IMPLEMENT
CONSULTING GROUP_

The AI innovation opportunity

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

February 2024

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

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

More than startups

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

More than tech

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

Innovative digital businesses are key to capturing the AI opportunity

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 Sweden which are further classified as startups (2–50 employees), scaleups (51–500 employees), or grownups (over 500 employees).

AI can super-charge Sweden's ecosystem of innovative digital businesses, boosting productivity and competitiveness

Sweden has a strong ecosystem of innovative digital businesses and ranks among the EU's top performers in innovation capacity

- 3,300 innovative digital businesses
- 93,000 jobs in innovative digital businesses
- 13% of net private sector job creation since 2017
- 4.5 times more venture capital (VC) investments per capita than the EU average

Innovative digital businesses create high-value jobs, drive innovation and enhance productivity

- 56% higher wages in innovative digital businesses compared to other private businesses
- 22% higher productivity in innovative digital businesses that have successfully scaled compared to the average
- Innovative digital businesses work to solve societal challenges in technology, health, biotechnology, climate tech, and energy

AI opens new opportunities, but effort is needed for Sweden to stay competitive

Sweden exceeds the EU average in number and scaling success of innovative digital businesses but lags behind leading OECD countries. Matching the leading OECD countries in scaling these businesses could create:

37,000 high-value jobs
supporting the country's competitiveness

SEK 41 billion
contribution annually to GDP

This can enhance the diffusion of AI innovations to the rest of the economy.

Unlocking the AI opportunity requires access to advanced AI models and infrastructure, eased regulatory burdens, and talented people

According to TechSverige, global competition has intensified, and both Sweden and Europe have lost ground in recent years. Funding gaps, insufficient digital infrastructure and an inhibiting regulatory environment constitute clear obstacles.

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

- **People.** Growing, attracting and retaining the people with business and AI-relevant talent and ideas.
- **Technology.** Providing access to state-of-the-art AI tools, digital infrastructure, and compute power.
- **R&D.** Accelerating R&D with AI.
- **Rules.** Providing regulatory clarity and reasonable compliance costs.
- **Capital.** Unlocking Europe's fragmented risk capital markets and increasing attractiveness for venture capital investment in the EU.

> 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

1

The economic role of innovative digital businesses

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

Innovative digital businesses are scalable and tech-enabled

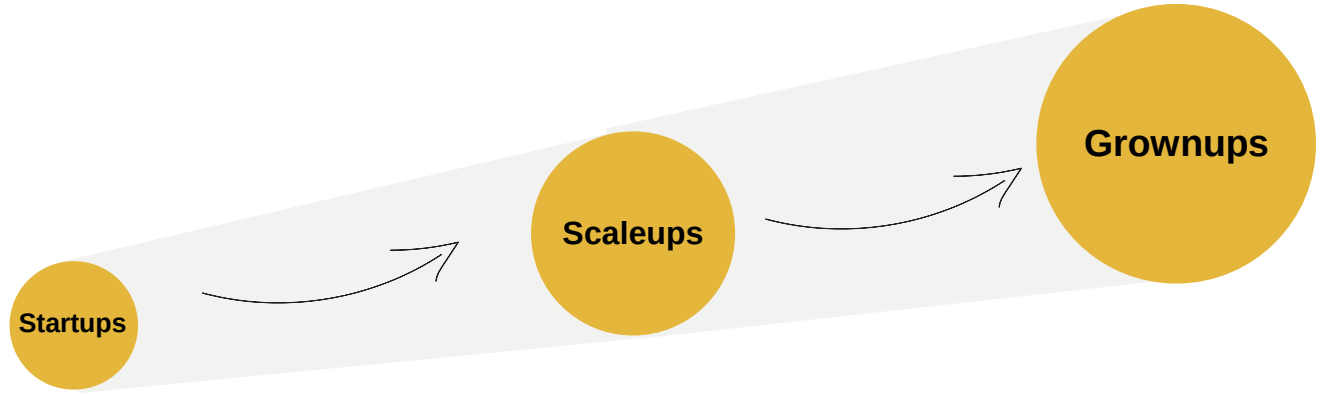
This research defines innovative digital businesses as companies headquartered in Sweden with a scalable business model, less than 30 years old, and whose product and/or business model are inherently innovative.

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

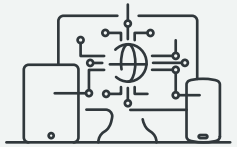
This study categorises innovative digital businesses by employment size into three main stages: startups, scaleups, and grownups.

> 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



Startups	Scaleups	Grownups
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).

Sweden is home to around 3,300 innovative digital businesses, employing 93,000 people

According to the European Commission, Sweden is among the EU's top performers in innovation capacity. Innovative digital businesses employ 93,000 people in Sweden, accounting for around 3% of private employment. Additionally, they employ 51,000 people outside Sweden.

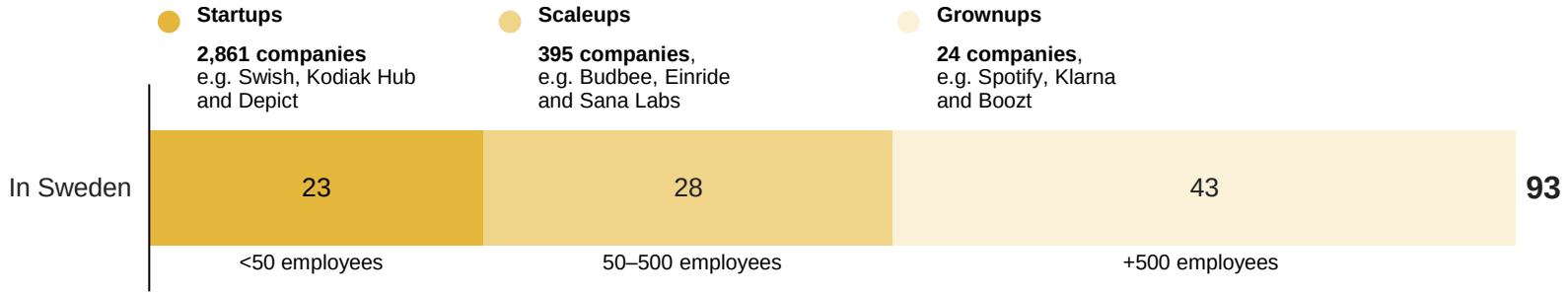
- *Startups* employ 23,000 people in Sweden and 8,000 abroad.
- *Scaleups* employ 28,000 people in Sweden and a further 15,000 people abroad.
- *Grownups* employ 43,000 people in Sweden and have created 28,000 jobs abroad.

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

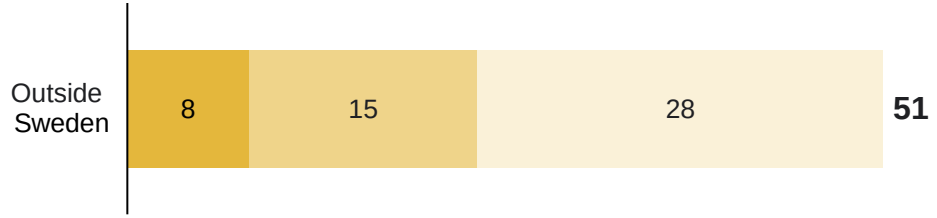
35% of jobs in innovative digital businesses headquartered in Sweden are abroad

Employment in Swedish innovative digital businesses
Thousand employees

93,000 people are employed in innovative digital businesses in Sweden



51,000 people are employed outside Sweden by Swedish-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 and the European Innovation Scoreboard.

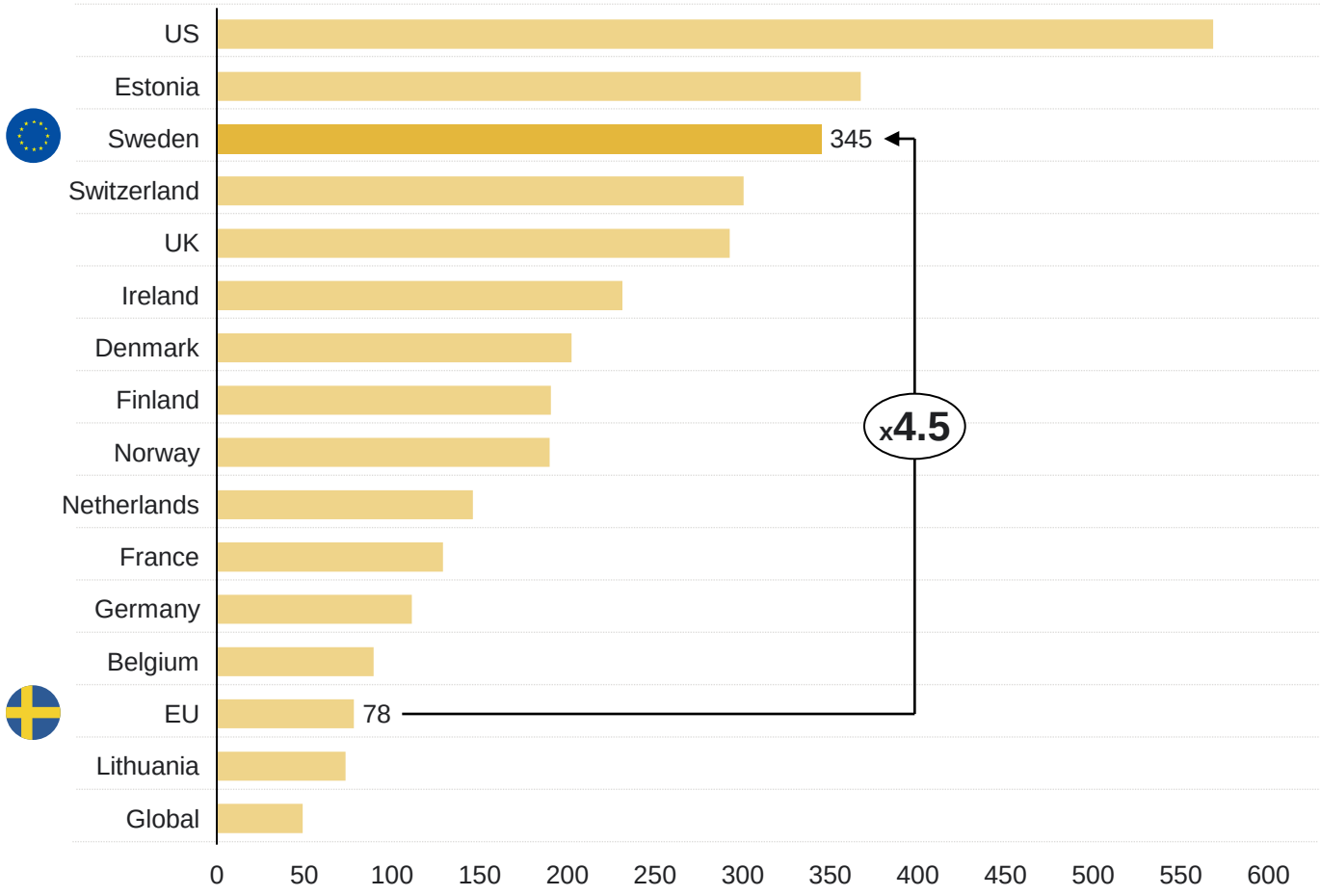
Sweden attracts large VC investments for its size

Sweden ranks second in Europe after Estonia on venture capital (VC) investment per capita over the past six years.

Sweden's venture capital (VC) investment per capita is 4.5 times the EU average.

Measured per capita, Sweden surpasses Switzerland and the UK, but is still behind the US.

Average annual venture capital investment 2018-24
EUR per capita



Source: Implement Economics based on Dealroom and World Bank.

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

AI accounted for a record share (18%) of VC funding in Europe in 2024, up from just over 4% of allocation in 2012. The recent growth is driven by generative AI, which now represents over 10% of VC funding in Europe.

Generative AI venture capital investment reached around EUR 44 billion globally in 2024, but only EUR 3.8 billion (9%) was directed to Europe. Sweden captured only 2.8% of the European investment, matching its share (2.8%) of the European economy.

