THE DANISH GOVERNMENT

Strategy for Denmark's Digital Growth

Ministry of Industry, Business and Financial Affairs

2018

Contents

“With this Strategy for Denmark’s Digital Growth, the Government is setting the direction as to how Denmark can seize the opportunities inherent in digital transformation, while creating jobs and improving growth and prosperity in Denmark.

Preface

Over the years, Denmark has been adept at seizing new opportunities, transforming our country and improving our lives.

The digital transformation and new business models may be the key to increase productivity and growth and create a basis for our shared future prosperity.

If we can create the right conditions for Danish business to utilise the newest technologies, we have much to gain as a country from the digital transformation – which will benefit not only trade and industry, but also the individual and our society in general.

The Government's vision is for Denmark to be a digital frontrunner, with all Danes gaining from the digitalisation. We must be ambitious, striding confidently into the future to exploit the potential offered by new technology. The Government therefore presents its Strategy for Denmark's Digital Growth, which contains clear goals and initiatives for the digital transformation of Danish commerce – for the benefit of all Danes.

We are introducing a total of 38 initiatives in which the Government will work with the Danish business sector and other parties to improve the capacity of organisations to use the new digital technologies. The aim is to make organisations more innovative, competitive and capable of developing new business models.

With this strategy, the Government aims to create a strong environment for growth in Denmark, and to support the digital transformation of our many small and medium-sized enterprises.

The strategy also includes initiatives aimed at improving the technological skills of Danes. This is important if we are to exploit the digital potential of the future. Our focus is broad as we focus on primary and lower secondary education, young people who are currently in education and all Danish people in the labour market – so that more people have an opportunity to contribute to the formation of our future digital society.

The Government also wishes to make regulation of trade and industry more agile and more accommodating of companies' use of new digital business models. Still while ensuring that this is balanced against the original purpose of regulation and with an eye for consequences relating to issues such as competition and consumer conditions.

The strategy is also intended to pave the way for data to become a bigger driver of growth – both in regard to companies' own data and public data, which we will make more available to trade and industry in relevant areas.

Finally, the Government will propose initiatives to help organisations develop better cyber security, ensuring safety for all and trust in our companies' digital systems and processing of data.

The Strategy for Denmark's Digital Growth is based, among other things, on recommendations made in May 2017 by the Government's Digital Growth Panel, and on work in the Government's Disruption Council. With the strategy, the government follows up on the Agreement on Business and Entrepreneurial Initiatives.

The Government will track whether the initiatives are being implemented and working as intended on an ongoing basis. A digital summit, where digital development is on the agenda, will be held every year, involving trade and industry, organisations and others.

The Government wants to encourage everyone to actively participate in the work of ensuring the best possible framework for Denmark's digital transformation – so that we utilise technological progress to create new jobs and improve the prosperity of all Danes.

This version has been updated so it reflects the political agreement from February 26th 2018, Initiatives for Denmark's Digital Growth.

Minister for Industry,
Business and
Financial Affairs
Brian Mikkelsen

Summary

Denmark and the rest of the world is facing an increasingly rapid digital transformation of trade, industry and society, which will affect many parts of our society. If we approach this development in the right way, we can utilize the opportunities to create more prosperity, improve wellbeing, conserve for the environment and create good, well-paid workplaces that are less draining. This is an opportunity we must seize.

*Therefore the **Government's vision** is for Denmark to be a digital frontrunner.*

Digital transformation brings with it great opportunities, but also challenges for businesses, the individual and our society as a whole.

Automation of manual labour will result in fewer draining jobs. New digital opportunities for diagnostics will improve treatment of illnesses and individual health. Businesses are able to collect and access large amounts of data, which may lead to new information, the possibility of new business models, and better products and service options for consumers. Digitalisation within companies can result in more efficient production and procedures, which can improve productivity.

Trade and industry can use new digital technologies to create new jobs, winning back jobs lost to other countries, so we can strengthen Denmark as a country of production and innovation. This will strengthen growth throughout Denmark.

Ambitious for the future
We must be ambitious and ready to take advantage of the opportunities to ensure that Danish commercial success continues into the future.

With this strategy, the Government is implementing a range of specific initiatives to enable Denmark and Danish businesses to be digital frontrunners in the coming years, to ensure every Danish person has the tools to operate in the digital transformation, and to ensure that trade and industry is in the best possible position to exploit digital opportunities for creating new jobs and new growth companies.

With the Strategy for Denmark's Digital Growth the Government sets the direction of how Denmark can create the best framework to enable businesses to utilise the opportunities inherent in digital transformation. The Government has also started working on a Public Sector Reform ("Sammenhængsreformen"), which will help the public sector to employ new technological solutions to create better core welfare.

A good starting point
– but we are losing ground
Denmark is in a good position to become a richer society in the digital transformation. We are one of the most digitised countries in the world. But we are starting to lose ground on other countries, particularly those in Asia. It appears that Danish businesses are not quite as good at utilising the newest digital technologies for new business models and services. This challenge applies particularly to small and medium-sized enterprises.

Challenges as well
Digital development also involves challenges that Denmark and Danish businesses must deal with.

Individuals may feel insecure in regard to future job opportunities – for example, if robots and software can do parts of the tasks that are currently managed by people, such as check-out assistants or legal work. This places demands on the education system

and retraining, and requires us to preserve our flexible labour market. This is one of the major topics covered by the Government's Disruption Council.

Data about our online behaviour and business secrets are becoming an increasingly large part of day-to-day life. This means that data leaks and cyber attacks can have major consequences for both companies and society as a whole, requiring cyber security and privacy protection to be put in place. Increased commercial use of data also requires a more ethically sound approach to processing information.

Objectives for Denmark's Digital Growth
The Government has set three objectives to guide policy in the coming years:

1. Trade and industry must tap into the potential for growth inherent in digitalisation
In conjunction with trade and industry, the Government will work to ensure that Danish businesses are among the best in Europe when it comes to the use of digital technology, and more SMEs should be able to use advanced digital technologies.

2. The best conditions for digital transformation of business
In order for trade and industry to tap into the potential for growth inherent in digitalisation, Danish regulation needs to be more agile than it is in other countries in order to provide optimal support for new business models and retain and attract investment in Denmark. This must be done while ensuring that the overall purpose of the law and protective considerations are maintained. It is also important to facilitate effective competition and counteract market abuse. The digital transformation should also be matched by increased awareness of cyber security and data processing in companies.

3. Everyone should be equipped to operate in the digital transformation
The Danish people must become the most digitally prepared people within the EU, and have the tools to undergo the digital transformation. This should be accomplished through education and continuing training, so that everyone is ready for the labour market of the future.

> **The Government's vision is for Denmark to be a digital frontrunner**

A solid foundation
The Government has already instigated several initiatives aimed at improving Denmark's digital growth. The remit of *the Disruption Council – Partnership for Denmark's Future* includes discussions of how Denmark can continue to have a robust labour market when many jobs are transformed by digitisation.

The Government has launched a *Research and Innovation Policy Strategy* which, together with the implementation of the research reserve, is strengthening research in digital technologies.

The Government has also launched a *Strategy for Growth Through the Sharing Economy,* which supports the digital sharing economy, and trials involving driverless cars are now possible.

The *Agreement on Business and Entrepreneurial Initiatives* prepares Danish companies for the future in regard to investment thanks to an improved culture of owning shares and investing in non-listed companies and better access to risk capital for small and medium-sized enterprises.

