Unicorns Lithuania

IMPLEMENT CONSULTING GROUP_

The AI innovation opportunity

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

An Implement Consulting Group study
Commissioned by Google
In partnership with Unicorns Lithuania

February 2025

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

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

More than startups

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

More than tech

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

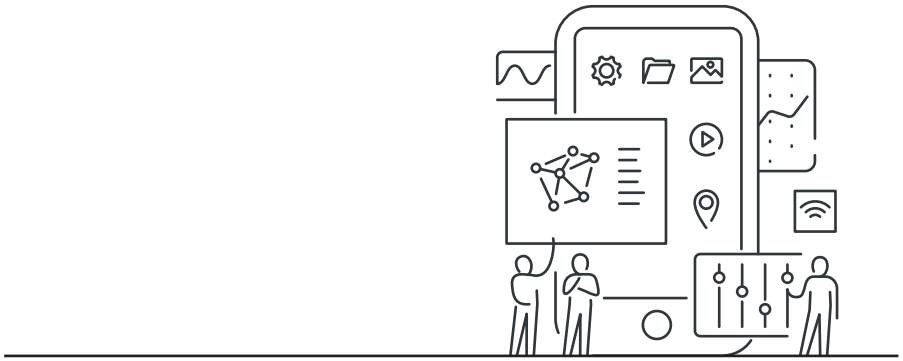
What are innovative digital businesses?

Innovative digital businesses are defined as businesses with scalable business models and high growth potential, operating in a high value-added sector, 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 and Unicorns Lithuania data. The analysis focuses on companies headquartered in Lithuania and are further classified as startups (2–50 employees), scaleups (51–500 employees), or grownups (over 500 employees).

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



Lithuania has a growing ecosystem of innovative digital businesses

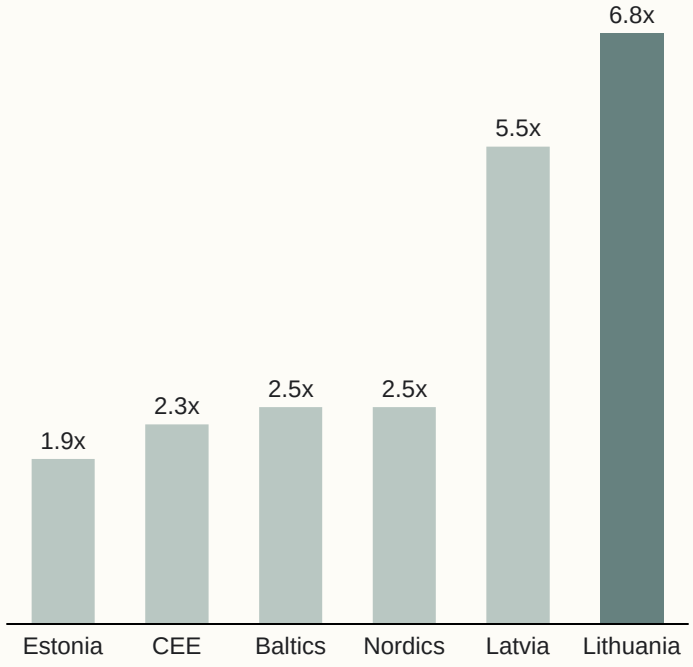
~1,000
innovative digital businesses

18,700
jobs in innovative digital businesses

22%
of net private sector job creation since 2017

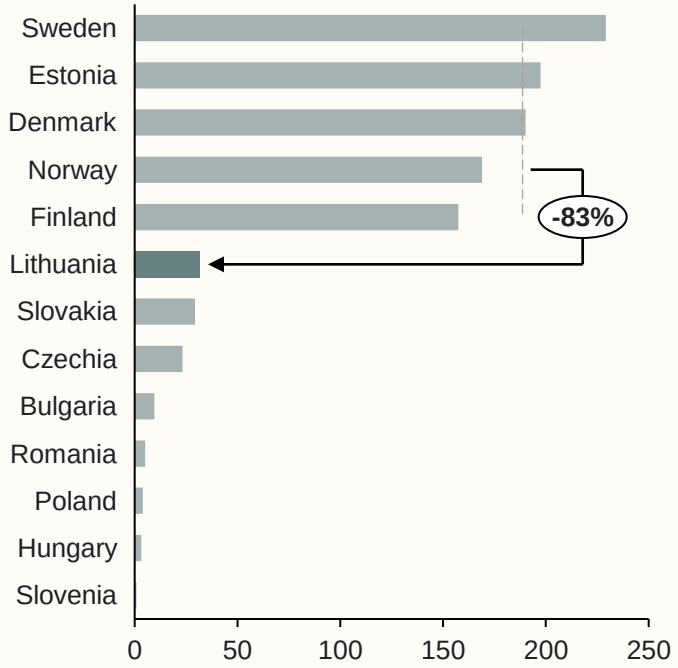
The innovative digital businesses have grown faster than in other Baltic countries and the Nordics...

Value growth of innovative digital businesses, 2019-2024
Factor increase



…but venture capital investment per capita still lags behind Estonia and the Nordics. Lithuania's entrepreneurial activity and success in scaling are ahead of regional peers but behind European leaders.

Venture capital investment per capita, 2024
EUR per capita

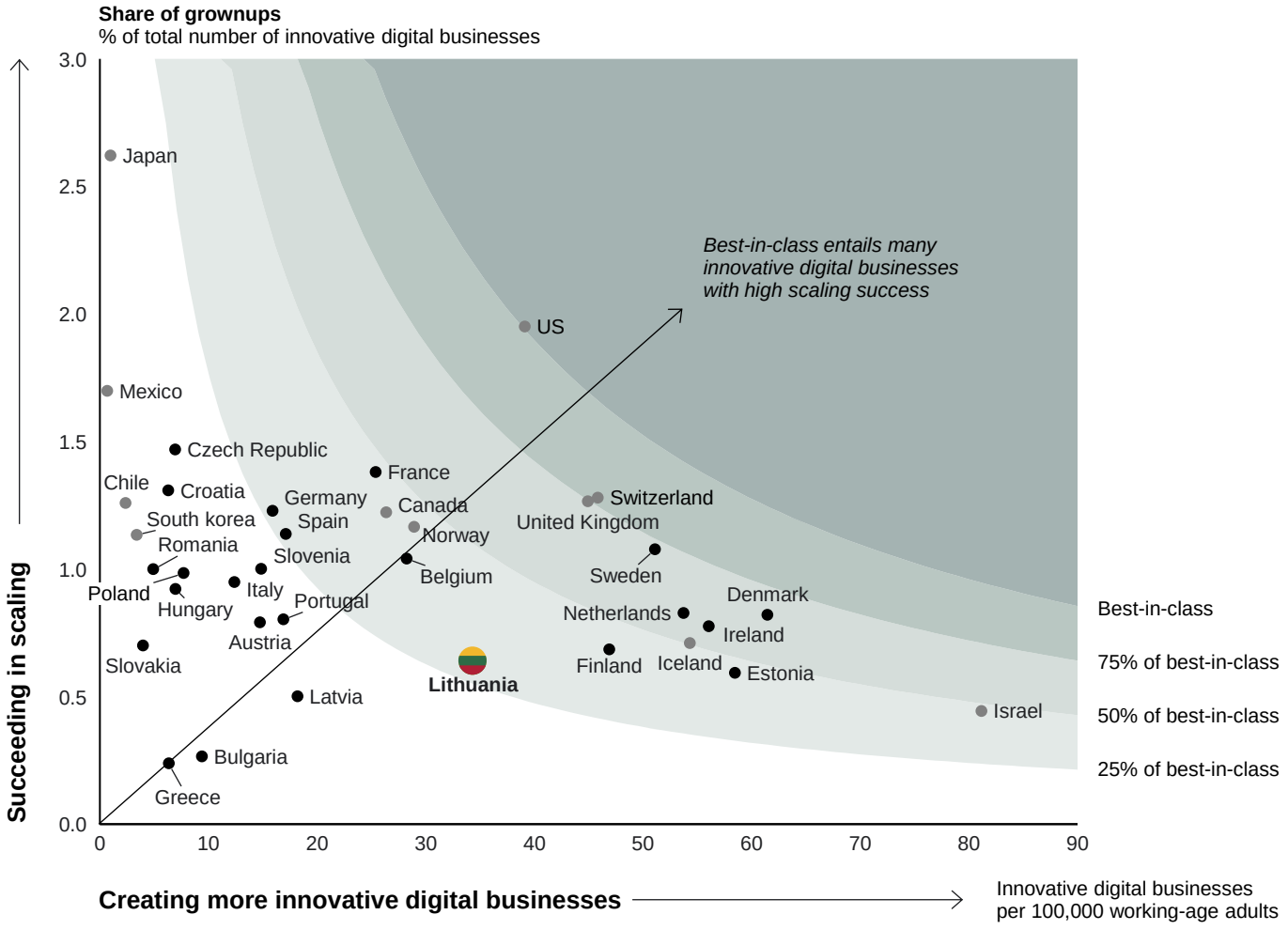


Expanding successful innovative businesses, which have 40% higher productivity than average, is essential for enhancing Lithuania's competitiveness

Lithuania has more innovative digital businesses than EU countries on average but still lags behind Nordic countries and Estonia. Moreover, Lithuania is among the low-performing European countries when it comes to scaling these businesses.

Growing more of these productive companies is crucial for enhancing Lithuania's competitiveness and closing the GDP gap with neighbouring EU countries.

> Productivity increases are the biggest engine of economic growth, ensuring the long-term and balanced development of the country's economy.
>
> **Invest Lithuania** in *Acceleration of the Lithuanian Economy* (2024)

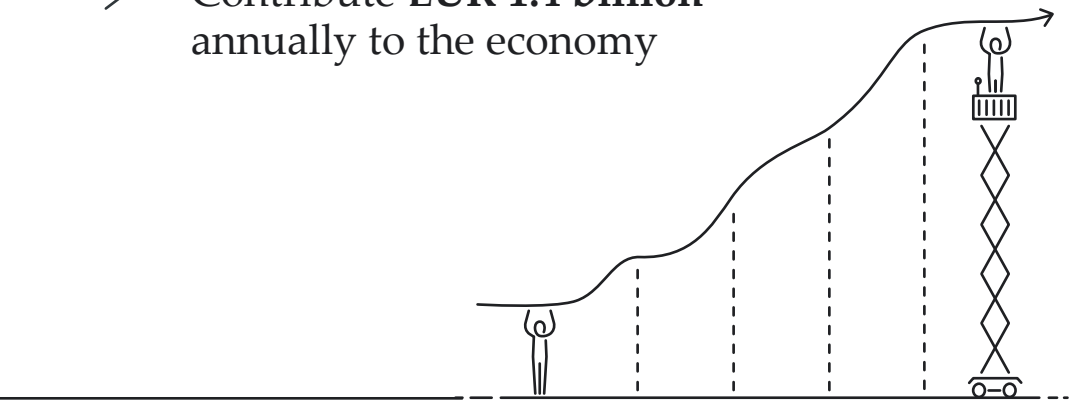


Note: Quote translated by Implement Consulting Group.
An Implement Consulting Group study commissioned by Google.

AI opens new opportunities to grow innovative digital business, potentially creating 23,000 high-value jobs

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

- Create **23,000 high-value jobs**, supporting the future competitiveness of the Lithuanian workforce
- Contribute **EUR 1.4 billion** annually to the economy



Fostering more successful innovative digital businesses can benefit society through positive spillovers. They:

- Create transformative innovations
- Propel AI adoption across the economy

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

Tech

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

Rules

Establishing clear regulations and frameworks that are supportive of AI-driven innovation and ensure reasonable compliance costs.

People

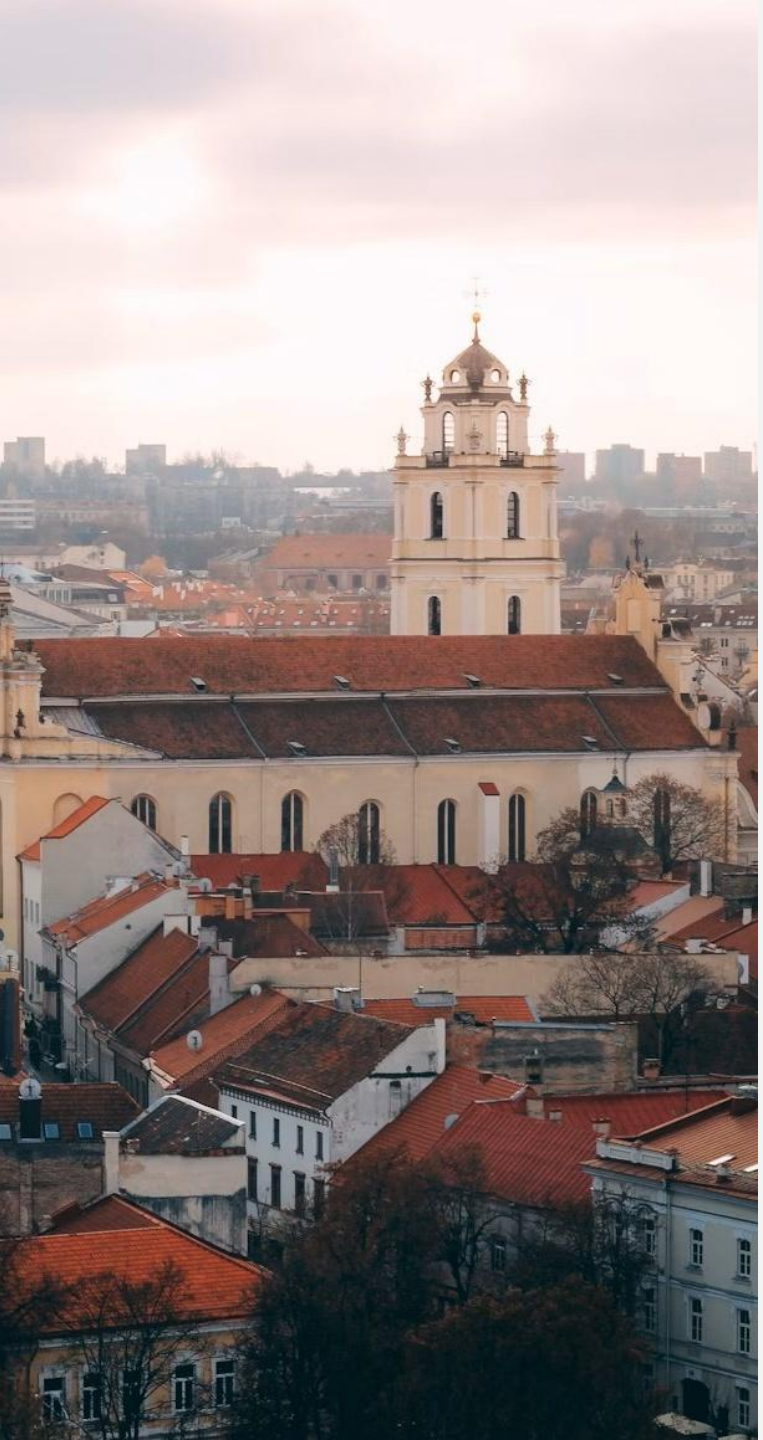
Developing AI-relevant skills, attracting top talent, and retaining expertise to drive innovation and success across tech-intensive industries.