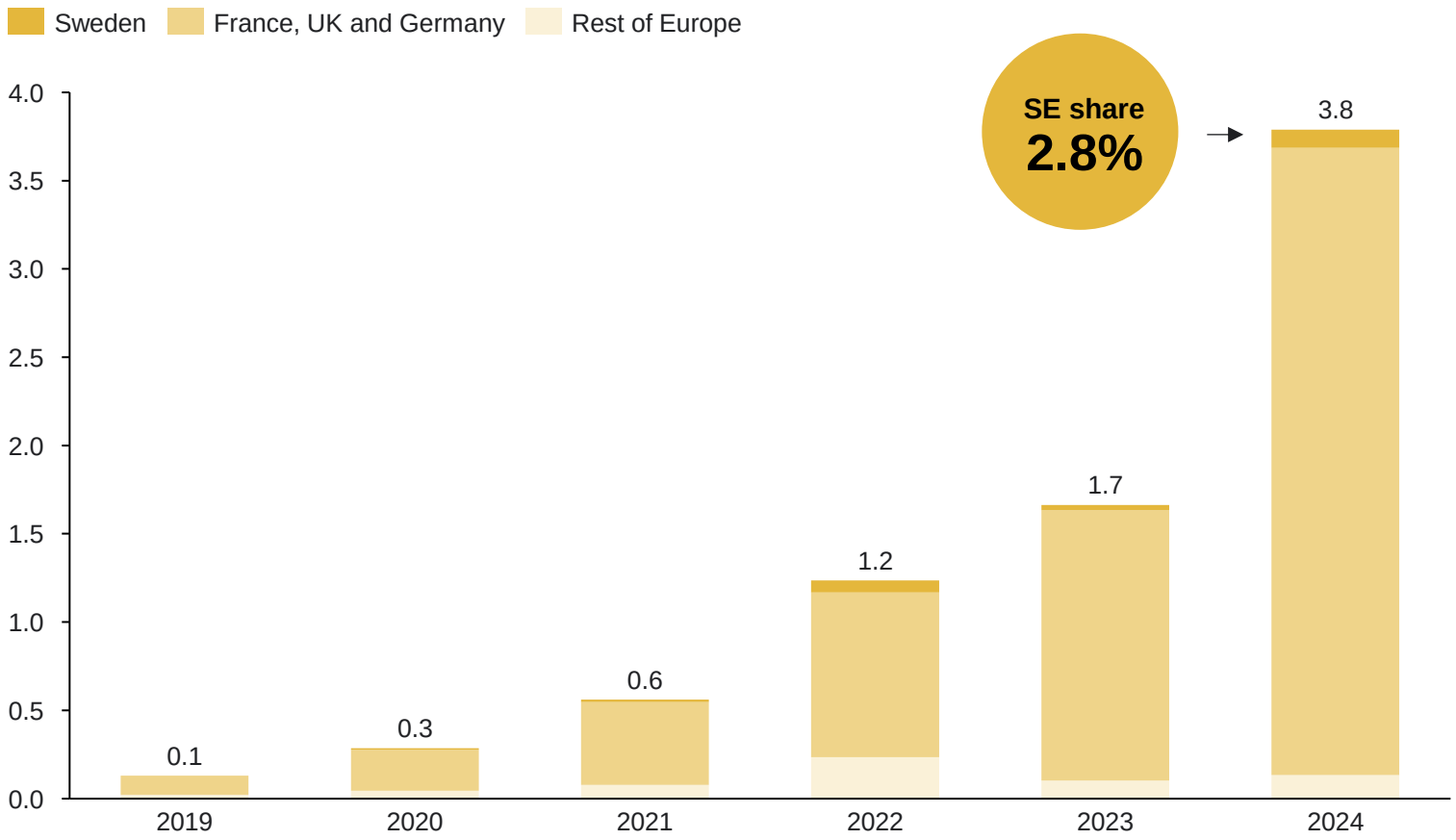
Most European venture capital funding is concentrated in a few nations: France, the UK, and Germany.

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

18% of total VC funding in Europe in 2024 was in AI

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.

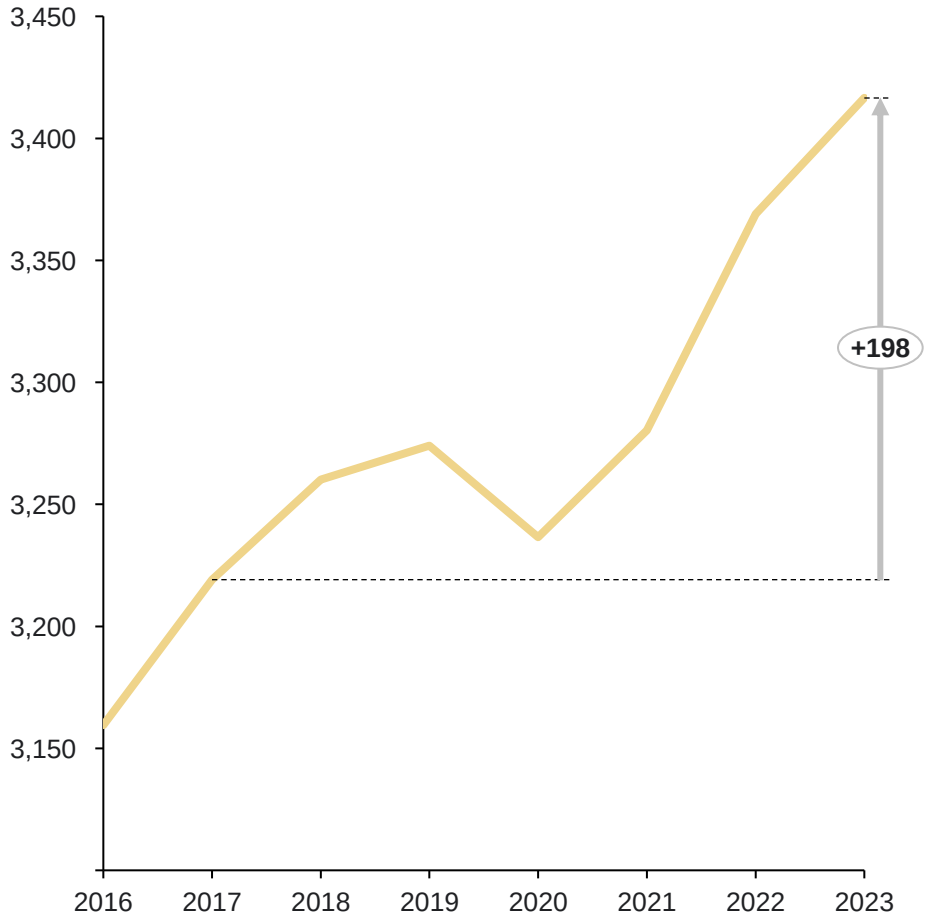
Innovative digital businesses have created 13% of all new private sector jobs in Sweden

Innovative digital business in Sweden have been creating jobs much faster than other private businesses. Since 2017, jobs in these digital businesses have grown by 6% each year compared to only 1% in other private businesses.

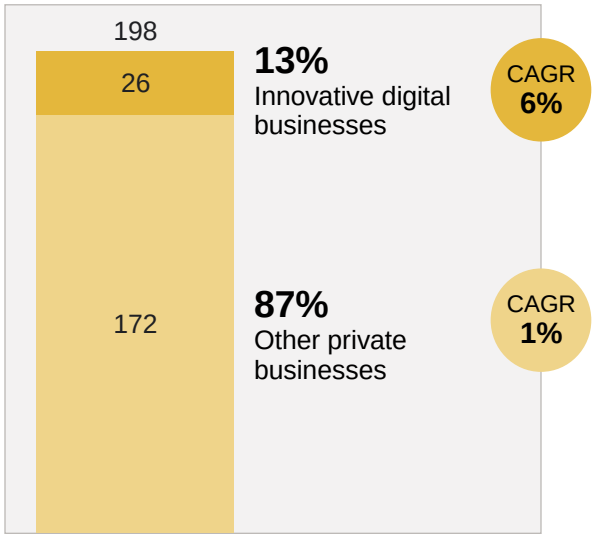
Overall, private sector jobs in Sweden have increased by 198,000 since 2017. Out of these, 26,000 new jobs came from innovative digital businesses, making up 13% of net private sector job creation in Sweden. This is a significant contribution, considering that innovative digital businesses only account for around 3% of private employment.

Innovative digital businesses in Sweden create more jobs compared to similar countries. In Denmark, these businesses account for 11% of new jobs; in Norway and Finland, they account for 5% and 4%, respectively.

Swedish 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.

Innovative digital businesses create high-paying jobs

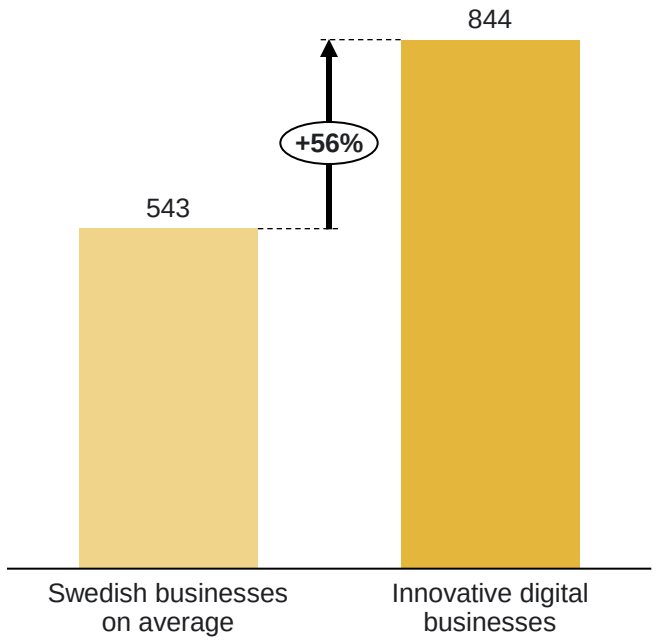
On average, innovative digital businesses pay higher wages than other Swedish businesses.

Despite many Swedish innovative digital businesses being on steep learning curves and constrained by resources, they are just as productive as other Swedish businesses on average.

Swedish innovative digital businesses …

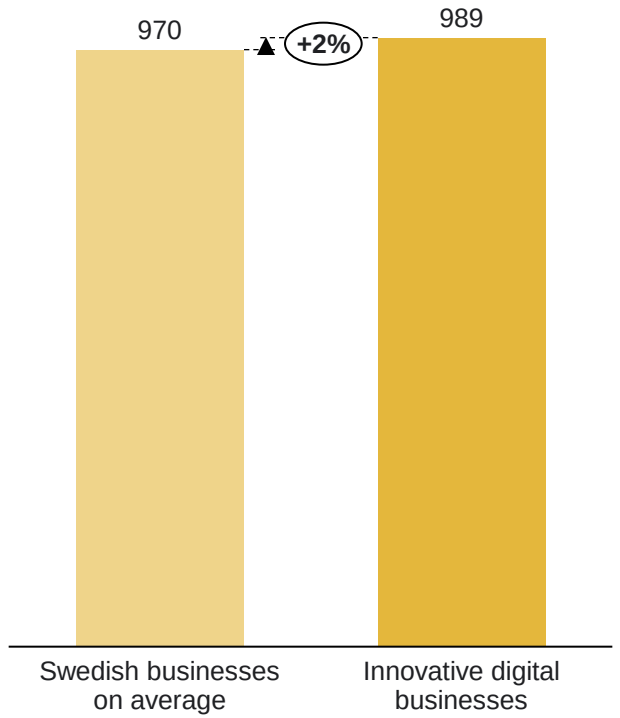
… pay significantly higher wages

Median wages
SEK (thousand) per employee , 2023*



… and are just as productive

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



Note: * Based on latest available data in Dealroom/TechIreland 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.