There are also initiatives in regard to a good digital infrastructure, including a modernised telepolitical agreement and work on the Public Sector Reform ("Sammenhængsreformen").

Together these initiatives will help to ensure that Denmark has a solid foundation for the digital transformation, with a good digital infrastructure, a good general framework and the most digital public sector.

Six new ways to strengthen digital growth
With this strategy, the Government is taking the next steps to make Denmark a future digital frontrunner. The strategy is based, among other things, on recommendations made in May 2017 by the Digital Growth Panel, and on discussions in the Disruption Council.

The Government will implement a broad strategy within six main strategic focus areas:

1. Digital hub for stronger digital growth
2. Digital enhancement of SMEs
3. Digital skills for all
4. Data as a driver of growth in trade and industry
5. Agile regulation of trade and industry
6. Strengthened cyber security in companies

These six focus areas support each other in order to achieve the strategic objectives.

Vision

Denmark as a digital frontrunner

Objectives

- Trade and industry must tap into the potential for growth inherent in digitisation
- The best conditions for digital transformation of business
- Everyone should be equipped to succeed in the digital transformation

Main strategic focus areas

1. Digital hub for stronger digital growth
2. Digital enhancement of SMEs
3. Digital skills for all
4. Data as a driver of growth in trade and industry
5. Agile regulation of trade and industry
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The strategy's main initiatives

Digital Hub Denmark

Big Data, artificial intelligence and the Internet of Things are evolving rapidly, and an ambitious initiative is required if Danish businesses are to keep up, and if Denmark is to attract companies wishing to utilise the opportunities.

The Government wants the digital growth environment in Denmark to be among the best in Europe. A partnership will therefore be established between the public and private sectors – Digital Hub Denmark – which will instigate activities to support business access to specialist expertise and opportunities for cooperation on the development of new business models. At the same time, the Government will strengthen research in digital technologies, including Big Data, artificial intelligence and the Internet of Things, attract international conferences and knowledge of new technology, and market Denmark as a digital pioneer in order to attract investment.

SME:Digital

With a collective scheme under the heading SME:Digital, the Government will assist in the digital enhancement of small and medium-sized enterprises and support Danish e-commerce.

SME:Digital will focus on business needs by offering:

- Private consultancy and assistance in development of digital transformation business cases.
- Better potential for e-commerce and e-exports via an e-commerce centre.
- Improving the skills of business leaders.
- Digital design consultancy.

The Technology Pact

The Government will set up a Technology Pact in cooperation with trade and industry, educational institutions and others to provide initiatives aimed at strengthening the technical and digital skills of Danish people. It will meet a growing need in trade and industry, and will provide a basis for resolving significant social challenges in the future. With the establishment of The Technology Pact, the Government's objective is to get more people interested in technical and digital skills at all levels of education, get more to educate themselves within it, and get more people employed where these skills are under high demand. The Technology Pact is a platform where initiatives can be instigated, developed and expanded to inspire and motivate more people to work in technology, IT and science, and apply these skills to innovation and business development.

Test program to improve technological understanding in primary and lower secondary education

A four-year pilot scheme will gather information about the best way to strengthen technological understanding in each students and make technological understanding a mandatory subject in primary and lower secondary education, as well as equipping schools for the initiative by developing the skills of teachers. Preparation will include contributions from an advisory expert writing group, and the scheme will be discussed in more detail with both the cross-party educational committee and parties from education. 4,050 schools are expected to participate in the pilot scheme.

Data as a driver of growth – free access to DMI data

The Government will work to enable Danish companies to be among the best at utilising the potential of data-driven business development. It will do this by facilitating access to in-demand and useful public data, for example, free meteorological data from DMI, to provide a catalyst for growth in trade and industry. The Government will also help businesses to apply their own data in new products, services and business models.

Regulation that facilitates new business models

Denmark can attract and retain businesses with more agile regulation that permits businesses to experiment with new business models new business models. Specifically, the Government will:

- Establish principles for agile regulation of trade and industry that supports new business models and digital growth. Among other things, the Government will look closely at real estate, financial regulation and consumer-related legislation.
- Establish one point of entry to the public sector for businesses with new digital business models and perform check-ups on neighbouring countries to ensure that commercial regulation is up-to-date.
- Improve opportunities to trial new business models in areas such as mobility, construction, financial services, the consumer field and health.
- Ensure competition and prevent market abuse via digital platforms.

Strengthened cyber security in companies

The Government will work on strengthening cyber security and data processing in Danish businesses. It will therefore improve cyber and information security in small and medium-sized enterprises by facilitating access to knowledge and developing concrete tools to support the work of businesses on cyber and information security. The Government will also make it easier to report cyber security incidents by setting up a shared digital access point for reporting cyber security incidents.

With Strategy for Denmark's Digital Growth from February 2018 the Government, Danish People's Party and Danish Social-Liberal Party have agreed on 38 specific initiatives. As part of the November 2017 Agreement on Business and Entrepreneurial Initiatives, a pool of DKK 75 million has been allocated in 2018, followed by DKK 125 million each year until 2025, and DKK 75 million in perpetuity for the implementation of the the strategy's initiatives. The pool is intended as a "seed capital" which will help to set up a range of initiatives.

The strategy will strengthen the potential of companies to adopt the new digital technologies and develop new business models, support the digital transformation of small and medium-sized enterprises, improve the conditions for the individual and strengthen Denmark's potential to remain one of the richest countries in the world.

The strategic initiatives will also have major long-term impacts. Among other things, the initiatives will lay the foundations for a brand new subject or subject topic of technological understanding in primary and lower secondary education, which will enable all children to acquire digital skills at an early age, thus equipping them for the future.

The new principles for agile regulation of trade and industry will support a legislative practice that better facilitates new business models – by providing better opportunities for tests, for example. It will pave the way for businesses to experiment their way into the future, as is possible today in driverless transport and FinTech.

Denmark will also be the first country in the world to use blockchain technology for registration of ships. This can create a basis for effective use of

The significance of the strategy to Denmark's digital growth

The Government's strategy equips the individual Dane with better tools

- Better digital skills for children at an early age by testing a new subject in primary and lower secondary education.
- More relevant training and skills for the individual in tomorrow's labour market, so that more people have good, well-paid jobs, including via the Technology Pact.
- More fair competition and stronger digital consumers in Denmark with a proposed digitalisation-ready competition bill and supervisory enforcement.

The Government's strategy provides a better basis for a digital society

- Increased use of digital technology and development of new business models will strengthen the competitiveness of companies and create more growth and progress in Denmark.
- Increased use of digital technology will help to provide a basis for future generations to participate in and design our future digital society.

The Government's strategy provides a better basis for developing new business models and products

- Better access to the skills that are necessary in order to exploit the commercial potential of new technologies with a partnership on Digital Hub Denmark.
- Better opportunities to test new products and business models with a proposed agile regulation on trade and industry
- Better and more secure options for data-driven business development via clear guidance on data use and increased use of the DMI's weather and climate data.

The Government's strategy provides a better basis for the digital transformation of small and medium-sized enterprises

- Many small and medium-sized enterprises can get help with taking the next steps on e-commerce, data analysis, new business models and digital solutions via the SME:Digital scheme.
- Reduce the administrative burdens on the organisations by an amount equating to billions, for example by faster clarification of business models, less reporting to authorities and a digital tax folder for companies.
- Specific, on-the-ground guidance for small and medium-sized enterprises regarding IT security, and easier reporting of cyber security incidents with proposals for strengthening cyber security within companies.

technology which substantially eases the burden on businesses in terms of registration, invoicing and forms.