R&D

Boosting R&D in AI through targeted funding and strategic initiatives to drive AI development & adoption.

Capital

Unlocking Europe's fragmented risk capital markets and increasing the attractiveness of venture capital investment in Lithuania.



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The economic role of innovative digital businesses

Innovative digital businesses play an outsized role in the Lithuanian economy.

Innovative digital businesses are scalable and tech-enabled

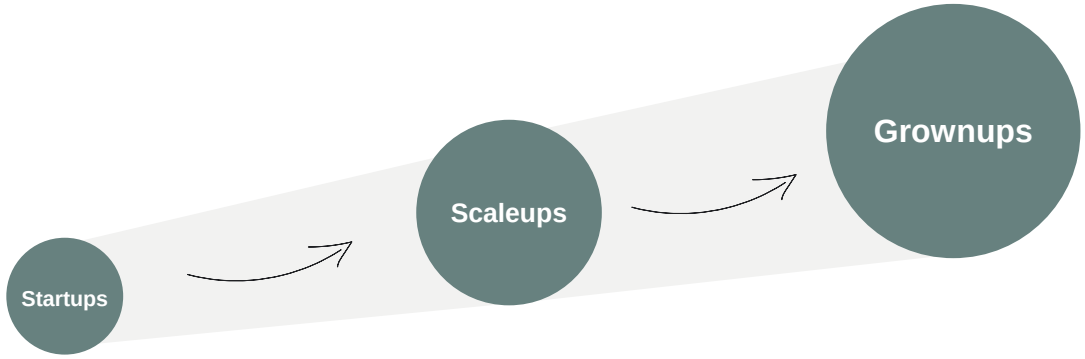
This research defines innovative digital businesses as inherently innovative companies headquartered in Lithuania with a scalable business model.

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

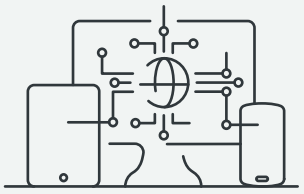
This study categorises innovative digital businesses by employment size into three main stages: startups, scaleups, and grownups.

> 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 2–50 people.	Innovative digital businesses with scaled operations, employing 50–500 people.	Established 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

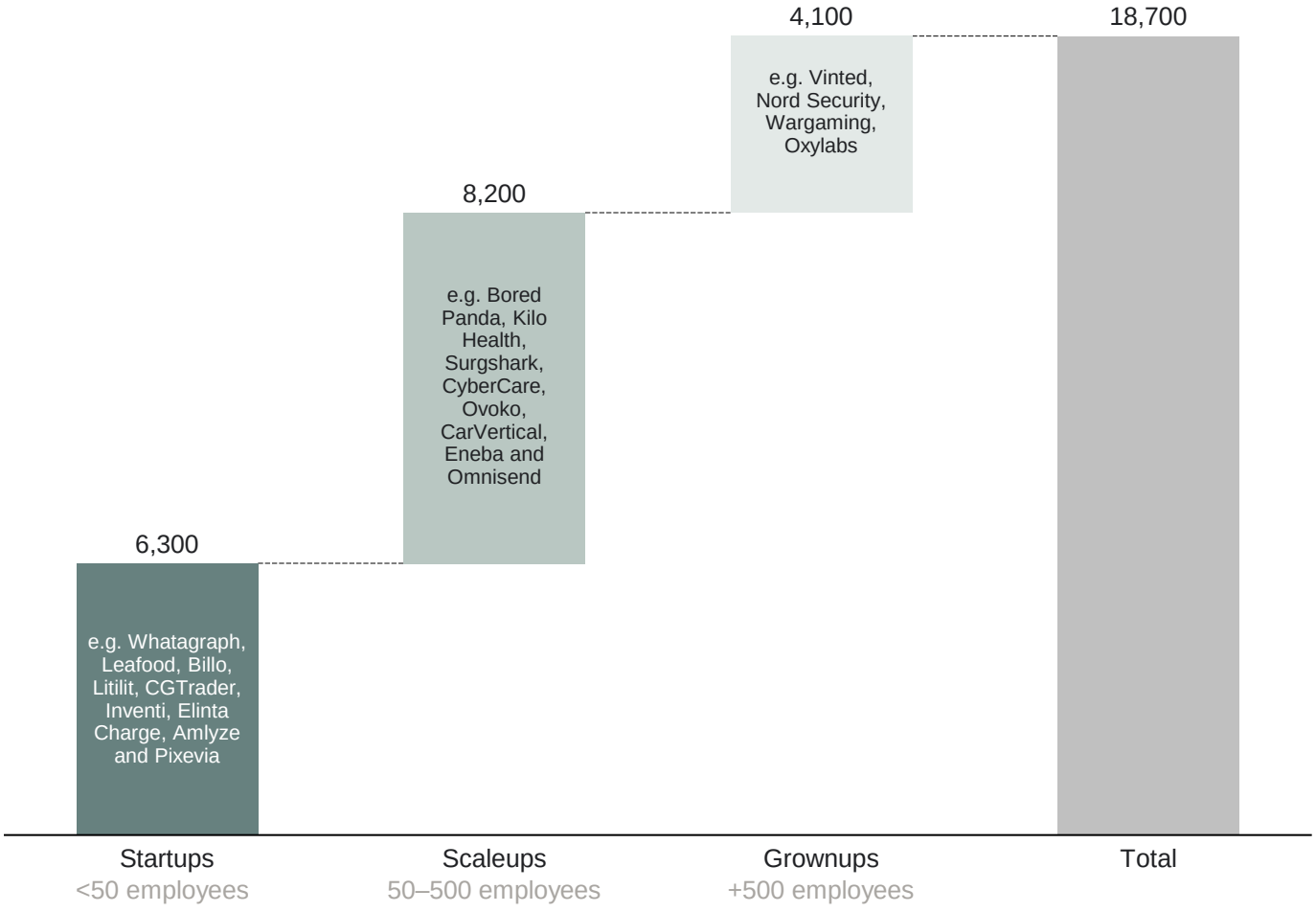
Note: This analysis uses data from Unicorns Lithuania and Dealroom. Following Dealroom's definition, innovative digital businesses are those headquartered in Lithuania with a scalable business model and less than 30 years old.
Source: Implement Economics based on Draghi (2024).

Lithuania is home to around 1,000 innovative digital businesses, employing 18,700 people

Lithuanian innovative digital businesses employ around 18,700 people.

- *~980* ***startups*** employ 6,300 people.
- *~70* ***scaleups*** employ 8,200 people.
- *4* ***grownups*** employ 4,100 people.

Employment in Lithuanian innovative digital businesses
No. of employees



Source: Implement Economics based on Unicorns Lithuania.

The value of innovative digital businesses has grown by a factor of almost seven in five years

The value of Lithuania's ecosystem of innovative digital businesses has grown faster than those in the Baltics and Central and Eastern Europe (CEE) in recent years.

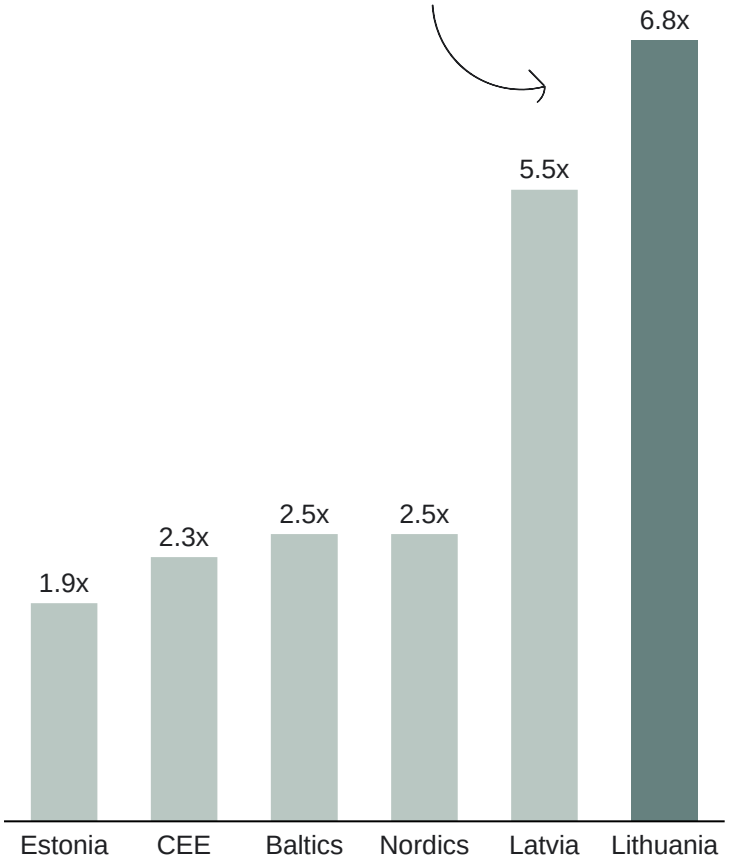
This growth is highlighted in the Lithuanian Economic Review by Lietuvos Bankas, which notes that the ICT sector has significantly expanded, contributing to a quarter of the country's total economic growth in 2024.

Despite this steady progress, venture capital investment per capita in Lithuania still lags behind Estonia and Northern European countries.

> Lithuania continues to be the fastest-growing startup ecosystem in CEE and ranks second-highest in EV per capita, driven by thriving startups, substantial foreign investments, and some of the region's largest seed round sizes.
>
> **Karolina Urbonaitė**, Head of Startup Lithuania in The Lithuanian Startup Ecosystem 2024 report.

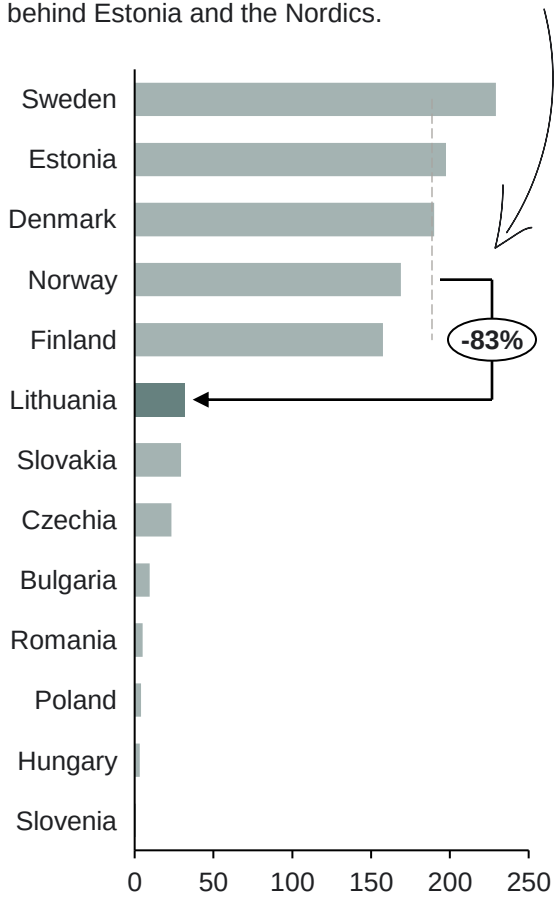
Value growth of innovative digital businesses, 2019-2024
Factor increase

The value of enterprises in the Lithuanian ecosystem of innovative digital businesses has grown roughly sevenfold between 2019 and 2024.



Venture capital investment per capita, 2024
EUR per capita

Lithuania ranks second among CEE countries on VC investments but is still significantly behind Estonia and the Nordics.



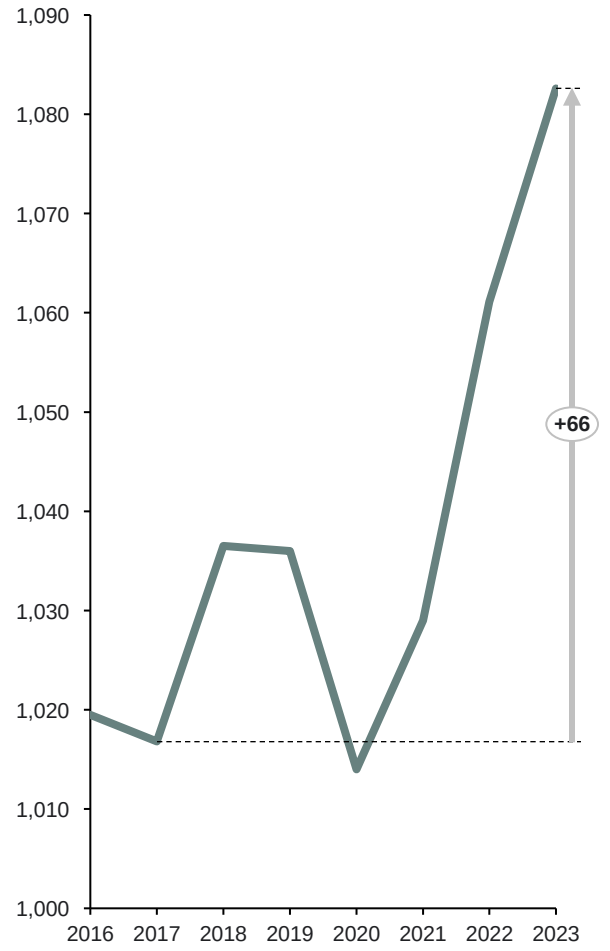
Note: Venture capital investment per capita based on publicly available data from Dealroom and total population according to Eurostat. Only companies HQed in Lithuania are included, not all Lithuanian founded companies as reported on p. 17 in the latest Dealroom report for Lithuania. Nordics comprises Denmark, Sweden, Norway, Iceland and Finland.
Source: Implement Economics based on Dealroom and Lietuvos Bankas (2024).