Innovative digital businesses make an outsized contribution when they scale

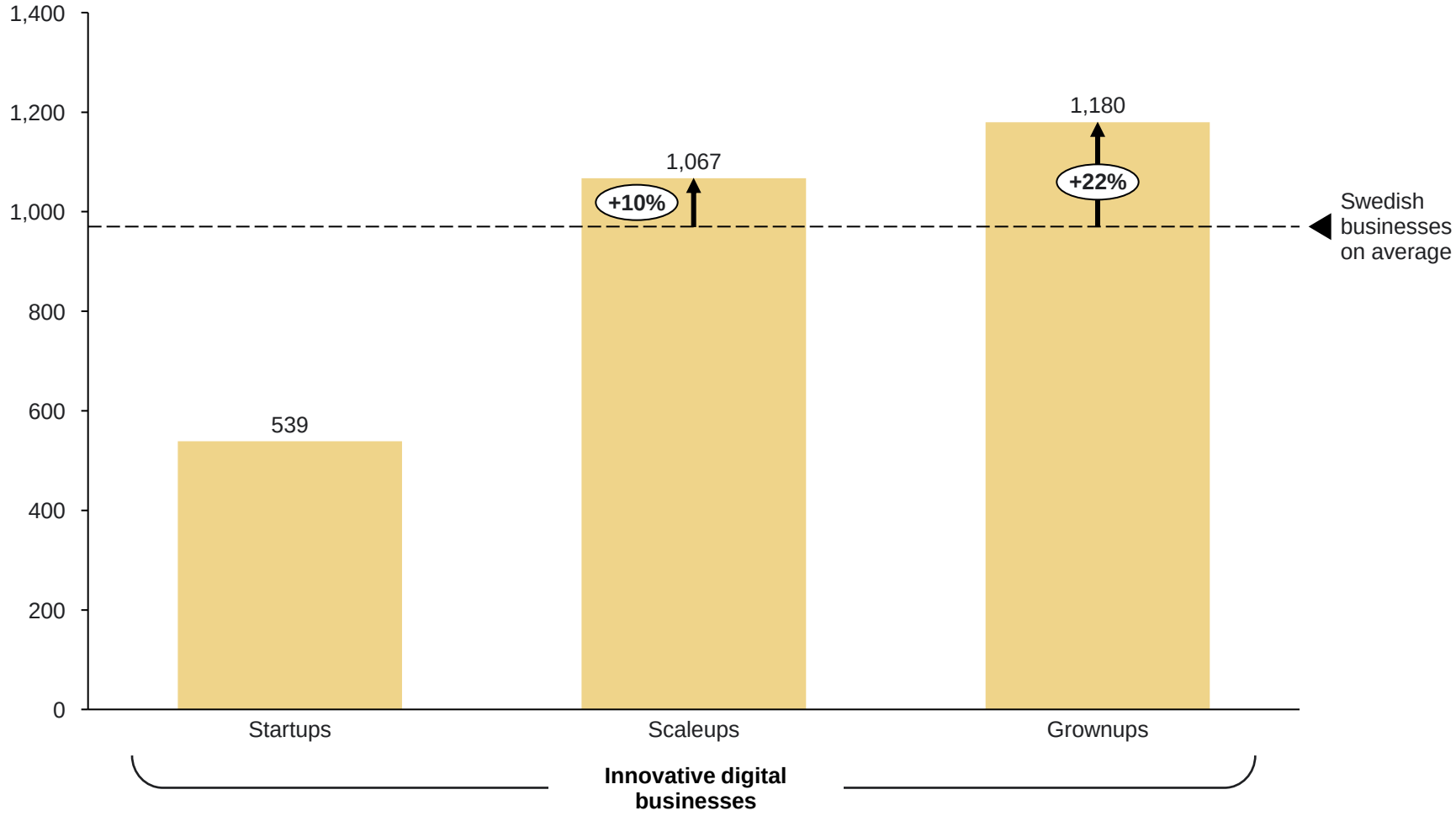
Employees in Swedish scaleups are, on average, 10% more productive than in other Swedish businesses. In contrast, scaleups in other comparable European countries tend to be less productive than their average businesses, highlighting the strong performance of Swedish scaleups.

Grownups in Sweden enable workers to be 22% more productive than Swedish businesses on average.

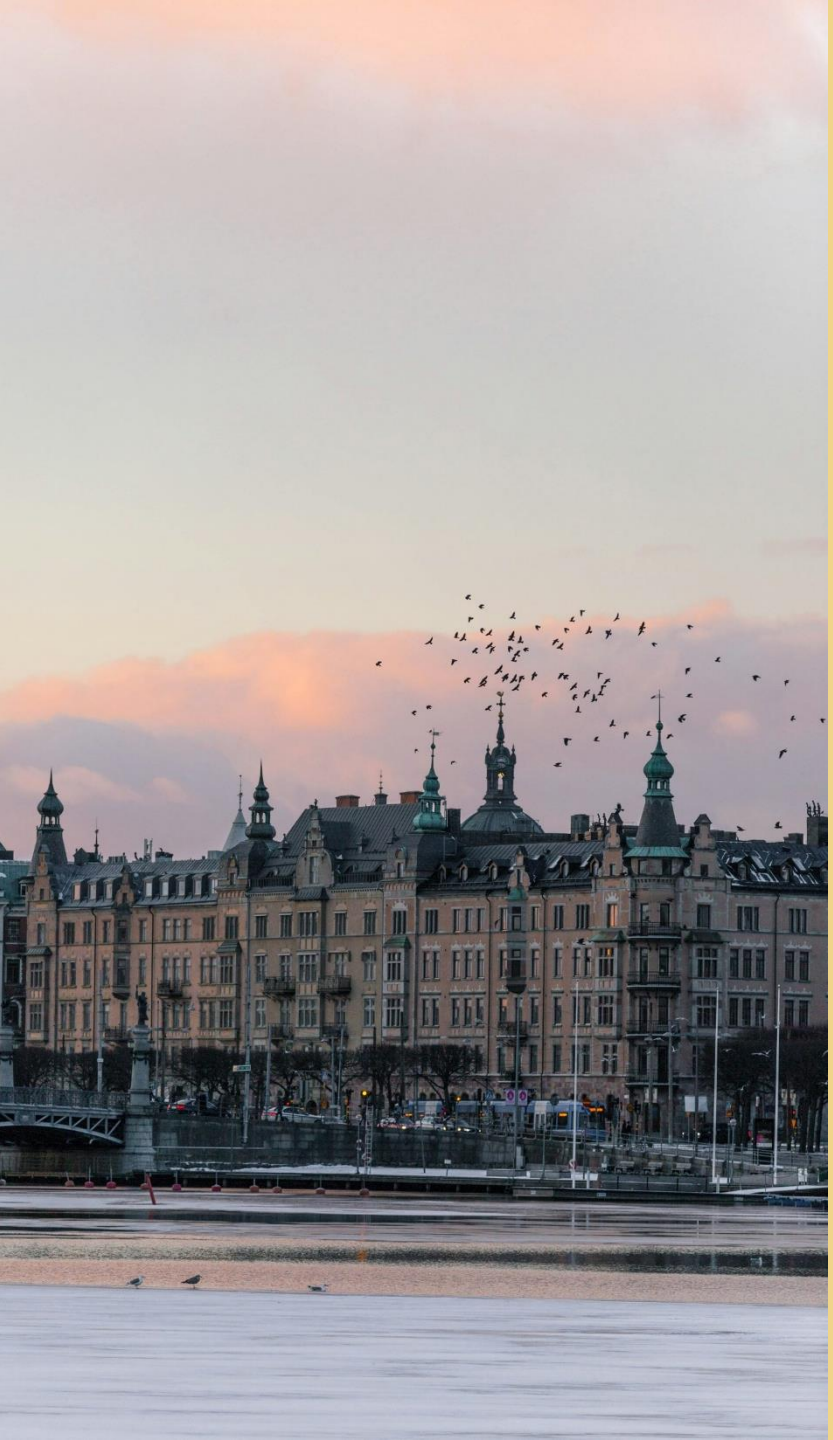
However, labour productivity is lower in startups compared to the average business. This can be due to factors such as rapid headcount growth, a steep learning curve, resource constraints, or market development challenges.

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

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



Note: * Based on latest available data in Dealroom/TechIreland 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.



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 like generative AI.

> … we are facing a crossroads where our future prosperity will be largely determined by how well we manage to take advantage of AI's opportunities and manage its problems.
>
> **The AI Commission** in Roadmap for Sweden (2024)

Innovative digital businesses propel AI adoption across the economy

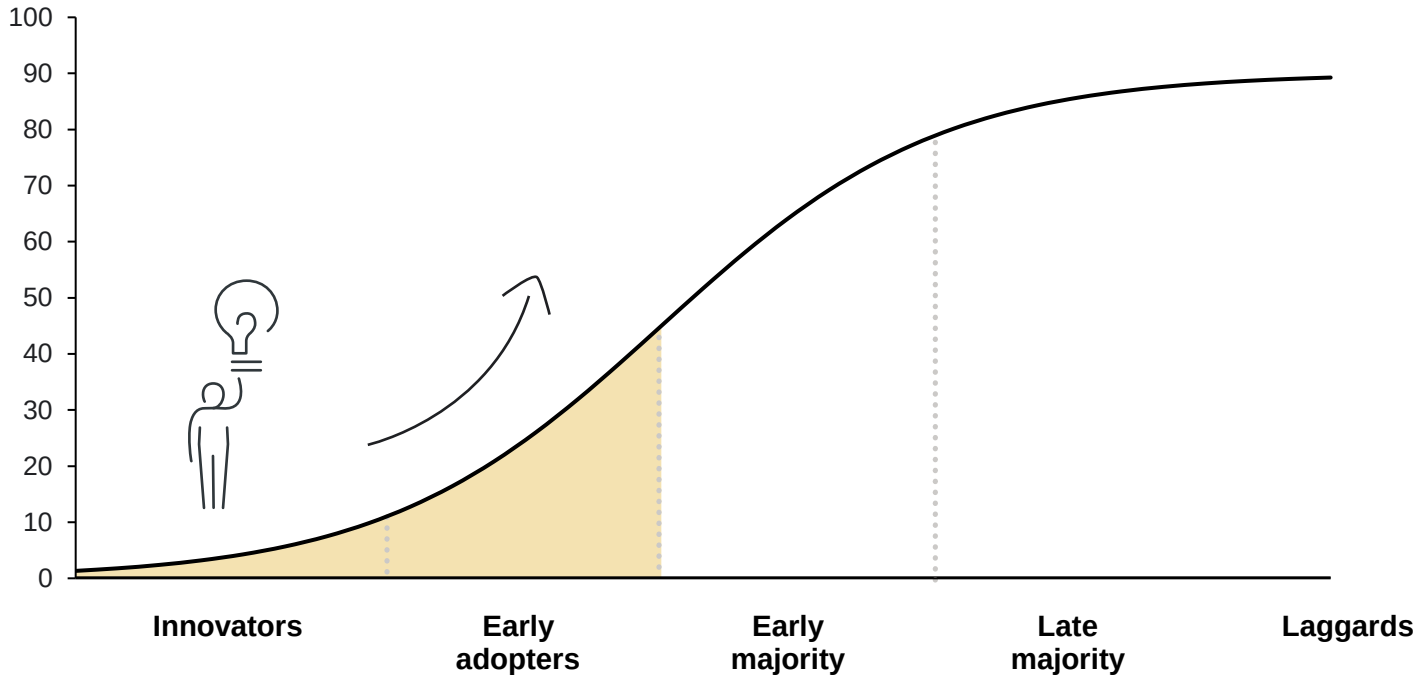
The coming AI era holds major potential economic benefits for Sweden.

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

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

> The players who can apply the latest technology the fastest gain a significant lead, while those who lag behind risk losing competitiveness.
>
> **The AI Commission** in Roadmap for Sweden (2024)

Diffusion of AI technologies in Europe
%



Innovative digital businesses find new ways of using AI tools and create new ones. This helps other businesses across sectors to benefit from the new technology. For example, in Sweden, the AI startup Sana provides AI solutions for performing routine tasks like filling forms.

Note: The figure shows generative AI adoption expressed as a share of economy-wide firms exposed to AI automation.
Source: Implement Economics based on Bruegel (2021) and Forbes.