Alongside the Government's other digital initiatives are initiatives (both underway and planned) that save billions in administrative burdens for trade and industry through digitalisation. This is a clear step towards realising the Government's objective of saving DKK 4 billion in administrative burdens for trade and industry by 2020.

Digitalisation should be utilised while taking into account privacy protection and responsible behaviour. This means that cyber security is a key prerequisite for digital growth. A responsibly cyber security policy with an emphasis on privacy can also offer a competitive advantage to businesses in terms of protecting people's rights.

The initiative doesn't stop here

The vision for Denmark to be a digital frontrunner requires a lasting effort. New opportunities and challenges will arise, and the initiatives we are setting up now will require ongoing adjustment.

To assess whether Denmark is on the right path, the Government will track developments in digital transformation and the progress of the strategy, including hosting an annual digital summit for the strategy in conjunction with trade and industry, organisations, and so on, in which the Government will outline the status of the initiatives and discuss the need for new initiatives as digital development and transformation open up new opportunities and challenges.

The Government has also set up a variety of goals and guideposts, cf. Box 1. The guideposts should be used as indicators as to whether digital development in Denmark is moving in the right direction. They cover the use of digital technology by trade and industry, companies' framework conditions for digital development, and digital readiness of Danish people.

The Government will also receive regular input from discussions in the Government's Disruption Council and the work of growth teams, in which business leaders offer recommendations for maintaining Denmark's core strengths, through focusing on new business models via digital tools among other things.

Succeeding with this vision will require a joint effort on the part of the Government, the parties in the Danish Parliament, trade and industry and society as a whole. With this strategy, the Government offers its proposal as to how we can take the first steps toward realising the vision of Denmark as a digital frontrunner by 2025.

"We will realise this vision by taking multiple steps, which in combination will take us to our goal. This requires a lasting effort.

Box 1
The Government's three objectives for Denmark's digital growth and benchmarks for follow-up

1. Trade and industry must tap into the potential for growth inherent in digitalisation

In order to track the progress of the objective, the Government has established the following benchmarks:

- Danish businessess should be the most digital in Europe, making Denmark one of the leading countries when it comes to new business models.
- More SMEs should be able to apply advanced digital technologies.

2. The best conditions for digital transformation of business

In order to track the progress of the objective, the Government has established the following benchmarks:

- Compared with other countries, Danish laws and rules should be at the leading edge of development.
- More Danes should have digital or technical skills.

3. Everyone should reap in the benefits of digitalisation

In order to track the progress of the objective, the Government has established the following benchmarks:

- Danes should be the most digitally prepared people in the EU.
- All Danes must thrive and feel secure as they go through the digital transformation.

Major opportunities – but also challenges

Social development is now extensively driven by developments in new digital technologies. These developments affect large parts of society.

For individuals, the use of new technologies may make for an easier daily routine, lower prices, new social networks, better educational opportunities and less physically deterioating work because their jobs have changed.

For companies, new technologies may mean more efficient machines, better production and new business models. it can increase revenues, improve competitiveness and create basis for increased productivity.

For Denmark as a whole, digitalisation may lead to new jobs, better use of resources, increased exports, improvements in the health care sector.

The impacts on the individual, business and society as a whole also affect each other. For example, as Danish people become more digital and improve their digital skills, companies will have access to higher skilled employees. And as companies go through a digital transformation, becoming more efficient and competitive, their potential to create new and retain existing jobs will improve to the benefit of the individual and Denmark as a whole.

This strategy focuses on the digitalisation of trade and industry – but as company procedures and business models become more digital, this also affects the individual and society as a whole.

Great potential for trade, industry and society as a whole

The digital transformation has been facilitated by a range of new technologies, which are linked to and powered by computers. They include the ability to process large amounts of data ("Big Data") and the use of sensors, robots, 3D printing and artificial intelligence across several industries. These technologies already help certain jobs become less physically deteriorating, perform tasks that were previously impossible and design better products and services.

The digital transformation is not about one single technological innovation. It is the fact that a range of technologies, which we have known about for a while, can now work together, and have matured to the point where they can be used commercially.

"Digitalisation offers benefits for the individual, business and society as a whole.

Examples of the benefits of using new digital technologies

Mobility

Technologies have matured – for example, electric cars, driverless vehicles and autonomous ships – and consumer preferences have changed, meaning that the transport sector is currently undergoing fundamental changes. Assisted driving is already an option, and driverless transportation is evolving rapidly. As this starts to spread, it will probably also become more common for individuals to hire a car when the need arises, rather than owning one outright, particularly in urban areas. In addition, 3D printing, better geolocation via sensors and satellite data and the use of drones will also transform goods transport. And fewer lorries on the road will entail/imply less traffic, fewer accidents and a cleaner environment.

Construction

Many construction projects are already using technologies such as sensors for monitoring, 3D printing of materials, intelligent materials for excavation and bricklaying, and new apps that make it easier to keep all building drawings, stocks, etc. in one app, making all information accessible to everyone involved in the construction process – including on the building site. Robots and digitalisation can reduce some of the more physically deteriorating work and offer new possibilities for efficient construction under safe conditions and with fewer errors.

Health

Developments in fields such as genetics as well as information technology and nanotechnology create the opportunity for more individualised healthcare, which can also be exercised at home. At the same time, parts of the monotonous work of rehabilitation and care can be undertaken with the help of machines, freeing up time for personal care. And going forward, medical practice may become more precise, as computer programs assist with scanning, logging and diagnosis. This will free up time for doctors to focus on critical tasks closer to the patient. This will also create business opportunities for Danish equipment manufacturers.

Financial services

The development of new financial platforms and new practices for payments and loans has been driven by breakthroughs in processing power, cloud computing and machine learning, where computers become increasingly intelligent without explicit programming. This has resulted in increasing competition to deliver the best service for payments, marketing, investment management, insurance, deposits and lending, placing increasing pressure on large companies and making room for new, innovative operators. App-based payment solutions have already revolutionised the way we make payments, for example.

Benefits for the economy as a whole

Digitalisation is also a driving force for productivity and growth. It will help make Denmark richer.

Investments in IT capital, such as computers and software, are an important part of this growth. IT investments have contributed with approximately half of the overall growth in the Danish economy deriving from investments. This exceeds the OECD average, cf. Figure 1.

IT is also an important tool for organising work. It can facilitate day-to-day procedures and make them more efficient, and can lead to innovation of new products. For example, new IT systems in procurement and accounting have simplified manual data entry and reduced administrative costs.

Across Danish trade and industry, the most digitised companies are also the most productive, cf. Figure 2. Part of this disparity may relate to the fact that some of the most digitised companies are also large companies which generally have higher productivity, while the disparity could also be caused by other differences between industries. However, even taking these factors into account, the most digitised companies are also the most productive ones.

If more businessess adopt digital technologies Denmark could become richer.