Innovative digital businesses greatly outpace private sector job growth

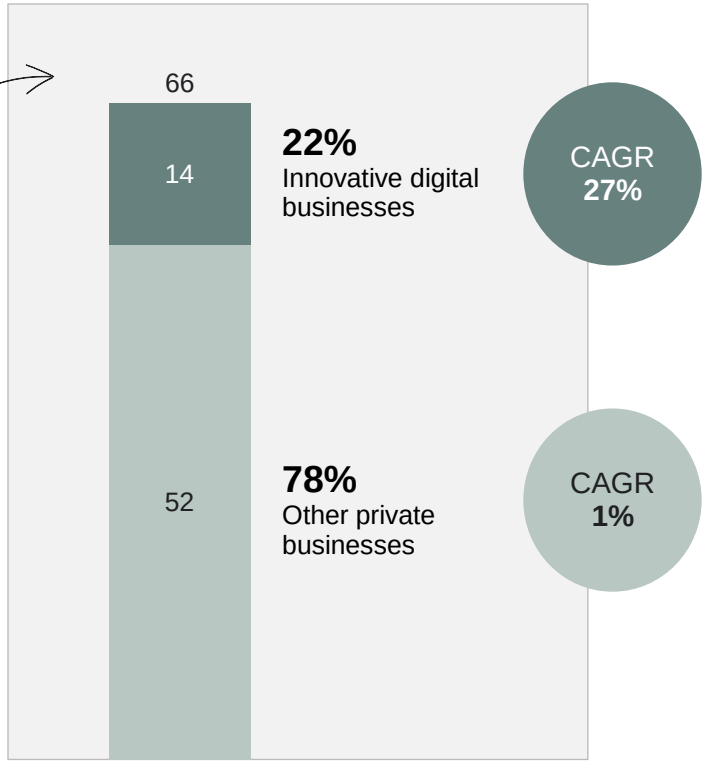
Innovative digital businesses in Lithuania have been creating jobs much faster than other private businesses. Since 2017, jobs in these digital companies have grown by 27% each year, while other private businesses have only grown by 1% per year.

Overall, private sector jobs in Lithuania have increased by 66,000 since 2017. Out of these, 14,000 new jobs came from innovative digital businesses, making up 22% of net job creation in the private sector. This is a significant growth contribution, considering these digital businesses only account for 1.7% of all private sector employment.

Lithuanian private sector employment
Thousand persons



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



Note: Calculations based on Unicorns Lithuania, which reports 4,500 jobs within IDBs in 2017 and 18,600 jobs in 2023.
Source: Implement Economics based on Unicorns Lithuania and Eurostat.

Innovative digital businesses create high-value jobs

On average, innovative digital businesses pay 32% higher wages than other Lithuanian businesses.

More importantly, they have 6% higher labour productivity than the average business, contributing to the competitiveness of the Lithuanian economy.

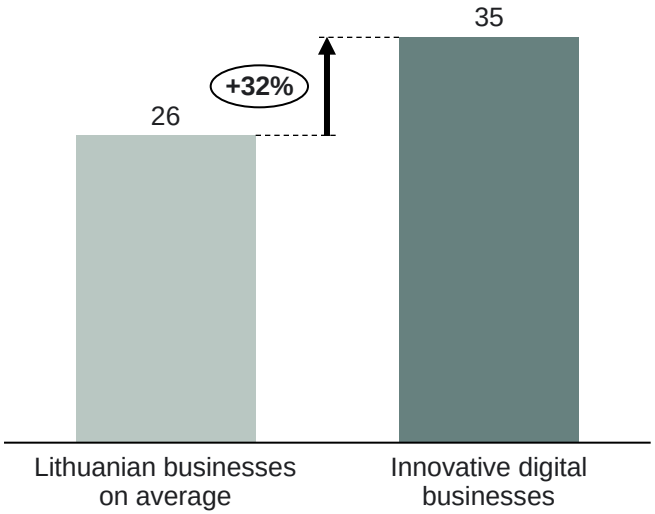
Growing more of these productive companies is essential for closing the GDP gap between Lithuania and other European countries. Currently, Lithuanian GDP per capita is 14% below the EU average and around 40% lower than leading Nordic countries.

> Lithuania's success will depend on how quickly it will mobilise available resources and be able to implement solutions that can accelerate the growth of the country's economy, creating conditions for balanced economic development.
>
> **Invest Lithuania** in Acceleration of the Lithuanian Economy (2024)

Lithuanian innovative digital businesses …

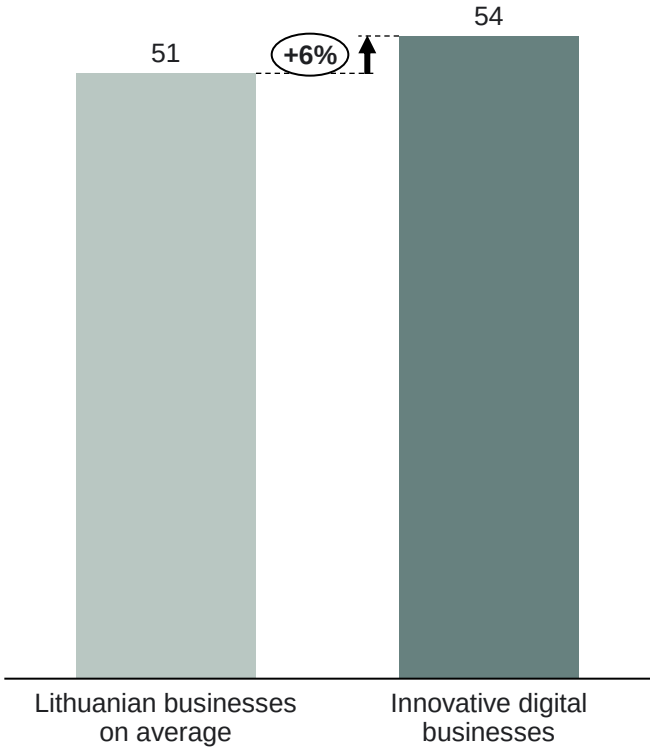
… pay higher wages

Median annual wages
EUR (thousand) per employee, 2023*



… and are more productive

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



Note: * Based on the latest available data. Calculations based on companies in Unicorns Lithuania and Orbis with available financial data. Value added at the company level is approximated as the sum of EBITDA and remuneration to employees. Quote translated by Implement Consulting Group.
Source: Implement Economics based on Unicorns Lithuania, Bureau van Dijk's Orbis database, Eurostat and Invest Lithuania (2024),

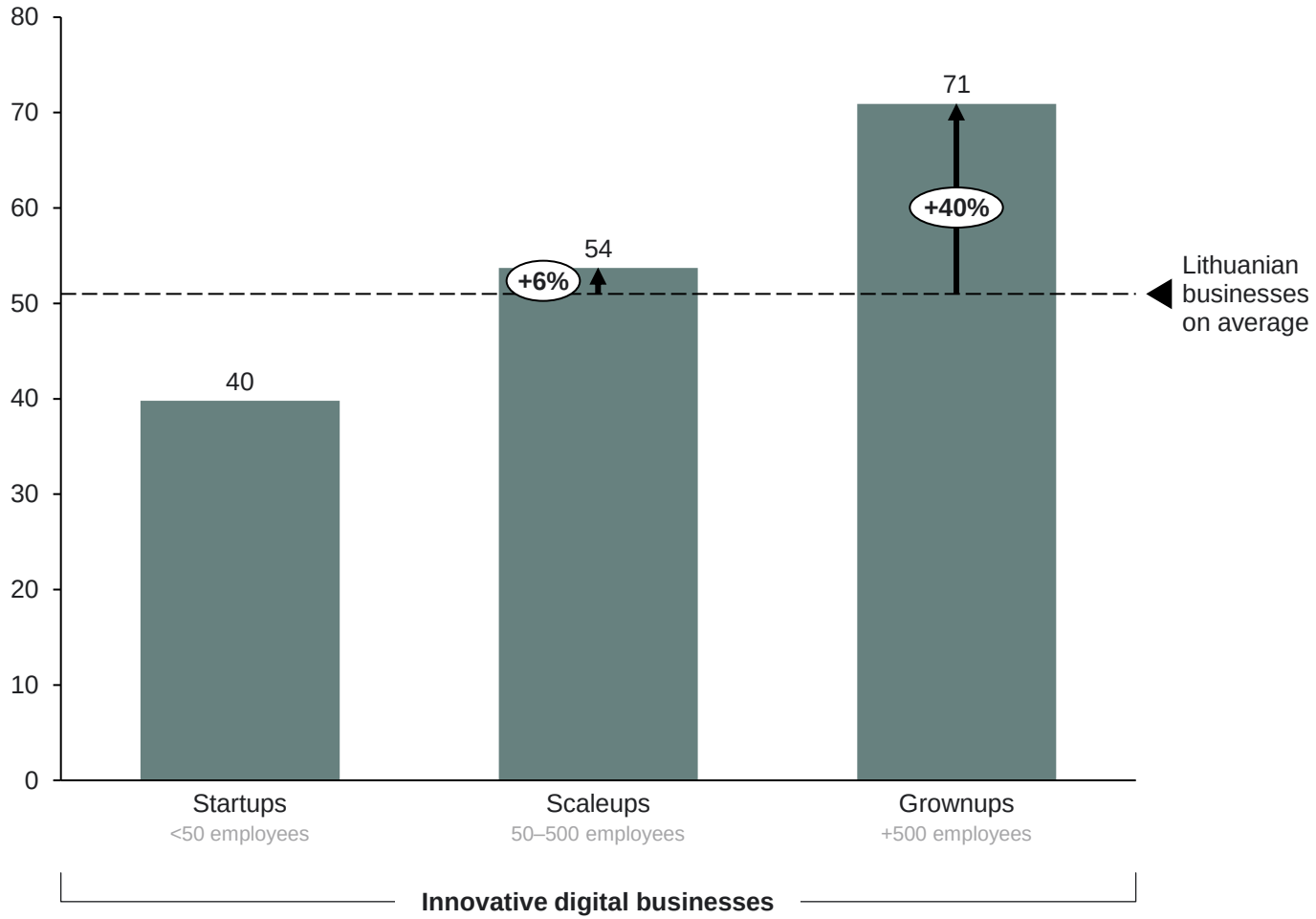
Grownup innovative digital businesses are 40% more productive than businesses on average

Employees in scaleups are, on average, 6% more productive than those in other Lithuanian businesses, while successful grownups allow workers to be up to 40% more productive than in Lithuanian businesses on average.

Labour productivity is lower in startups than in Lithuanian businesses on average. This may result from factors such as rapid headcount growth, steep learning curves, or resource constraints on either the operating model or market development.

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
EUR (thousand) per employee, 2023*



Note: * Based on latest available data. Calculations based on companies in Unicorns Lithuania and Orbis with available financial data. Value added at the company level is approximated as the sum of EBITDA and remuneration to employees. Note that due to the small number of grownups in Lithuania the average labour productivity in these firms is based on a limited sample.
Source: Implement Economics based on Unicorns Lithuania and Bureau van Dijk's Orbis database.

