

NETHERLANDS

COUNTRY REPORT

Unlocking the Netherlands' AI Potential in the Digital Decade

The Netherlands is a frontrunner in Europe's journey to achieve the European Commission's (EC) [Digital Decade](#) goals, with 40% of Dutch businesses adopting artificial intelligence (AI) in 2023, far outstripping the European average of 33%.

The Digital Decade policy programme, with concrete targets and objectives for 2030, looks to make Europe a digital leader. A key goal is for 75% of Dutch businesses to be using AI by 2030. This study finds that the digital transformation in the Netherlands is well underway, and that the country's businesses are on track to meet the Digital Decade targets if they are able to maintain their accelerated uptake in new technologies.

AWS shares the vision of the Digital Decade, and commissioned independent consultancy, Strand Partners, to undertake a [new study](#) to understand the role that cloud computing and artificial intelligence (AI) can play in unlocking Europe's digital ambitions.

The study surveyed over 1,000 citizens and 1,000 businesses within the Netherlands to examine where the country finds itself on its journey towards the realisation of the Digital Decade goals.

The study finds that Dutch businesses are embracing the possibilities of fast-emerging new technologies, in particular by rapidly increasing their use of AI. These technologies have unlocked new economic potential and Dutch businesses have reported a range of positive impacts, including increased revenues, cost savings, and improved efficiency.

This study, which builds on an [independent 2022 report](#) carried out by Public First and commissioned by AWS, notes that in order to unlock the full benefits of these new technologies, it will be important for the Netherlands to match digital capabilities and understanding with levels of ambition. Increased investment in upgrading the country's digital capabilities is therefore a necessity to realise the Netherlands' full potential.

Key Statistics

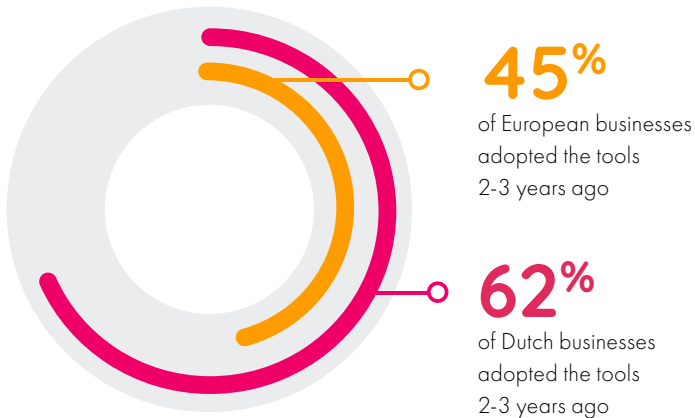
- 2023 was the 'year of AI' in the Netherlands and across Europe, with Dutch businesses increasing their adoption of AI by **38%**, up from 29% in 2022 to 40% in 2023.
- If the Netherlands is able to maintain this level of adoption to 2030, it could add **€230 billion** to the Dutch economy.
- When asked which benefits they had already realised as a result of adopting AI, **83%** of Dutch businesses reported that they had increased revenues.
- **50%** of Dutch citizens believe that AI will be important in addressing large societal challenges, such as climate change or disease control.
- Only **8%** of businesses believe it is easy to find new employees with adequate digital skills.
- **60%** of businesses report the digital skills most lacking in their business are basic digital skills, which include backing up data, researching topics online, and using documents and spreadsheets, while **29%** of Dutch citizens feel that their lack of digital skills is hindering their job opportunities.

2023: a 'year of AI' driving an acceleration in economic growth

In the Netherlands, as across Europe, businesses are strongly reliant on digital technology in order to realise growth. Dutch businesses have increased their investments in digital technology by **45%** in the past year, and anticipate a further **45%** growth in investment in 2024. **93%** of Dutch businesses reported that digital technology is crucial for achieving their five-year growth plans.

Dutch businesses are embracing AI tools with increasing enthusiasm: **40%** reported consistently using at least one such technology in their daily practices in 2023, up from 29% in 2022. This was a percentage increase of 38%. This enthusiasm seems likely to grow further, with almost half (**49%**) of all Dutch businesses planning to consistently use multiple AI tools in the coming year – 10% more than the European average (39%).

