DENMARK

COUNTRY REPORT

Unlocking Denmark's AI Ambitions in the Digital Decade

The Nordic nations surveyed in this study (Denmark, Finland, Norway and Sweden) are front runners in the journey to achieving the European Commission's (EC) Digital Decade goals, with both businesses and people embracing the possibilities of new and frontier digital technologies.

Denmark is an AI leader in Europe. Danish survey data shows high openness to AI among individuals and businesses and Denmark was ranked 2nd in the EU in the 2022 Digital Economy and Society Index (DESI) on integration of digital technology by businesses.[1] Many Danish companies are already using AI or have plans to adopt AI solutions.

Danish businesses and people understand the transformative power of AI and businesses are actively looking to increase their use of it. This increased appetite has largely been driven by developments in generative AI and large language models (LLMs).

This research, the first of its kind since the boom in generative AI and LLMs in 2023, surveyed 1,000 citizens and 1,000 businesses in each Nordic nation, examines where Denmark finds itself on its journey towards the realisation of the goals of the Digital Decade policy programme, and seeks to uncover the benefits and barriers to the adoption of key digital technologies, including AI. It shows a significant recent increase in levels of business AI adoption, but also that there are significant barriers to overcome in order to maintain this growing adoption rate.

This study, which builds on a 2022 report carried out by Public First and commissioned by AWS, reveals that to fully embrace the opportunities offered by AI, Denmark's government and businesses must collaborate in order to offer increased digital skills training and to address public concerns.

Key Statistics

- **34%** of Danish businesses used AI in 2023, up from **26%** in 2022, a growth rate of **31%**.
- If the increased adoption of digital technologies, especially AI, is maintained, it could unlock **498 billion DKK** for the Danish economy.
- Danish businesses predict a **53%** increase in digital investments in the next year, and a further **60%** increase in the next three years.
- **78%** of Danish businesses that use cloud computing technologies report that they are essential or important to their business, while **67%** state the same for AI.
- New Danish adopters of AI are using it with increasing sophistication – **65%** are using LLMs or generative AI.
- **49%** of Danish people believe that AI will be important in addressing large societal challenges, such as climate change or disease control.

The Expanding Potential of Digital Technology

Danish businesses are increasingly adopting new and frontier technologies into their everyday operations, especially cloud computing and AI tools. **51%** of Danish businesses state that cloud computing technologies have become more important to their business in the past year, above the Nordic average (49%). Similarly **52%** of Danish businesses similarly report that AI has become more important to their business, again slightly more than the Nordic average (50%).

Danish businesses are enthusiastic about the potential of digital technology, with **82%** believing that it will be pivotal in achieving their five-year growth targets, closely mirroring the European average (84%) and the Nordic average (81%). Increased investments in digital technology in Denmark further highlight the key role new technologies are playing in the growth of Danish businesses. In the past year, Danish businesses have increased their investment in digital technology by **53%**, compared to the Nordic average of 51%. In their projected spending on digital technology, Danish businesses are leading in both the Nordic and wider European region in their investment in digital technology. They report that they plan to increase their investment in digital technology by **60%** in the next three years, just above the Nordic average of 59%.

51% of Danish businesses state that **cloud computing technologies have become more important** to their business

52% of Danish businesses similarly report that **AI has become more important to their business**

82% **believe digital technology will be pivotal** in achieving their five-year growth targets

Danish businesses in our survey reported that 18% of their IT budget in 2022 was spent on AI, estimating that this figure will rise to just over a quarter (26%) by 2030. Denmark is one of the leading Nordic nations in this regard, as Nordic businesses in 2022 reported spending 16% of their IT budget on AI, predicting a rise to 25% in 2030.

Denmark understands the powerful potential of digital technology. Danish businesses are increasing their adoption of AI technology, while also looking to harness more advanced forms of the technology. 65% of Danish businesses that have adopted AI are using LLMs and generative AI.

2023: A 'Year of AI' Driving an Acceleration in Economic Growth

Danish businesses are increasingly looking to integrate AI technologies into their business operations; **34%** consistently used at least one AI tool in their daily practices in 2023, compared with **26%** in 2022; a percentage increase of **31%**. Only **7%** said that they had no intentions of integrating AI into their business. Here, Denmark is largely aligned with Nordic businesses, where **33%** were using AI daily in 2023.

If this rate of growth is maintained, **498 billion DKK** could be unlocked for the Danish economy by 2030. This is equivalent to **18%** of Denmark's economy.