Innovative digital businesses can promote growth by innovating in emerging opportunities

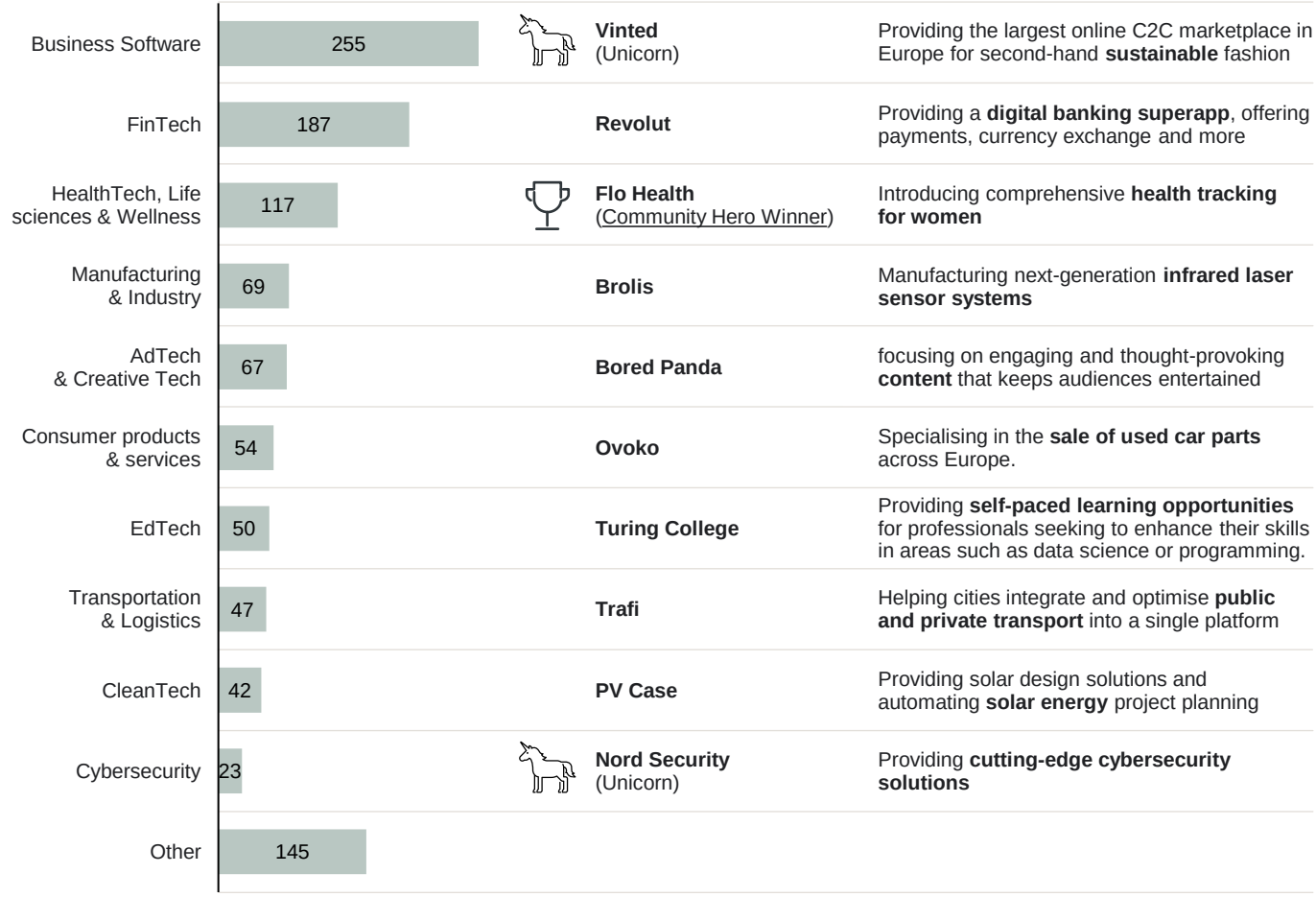
Invest Lithuania identifies six emerging opportunities for newcomers that can promote growth in Lithuania:

- Health technologies and biotech
- Fast-growing IT (incl. AI and fintech)
- Semiconductors and optoelectronics (incl. lasers)
- Defence technologies
- Green economy (incl. renewable energy)
- Bioeconomy

Rising startups, scaleups and grownups in Lithuania are already promoting growth within these areas, helping propel Lithuania into a more competitive position.

> In order to identify promising niches in the global economy, it is extremely important for Lithuania to leverage the potential of emerging opportunities.
>
> **Invest Lithuania** in Acceleration of the Lithuanian Economy (2024)

Sectors of Lithuanian innovative digital businesses
Number of innovative digital businesses operating in the sector



Note: Based on sectors as defined in Unicorns.lt. Additional company examples under Business Software include Hostinger, Oxylabs and Ondato. Quote translated by Implement Consulting Group.
Source: Implement Economics based on Windsor (2024) using Dealroom data and Invest Lithuania (2024).

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

Academic studies show that …

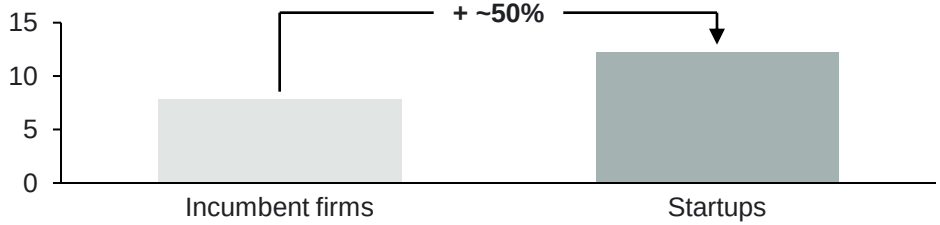
… startups create more radical and disruptive innovations …

~50% higher chance that innovations are radical as compared to incumbent firms.

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

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

Likelihood that innovations are radical
% outlier inventions



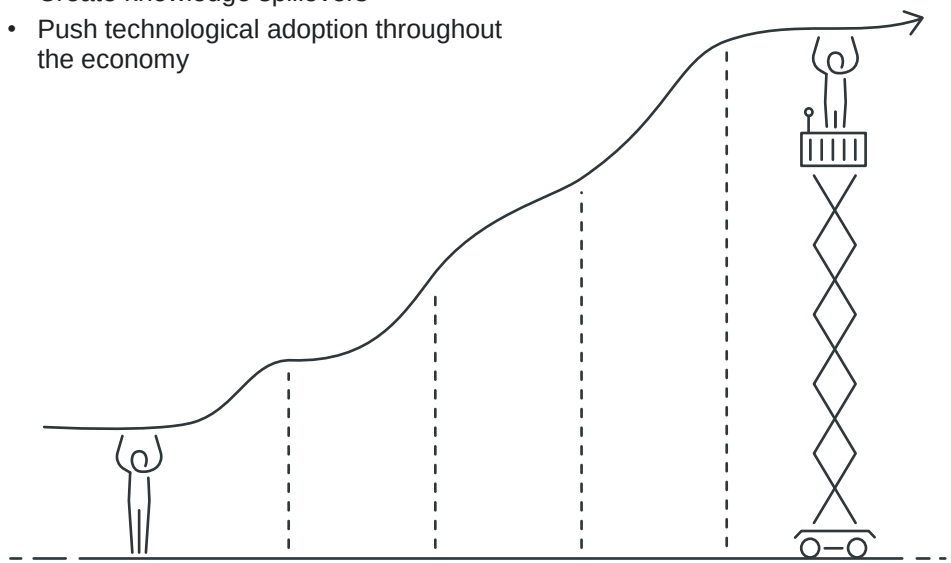
> Startups generate innovations that are more radical and disruptive than those of incumbent firms.
>
> **Kolev et al. (2022)**

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

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

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

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



Note: These metrics are based on various academic studies with different definitions of market entrants, startups and high growth businesses. While these definitions differ slightly from ours, they are closely correlated, making the results both indicative of broader trends and applicable to our definition of innovative digital businesses. Based on US business-level data, Akcigit & Kerr (2018) estimate that 25.7% of aggregate growth due to innovation is driven by new entrants defined as businesses entering the census data during the sample period.
Source: Implement Economics based on Kolev et al. (2022) and Akcigit & Kerr (2018).

Europe and Lithuania 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. Lithuania captured just 0.2% of this European funding, despite making up around 0.5% of the EU economy.

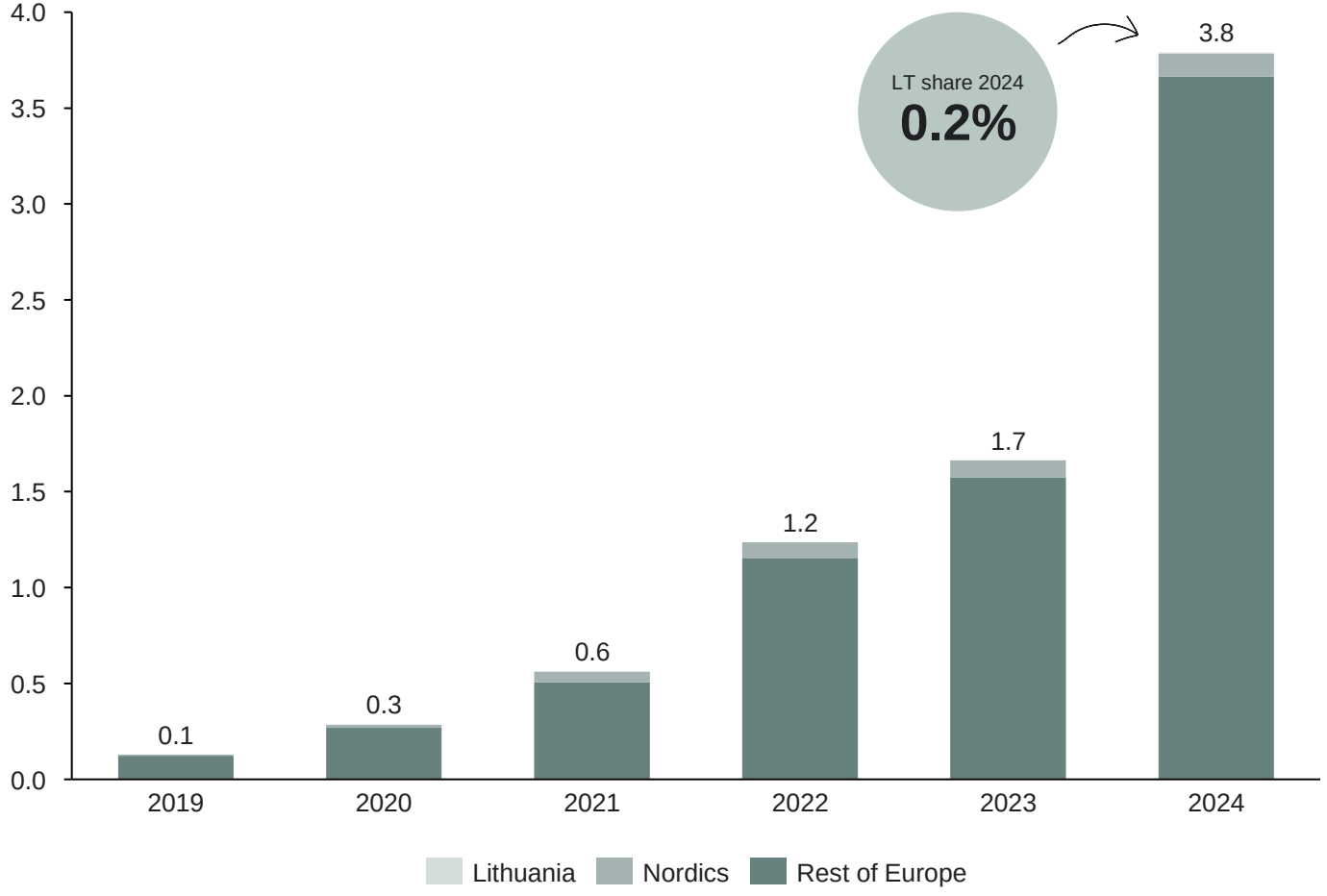
The Nordics are also trailing behind, securing just 3% of the funding in 2024, although they account for 7% of European GDP.

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

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

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

Generative AI VC investment in Europe
EUR billion



Source: Implement Economics based on Dealroom.

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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.

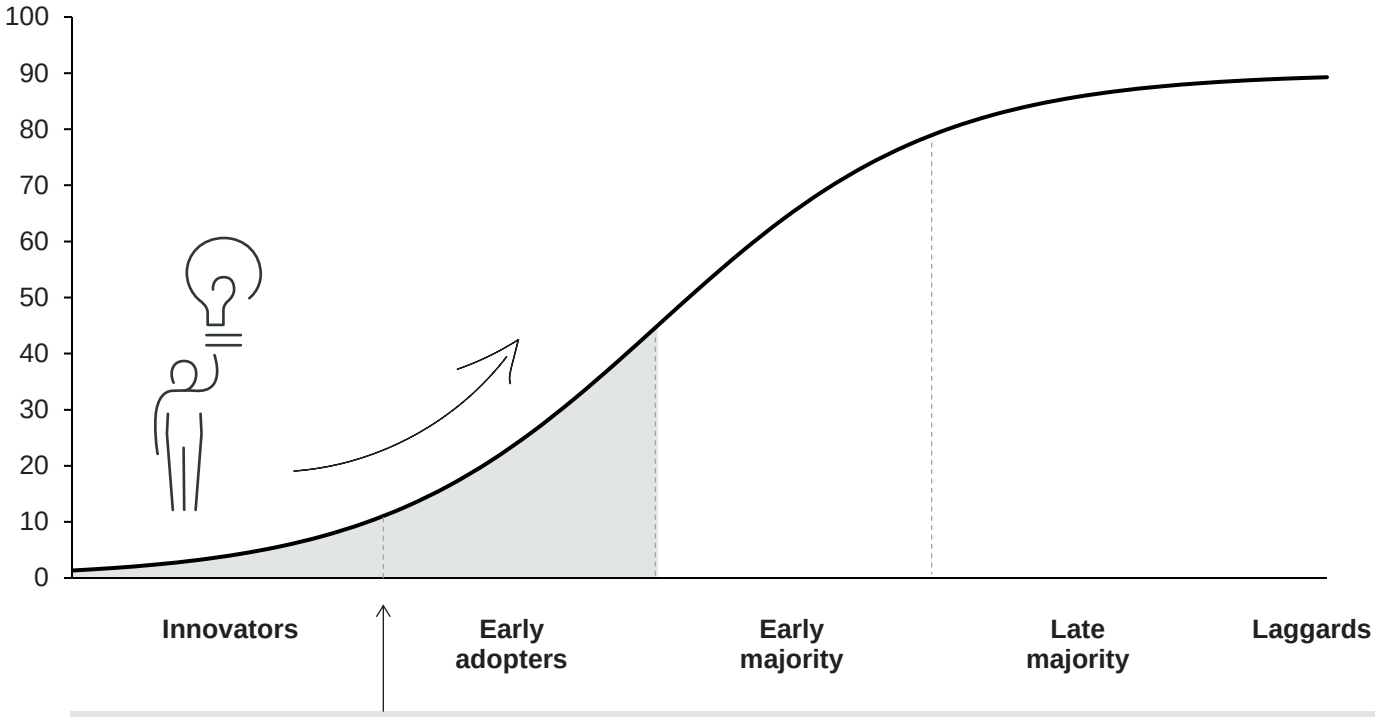
Innovative digital businesses propel AI adoption across the economy

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

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

In Lithuania, companies like Nord Security, Pixevia and Hostinger are catalysts for spreading AI to the rest of the economy by being creators, adapters and early adopters of AI.