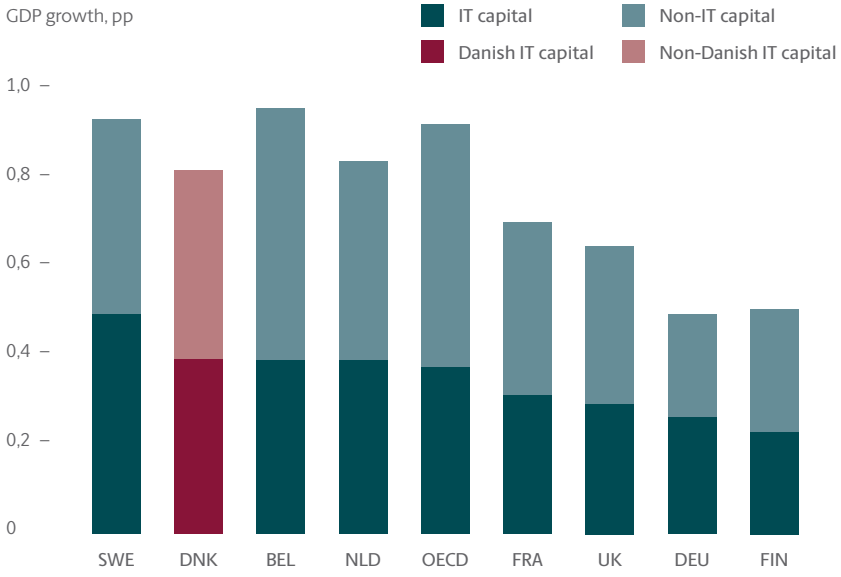
And it is not only companies that will benefit. Individuals and society in general will also gain the rewards. The faster we seize the opportunities, the greater these rewards will be. The countries that acquire digital opportunities first will gain the greatest rewards, both financially and in the labour market, cf. Box 2.

The most digitised companies have higher productivity than the least digitised ones.

Figure 1
Investment in IT has contributed substantially to GDP growth, 1995–2015

Report: The contribution from IT investments to GDP growth is the contribution that derives from IT capital. This is information technology equipment (computers and related hardware), communication equipment and software (acquisition of product software, tailored software and software developed in-house). Contributions from capital, such as machines and other material, are not counted as IT capital. Calculated using harmonised deflators. Data are from 1995–2014 for AUS, IRL, JPN, NZL, PRT, ESP and CHE.

Source:
OECD and own calculations



Box 2
Digitalisation's potential for the individual, society and businesses in Denmark

It is difficult to estimate the potential of increased digitalisation in Denmark measured in terms of factors such as productivity, GDP growth and job creation.

An analysis of five specific sectors by the World Economic Forum/Accenture (2017) undertaken for the Digital Growth Panel shows that in 2025, Denmark could benefit from digital transformation by approximately DKK 90 billion by making greater use of some of the newest technologies which we already know about today. Benefits are measured based on a broader concept of wellbeing than GDP, including benefits in terms of more leisure time, reduced CO_2 emissions and longer life-cycle.

Other analyses also suggest major benefits of digitalisation. For example McKinsey & Company (2017) estimates that the Danish GDP per capita wil increase by between 0.9 and 3.1 per cent, depending on how quickly Denmark seizes its digital opportunities.

Quickly adopting digital opportunities is also thought to have a positive effect on employment, while slow adoption is not expected to result in net job creation. A similar survey by Boston Consulting Group (2016) notes that digitalisation will result in a net increase of 150,000 full-time jobs in Denmark and increase Danish GDP by more than DKK 200 billion by 2020.

The OECD (2014) estimates that data-driven innovation and business development may result in productivity improvements of 5 to 10 per cent across sectors.

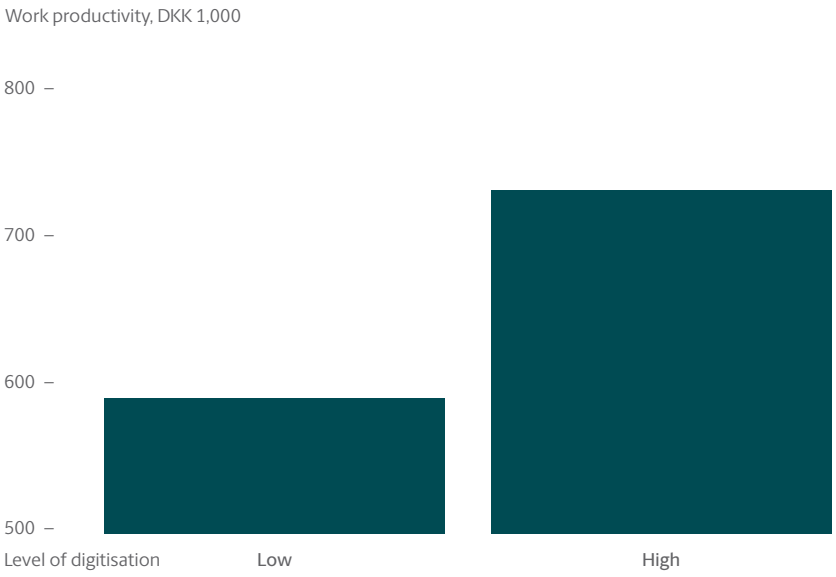
Estimating the effects from digitisation is associated with noticable uncertainty. But even so, there seems to be consensus around the notion that digitisation creates significant benefits in terms of GDP and employment improvements – especially for the countries that are quick to adapt.

Source:
Eurostat, Digital Growth Panel 2017, OECD 2014, Boston Consulting Group 2016, McKinsey & Company 2017, Accenture/World Economic Forum 2017

Figure 2
The most digitised companies have higher productivity per employee

Report: Expressed as value growth per full-time equivalent. The figure shows private urban trade and industry. Low and High refer to the level of digitalisation in the company, cf. the 2016 Report on Denmark's Digital Growth. The figure shows companies with over ten employees in private urban trade and industry. The impact of the company's size, industries, capital intensity, etc. was not taken into account – but even when these factors are taken into account, the most digitised companies are also the most productive ones. Data from 2014.

Source:
Statistics Denmark and own calculations



The changes are coming quickly
The need to adapt to change is nothing new. Technological progress has always influenced our society. What is new about the digital transformation is the speed of the change, and the fact that it will affect such a large section of society.

Some of the new digital technologies most extensively discussed have existed for several years, but are truly beginning to break through into the mainstream. They affect factors such as how we work and the skills we need; workplaces have been transformed by computers, mobile phones and cloud technology. Work takes place outside, at home and on the move.

Technology also affects the way companies are managed and how they innovate. New business models and products are being invented and are spreading rapidly, but they also have shorter life cycles than traditional industrial products.

For example, the banking sector is currently being transformed by new forms of payments – so-called FinTech solutions – that are app-based payment services. In the hotel industry, new digitally based companies and platforms that do not own tangible assets, such as hotels, have gained a large share of the market from traditional operators. And every year new companies are using digital technologies for activity in the sharing and circular economies.

