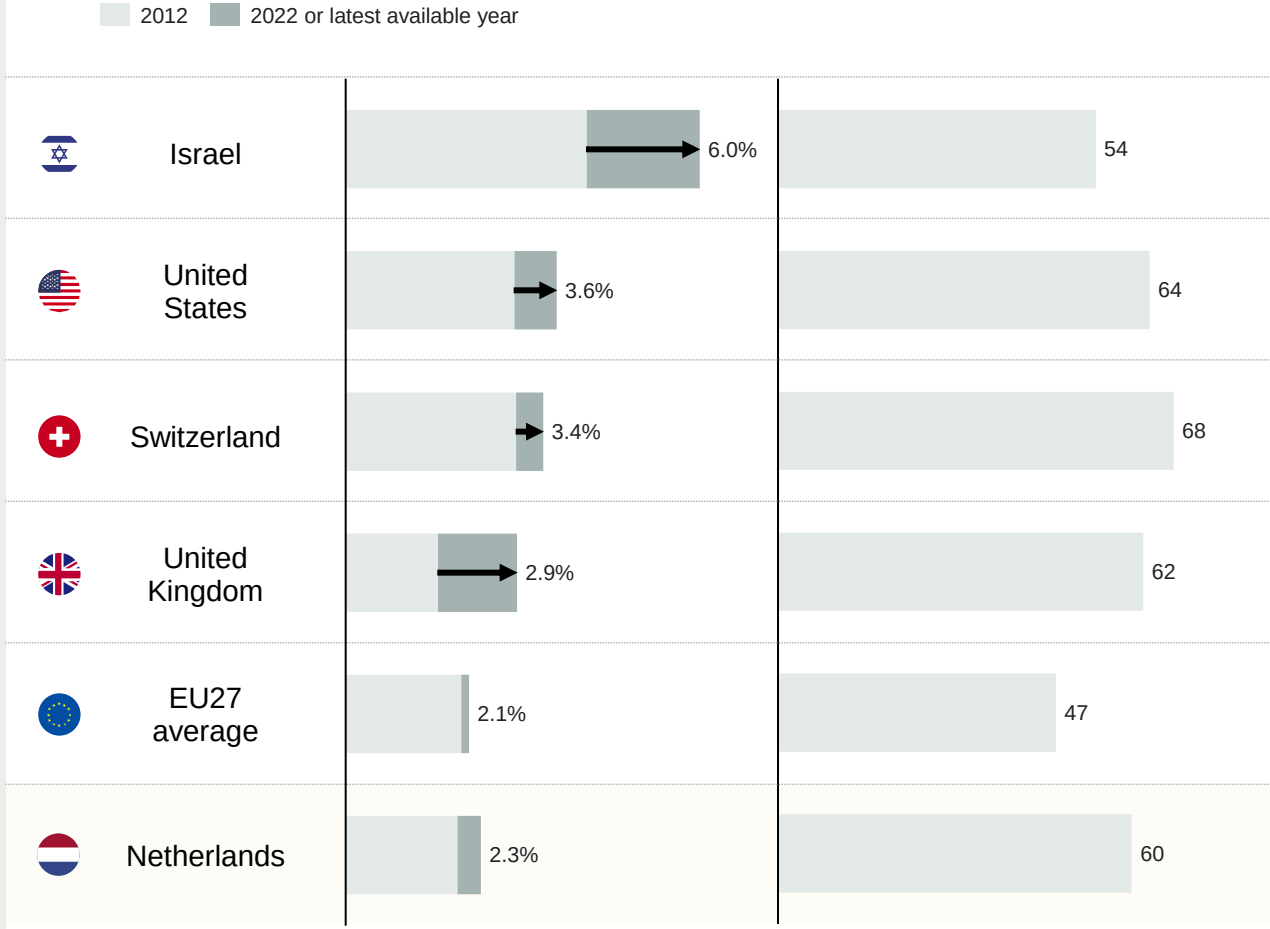
The Netherlands has slightly higher R&D spending than the EU average. Additionally, the Netherlands demonstrates strong innovation capacity, as measured by the WIPO Global Innovation Index (GII), ranking well above the EU average and nearly matching the US.

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, the Netherlands could enhance R&D productivity, enabling researchers to stay current and identify breakthrough opportunities.

Academia and startups are closely linked in the Netherlands, creating knowledge spillovers. Since 1990, over 2,500 companies have been started by researchers and students. Academic ventures can play an important role in transforming breakthrough research in commercial products to solve societal challenges.