Diffusion of AI technologies in Europe
%



Nord Security, a Lithuanian unicorn, is set to develop a platform to ease AI adoption for other businesses, securing investments from international VCs.

Pixevia has developed AI-managed retail store systems that automate operations without checkout staff, enhancing retail efficiency.

Hostinger has implemented their own open-source conversational AI framework, enhancing the efficiency of their customer support services.

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 Invest Lithuania (2024).

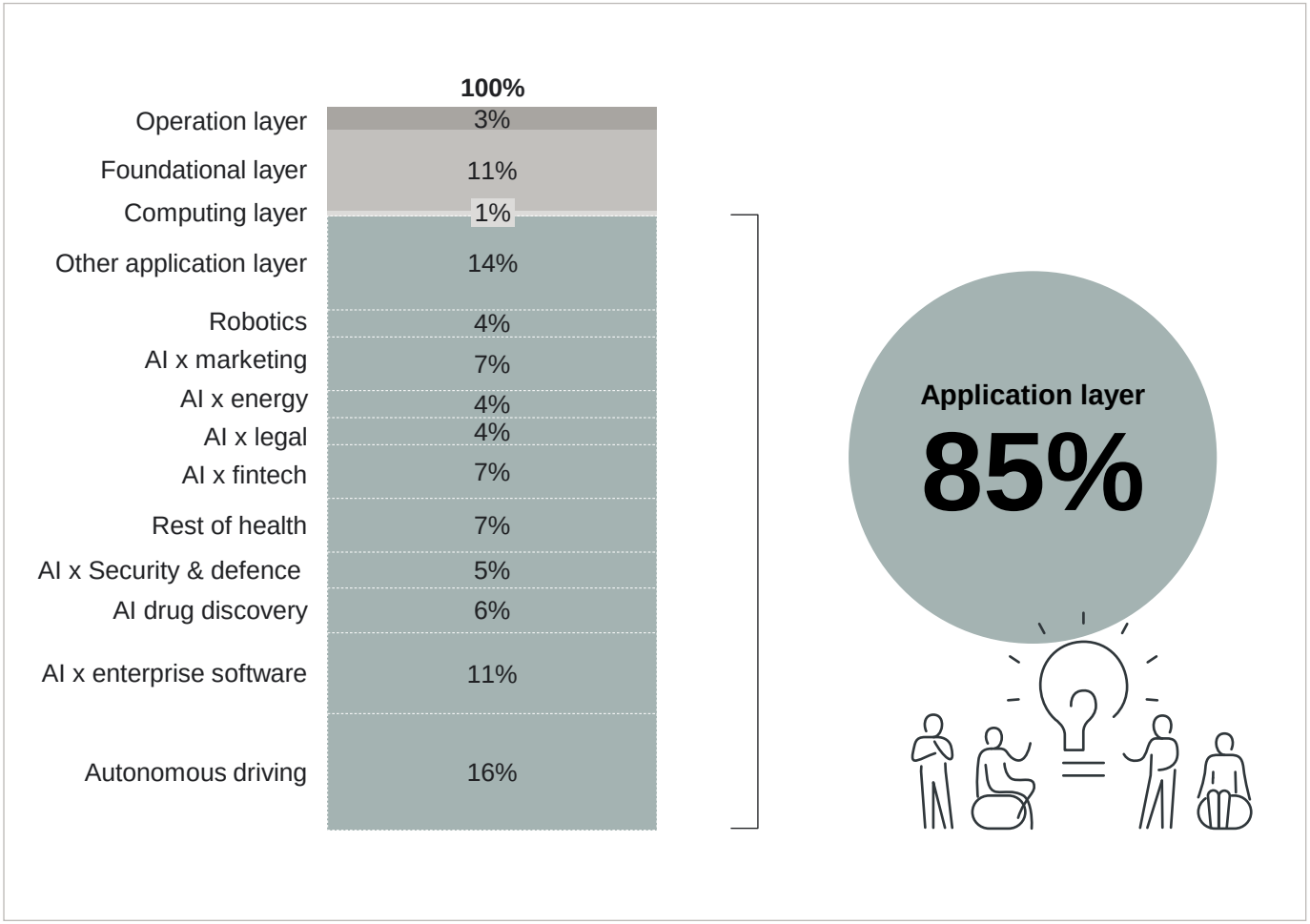
Application layer of AI offers a transformational opportunity

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

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

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

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



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

Case: myTU (Travel Union UAB) tackles inefficiencies in banking services with AI

The challenge

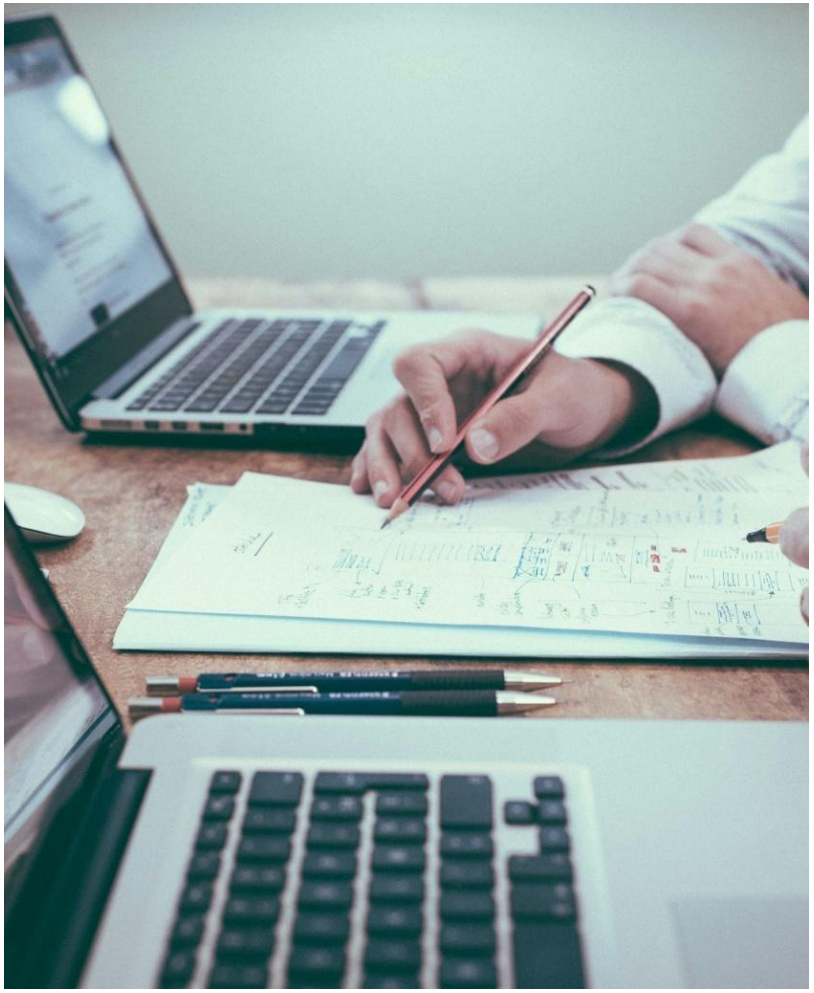
- myTU aims to address inefficiencies in banking services such as slow processes, high costs, and limited accessibility.

The solution

- myTU developed its own technology infrastructure and implemented AI solutions to offer a more efficient and user-friendly banking experience.

The impact

- **Customer service:** The integration of AI enables myTU to perform real-time transaction monitoring, customer support communication and quality control.
- **Cost efficiency:** myTU's approach has streamlined operations, allowing our team to focus on enhancing the customer experience rather than managing infrastructure. With a small team of 25 employees, myTU serves over 50,000 customers.
- **Resource optimisation:** By using AI, myTU reduced the need for anti-money laundering employees by a factor of four.
- **Quality control:** AI ensures 100% quality control, preventing issues before they happen and providing consistent, unbiased service.



Source: Implement Economics based on myTU

Case: Neurotechnology tackles large-scale biometric challenges with AI

Neurotechnology was awarded **AI innovation of the year 2024**

The challenge

- Neurotechnology aims to address complexities in biometric identification such as slow matching speeds, high error rates, and security risks.

The solution

- Neurotechnology developed its own deep-learning infrastructure and multi-modal biometric solutions to deliver a fast, accurate, and secure identification experience.

The impact

- **Scalability:** The advanced AI enables Neurotechnology to handle national-scale identity projects efficiently.
- **Precision:** Neural network-based algorithms ensure high accuracy and reliability in fingerprint, face, iris, and voice recognition.
- **Versatility:** With a range of products, Neurotechnology supports everything from forensics to border control, meeting diverse industry needs.

Source: Implement Economics based on Neurotechnology

Four out of five European innovative digital businesses use generative AI

Realising the productivity potential of AI hinges on Lithuania 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.

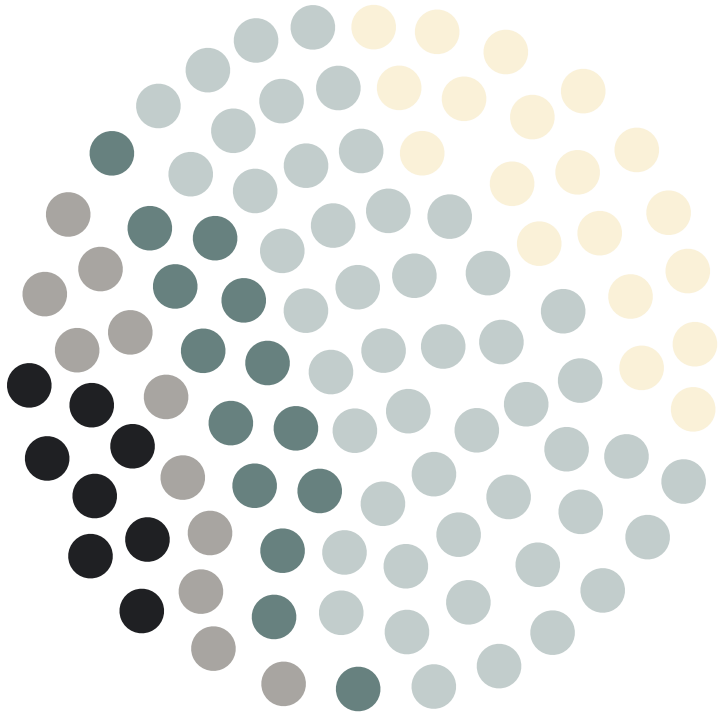
Notion Capital poll

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

79% of European innovative digital businesses use generative AI. (72% in Lithuania). This covers…

Focusing on *generative AI*

- … **46%** who have **experimented** with or **partially adopted** generative AI (52% in Lithuania).
- **… 14%** who have **fully adopted** generative AI (10% in Lithuania).
- … **11%** who have **adopted and actively adapted** generative AI technology to suit business needs (6% in Lithuania).
- … and **8%** who have **generated** new AI technologies to serve business needs (4% in Lithuania).
- **21%** do not use generative AI (28% in Lithuania).



Note: Sample size of n=1095 in Europe and n=50 in Lithuania for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

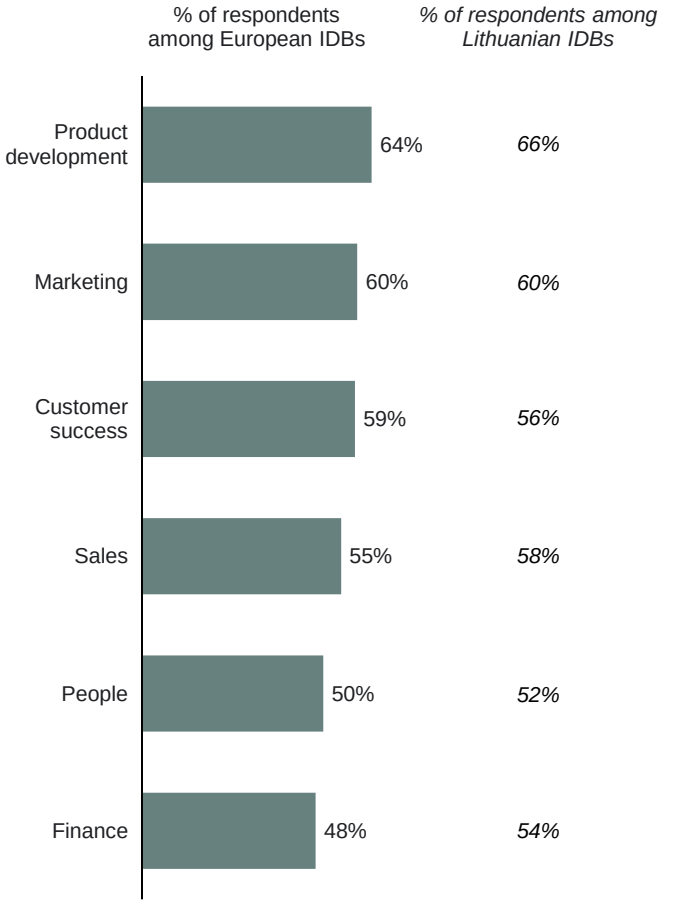
AI boosts value creation and efficiency in innovative digital businesses

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

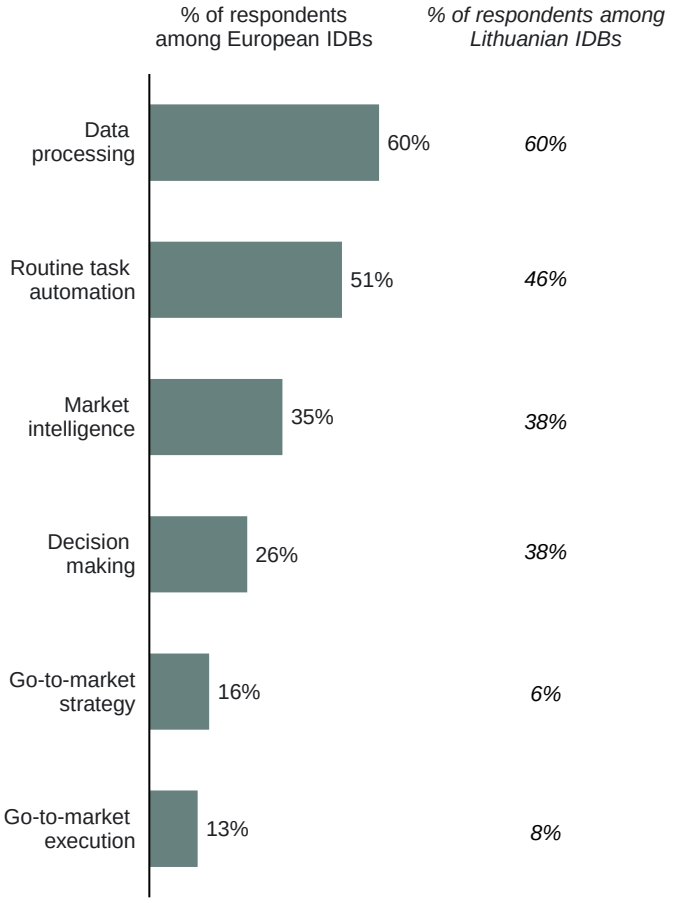
In addition, surveyed innovative digital businesses report that AI has improved efficiency across multiple areas, helping optimise and streamline operations. For example, in Europe 60% report improved data processing, and 51% point to improvements in routine task automation.