The most common use for AI technology in Nordic businesses is to interpret and generate natural language (for example, through machine translations or chatbots). **56%** of Danish businesses intend to use AI for this purpose, in line with the Nordic average (**54%**). The next most common uses for AI among Danish businesses are for detecting fraud or anomalies (**35%**), for analysing and interpreting visual information (**32%**), and for using data to make decisions or predictions (**26%**).

Cloud computing is a key foundational technology for the adoption of AI, empowering businesses to use and experiment with a range of AI technologies. Danish businesses show a strong general understanding of cloud computing (**87%**), above the Nordic average of 84%, demonstrating familiarity with the concept. In order to maintain the increase in AI adoption, Danish businesses will need to build on this understanding of cloud computing as an enabling technology.

Danish companies which have embraced cloud computing are reporting a range of benefits. The most frequently cited benefits of adopting cloud computing are:

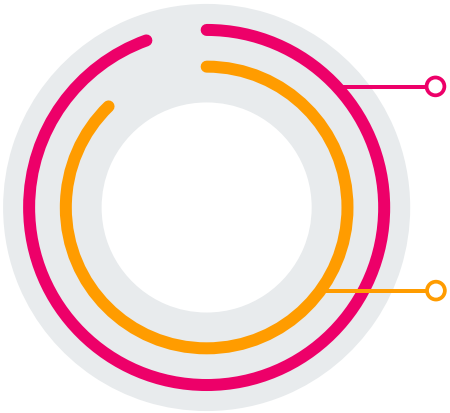
48%
are supporting remote or flexible working

40%
are improving online security

31%
are aiding digitalisation by replacing paper or manual processes with digital systems

Danish businesses, to a greater extent than the wider Nordics, recognise the transformative power of AI. **76%** of Danish companies believe that AI will completely or largely transform their industry in the next five years, compared to **62%** of Nordic companies. In Denmark, this belief is even higher among small businesses (those employing less than 50 people), with over eight-in-ten (**81%**) viewing AI as a transformative technology.

Danish companies which have successfully adopted AI technologies have already realised a range of benefits. The two most commonly cited benefits resulting from the adoption of AI were stimulating innovation (for example, through improving the development of new products) and improving customer experience, both cited by **94%** of AI adopters. Enhanced automation and efficiency was also commonly reported, with **88%** of Danish AI adopters experiencing these benefits.



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AI adopters two most commonly cited benefits resulting from the adoption of AI were stimulating innovation and improving customer experience

88%
of Danish AI adopters reported enhanced automation and efficiency as another common benefit

The adoption of AI has stimulated internal growth across Danish businesses, with **91%** of Danish AI adopters stating that using it has already increased their revenues, significantly more than the Nordic average of 76%. A further **88%** of Danish businesses state that AI technologies have already improved cost savings, also significantly above the Nordic average of 73%. The increased adoption of AI among businesses could represent significant financial growth for Denmark if businesses and the government are able to maintain accelerations in uptake and overcome barriers to adoption.

As well as reporting a range of benefits resulting from adoption, Danish businesses predict that AI will provide a variety of improvements to their business operations over the next five years. The primary benefit Danish businesses expect AI to deliver over this period is the automation of repetitive tasks (**85%**). Moreover, **83%** of Danish businesses expect AI to lead to the improvement of internal processes and systems, while **81%** expect it to disrupt existing business models or to enable personalised customer experiences.

Danish businesses are, at the same time, increasingly looking to use advanced AI technology in more sophisticated ways, as highlighted by excitement surrounding generative AI. **58%** of Danish businesses believe that generative AI will transform their industry's landscape over the next five years.

However, only **6%** of Danish businesses were able to name a specific everyday problem faced by their business that they thought AI could solve, significantly less than the Nordic average (14%). While Danish businesses are clearly enthusiastic about AI's potential to positively impact their company, there are still opportunities to develop a greater understanding of the technology and its applications in order to utilise it in an efficient and effective way.

Overcoming Barriers to AI Growth

In order to unlock the full potential of their AI ambitions, Danish public and private sectors will need to work to overcome significant barriers to adoption to maintain the accelerated uptake of AI. While Danish businesses are raising their AI aspirations, they continue to face substantial challenges in maintaining and harnessing the current momentum.