Research and development expenditure
% of GDP

WIPO Global Innovation Index (GII) 2023
Index



Source: Implement Economics based on the European Commission, OECD Economic Surveys: DESI, European Innovation Council, World Development 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

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.

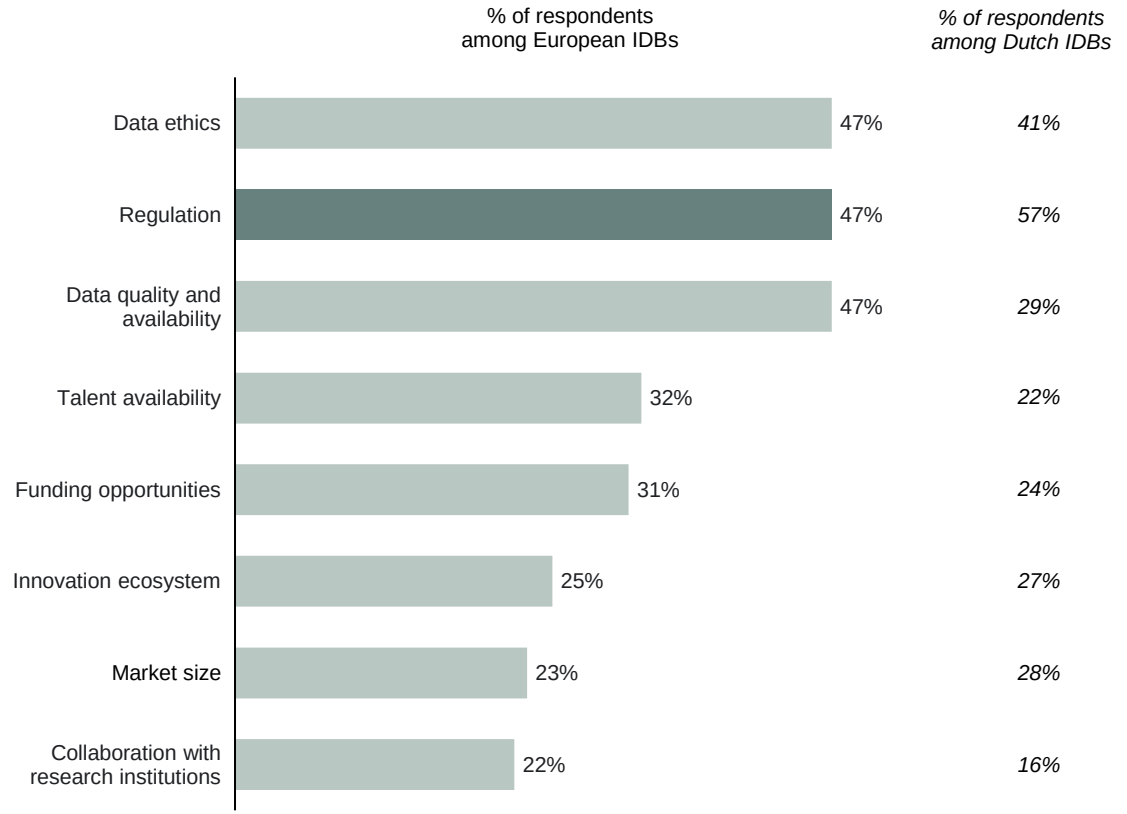
Compliance costs are substantial and particularly burdensome for small businesses. GDPR enforcement alone led to an 8% reduction in profits by covered businesses, with small tech companies experiencing double the impact.

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. Regulation is also reported by Techleap as the biggest risk to growth for the European tech ecosystem in the State of Dutch tech 2024 report.

Rules

> … 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=51 in the Netherlands for Notion Capital survey.
Source: Implement Economics based on iapp (2024), Draghi (2024), Bruegel (2014), Chen et al. (2022), Euronews, Techleap (2024) 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

Capital

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.