Responses from Lithuanian 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=50 in Lithuania for Notion Capital survey.
Source: Implement Economics based on Notion Capital survey (2024).

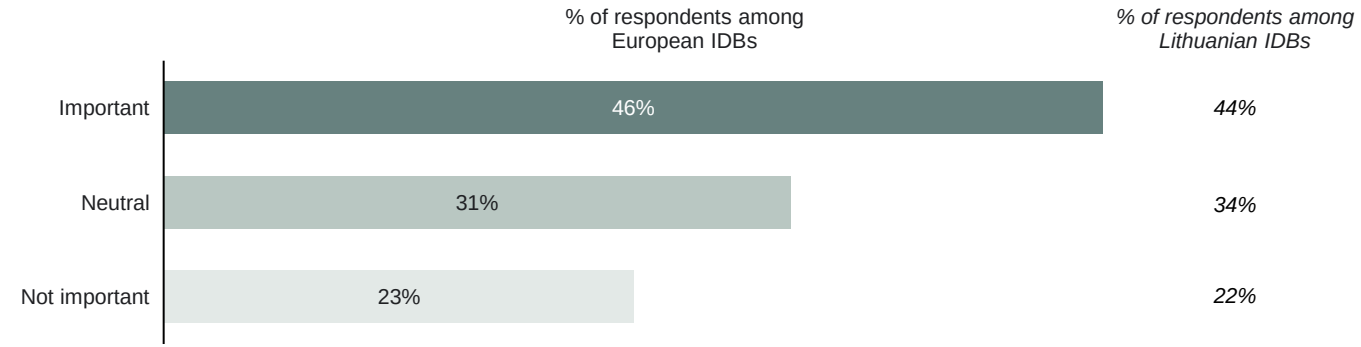
Innovative digital businesses benefit from global access to AI technology

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.

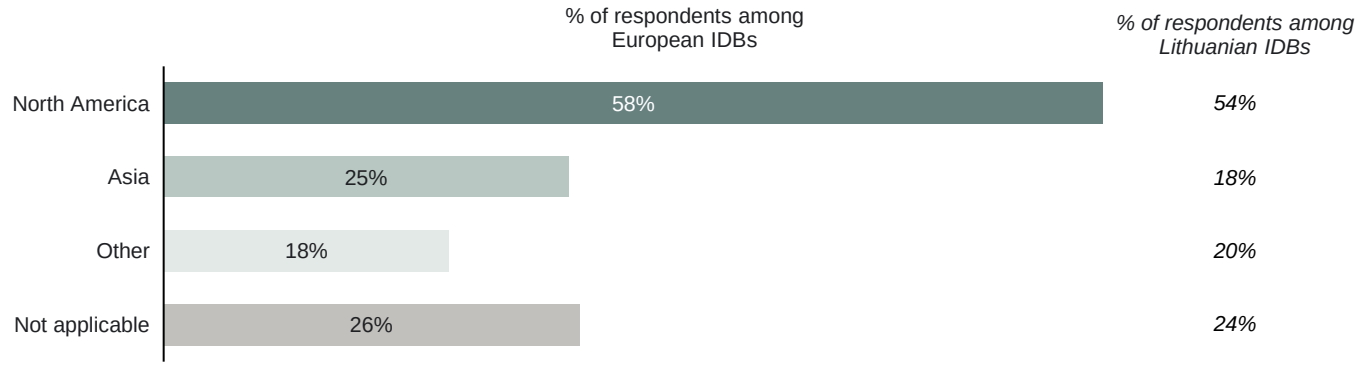
European innovative digital businesses express that they benefit from AI models developed outside Europe, with 46% saying that access to cutting-edge AI technologies from non-European companies is important for their business. Most respondents (58%) source these technologies from North America.

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=50 in Lithuania 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 Lithuanian 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).

3

The potential of scaling innovative digital businesses

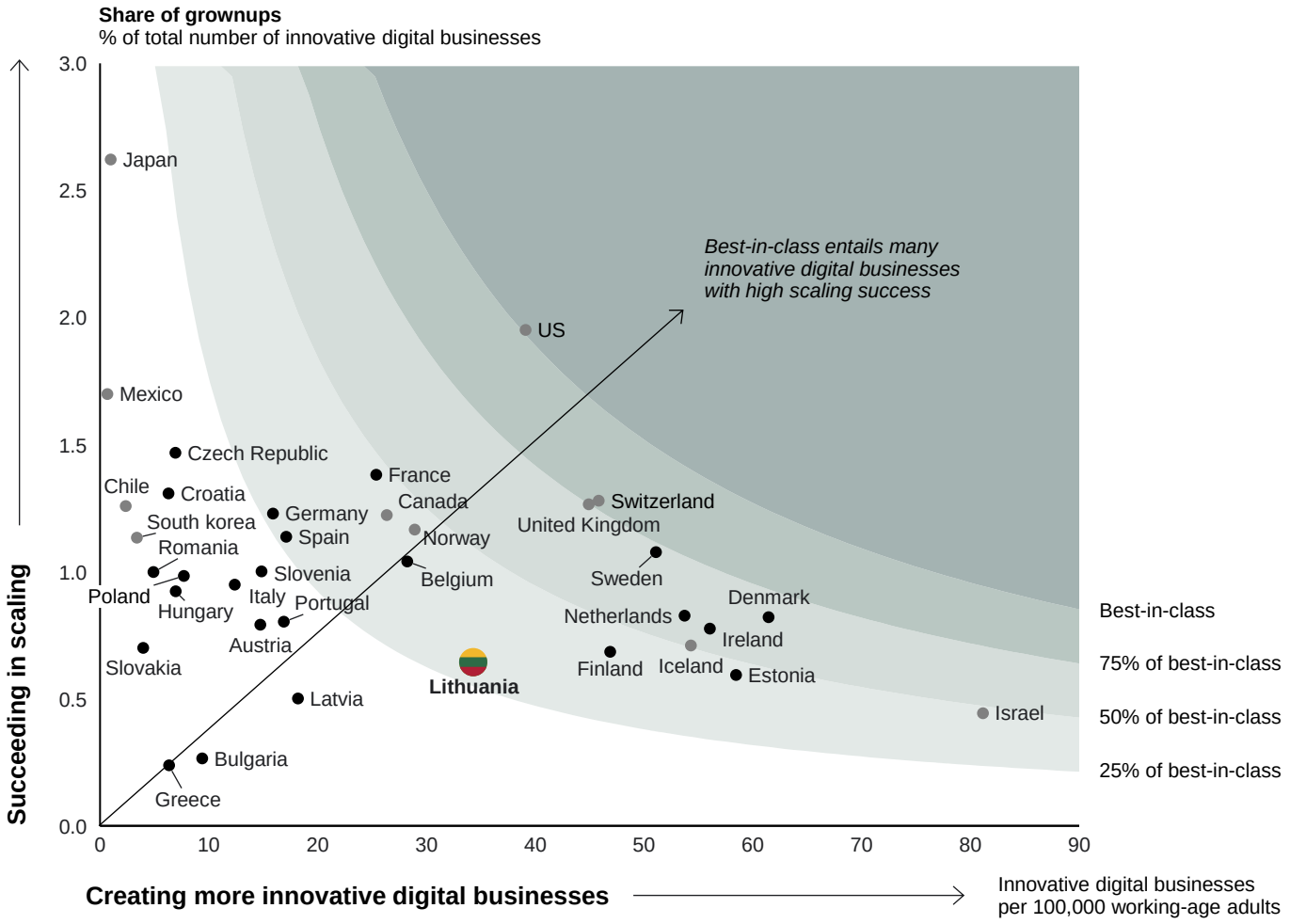
Successful scaling of innovative digital businesses holds major economic potential for the Lithuanian economy.

Scaling more innovative digital businesses is crucial for sustained economic growth in Lithuania

Lithuania boasts a higher-than-average level of entrepreneurial activity, with 34 innovative digital businesses per 100,000 working-age adults, surpassing the EU average of 19. However, Lithuania still trails behind Nordic countries and Estonia.

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

The success of these businesses is crucial for capturing the AI opportunity because they are instrumental in spreading the technology across the economy.



Note: For all countries excl. Lithuania, the data reflects the full sample from Dealroom including verified companies with verified employment data, excluding single-employee companies. For comparability, the Unicorns Lithuania data set is restricted to only companies with employment data and more than one employee.
Source: Implement Economics based on Unicorns Lithuania, Windsor (2024) using Dealroom data and Eurostat.

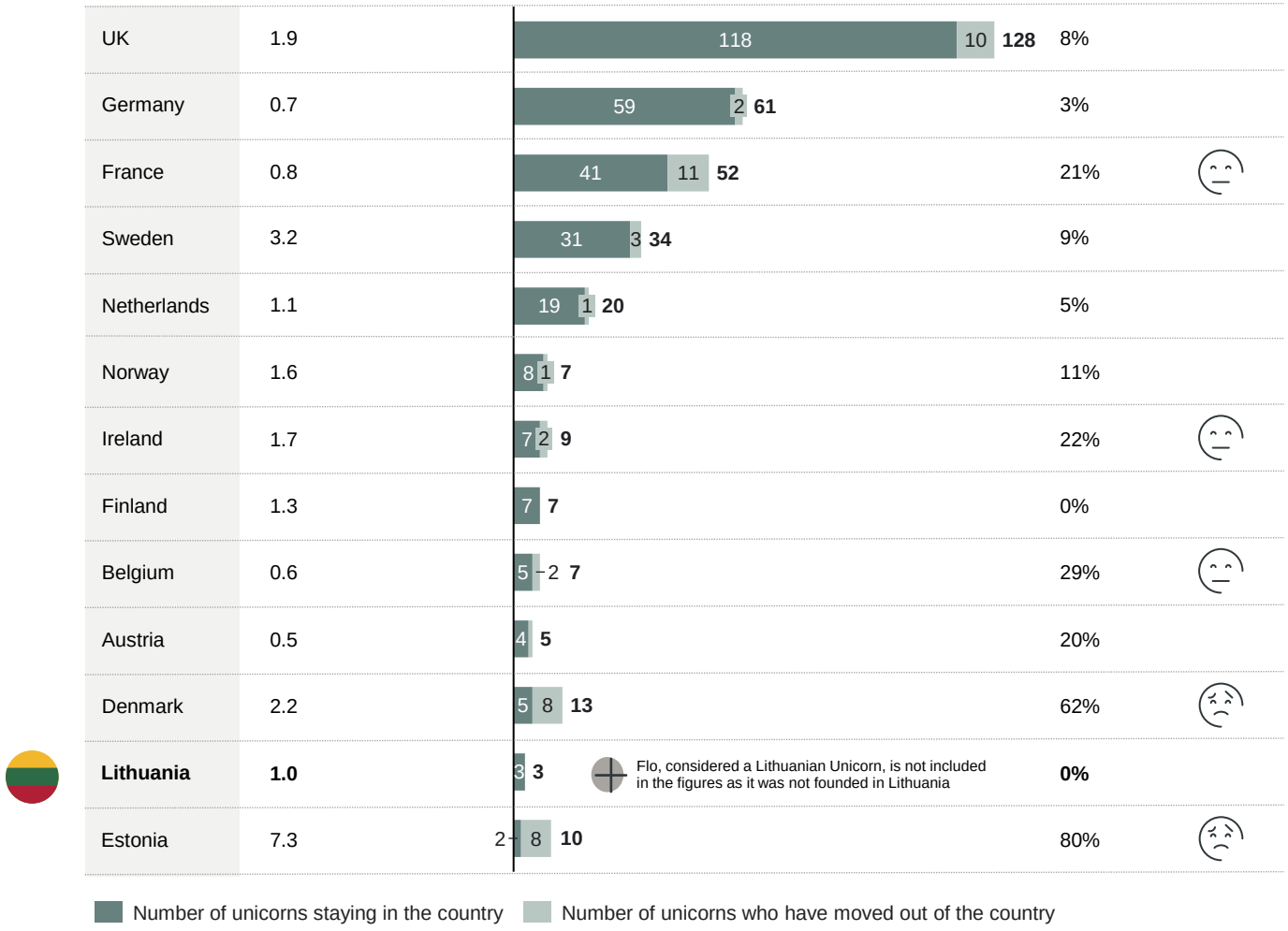
Lithuania is successful in retaining unicorns

Since 2000, Lithuania has produced 3 unicorns (1.0 per million people), trailing Finland (1.3) and Sweden (3.2). Unicorns are startups that reach a valuation of USD 1 billion.

In Lithuania, no unicorns have moved abroad, compared to Denmark where 62% of unicorns have moved their headquarters abroad.