The two most significant barriers to increased AI adoption Danish businesses reported are the inability to switch between AI providers (cited by **50%** of Danish companies) and lack of choice between AI providers (cited by **32%** of Danish companies). Only **6%** cited legal or compliance issues as a barrier to greater AI adoption, below the 13% Nordic average.

Greater flexibility in choice of AI provider and increased ability to switch between providers would help a significant number of Danish businesses to increase their adoption of AI technologies.

Danish and European authorities must work to maintain a principle-based and open regulatory framework that incentivises increased AI adoption and allows for experimentation, providing both guidance and clarity. The European Commission has noted the regulatory burden on businesses and committed to reducing them, stating that it will make legislative proposals towards reducing reporting obligations at the European level by 25%.[2]

In December 2023, the EU reached a provisional agreement on the AI Act, 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. We encourage policymakers to continue pursuing an innovation-friendly and internationally coordinated approach and are committed to collaborating with the EU and industry to support the safe, secure, and responsible development of AI technology.

Another significant barrier to digital adoption in Denmark is a lack of both basic and advanced digital skills in the workforce, although Denmark is leading the Nordics in terms of overcoming this barrier.

21%

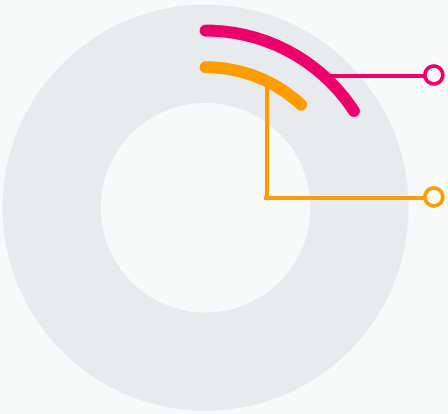
of Danish businesses cited a **lack of in-house digital skills as a barrier to the further adoption of AI technology**, below the 30% of Nordic businesses which cited this as a barrier

Although

35%

of small businesses in Denmark reported that this is holding back their AI adoption

The digital skills gap, between the digital ambitions of businesses and the lack of digital skills in the workforce, poses a challenge to both Nordic and European businesses more widely. As businesses raise their AI ambitions, a lack of digital skills threatens to hinder its adoption.



Only
16%
of Danish businesses report that they find it easy to find new employees with good digital skills,
compared to the Nordic average of 22%

This falls to
12%
among small businesses

Danish businesses state that, from the posting of a job vacancy, it takes **6.1 months** to find an employee with the appropriate digital skills. This highlights a digital skills dilemma which Danish businesses and government will need to overcome to fully harness the potential of AI technology. Furthermore, within the workforce, only 21% of Danish businesses and 27% of Nordic businesses find it easy to train their existing employees in digital skills.

Within this digital skills gap, basic digital skills emerge as a leading barrier preventing companies from moving on to the adoption and effective use of more advanced digital technologies such as AI, cloud computing, and Big Data analytics. **Over half (51%)** of both Danish and Nordic businesses report that basic digital skills, such as creating a spreadsheet or editing an online document, are the digital skills most lacking in their organisations. In Denmark, this rises to **60%** among small businesses.

44%
of Danish businesses which lack digital skills reported that these skill shortages have increased their costs

17%
stated that this has slowed business growth

55%
of Danish people report that a lack of digital skills hinders their job opportunities

Danish businesses and government will need to work to foster digital skills among the public to reach the Digital Decade target of ensuring **80%** of individuals have basic digital proficiency skills by 2030, and to fully realise AI's transformative potential. Increasing digital skills proficiency and awareness among Danish people will empower them to use new and frontier technologies and also ensure that their understanding of the risks and opportunities created by AI are grounded in reality.

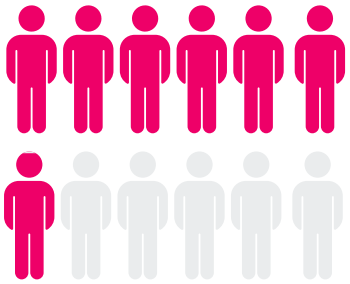
A considerable number of Danish businesses are working to address this skills gap by upskilling their current employees, with **87%** of Danish companies currently offering employees some form of digital skills training. However, only **27%** report that they regularly invest in comprehensive digital training programmes for all employees, indicating significant room for progress.

Moreover, most Danish people state that they have learnt their digital skills through their own independent research (**60%**) or through trial and error (**37%**), rather than through training programmes offered by their employer or government.