If this rate of growth is maintained, €230 billion could be added to the Dutch economy by 2030. This is based on updated [economic modelling](#) of the economic impact of achieving Europe's Digital Decade goals, using our surveys of businesses and citizens.¹



Such clear commitment to embracing AI is not as new in the Netherlands as elsewhere in Europe. Dutch businesses started exploring AI earlier than their European counterparts; of the companies currently using AI; almost two thirds (**62%**) of Dutch businesses adopted the tools 2-3 years ago, compared to only **45%** in Europe.

Dutch businesses are optimistic about AI's broader transformative potential. In the Netherlands, **75%** of companies believe AI will significantly impact their industry in the next five years – exceeding the European average of 63%. Businesses which have adopted AI have already accessed a variety of benefits. For example, **83%** of these firms report that integrating AI tools has directly led to higher revenues.

Dutch citizens are similarly excited about the potential impact of AI, with **half** believing that the technology will be important in addressing big societal challenges, such as climate change and disease control. Increasing awareness of AI and its functions seems fundamental to capitalising on this growing excitement. **71%** of Dutch citizens reported at least a basic familiarity with AI technology in 2023 – this included just **17%** who reported that they were very familiar with the concept and understood what it does.

Overcoming Regulatory Barriers

Dutch businesses report a lack of choice in AI providers which is threatening to hinder high levels of excitement and adoption.

41% of Dutch firms cite a lack of choice among AI providers

38% mention difficulties in switching between them.

Dutch businesses would therefore benefit from a regulatory landscape that enables greater flexibility, certainty, and agency for businesses to choose between AI providers.

The EU reached a provisional agreement on the AI Act in December 2023, forming a broad legal framework for regulating the use of AI. AWS supports government efforts to put in place effective risk-based regulation for AI that protects people and their rights and encourages trust, while also allowing for continued innovation and practical application.

This research encourages policymakers to continue pursuing an innovation-friendly and internationally coordinated approach. AWS is committed to collaborating with the EU and industry to support the safe, secure, and responsible development of AI technology.



Cloud Computing: A Foundational Technology

Cloud computing underpins Europe's journey to becoming a digital leader, as it is fundamental to supporting the growth of Europe's AI capabilities. Dutch businesses' familiarity with cloud computing is at a higher level than in most European countries. **91%** of businesses in the Netherlands reported at least a general awareness of the technology, compared to **85%** in Europe.

This included **38%** of Dutch businesses, who reported a deep understanding of cloud computing and its functions. The advantages of cloud computing are clear. Dutch businesses which use the technology cited improved online security (**50%**) as the primary benefit of cloud, followed by support for remote or flexible working (**39%**).

However, a significant **52%** of Dutch citizens have never heard of cloud computing. Bearing in mind the importance of cloud computing to the Digital Decade goals to have 75% of businesses using cloud computing, AI, and Big Data by 2030, increasing broad knowledge of its uses and benefits will be key for the Netherlands' digital journey. Cloud technology forms the foundation for the adoption of digital and AI technology. In particular, cloud underpins the Foundation Models which form the basis of generative AI.

To guarantee continued momentum, employers must ensure they hire more IT specialists, and, crucially, provide and ensure awareness of upskilling programmes for both tech and non-tech employees.

Addressing the Digital Skills Gap

Although Dutch businesses indicate a strong desire to explore the benefits of AI, a lack of digital skills threatens to halt growth and digital adoption, creating a deficit that could prevent the Netherlands from reaching its full digital potential.

Only a very small proportion of Dutch businesses (8%) believe it is easy to find new employees with good digital skills, compared to 19% across Europe. Furthermore, 60% of Dutch businesses report that the digital skills most lacking in their business are basic digital skills, which include backing up data, researching topics online, and using documents and spreadsheets. Businesses report that it takes, on average, six months from posting a job vacancy to finding an employee with the appropriate digital skills.

This skills gap will obstruct Dutch businesses from fully accessing the digital future. Of the firms which report having difficulty finding new employees with digital skills, 37% report that this has slowed business growth; this is more than their counterparts across Europe (29%). The digital skills gap is also damaging for those looking for work, with 29% of Dutch citizens reporting that a lack of digital skills hinders their job opportunities.