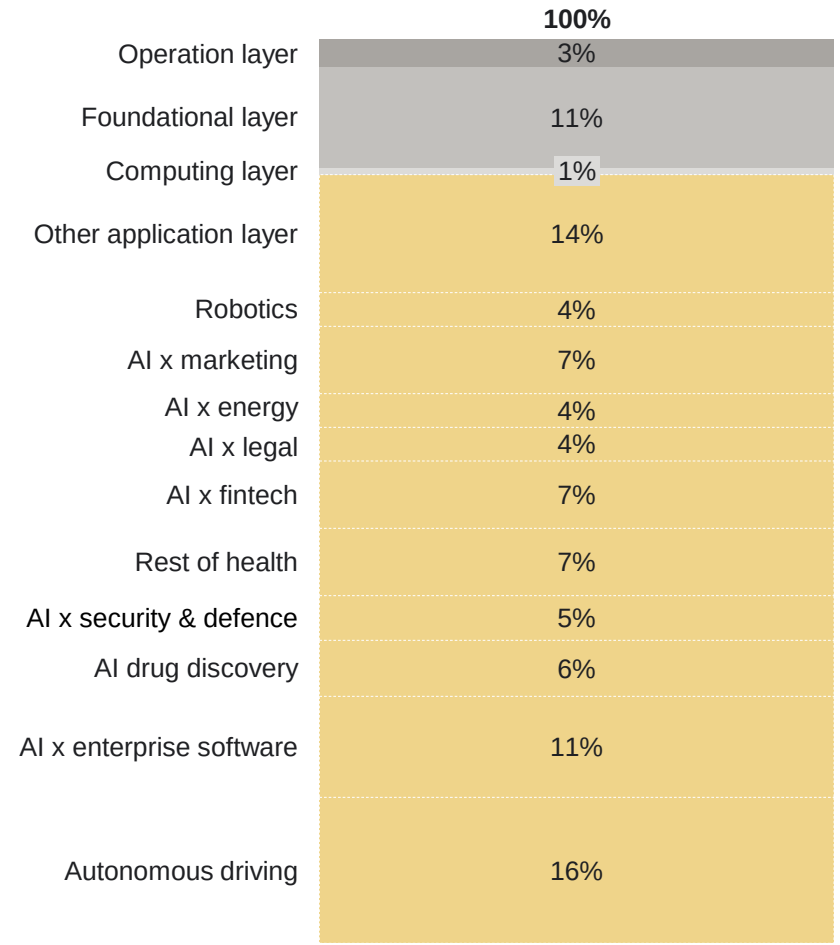
Innovative digital businesses can use AI to transform sectors across the economy

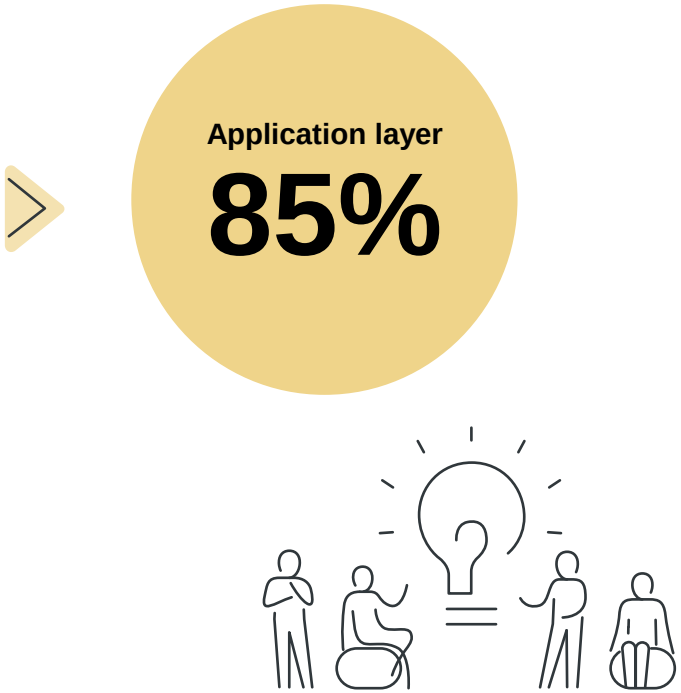
85% percent of European AI venture capital funding is directed toward the application layer of AI, focusing on real-world uses and integration into diverse sectors of the economy.

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 Swedish 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 comprises 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. (85% in Sweden). This covers…

- ... **46%** who have **experimented** with or **partially adopted** generative AI (52% in Sweden).
- … **14%** who have **fully adopted** generative AI. (14% in Sweden)
- … **11%** who have **adopted and actively adapted** generative AI technology to suit business needs. (9% in Sweden)
- … and **8%** who have **generated** new AI technologies to serve business needs. (10% in Sweden)

21% do not use generative AI. (15% in Sweden)

Note: Sample size of n=1095 in Europe and n=109 in Sweden for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

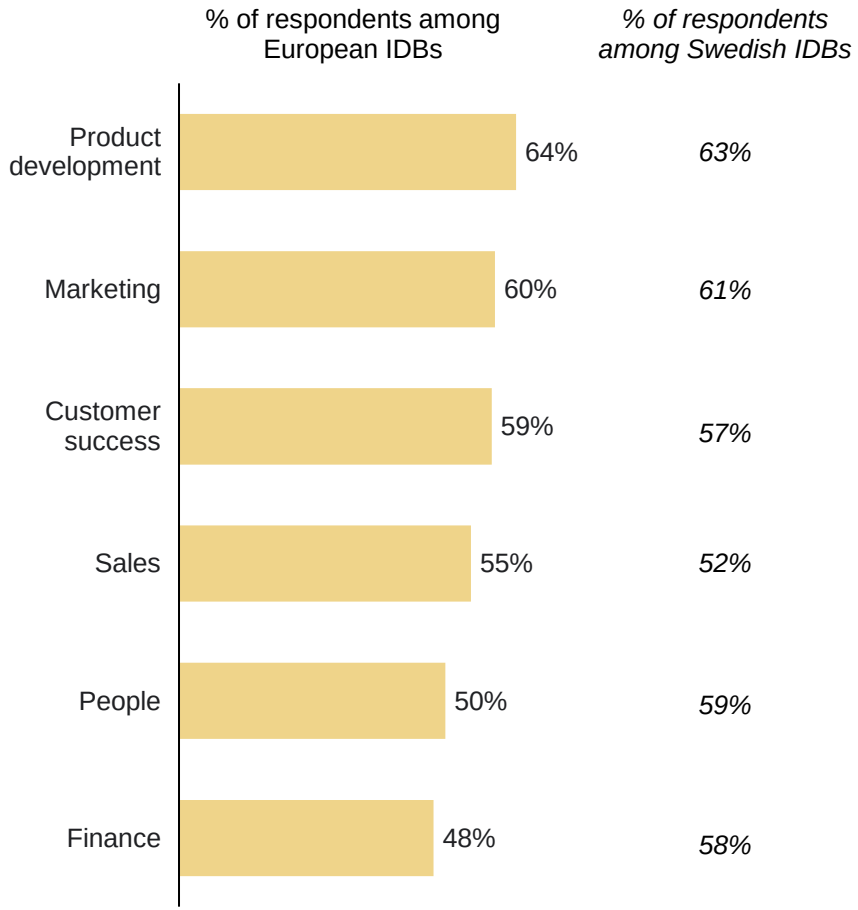
AI boosts value creation and efficiency in innovative digital businesses

Surveyed innovative digital businesses in Europe and Sweden 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 efforts.

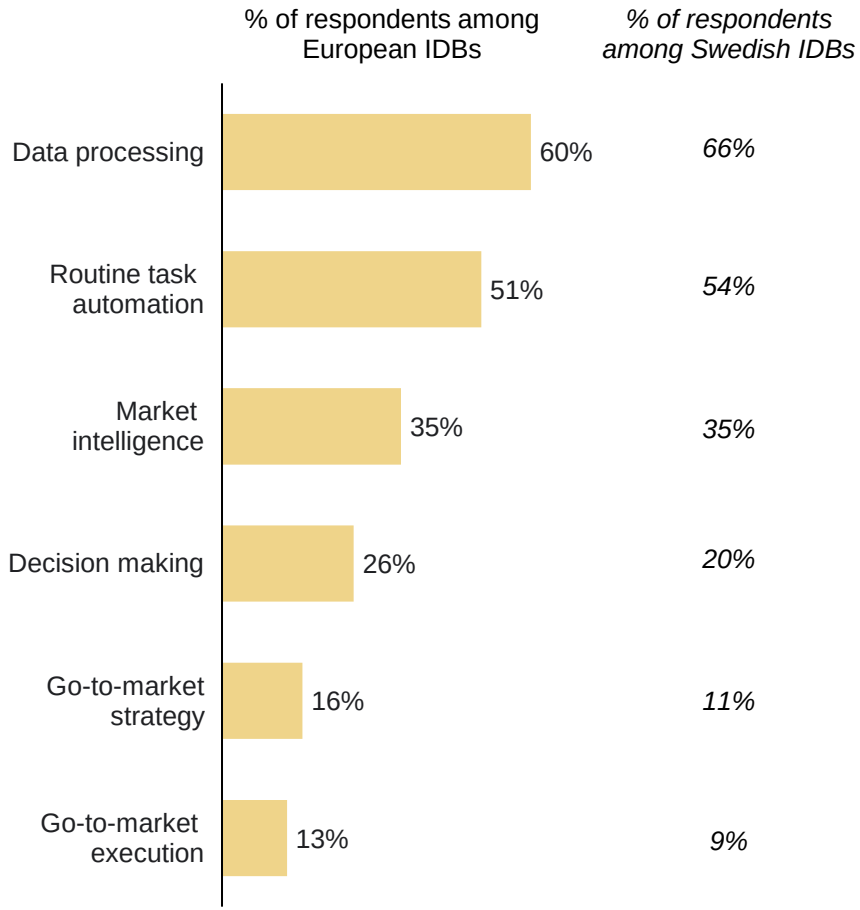
In addition, surveyed innovative digital businesses report that AI has improved efficiency across multiple areas, helping to optimise and streamline operations. For example, 60% of European respondents report improved data processing and 51% point to improvements in routine task automation.

Responses from Swedish 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=109 in Sweden for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

Innovative digital businesses benefit from global access to AI technology

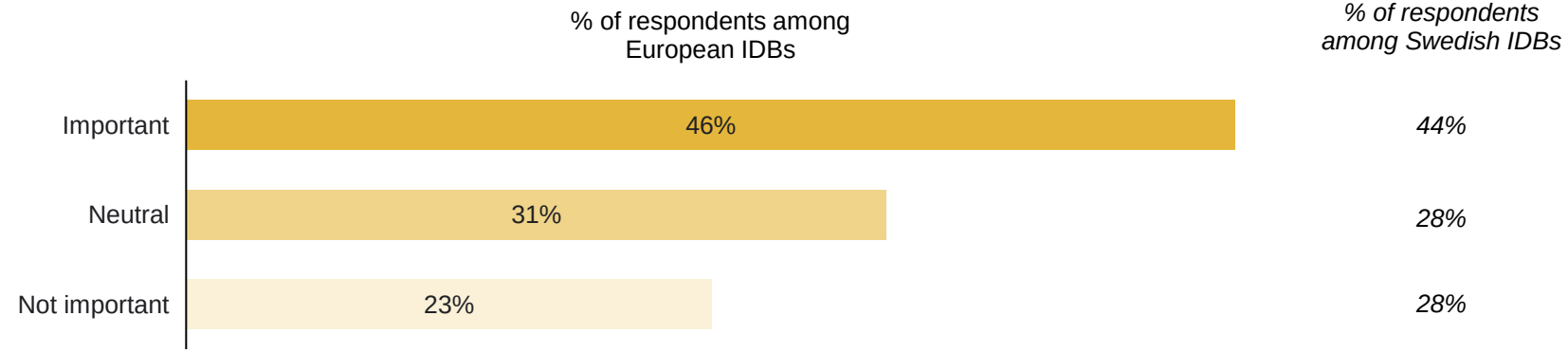
Generative AI is a general-purpose technology with broad application across industries and countries. While the majority of foundational AI models (73%) are developed in the US, according to the Draghi report, companies worldwide can benefit from them.