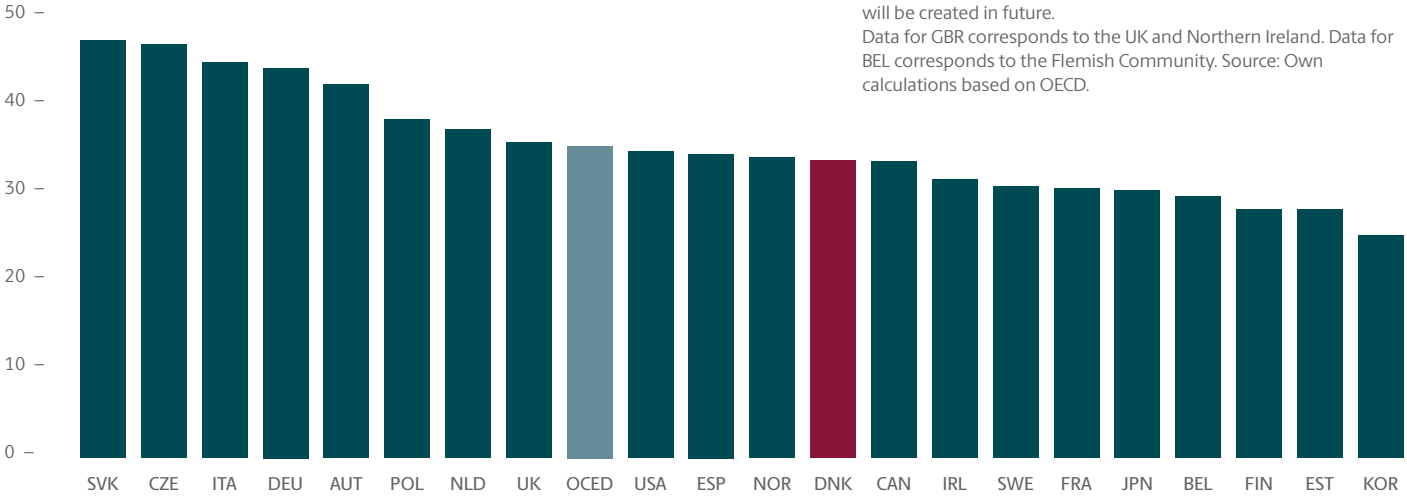
This development has improved conditions for the consumer in terms of lower prices, more options and better quality for the money. Many Danes will therefore feel that they can get more for less money. It has increased competition within several industries, which challenges established companies. For example, online platforms have taken large shares of the retail trade market without necessarily having a bricks and mortar store in Denmark. This brings increased competition also for smaller Danish shops.

Many of these new business models are growing quickly, because the solutions offered by the new companies are better and more efficient than previous ones. The new solutions are more tailored to the consumer and fit better into many people's daily routines.

While this solution may be convenient for the consumer in the short-term, in the longer term it could become problematic if a few operators obtain very large market shares and dominate the market. Ultimately it could result in less competition, higher prices and less innovation and growth. Increased use of data also requires Danish companies to work in an ethically sound manner with matters such as personal data.

Technology is transforming the labour market
Technological progress has always changed the labour market. Digitisation will do it too, and it will happen in many different ways. Many tasks will become less physically deteriorating. Work need not be done between 8 a.m. and 4 p.m., but can also be done from a tablet or smartphone at a time convenient to the individual. In addition, more and more job functions and tasks can be handled by computers and robots. This may result in many people becoming more specialised, and require employees to acquire new skills in many fields.

Figure 3
One in three job functions in Denmark could be automated, 2012.



Report: This figure is based on an approach in which the ratio between employee tasks and the likelihood of work tasks being automated is estimated. It is expected that more non-routine jobs will be created in future.
Data for GBR corresponds to the UK and Northern Ireland. Data for BEL corresponds to the Flemish Community. Source: Own calculations based on OECD.

One third of the existing job functions in Denmark could potentially be automated if existing technologies are fully automated, cf. Figure 3. However, this is likely to take place over a longer time frame.

In particular job functions that are physically deteriorating, administrative and routine-driven will change. This means that we will probably see the biggest changes in industries dominated by routine job functions (both physical and cognitive), where the potential for automation is the greatest. This applies to industries such as hotels and hospitality and transport, where up to two thirds of working hours can be automated using existing technology. On the other hand, new jobs are being created in IT, analysis, care, and so on. A strong robot environment has been created around Odense, for example, employing thousands of people, cf. Figure 4.

As job functions evolve, we will see a shift in the skills that are important for people to have. Danish workers may in future spend twenty to thirty per cent more of their time on activities requiring social skills, creativity and problem-solving, cf. Figure 5.

The potential for new digital technologies and business opportunities to transform many companies will also bring new requirements for the skills and flexibility of managers and employees.

Many of the new jobs will require new skills. This only emphasizes the importance of possessing the skills and tools needed to seize the opportunities deriving from digitisation.

Figure 4
Large variation in the potential for automation across sectors.

Report: Automation potential is defined as the proportion of work activities that could be automated using existing technologies.

Source:
McKinsey & Company, 2017

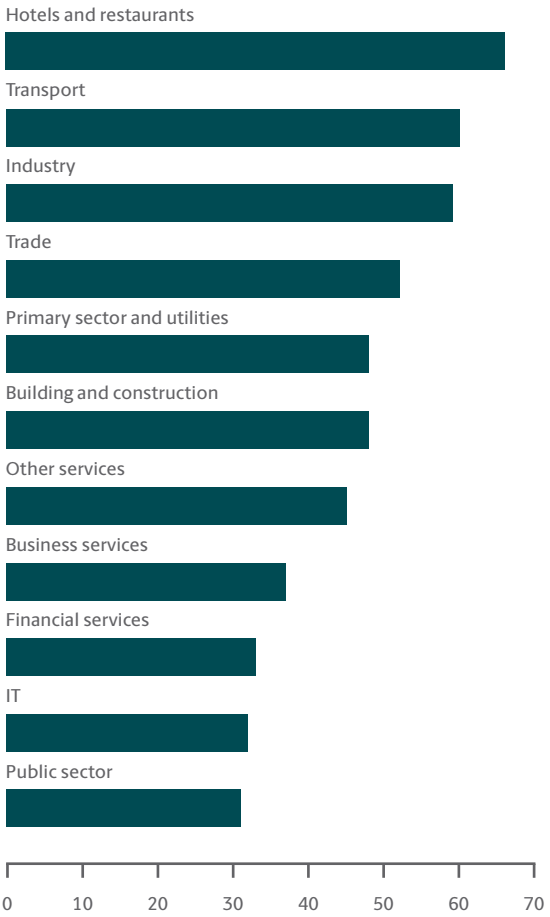
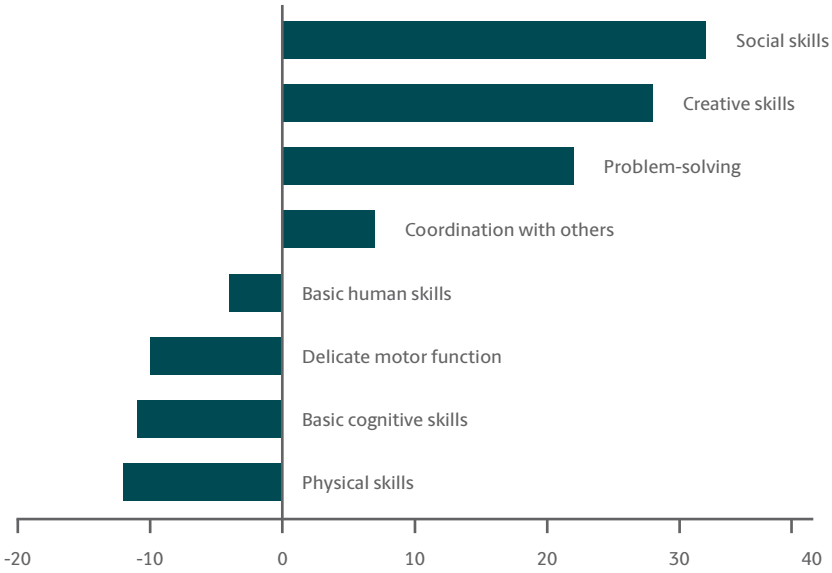


Figure 5
Less routine skills will become more important.