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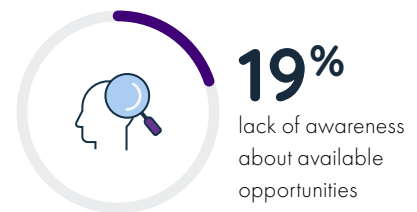


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Although 91% of Dutch businesses report offering digital skills training of some sort (more than the European average of 87%), only 31% invest in comprehensive digital training programmes for all employees. Furthermore, only 15% of Dutch citizens agree that there is enough access to quality digital skills training and education for individuals.

Despite these challenges, demand among citizens to improve their digital skills is high, with 60% reporting that they are interested in learning new digital skills. However, despite businesses reporting that they are taking steps to address the digital skills gap by providing digital skills training, 60% of Dutch citizens report that they have learnt the majority of their digital skills through their own independent research.

The most frequently cited barriers to digital skills acquisition are:



In order to ensure that citizens are able to realise the benefits, businesses' digital skills programmes must be responsive to barriers such as these, offering the programmes in a form that suits employees' time demands and increasing awareness of their offerings.

Addressing these discrepancies will be key to ensuring that both businesses and individuals are able to fully realise the benefits unlocked by AI. Therefore, businesses and government must take steps in order to provide and to increase awareness of quality digital skills training programmes for both tech and non-tech employees, as well as clarifying the benefits of participation, such as tangible career progression. These should remove or address barriers to digital skills acquisition; available at low or no cost and in a format that allows for flexible learning, such as microlearning.

Citizens share excitement about AI, but anxiety remains



Dutch citizens are aware of the transformative potential of AI; 41% of citizens believe AI is likely to positively impact their lives in the next three years (though this is lower than the European average of 51%).

For example:



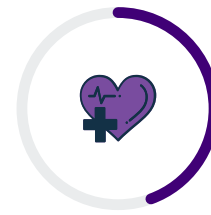
62%

of Dutch citizens believe AI will have a positive impact on helping with day-to-day tasks



50%

of Dutch citizens believe it will have a positive impact on safety and security



44%

of Dutch citizens believe it will positively impact physical health

Lower enthusiasm may be linked to a lack of awareness among Dutch citizens around specific technologies and their application in certain sectors. While **71%** of Dutch citizens had some degree of familiarity, this included just **17%** with strong familiarity, while over half (**54%**) said they did not know what artificial intelligence was but had heard of it. 1 in 5 (**21%**) said they had never heard of the term. Considering that **40%** of Dutch businesses are using or experimenting with AI technologies, this large gap in awareness is a concerning barrier preventing the Netherlands from maximising its digital potential.

Furthermore, **46%** of Dutch citizens reported that they were concerned about AI leading to job losses. Fears around AI's impact on job losses are shared by many European citizens, but emerging research suggests that these fears are overstated.

The World Economic Forum estimates that the impact of digital technologies on jobs is expected to be **a net positive over the next five years**, with AI expected to have a **25.6%** net positive effect on job growth.² The key to unlocking a smooth transition within the workforce is ensuring that all are equipped with the right digital skills to be a part of the digital economy.

Without a better understanding of how emerging technologies are currently being used and their economic benefits, large swathes of the population could be excluded from the new digital economy. This will inevitably stunt the growth of a digital transition and reduce the possibility of meeting the Digital Decade goals.

Steps to address the digital skills gap and increase awareness of how new technologies function will again be crucial here. Businesses and governments must work to develop, offer, and promote digital skills training courses and cooperate in order to ensure that these programmes are aligned to both industry and employee needs and empower citizens and businesses to effectively upskill and use digital tools. Education in schools, universities, and workplaces will also be crucial, with **69%** of Dutch citizens reporting that they believe it will be important for educational institutions and employers to offer digital skills training and development opportunities.

CASE STUDY:

Growy



Growy: How cloud computing is transforming agriculture

One area in which citizens are convinced about the transformative power of AI is agriculture, with over half (56%) expressing this belief.