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.

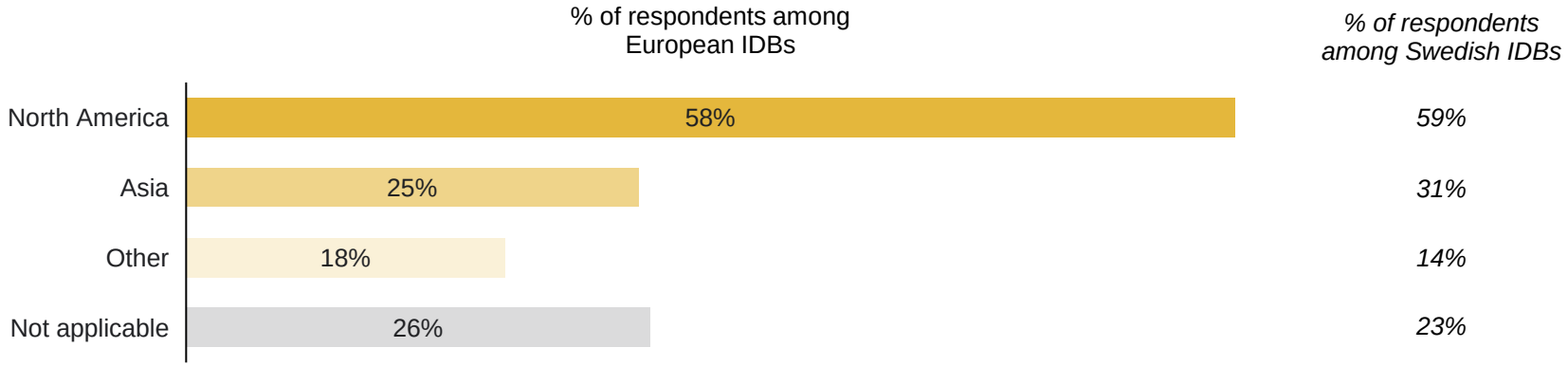
Access to these pre-trained models allows innovative digital businesses to develop AI applications efficiently without the risk and cost of training models from scratch.

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

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=109 in Sweden 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.
Source: Implement Economics based on Notion Capital survey (2024).

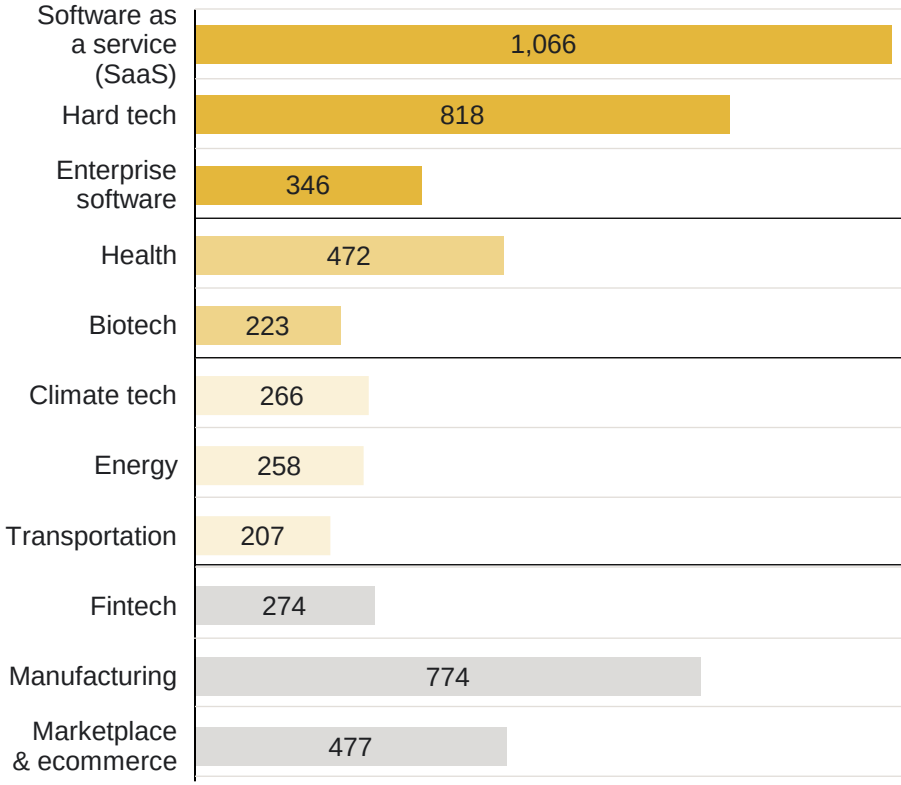
Innovative digital businesses work to solve societal challenges

Sweden has strong competencies in digital technologies, life science and manufacturing. Innovative digital businesses contribute to these strongholds and to economic diversity by bringing new products and ideas to the market. Key areas include:

- **Tech:** Supporting digitalisation and innovation in Software as a Service (SaaS), hard tech, and enterprise software.
- **Health and biotech:** 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 Swedish 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…
VITEC	Optimising operations with tailored software solutions
voi.	Improving urban mobility with shared micro-mobility
BEETROOT	Providing sustainable software solutions for businesses
RaySearch	Developing software solutions for radiation oncology
oncopeptides	Advancing targeted therapies for difficult-to-treat cancers
FLOWER	Enabling flexibility for energy producers and consumer
SVEA SOLAR	Accelerating the energy transition with solar power
einride	Reducing emissions from transportation
Klarna	Helping businesses get paid
BONESUPPORT	Developing injectable bone graft substitutes
Dignita	Enhancing traffic and workplace safety

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 …

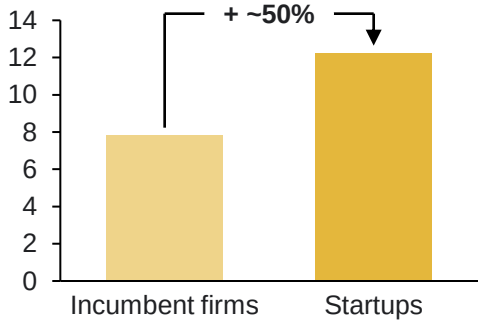
… startups create more radical and disruptive innovations …

~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



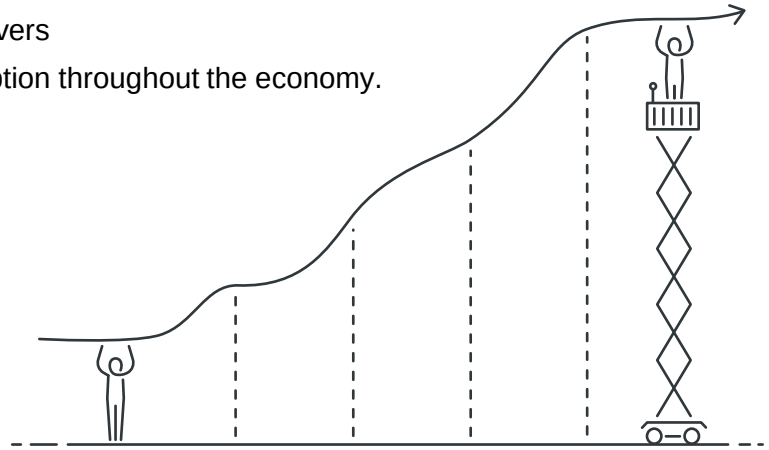
> Startups generate innovations that are more radical and disruptive than those of incumbent firms.
>
> **Kolev et al. (2022)**

… 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 better innovative digital businesses

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

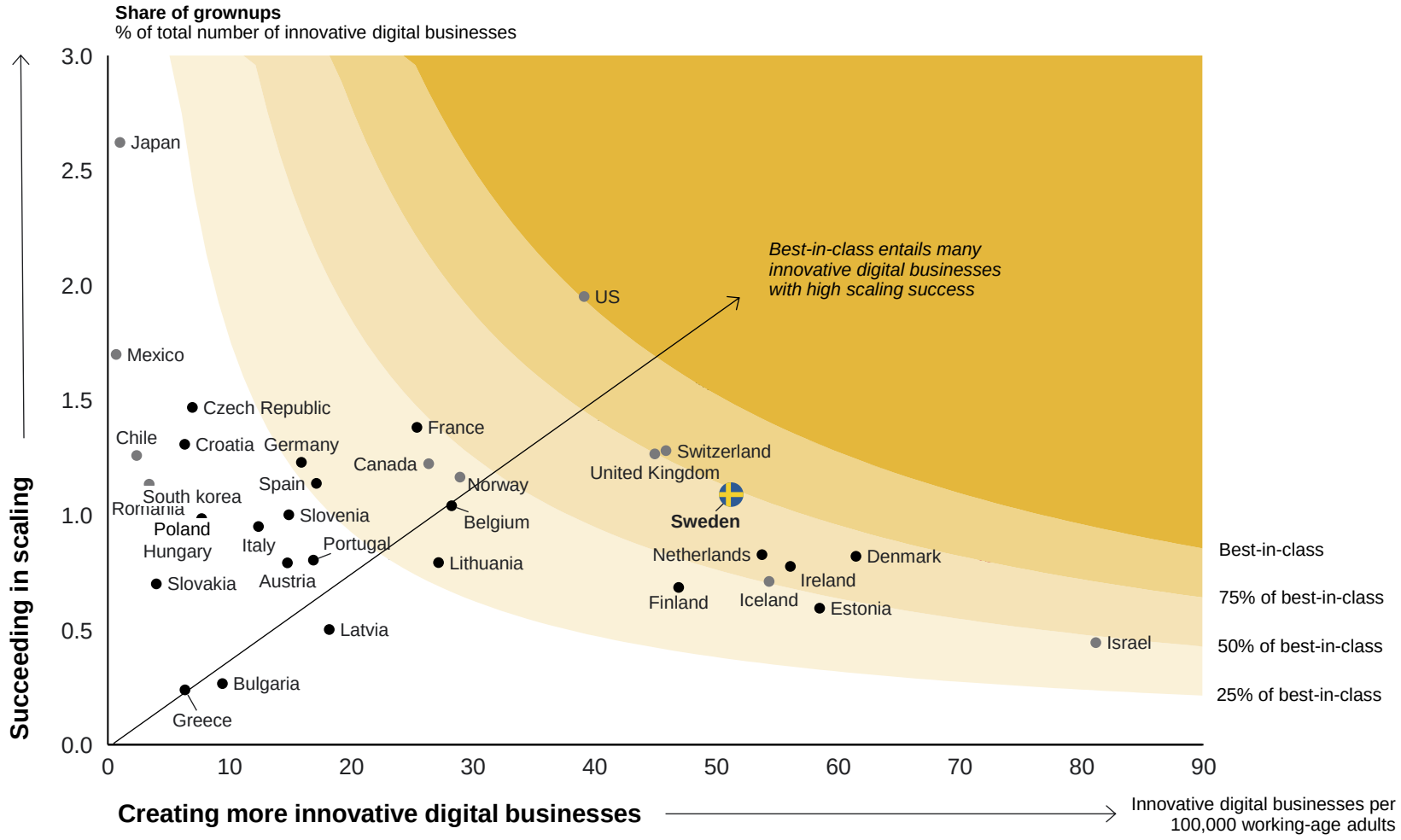
Sweden cannot take its strong entrepreneurial ecosystem for granted

Sweden outperforms most European countries on the scaling success of innovative digital businesses.

Sweden also has one of the highest levels of entrepreneurial activity in Europe, with 51 innovative digital businesses per 100,000 working-age adults compared to the EU average of 19.

Despite the strong entrepreneurial ecosystem, Sweden cannot assume it will remain at the forefront. The future success of businesses and their ability to capitalise on AI opportunities will be crucial for Sweden's competitiveness in the coming decade.