Report: The change in time spent is relative to the time spent if the full automation potential were realised. Automation potential is defined as the proportion of work activities that could be automated using existing technologies. Figures in parenthesis indicate the proportion of working hours spent on this activity today.

Source:
McKinsey & Company, 2017



In some of the newest areas of digital growth, such as the use of new technologies like the Internet of Things and Big Data, Danish companies are lagging behind certain countries with which we would normally compare ourselves to.

Denmark is in a good position digitally, but also faces challenges

Denmark is in a good position regarding the digital transformation. Denmark is the most digitised country in the EU, cf. Figure 6. This is partly because Danmark has a solid and extensive digital infrastructure (mobile networks, broadband etc.), we have the most digitised public sector, and the population has good basic IT skills.

Danish companies are also on board. This applies in particular to the use of technologies to automate tasks in regard to accounting, administration and operation, or to an emphasis on using new technology to improve efficiency.

However, there are substantial differences depending on the size of the company and who benefits from the rewards of digitalisation. In general, larger companies are more digitised than small and medium-sized enterprises.

Danish companies are lagging behind certain countries with which we traditionally compare ourselves to in some of the newer areas of digital growth, such as use of the Internet of Things (linking physical objects and sensors to the internet), in cars for the purpose of semi-automated or fully-automated driving, in the shipping industry and in energy companies. The same applies to the use of data (collection and analysis), which can be used for targeted marketing or optimised production in factory warehouses, and which forms the backbone of the large digital companies, cf. Figure 7. These are technologies with substantial potential for growth.

However, technological developemt is moving rapidly at the moment, and many countries are quickly advancing towards the digital transformation – including countries outside the OECD. The level of digitalisation in many other countries, including Sweden, Singapore, Finland and Estonia, is growing faster than it is in Denmark.

This development may eventually challenge Denmark's leading position, and potentially the competitiveness of our businesses. For example, Boston Consulting Group notes that, compared to the other Nordic countries, Danish businesses is well ahead in terms of developing digital strategies, but is farther behind in regard to using new technology in companies.

This indicates that new technology is spreading to new products and processes within companies more slowly than in comparable countries.

Digitalisation can make Denmark richer and stronger. But if the transformation is to be successful, it is very important that we deal with various challenges, cf. Box 3.

The Government will therefore focus on six strategic areas which will be crucial to Denmark's success in the digital transformation:

1. Digital hub for a stronger growth environment
2. Digital enhancement of SMEs
3. Digital skills for all
6. Data as a driver of growth in trade and industry
5. Agile regulation of trade and industry
6. Strengthened cyber security in companies

Figure 6
The Digital Economy and Society Index (DESI), 2017

Report: The European Commission's Digital Economy and Society Index (DESI) is an index based on five dimensions covering a total of 40 indicators:
a) Digital public services
b) Use of Internet
c) Digital skills
d) Connectivity/digital infrastructure
e) Integration of digital technology by businesses.
These numbers are estimates, and thus are not absolute.

Source:
Eurostat and own calculations.

Box 3
Digitalisation challenges for Denmark

As new demands change job requirements towards the ability to use digital tools that people may not have been trained to use.

As data becomes a key driver of growth for companies, offering significant comparative benefits for companies that seize the opportunity. The take-up in Danish trade and industry is lower than in other countries.

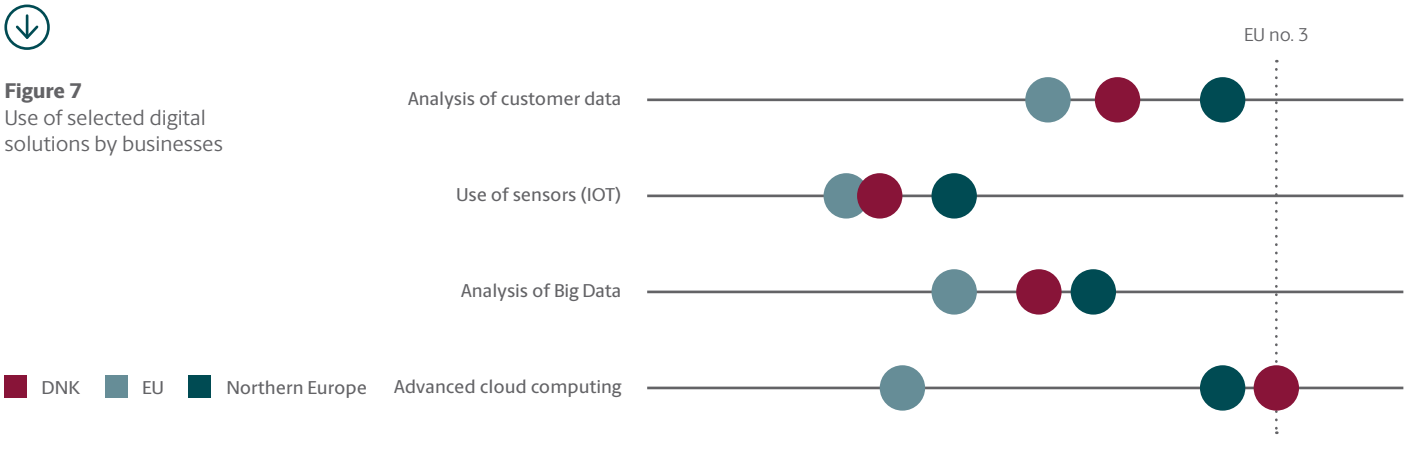
As new business models, such as sharing economy companies like Airbnb and GoMore, result in a new competitive situation and grow so quickly that the existing regulation may be challenged.

As Danish companies make less use of new digital technologies such as Big Data and the Internet of Things to develop new products and business models than in comparable countries.

As more and more things are linked via the internet, and as we spend more and more of our time in digital environments, this increases demands regarding cyber security and data protection.

As smaller companies lag behind larger ones in the digital transformation, this may result in competitive issues at both national and international levels. Denmark has a lot of small and medium-sized enterprises.

Figure 7
Use of selected digital solutions by businesses



Report: This chart displays standardised values. The indicator bar (EU no. 3) is set to 100. The smallest value in the chart is 0. Data for the "Analysis of Big Data" and "Advanced cloud computing" indicators is from 2016. Data regarding "Analysis of customer data" is from 2015. Data for "Use of sensors (IOT)" is from 2014. "Northern Europe" means the Netherlands, Great Britain, Germany, Finland, Norway and Sweden. Source: Eurostat and own calculations.

1

Digital hub for a stronger growth environment

Over the years, Denmark has been good at seizing new opportunities to make us richer and improve our society. Denmark has many global commercial success stories, because Danish companies have been good at developing and utilising new innovative solutions.

As technology develops, it is crucial that Danish companies continue to have the best possible preconditions for competing internationally by using the new technology, so that we will continue to see new growth companies in future.

The development of technologies such as Big Data, the Internet of Things and artificial intelligence is proceeding at a rapid rate. The number of patents relating to artificial intelligence has increased substantially over the past 15 years, cf. Figure 1.1. This development will also affect Danish companies, since the use of research results and innovation is very important to a company's productivity and competitive ability.

Asian countries, in particular, are moving quickly in these new technological fields – not just China, but other smaller countries like Korea. In Europe, countries such as Finland, the Netherlands and Sweden have a substantial lead over Denmark, cf. Figure 1.2.