Growy exemplifies the transformative impact of AI in agriculture. As a Netherlands-based start-up, Growy operates vertical farms where robots tend to the plants. The company – based in the heart of agricultural science in the Netherlands, Wageningen – has developed an automated vertical farming system called Growy Cube that uses hydroponics. The Growy Cube uses LED lights, sensors, cloud software, robotics, and AI to optimise growing conditions. It monitors factors like temperature, humidity, CO₂, etc. in real-time. The cubes are modular and can be linked together. Growy claims each module can grow the equivalent of 1 hectare. The technology aims to improve yields, reduce resource use, and allow year-round production



Core Features:

- **Robots at Work:** Robots equipped with advanced cameras and IoT sensors closely monitor plant health. They analyse water intake, growth rates, and nutritional needs.
- **Valuable Data Points:** These tech-savvy robots gather over a million pieces of data annually. This isn't just for efficiency; it's to truly understand and optimise plant health and growth.
- **Quality Produce:** Armed with this vast amount of data, Growy ensures that their plants aren't just grown, but nurtured. The result? Plants that not only look but also taste superior.
- **Global Expansion with Cloud:** Growy's innovative use of cloud technology makes launching new farms a breeze. Each farm, regardless of its location, connects back to a central cloud system, ensuring consistent quality and care.



Key Advantages:

- **Continuous Care:** Robots, working round the clock and backed by cloud data, ensure plants always receive the care they deserve.
- **Data-Driven Excellence:** Every decision at Growy is backed by data, leading to continuous improvements in plant quality.
- **Quality and Efficiency:** Growy's technology ensures that every plant gets the best possible care.

As Growy grows, its need for a reliable and scalable infrastructure will only increase. Using cloud computing, the company can focus on its innovative agricultural methods instead of IT maintenance.

Here are some of the ways that cloud computing is helping Growy to embrace AI:

Cloud computing allows Growy to automate its farming operations, reducing the need for manual labour. This frees up the company's employees to focus on more skilled tasks, such as developing and deploying AI applications.

Cloud computing provides a scalable and reliable infrastructure for Growy. This ensures that the applications are always available and that they can handle the increasing amounts of data that Growy's robots are collecting.

Cloud computing makes it easy for Growy to collaborate with partners and suppliers around the world. This allows Growy to share data and insights, and to develop new AI applications more quickly.

Conclusion

Having experimented with AI earlier than many European countries, the Netherlands is a leader in embracing the emerging digital future, with 40% of businesses reporting consistently using at least one AI tool in their daily practices in 2023. Maintaining this growth could unlock €230 billion for the Dutch economy.

Businesses are looking to increase their digital investment and AI adoption, and many are optimistic about its transformative potential. Case studies such as Growy highlight the potential for innovation with AI. Businesses which have already adopted AI are reporting a range of benefits, including increased revenues, cost savings, and enhanced automation and efficiency.

There are nonetheless challenges to overcome, notably in skills shortages. The digital skills gap is preventing businesses from fully realising the benefits of AI technology and hindering job opportunities for citizens. Overcoming this digital skills barrier by improving the quality, access, and awareness of digital skills training programmes will be crucial to unlocking the transformative power of AI.

Furthermore, it will be essential to maintain a risk-based regulatory landscape, which provides clear and internationally coordinated guidance, while also encouraging the adoption of and innovation with groundbreaking digital technologies, such as AI.

Dutch citizens also hold cautious views on AI when compared to their European peers. Increasing awareness of how AI operates and the benefits that can arise from its adoption will therefore be crucial to continue enabling the Netherlands to achieve the goals of the Digital Decade and tackle the most pressing challenges of the 21st Century.

References:

1. Our headline estimate of the potential economic impact of digital transformation is an update on the economic modelling published in 2022 with new data from 2023. This model is based on the potential economic impact of achieving the following four goals, based on the European Commission's Digital Decade targets:
 - Increasing businesses' cloud computing uptake to 75%.
 - Small business adoption of three key digital tools and services (CRM, ERP, and fast broadband) increases to 90%.
 - 80% of Dutch adults achieve basic digital skills.
 - Taking maximum advantage of the potential economic impact of AI and big data.'
2. The World Economic Forum (2023) 'Future of Jobs Report 2023'. Available at: <https://www.weforum.org/reports/the-future-of-jobs-report-2023/>