> Passivity is rarely a good strategy, especially not when life is changing.
>
> **The AI Commission** in Roadmap for Sweden (2024)



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

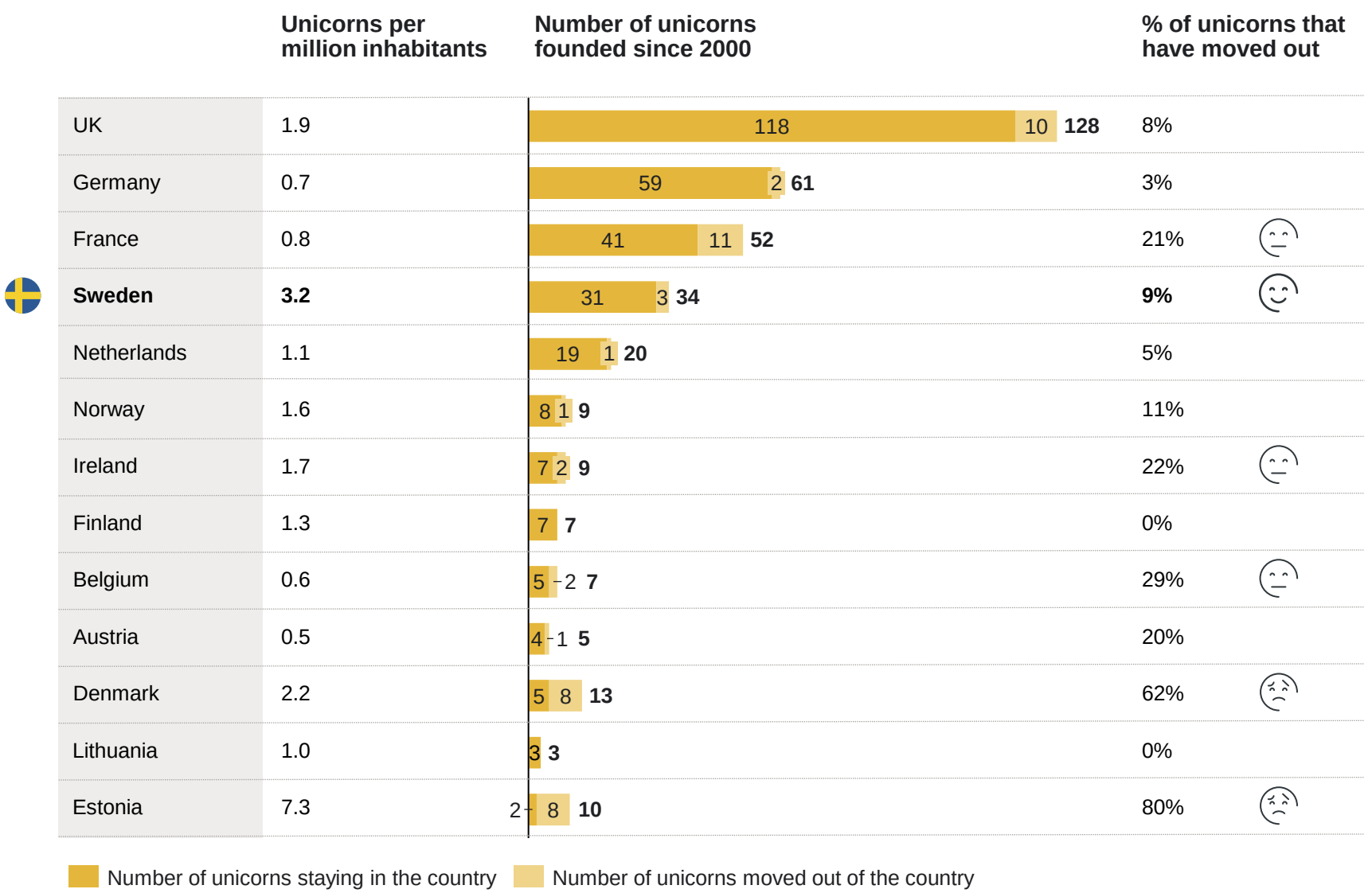
Sweden excels at creating and retaining unicorns

Since 2000, Sweden has produced 34 unicorns (3.2 per million people), surpassing its Nordic peers of Denmark (2.2), Norway (1.6) and Finland (1.3). Unicorns are startups that reach a valuation of USD 1 billion.

Additionally, only three Swedish unicorns (9%) have moved abroad, which is less than comparable Nordic and European countries.

Growing and retaining more of these quickly scaling innovative businesses holds considerable economic potential for Sweden.

> … 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).

Global competition is intensifying

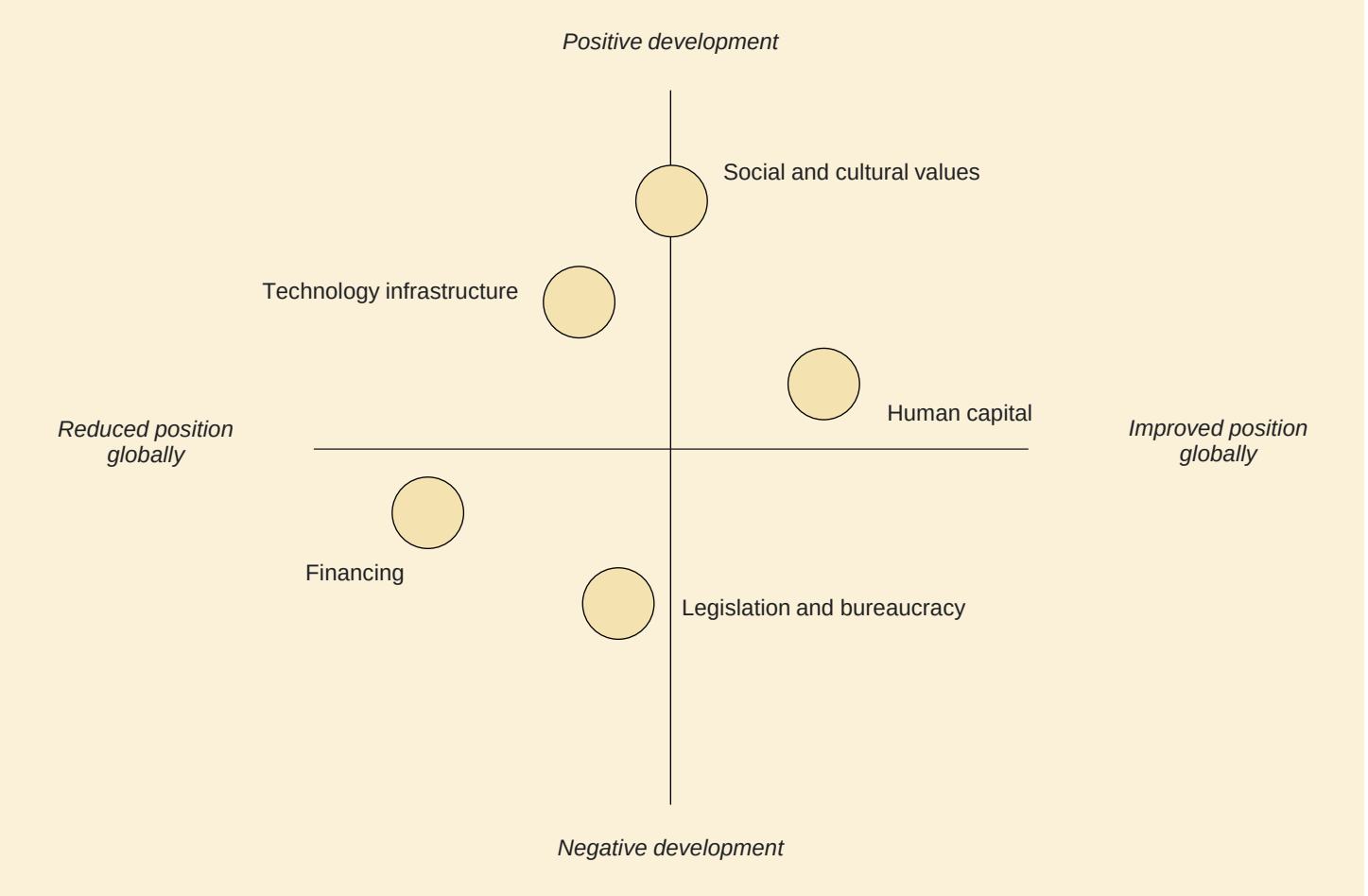
TechSverige took a recent deep dive into the conditions for entrepreneurship in Sweden.

TechSverige found that Sweden has good overall conditions for entrepreneurs. There are good institutions, strong human capital and a well-developed technology infrastructure that has increased the opportunities for entrepreneurship over time, not least in tech.

However, TechSverige also found that global competition has intensified and both Sweden and Europe have lost ground in recent years, with the clear obstacles being funding problems, lack of skills and an inhibitive regulatory environment.

> … tech entrepreneurs show the way to brighter times
>
> **TechSverige** in The Swedish Tech Industry 2024

Indicative development of the five system factors over time



Note: TechSverige has assessed five system factors that are significant over time for stimulating entrepreneurial creativity in an economy: (1) access to finance, (2) access to human capital, (3) well-aligned regulations and bureaucracy, (4) good technical infrastructure, and (5) supportive social or cultural values.
Source: TechSverige (2024)

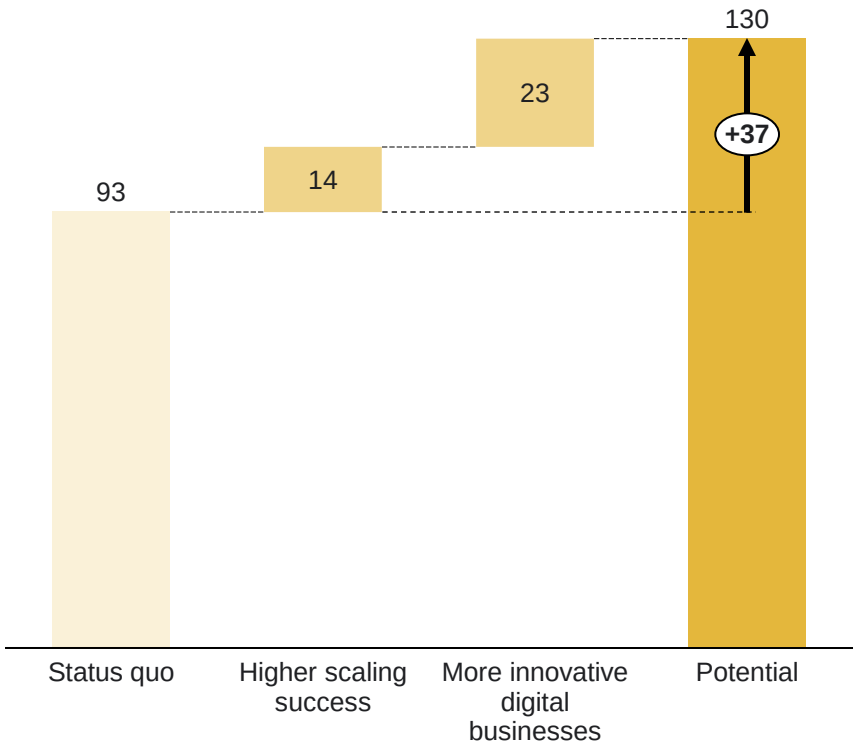
Sweden can unlock significant economic growth through innovative digital businesses

More and better innovative digital businesses could create 37,000 high-value jobs and contribute almost SEK 41 billion annually to the Swedish economy. The impacts stem from:

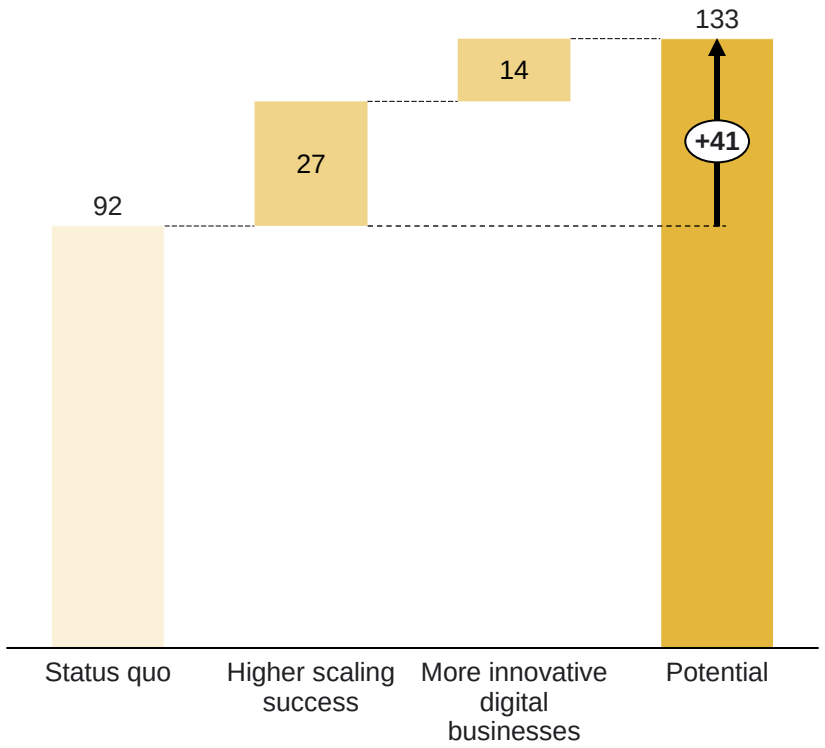
- **Higher scaling success of innovative digital businesses:** Transforming more startups into grownups, reaching the same success rate as the three leading OECD countries, could create 14,000 high-value jobs and add SEK 27 billion annually to the Swedish economy.
- **More innovative digital businesses:** If Sweden can grow more innovative digital businesses, reaching the entrepreneurial activity of the three leading OECD countries, these new innovative digital businesses could support 23,000 jobs and contribute SEK 14 billion annually to the Swedish economy.