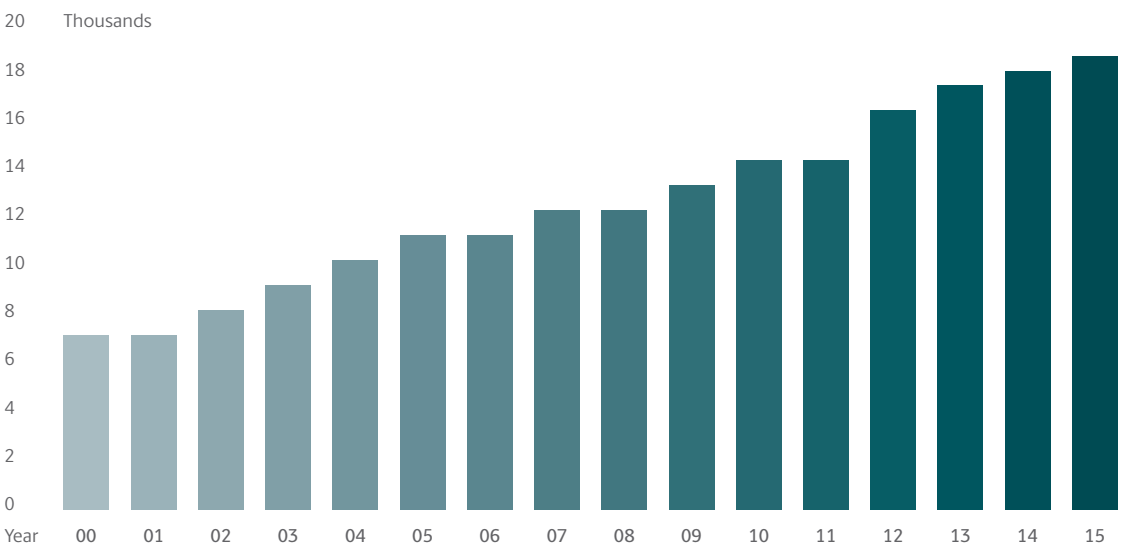


Figure 1.1
The number of patents relating to artificial intelligence is rising quickly, 2015

Report: The chart shows the number of artificial intelligence patents (IP5 patent families) owned by the top 2,000 R&D companies worldwide. This indicates that, among the richest companies in the world, there has been a strong trend toward research and development in regard to artificial intelligence.

Source:
OECD (2017) and own calculations

If Danish companies are to remain among the most innovative in the world, we must optimise the opportunities for using the new technologies.

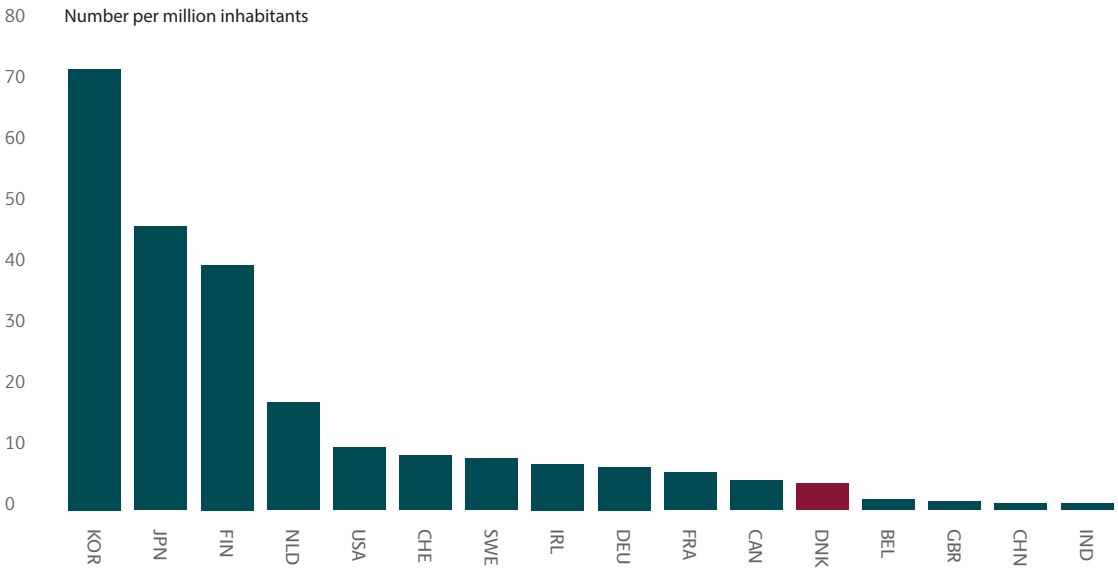
A few years ago, digital technologies such as artificial intelligence were really only talked about in academic circles. Today they are increasingly regarded as broadly useful technologies with major commercial potential across industries and sectors. Companies that implement the new technologies quickly and effectively will have a significant competitive advantage (OECD, Digital Economy Outlook 2017).

If Danish companies are to remain among the most innovative in the world, we must optimise the opportunities for using the new technologies.

Danish companies have been good at riding the first wave of digital technologies, such as websites, e-billing and computer-based financial systems. Companies in the Nordic Region, including Denmark, have also been good at creating digital visions and setting goals for digital strategies, cf. Figure 1.3.

On the other hand, Danish companies are lagging behind in using the new digital technologies. For example, Danish companies make less use of artificial intelligence and Big Data than those in comparable countries. The leading Nordic companies have also not developed new business models to the same extent as leading international operators. But Danish companies have increased their focus on investing in these new technologies.

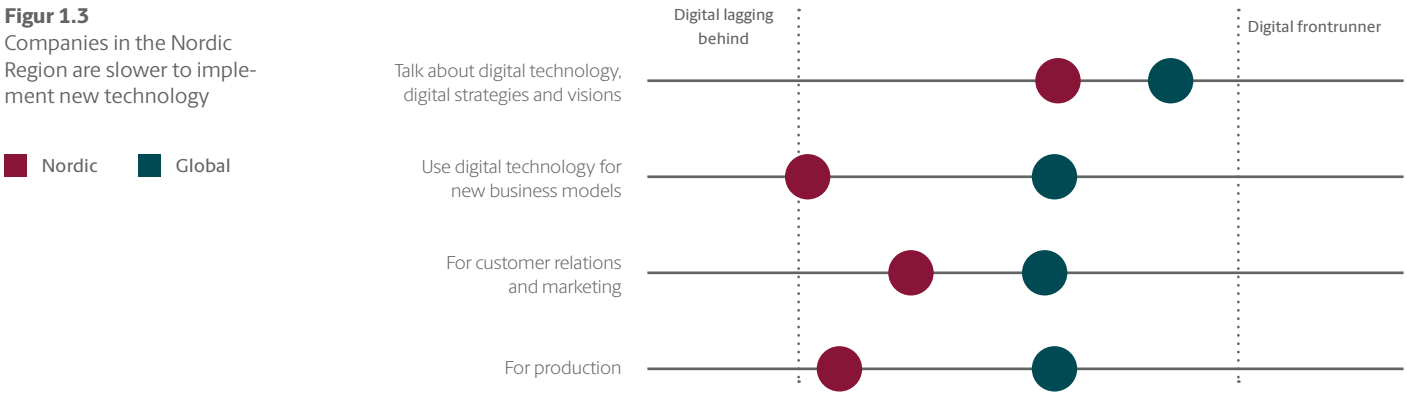
Figure 1.2
Denmark is lagging behind in the race to patent new technologies, 2015



Report: Per country: number of artificial intelligence patents per million inhabitants owned by the top 2,000 R&D companies.