Growing and retaining these quickly scaling innovative businesses holds large economic potential for Lithuania.

> … 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).

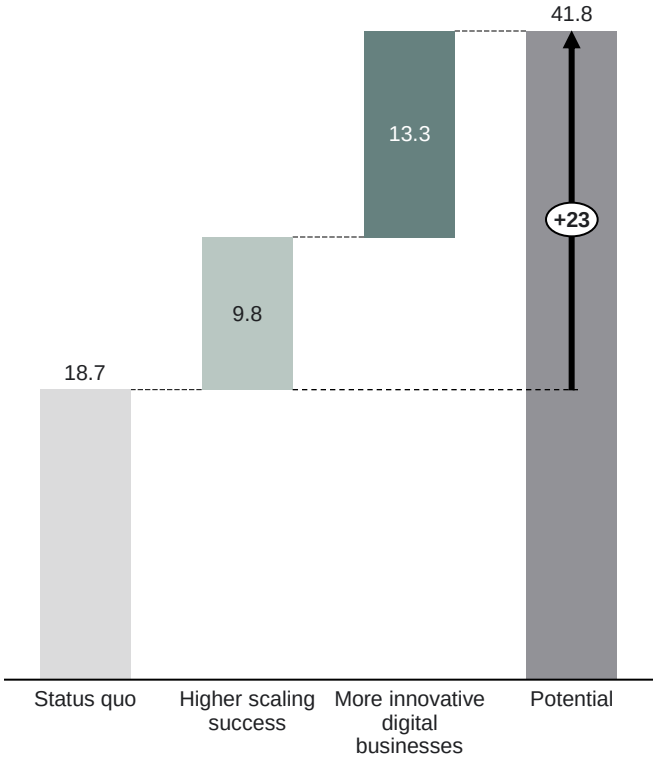
Scaling more innovative digital businesses can create 23,000 jobs and contribute EUR 1.4 bn to the Lithuanian economy

More and better innovative digital businesses on a par with OECD leaders could create 23,000 high-value jobs and contribute around EUR 1.4 billion annually to the Lithuanian economy, equivalent to 2% of Lithuanian GDP. The impacts stem from:

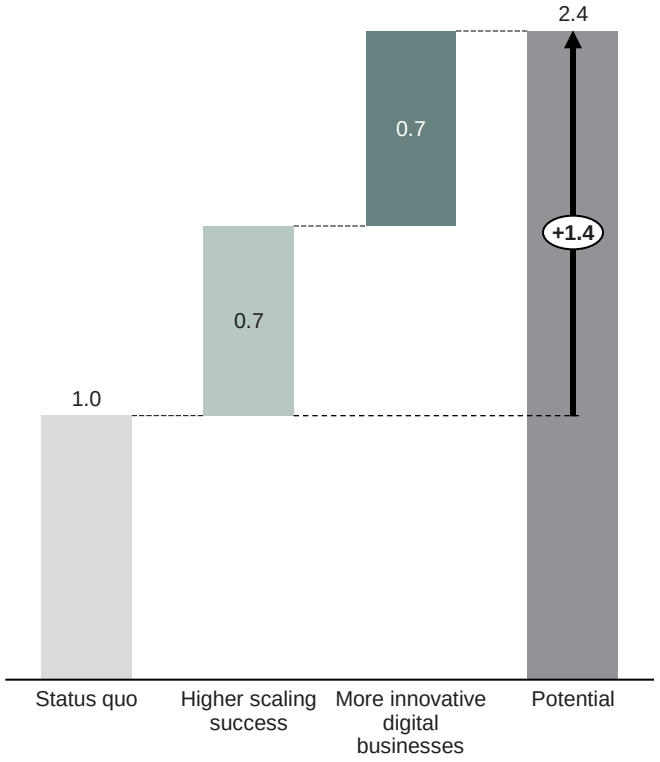
- **Higher scaling success of innovative digital businesses.** Transforming more startups into grownups, reaching the same success rate as the three leading OECD countries, could create 9,800 high-value jobs and add EUR 0.7 billion annually to the Lithuanian economy.
- **More innovative digital businesses.** If Lithuania can grow more innovative digital businesses reaching the entrepreneurial activity of leading peers, these new innovative digital businesses could support 13,300 jobs and contribute EUR 0.7 billion annually to the Lithuanian economy.

Considering that workers in new jobs may have been employed in jobs with average productivity, the net impact on the Lithuanian economy is EUR 0.2 billion.

Jobs
Thousand



Annual GVA* in innovative digital businesses
EUR billion



Note: Higher scaling success is defined as performance corresponding to the average of the top three OECD countries (UK, Switzerland and the US). Likewise, the scenario of "More innovative digital businesses" is defined by the average performance of the top three OECD countries (Ireland, Denmark and Estonia). *GVA: Gross Value Added. This report's calculations do not presuppose a given timeline to achieve the potential. Reported figures are gross estimates. For comparability, the calculations are based on a Unicorns Lithuania data set that is restricted to include only companies with employment data and more than one employee.
Source: Implement Economics based on Unicorns Lithuania and Bureau van Dijk's Orbis database.

4

The way forward

Lithuania’s potential for generating added value is increasingly depleted, so we must find new sources of productivity growth.

Invest Lithuania in Acceleration of the Lithuanian Economy (2024)

Quote translated by Implement Consulting Group.

Scaling innovative digital businesses and unlocking AI opportunities requires access to technology, people, R&D and capital … and good regulation

To fuel its startup ecosystem and support the scaling of its innovative digital businesses, Lithuania should consider five key framework conditions:

Tech	**Providing access to state-of-the-art AI tools, digital infrastructure, and compute power.**	Access to open, flexible and secure cloud platforms and AI tools/models is critical for growing efficient innovative digital businesses.
Rules	**Establishing clear rules that are supportive of AI-driven innovation and ensure reasonable compliance costs.**	National regulation and implementation of EU regulation in relation to AI can be especially burdensome for innovative digital businesses, especially in the startup and scaling phase.
People	**Developing AI-relevant skills, attracting top talent, and retaining expertise to drive innovation and success across tech-intensive industries.**	Skill shortages and adverse demographic developments highlight the need for continuous upskilling and attracting skilled foreign labour to grow innovative digital businesses and realise the AI potential.
R&D	**Boosting R&D in AI through targeted funding and strategic initiatives to drive AI development and adoption.**	Innovative digital firms are dependent on R&D investment and many innovative businesses are built on scientific research. Furthermore, AI has the potential to accelerate scientific breakthroughs and innovation. This means that the return on R&D can increase with the help of AI.
Capital	**Increasing the attractiveness of venture capital investment in Lithuania and support improvements at EU level to improve the risk capital market.**	Innovative digital businesses need risk capital and are often financed by venture capital investors from both Lithuania, Europe and globally. Venture capital is attracted by limited partnerships with possibility for stock options with a high after-tax return.

Reliable digital infrastructure and access to top-performing AI tools are essential for growing innovative digital businesses and seizing the AI opportunity

Tech

Rules

People

R&D

Capital

Access to open, flexible and secure digital infrastructure is a cornerstone for the growth of startups, which often lack the resources for large upfront investments or dedicated IT expertise. This infrastructure – including data centres and cloud computing – enables startups to scale efficiently and competitively.

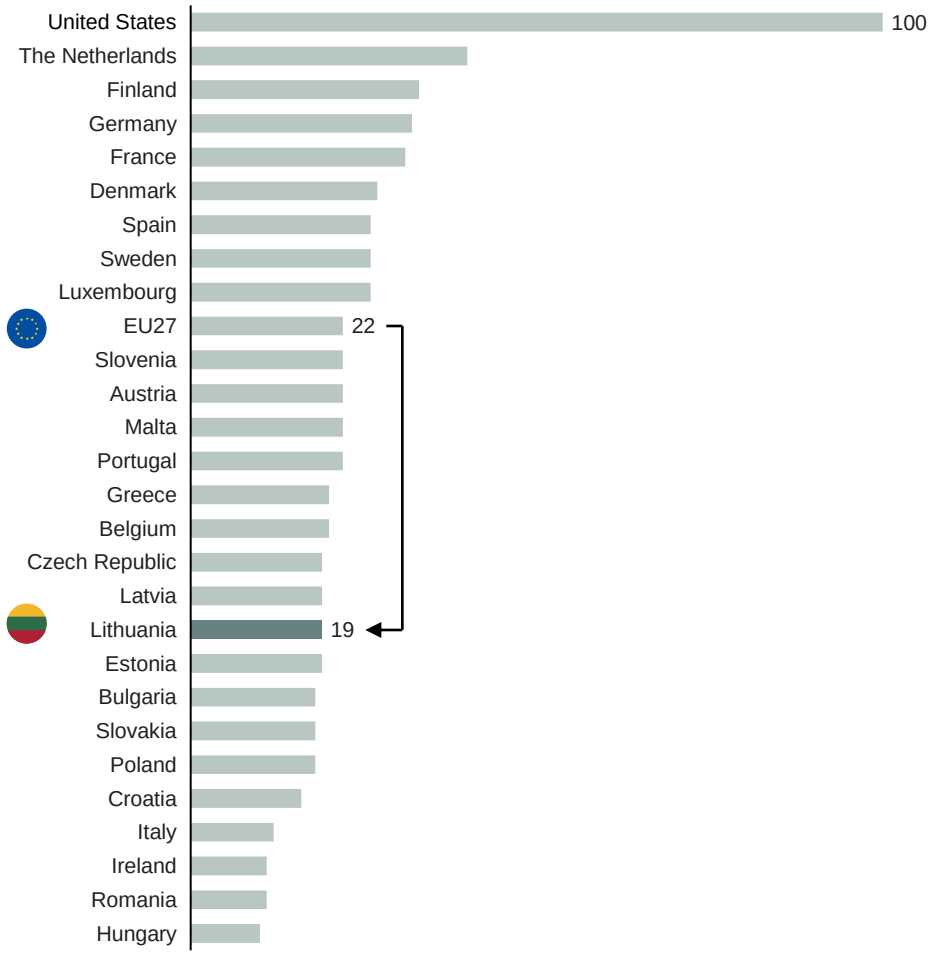
Access to top-performing AI/ML tools like Google Vertex and Hugging Face is central for European innovative digital businesses. According to Notion Capital polling, 46% (44% in Lithuania) of them already rely on international models, mostly from North America.

Lithuania lags behind in digital infrastructure, scoring only 19 out of 100 in the Tortoise Global AI Index for infrastructure in 2024, reflecting key areas such as GPU access, computing power, semiconductors, and connectivity.

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

AI Infrastructure 2024
Global AI Index,
score out of 100 (global leader)



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

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

Tech

Rules

People

R&D

Capital

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. Although Lithuania has successfully reduced administrative burdens, there is only so much that can be achieved once EU legislation is in place. Therefore, the government should be an active participant in EU policy discussions to help ease the administrative burden on Lithuanian companies.

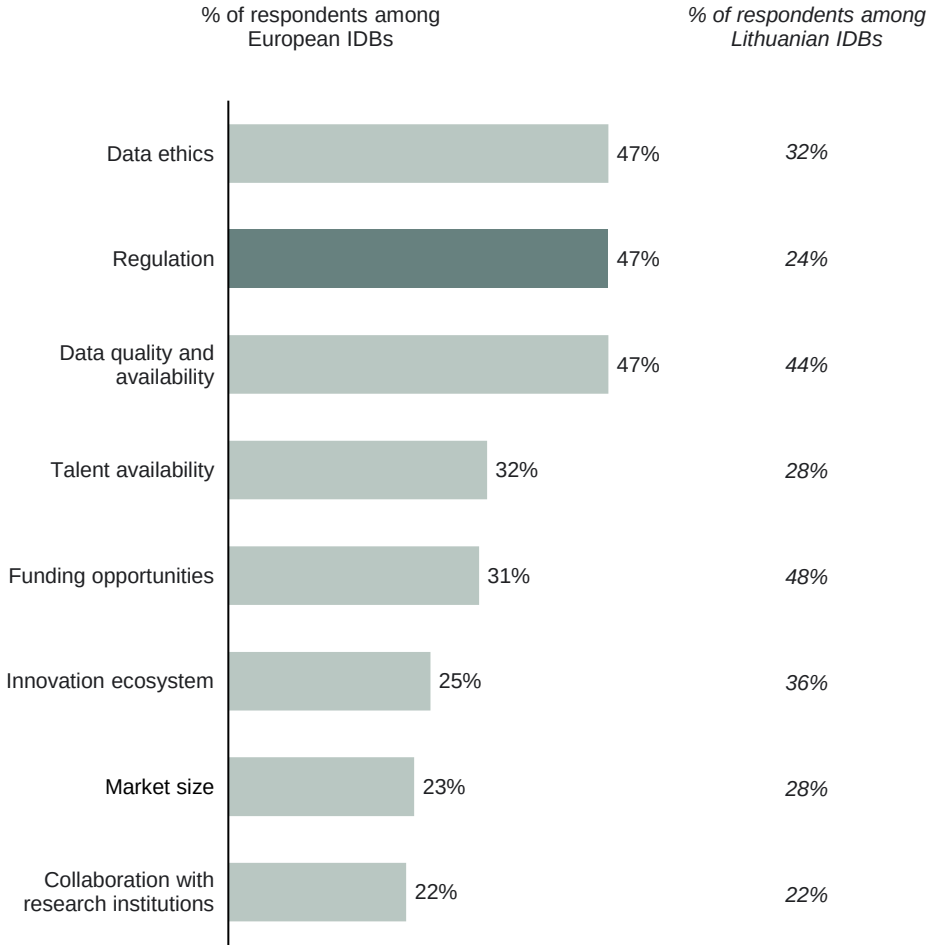
Compliance costs are substantial and particularly burdensome for small businesses. GDPR enforcement alone led to an 8% reduction in profits by covered businesses globally, with small tech companies experiencing double the impact.

The administrative burden related to EU structural funds projects is substantial, costing Lithuanian companies EUR 21 million, according to the Innovation Agency.