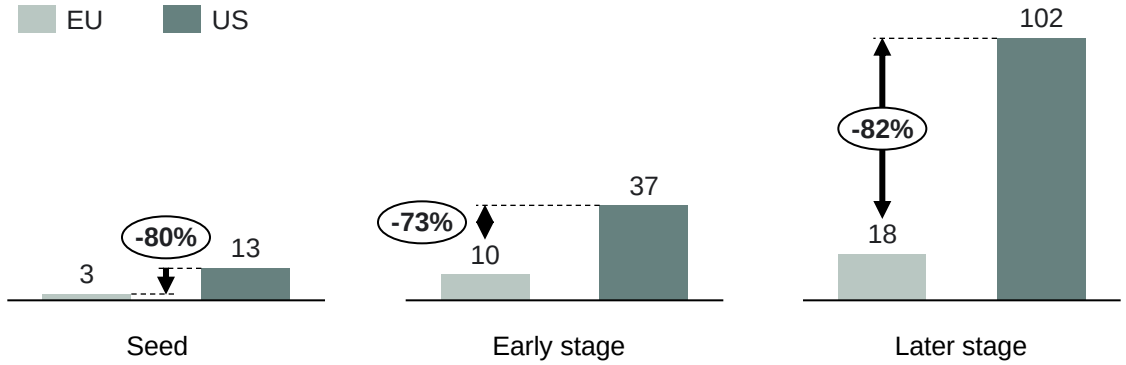
But Europe attracts around USD 100 billion less in venture capital investment than the US. Venture capital is the main source of financing for innovative digital businesses, especially those aiming to grow aggressively towards the 'grownup' scale.

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.

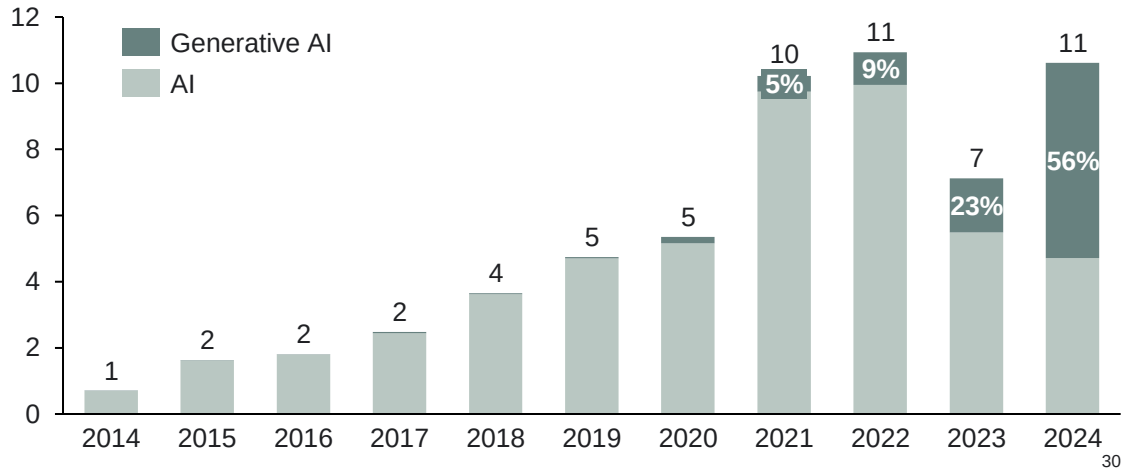
Regulatory uncertainty and excessive regulatory costs are a further negative element. Unclear rules and higher regulatory burdens reduce the expected return on the capital needed to scale up Europe's innovative digital businesses.

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

Venture capital investment by development stage
USD billion, 2023

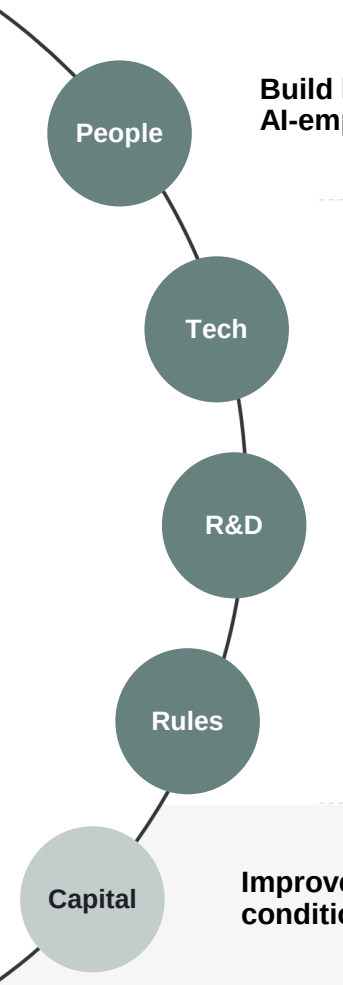


Europe AI venture capital investment
EUR billion



Unlocking the potential of innovative digital businesses with AI

The Dutch 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 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 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	• 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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