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 Swedish economy is SEK 5 billion.

Jobs
Thousand



Annual Gross Value Added
SEK 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 on "More innovative digital businesses" is defined by the average performance of the top three OECD countries (Ireland, Denmark and Estonia). 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

> Clear political leadership is needed in times of great and rapid change, but it also requires coordinated resources for our public sector, secure electricity supply, available computing power, fast digital infrastructure, good skills supply and stable entrepreneurial conditions.
>
> **Chairman of the AI Commission, Carl-Henrik Svanberg**

Sweden has strong framework conditions to grow innovative digital businesses, but challenges remain

Innovative digital businesses need…	Sweden's strengths and challenges in creating a supportive environment for innovative digital businesses:
People Growing, attracting and retaining the people with business and tech talent and ideas	The Swedish workforce is generally well-equipped, but skill shortages highlight the need for continuous upskilling and attracting skilled foreign labour to grow innovative digital businesses and realise the full AI potential.
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. Sweden has strong digital infrastructure, but to fully capture the AI opportunity, significant expansions in digital infrastructure capacity are needed across Europe.
R&D Accelerating R&D with AI	AI has the potential to accelerate scientific breakthroughs and innovation, and Sweden has a solid starting point to harness this opportunity, with high R&D spending and strong innovation capacity and success.
Rules Regulatory clarity and reasonable compliance costs	The complexity of EU regulation makes 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.

The Swedish workforce holds key potential for AI-driven economic growth

People

A skilled workforce is essential for growing digital innovative 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.

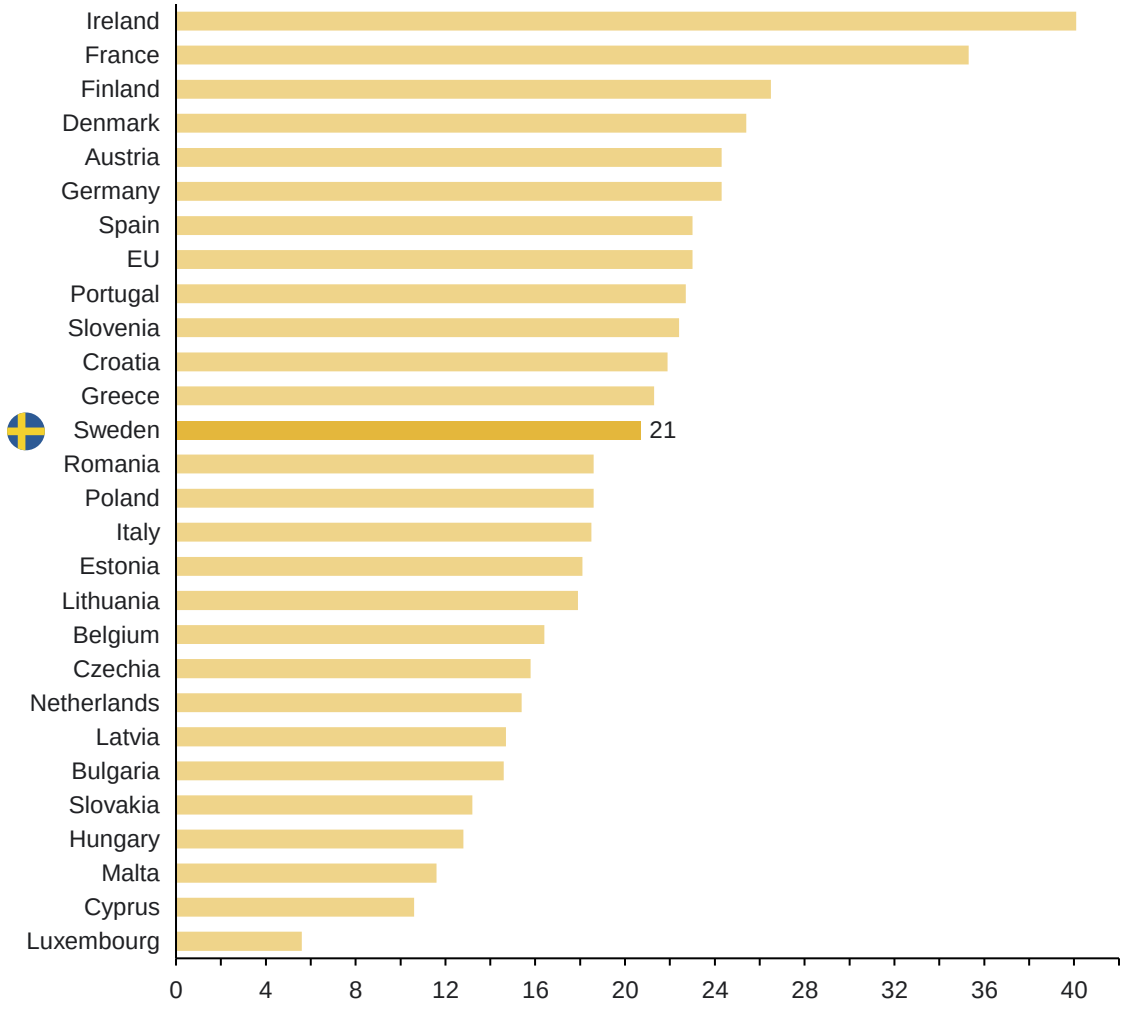
The Swedish workforce is digitally enabled and well-educated, ranking 4th on human capital in DESI, with 49% of the adult population having above-basic digital skills (EU average 36%). Additionally, Sweden only ranks moderately in Europe in terms of STEM graduates.

Attracting and developing highly skilled labour is crucial for the success of innovative digital businesses. According to the European Employment Service (EURES), 41% of private employers are challenged by skills shortages, particularly in healthcare, engineering, ITC and education. Continuous upskilling that leverages platforms like Promt SM is key for harnessing the AI opportunity.

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.

Several public and private initiatives are already aiming to build more digital skills for the Swedish workforce, e.g. Digitalidag, Digitalakademin, Digitala jag.

Graduates in STEM
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, EURES, and DESI (2022).

Sweden's strong digital infrastructure is a good starting point for growing 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.

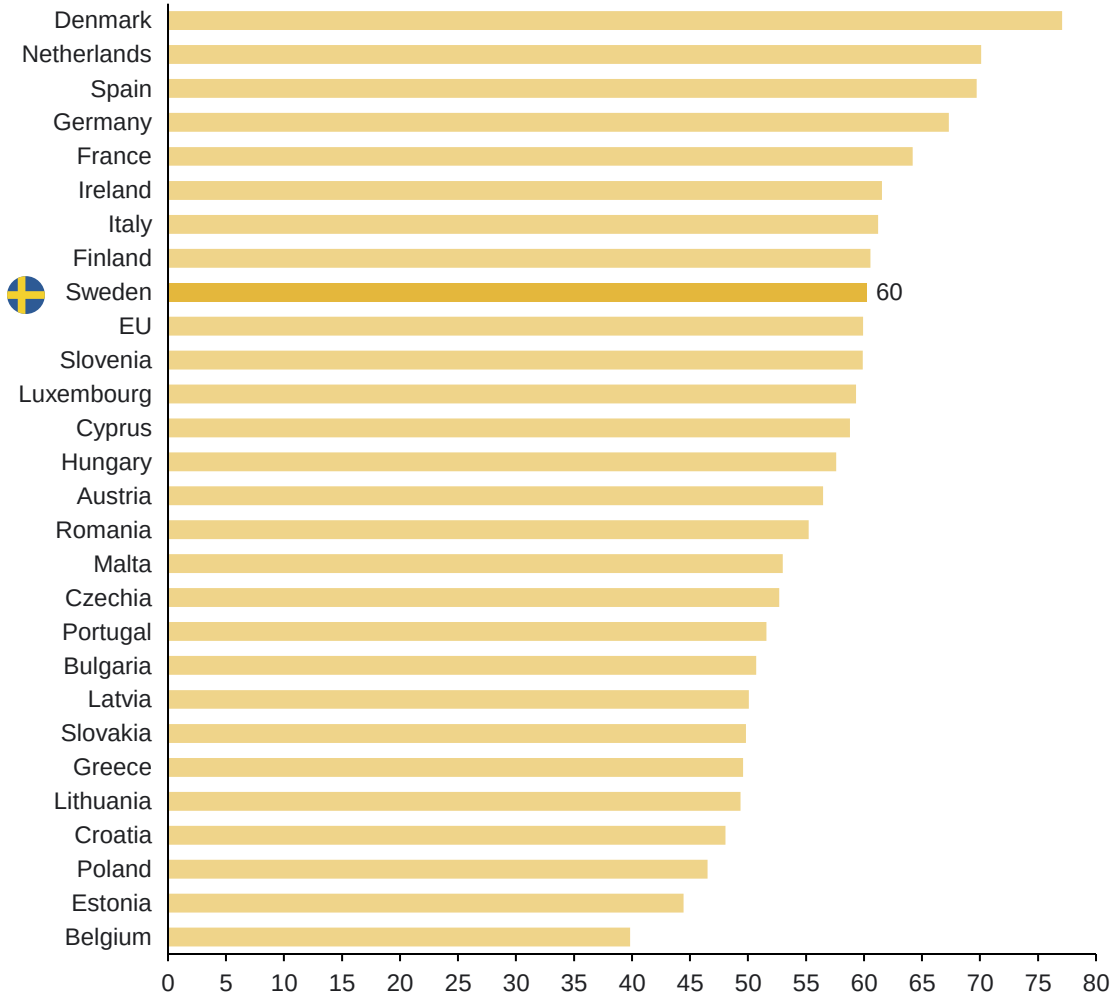
Access to top-performing AI/ML tools like Google Vertex, GitHub Copilot and Midjourney Ai is central for European innovative digital businesses. According to Notion Capital polling, 58% of them already rely on international models, mostly from North America.

Sweden has relatively solid and sustainable digital infrastructure, ranking 9th on connectivity in DESI and 21st on AI infrastructure globally in the Tortoise Global AI Index.

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

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), Letta (2024) and Tortoise Global AI Index.

AI is not just an innovation in itself, but an innovation in how we make breakthroughs

R&D

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

AI is reinventing the way we invent according to the UK's Innovation Agency, NESTA. This is substantiated by the US National Bureau of Economic Research (NBER) finding that AI may serve "...as a new general-purpose 'method of invention'."

Sweden has high R&D investment, above the EU average and nearly matching the US. In addition, Sweden has strong capacity and success in innovation, as measured by the WIPO Global Innovation Index (GII).