Increasing awareness and investment in regular and comprehensive digital skills training for employees, students, and citizens will prove crucial in helping Denmark to act upon the recognition that digital skills are becoming increasingly important. **72%** of Danish businesses predict that digital skills will take precedence over university degrees in hiring decisions within the next four years, as do **70%** of Nordic businesses.

Citizens' Concerns

While Danish people demonstrate excitement about AI's transformative potential, they also harbour some concerns about the risks posed by AI.



58% of Danes believe that AI will positively impact their lives in the next three years compared to 56% of Nordic people and 51% of people across Europe. The four main sectors in which Danish people believe AI will have a transformative effect over the next five years are healthcare (68%), education (64%), entertainment (64%), and finance (63%).

However, Danish people are also concerned about the potential impact of AI and, in particular, its potential impact on job security. Almost three quarters (72%) of Danish people voiced some fear about AI, in line with the Nordic average of 73%. 48% were concerned that AI has the potential to lead to job losses.

Although there are concerns about AI, 58% of people in Denmark believe that it will create more opportunities than risks in regard to job security and the future of work. This belief is supported by the 2023 World Economic Forum Future of Jobs report, which estimates that AI is expected to have a 25.6% net positive effect on job growth over the next five years.[3]

CASE STUDY:

Too Good To Go

Too Good To Go: How A Danish App is Saving 200 Million Meals a Year

One of TIME's 100 Most Influential Companies of 2022, Too Good To Go seeks to combat food waste by using an app to link consumers to restaurants, cafes, and supermarkets with unused food that is available at reduced cost. Too Good To Go is growing rapidly, and now spans 81 million registered users and 145,000 active partners across 17 countries.

Core Features:

- **Connecting Consumers and Retailers**: The Too Good to Go app is free, and connects customers in Europe and North America with local restaurants and supermarkets who sell their surplus food at a reduced price.
- **Operating Globally**: Digital technology is enabling the Danish company to operate in some of the largest cities in Europe, as well as expanding to America in October 2020.

Key Advantages:

- **Growth**: Too Good to Go experienced exponential growth. From its launch in 2016, it took six years to save its first 100 million meals. The next 150 million were saved in less than 2 years.
- **One Meal at a Time**: Too Good to Go does not sell any food of its own, but uses a range of AWS cloud services to link customers and retailers, and take care of all the relevant details. In the past year and a half it has increased its registered users by 50%.
- **Flexibility**: The app links customers with shops within a certain radius, and helps them to pick time slots to collect their chosen food. The app works across countries, so consumers in Europe can use the app in the US. AWS helps Too Good To Go to comply with a range of regulations on commerce, food waste, and consumer data.

Digital Ambitions:

- **Wider Impact**: food waste is one of the primary drivers behind the climate crisis, with as much as a third of the world's food going to waste every year - accounting for 10% of all greenhouse gas emissions.[4] Too Good to Go is playing its role against food waste and reducing emissions by saving one meal at a time.

Too Good To Go was founded in 2016 with a clear mission: to inspire and empower everyone to fight food waste together. Food waste had become normalised, and the meals being thrown away were simply too good to go. In August 2023, the Too Good To Go team announced that their app had saved 250 million meals from going to waste. The company now operates across Europe and North America and is planning to grow even further.

Conclusion

Danish businesses and people are increasingly looking to adopt advanced digital technologies, including cloud computing and AI, with businesses increasing their adoption of AI by 31% between 2022 and 2023. If Denmark is able to maintain this accelerated uptake, it will be able to reach the European Commission's target of 75% of businesses using AI by 2030.

Danish people demonstrate some concern about the impact of AI, especially in regard to job security, with nearly three quarters of the population registering concern in this sphere. However, they recognise that AI presents more opportunities than risks and are excited about its transformative potential. In order to maintain the current growth rate in AI adoption, Danish businesses and the country's government will need to work to address consumer concerns regarding AI and highlight the opportunities for growth that technology presents.

There are significant barriers which the Danish government will need to overcome to achieve the Digital Decade goals, despite the significant increases in AI adoption over the past year. In order to defeat these barriers, businesses and the government must work together to provide comprehensive digital skills training for both tech and non-tech employees and people, as well as to maintain a principle-based and open regulatory framework that incentivises the adoption of new technologies.

By addressing these barriers, Denmark will be able to unlock the ambitions of the Digital Decade and continue as a European frontrunner in AI adoption.

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