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

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

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



Note: Sample size of n=1095 in Europe and n=50 in Lithuania for Notion Capital survey.
Source: Implement Economics based on iapp (2024), Bruegel (2014), Chen et al. (2022), Euronews, Draghi (2024) and survey by Notion Capital (2024).

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

Tech

Rules

People

R&D

Capital

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.

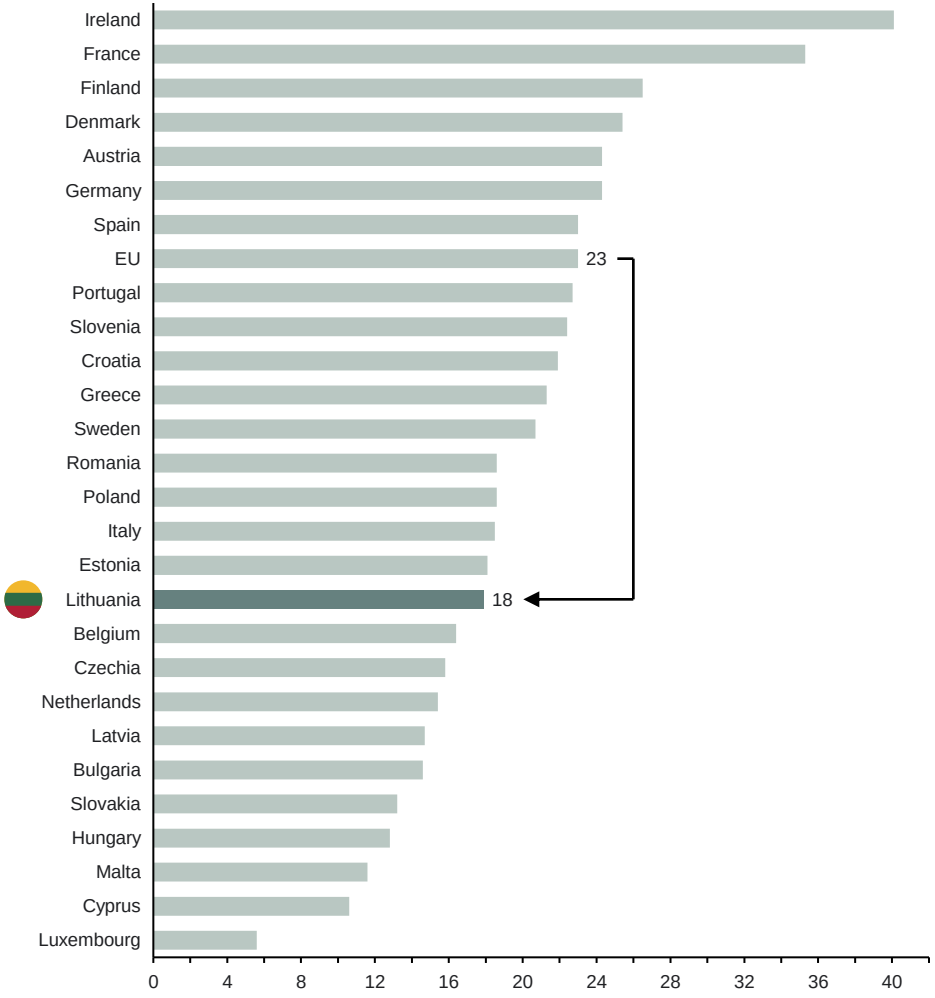
The potential of generative AI is especially large for highly educated individuals because it can significantly free up time from mundane tasks such as coding and writing, allowing more time for creative thinking and problem solving.

The Lithuanian workforce need upskilling to capture the economic opportunity from AI, ranking 20th on human capital in DESI, with 26% of the adult population possessing above-basic digital skills (EU average 27%) and having a low amount of STEM graduates compared to European peers.

Further, the Lithuanian workforce is projected to decrease by around one-tenth during the next decade. Attracting and retaining highly skilled labour will therefore be key in ensuring that the Lithuanian workforce is equipped to fully capture the AI opportunity.

> In order to solve the challenges of the supply of highly qualified specialists, it is necessary to strengthen the adaptability and flexibility of the country's education system.
>
> **Invest Lithuania** in Acceleration of the Lithuanian Economy (2024)

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



Note: Quote translated by Implement Consulting Group.
Source: Implement Economics based on OECD Employment Outlook (2023), World Economic Forum's Future of Jobs report (2023), Eurostat, DESI (2024) and Invest Lithuania (2024).

Lithuania is behind peers on innovation capacity

Tech
Rules
People
R&D
Capital

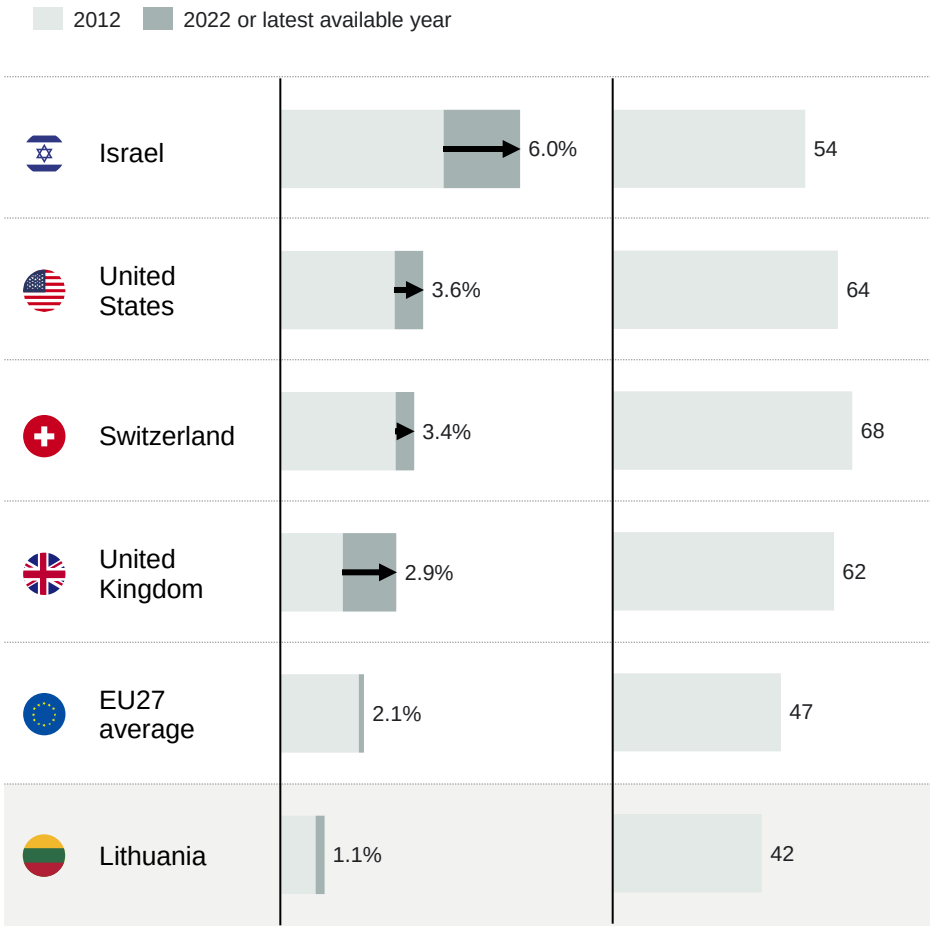
The productivity of research, in general, has been declining for the past century, while the number of researchers has increased.

Lithuania has a weak innovation capacity, limiting competitive product development. Lithuania spends significantly less on R&D as a share of GDP than the EU average and ranks 18th in the EU on the European Innovation Scoreboard, reflecting its below-average performance in business investments in R&D. As a result, the ability of companies to develop high-value, competitive products for international markets is limited. This challenge is further highlighted in the WIPO Global Innovation Index, where Lithuania's capacity and success in innovation are also below the EU average.

AI has the potential to accelerate applied research and scientific breakthroughs. AI can synthesise knowledge, analyse data, simulate experiments and model complex systems. This supports the National Progress Plan 2021–2030 goal of enhancing science-business co-operation to find creative solutions for national challenges and create greater value.

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).

Increase the attractiveness of investing in innovative digital businesses

Despite recent local investment by a startup accelerator, Lithuania's investment levels have dropped since the peak in 2021 and VC investment per capita is lower than that of the Nordics and Estonia in 2024. The lack of VC investments is part of a broader Europe challenge reflecting low expected risk-adjusted after-tax return.

Tech

Rules

People

R&D

Capital

Lithuania ranks second among CEE countries on VC investments but is still significantly behind Estonia and the Nordics when measured per capita.

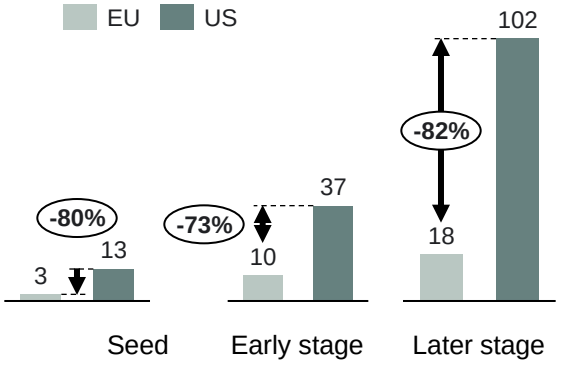
The EU as a whole also attracts around USD 100 billion less in venture capital investment than the US. Venture capital is the main source of financing for innovative digital businesses, especially those aiming to grow aggressively towards the 'grownup' scale.

European venture capital investment in AI has increased steadily until 2020 and took a step change in 2021 to EUR 12 billion. Generative AI takes a larger and larger share of total AI venture capital investment in Europe and reached 32% in 2024.

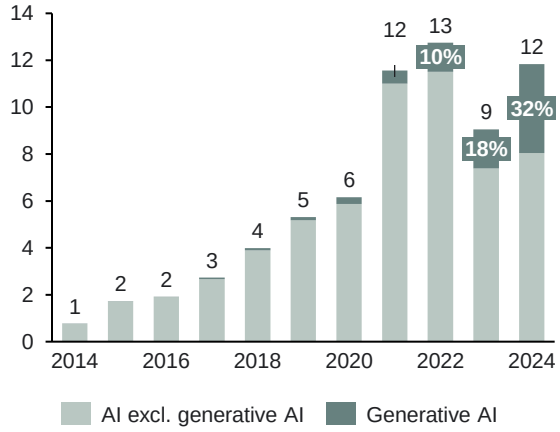
Europe's fragmented capital markets hamper the flow. Different rules in each EU country make it difficult for investors in one country to fund projects in another. This prevents the EU from using its full scale to create large investment funds that can support risky projects.

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.

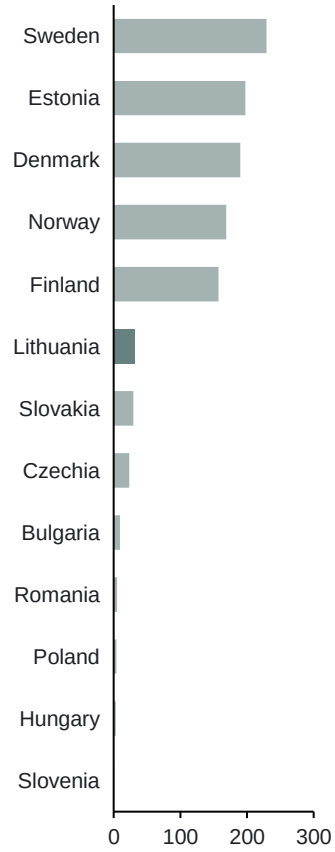
Venture capital investment by development stage
USD billion, 2023



Europe AI venture capital investment
EUR billion



Venture capital investment per capita, 2024
EUR per capita



Notes: The large US startup accelerator Plug and Play has recently stated that it will grow 60 innovative businesses in Lithuania over three years with an investment of almost EUR 63 million.
Source: Implement Economics based on Draghi (2024) and Dealroom.

The Ministry of Economy and Innovation has unveiled an economic transformation plan that, among other things, will enhance the startup ecosystem's framework conditions

Lithuania's economic transformation plan "START" from the Ministry of Economy and Innovation recognises the importance of Lithuania's startup ecosystem. According to the plan, the government will allocate EUR 5 million to enhance Lithuania's startup ecosystem and improve its acceleration system and review the startup promotion policies to foster startup ecosystem growth and international expansion.

Selected highlights from the START plan on the five key dimensions:

Tech	**Invest in AI infrastructure and compute power**	• Provide EUR 4 million in funding to ensure Lithuania's involvement in EU strategic sectors, particularly semiconductors towards 2028
Rules	**Create conducive and aligned AI regulation**	• Establish an AI sandbox by 2026 to help SMEs adapt to AI regulations and integrate AI technologies into their operations. • Create an institutional framework to support AI development across sectors, in compliance with the EU AI Act.
People	**Build human capital and an AI-empowered workforce**	• Propose new laws to attract human capital essential for a higher-value economy and provide EUR 3.43 million for study programmes relevant to the development of a high-value-added economy
R&D	**Enable innovation and invest in AI research and development**	• Support the development of AI solutions for SMEs to accelerate digital transformation and provide funding to companies for the development and production of EU critical technologies, yet no budget is specified. • Fund SME adoption of digital technologies, prioritising AI solutions for transformation (no budget allocated). • Develop national agreements for priority innovation-driven sectors, involving business, public sector, and academia
Capital	**Improve framework conditions to attract capital**	• Amend laws aimed at improving framework conditions to attract capital, including on redeemable shares, strengthening investor protection and corporate bond market regulation. • Amend reinvested profit taxation to encourage technological renewal and targeted investment expansion. • Ensure continued incentive mechanisms for companies investing in research and technological development. • New state aid measures to attract and support large-scale transformative investment projects from both local and foreign investors.

→ **The proposed measures would benefit from further discussions where additional ideas from the ecosystem may be explored.**

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