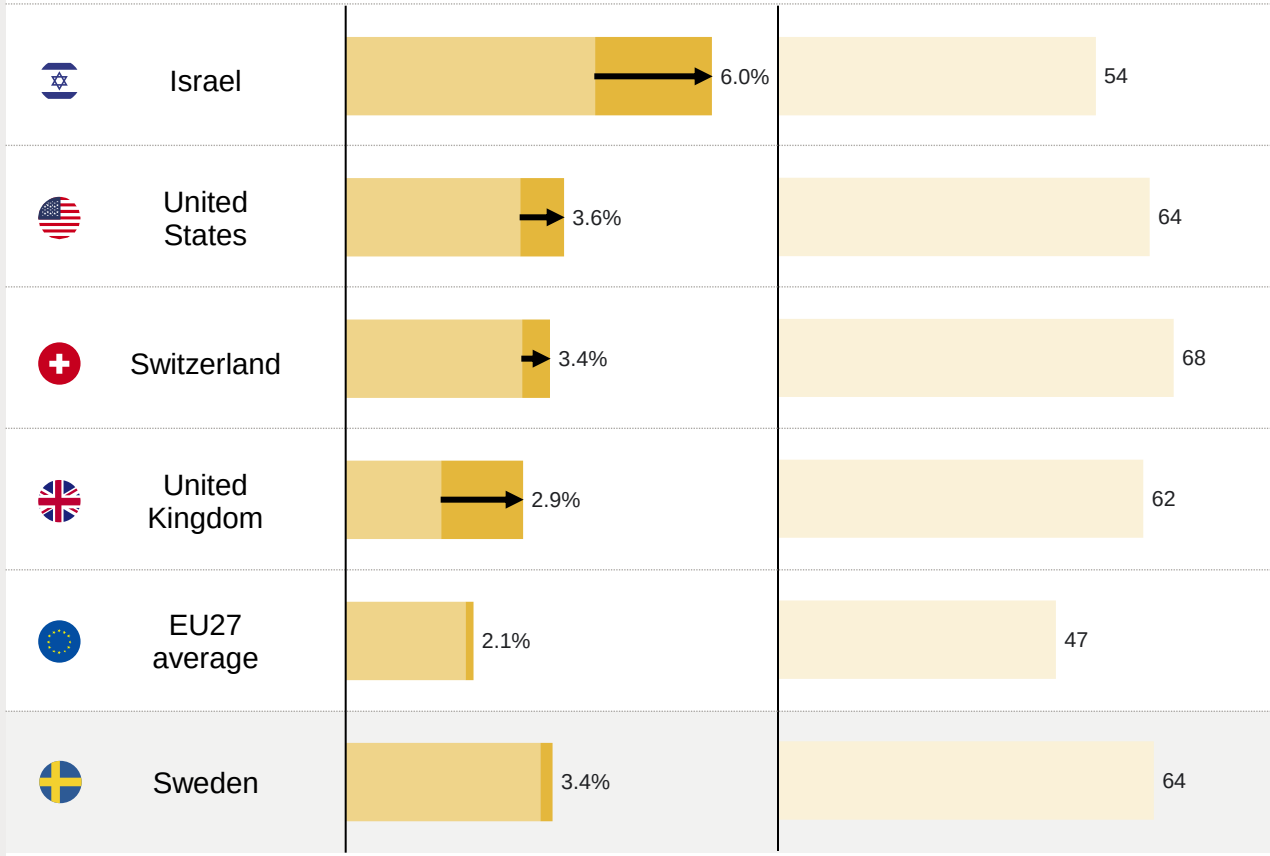
Sweden's strong R&D position could be further accelerated with AI-driven scientific breakthroughs. For example, AI innovations like AlphaFold, an AI system developed by Google DeepMind, have revolutionised protein folding predictions. Additionally, initiatives like WASP demonstrate how AI can drive innovation.

By adopting generative AI, Sweden 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

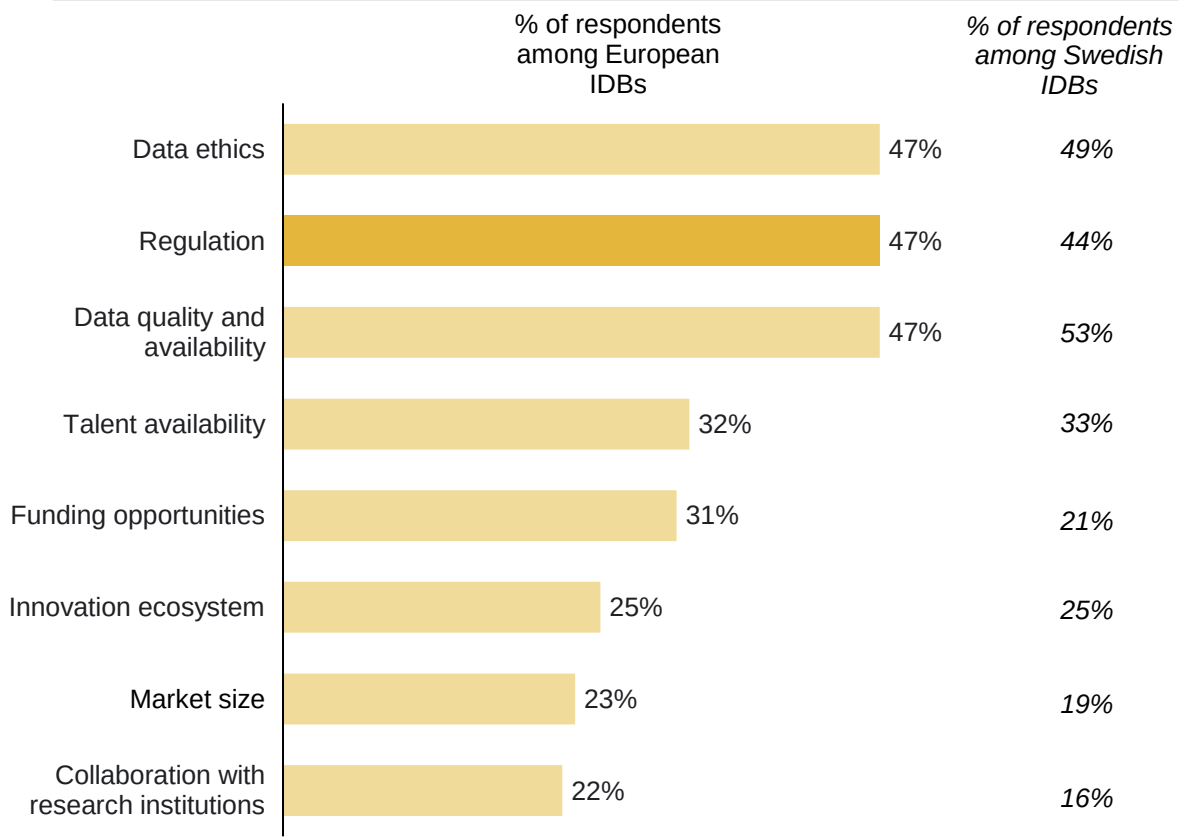
The complexity of EU regulation hampers innovation and investment. The EU now has around 100 tech-focused laws and over 270 regulators active in digital networks across EU Members.

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. 44% of surveyed Swedish innovative digital businesses see regulation as an obstacle to developing cutting-edge AI technologies. Large companies like Apple, Meta and OpenAI have also announced AI product delays or cancellations due to regulatory ambiguity.

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

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



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

Capital

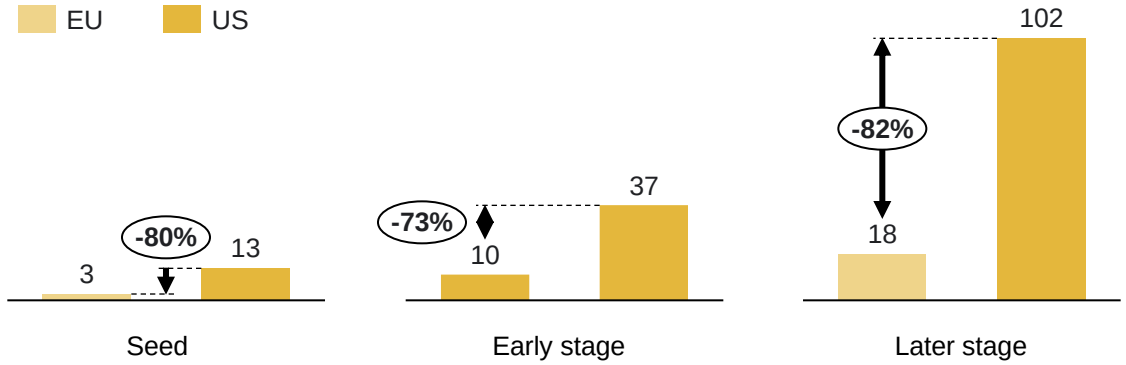
Europe is not lacking money. In 2022, EU household savings were EUR 1,390 billion compared to EUR 840 billion in the US, according to the Draghi report.

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.

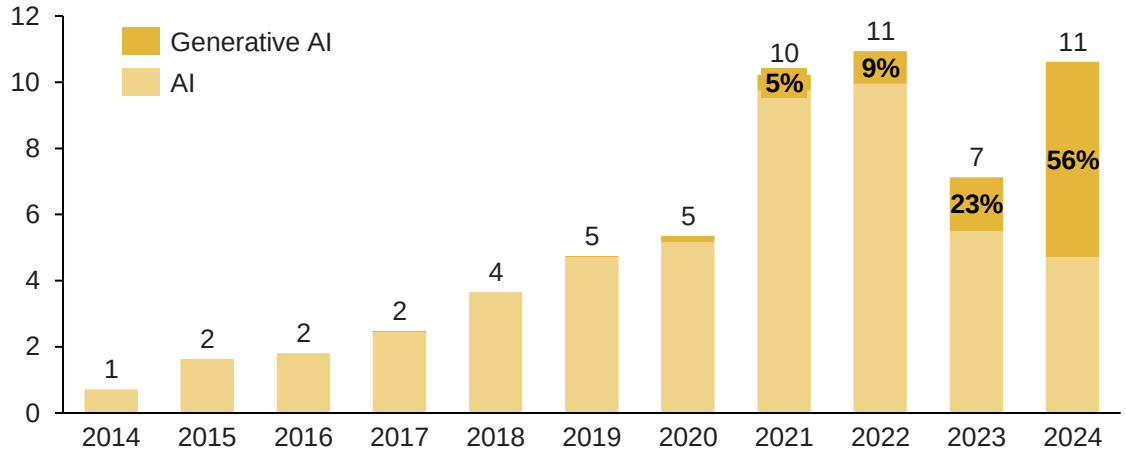
Europe's fragmented capital markets hamper the flow. Different rules in each EU country make it difficult for investors in one country to fund projects in another. This prevents the EU from using its full scale to create large investment funds that can support risky projects.

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.

Venture capital investment by development stage
USD billion, 2023



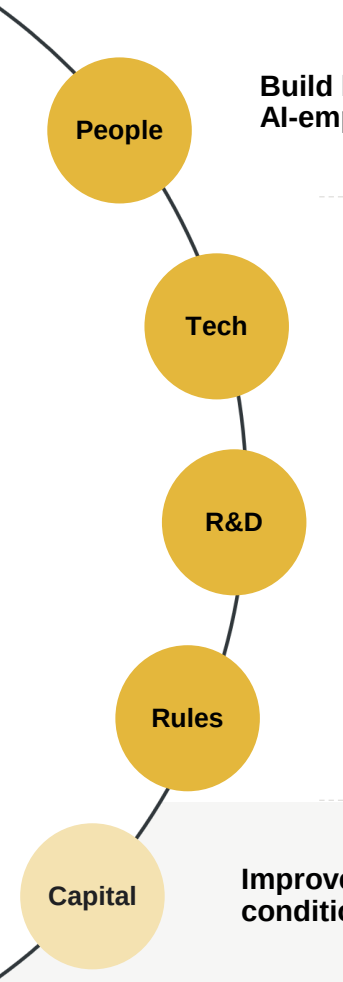
Europe AI venture capital investment
EUR billion



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

Unlocking the potential of innovative digital businesses with AI

The Swedish 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 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.

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 the Sweden.

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 January 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