Source:
OECD (2017) and own calculations

Figur 1.3
Companies in the Nordic Region are slower to implement new technology



Source: Own chart based on BCG analysis in 2017. The best Danish companies (Digital Leader) are level with the best foreign companies in regard to digital strategies and visions, but are lagging behind in applying digital technology to develop new business models and new products.

"Use of Big Data, the Internet of Things and artificial intelligence offer substantial commercial potential.

Nor is Denmark leading the pack in world-class entrepreneurial environments. In Europe, Copenhagen is ranked 7th and Aarhus comes in at 22nd, putting Danish cities below others such as Stockholm, Amsterdam and Helsinki as attractive digital growth environments. Among other things, the other cities have been more successful in attracting talent and capital and in making commercial use of new technologies (European Digital City Index, 2016).

More innovation and growth activities have been set in motion in recent years in both the Danish public and private sectors to support commercial use of new technologies. They each play a role in building a digital environment. But it is important that the initiatives can intersect, giving us a cohesive ecosystem in which both new and established companies can converge and work together to develop and use new digital technologies.

Germany, the Netherlands and Sweden have all invested in digital growth environments in order to improve opportunities for partnerships and attract skills and investment to these countries. They have set up partnerships between the public and private sectors to provide test facilities and growth environments for new technologies such as the Internet of Things, artificial intelligence and data analysis. These initiatives create strong networks and synergies, improving the opportunities of companies amid growing international competition.

We must also strengthen the basis for the development of new digital products and business models in Denmark. This will enable companies to exploit the opportunities inherent in these digital technologies and write new global commercial success stories.

This effort will not be started from scratch. We must build on our existing strengths in areas such as life sciences, green technology, production and robot technology, research environments, Maritime Denmark and FinTech.

We must also unlock the potential of technical and digital research. The Government's research and innovation policy strategy *Denmark is Ready for the Future* has established goals and guide posts for future research and innovation initiatives. Danish research and innovation must support the development and use of new technological opportunities in Denmark to a greater extent.

Overall, the Government will strengthen the digital growth environment by establishing a range of initiatives that support companies' needs and challenges and provide them with concrete tools for the digital transformation.

These initiatives build on a range of other initiatives that have been established to strengthen Denmark as an attractive digital growth environment. They include greater tax deductions for research and development costs as part of the *Agreement on Business and Entrepreneurial Initiatives.*

New initiatives in the Digital Hub for a stronger growth environment

Digital Hub Denmark
– partnership for digital growth

1.1 Establish a partnership between the public and private sectors – Digital Hub Denmark

Good environment for digital investment

1.2 Overhaul of rules for depreciation of IT and telecommunications equipment

Support research in digital technology

1.3 Strengthen research to further new technological solutions

1.4 National strategy for digital research infrastructure

Other regulatory measures in the Digital Hub for a stronger growth environment

- A competitive entrepreneurial environment, as part of the implementation of the Agreement on Business and Entrepreneurial Initiatives, which will make it more attractive to set up, develop and invest in companies. It should be easier for entrepreneurs to venture into new ideas and business models.

- Greater tax deductions for research and development costs (part of the *Agreement on Business and Entrepreneurial Initiatives*).

- Tax deductions for wage and salary costs associated with setting up and expanding a company, e.g. by making a company's digital business development simpler and easier to administer.

- Prioritisation of funds for research and innovation in digital technologies, including the Innovation Fund.

Digital Hub Denmark – partnership for digital growth

Artificial intelligens, Big Data and Internet of Things are evolving quickly at the moment, and many countries in both Europe and Asia are investing heavily in the development of growth environments which can support digital innovation in companies and attract talent and investments. We need an ambitious initiative if Danish businesses are to keep up with their foreign competitors, and if Denmark is to attract businesses wishing to utilise the opportunities. Otherwise we risk that leading companies will disregard Denmark, and we will lose out on investments and new jobs, while entrepreneurs and new growth companies move to other areas with more optimal conditions for digital business development.

Talent and companies are attracted by factors such as an attractive digital growth environment in which new, value-creating solutions, new growth companies and new business successes are developed.

For a digital growth environment to be attractive to talent and companies, access to specialist expertise, cutting-edge knowledge and opportunities for open innovation between new and established companies are among the most important things. Access to capital is important too.

It is the Governments ambition that the digital growth environment in Denmark is among the best in Europe, enabling more new growth companies to flourish. To ensure this, we need a strong, joint initiative between companies, authorities, industry organisations, universities and more. In oder to facilitate that, the Government will initiate a partnership between the public and private sectors called Digital Hub Denmark. The Government will join forces with a group of private actors to focus on:

Matching and collaboration between established businesses, entrepreneurs and other actors

- Establishment of a digital platform that matches operators – e.g. larger companies facing a digital transformation with entrepreneurs and smaller companies that can contribute with skills, knowledge and talent. Companies, funds and research environments have an opportunity to offer tasks, projects, challenges, etc., which other companies can bid for.
- The initiative will also include a training website, where people can acquire skills relating to the commercial application of Big Data, the Internet of Things and artificial intelligence.

A National Centre for Research in Digital Technologies

- A new National Centre for Research in Digital Technologies will be established across relevant research institutions. The centre will support the development of the digital field in Denmark and contribute to cross-disciplinary research.
- Co-financing of a pilot project to support collaboration between universities and businesses on digital technologies.
- Promoting opportunities for Danish stakeholders to attract funds on the theme of "Digital Innovation Hubs" under the auspices of Horizon 2020, the European Framework Programme for Research and Innovation.

Better access to knowledge and experts on the commercial application of digital technology

- Co-financing of conferences involving leading international experts on Big Data, artificial intelligence and the Internet of Things.
- Initiating trials and pilot projects on public data to promote the development of commercial use of data.

Marketing of Denmark's strong digital growth environment

- Strengthen foreign awareness of Denmark as a digital frontrunner.
- Increased focus on attracting foreign investments by continuing the development of Invest in Denmark's initiative to promote Denmark as an attractive test country for tech and IT solutions.

National platform

Matchmaking

Better access to ideas, skills and collaboration

Learning

Training portal for commercial application of new technologies

Marketing

Marketing of Denmark

Attraction of more businesses, talent and investment

Digital Hub Denmark

A National Centre for Research in Digital Technologies

Artificial intelligence

The Internet of Things

Big Data

Activities

Conferences

Attraction of international conferences and increased sharing of knowledge

Trial projects

Trials in areas such as new public data with the aim of commercial use of data

The partnership is established with the involvement of the Ministry of Industry, Business and Financial Affairs, the Ministry of Higher Education and Science, the Ministry of Foreign Affairs and industry organisations. The partnership will appoint a board of directors. The board will have an advisory board and an external secreatariat attached in order to facilitate the initiatives. A total of DKK 110 million has been allocated for the initiative from 2018 – 2022, which will be supplemented by contributions from private sector stakeholders.

In addition to this, the Government will establish a National Centre for Research in Digital Technologies as part of our goal for the public research budget to be worth at least one per cent of GDP. The Government has already allocated DKK 10 million for the pilot project, which will strengthen collaboration between universities and businesses on digital technologies.

The Government will

1.1 Establish a partnership between the public and private sectors – Digital Hub Denmark – to support Denmark's digital growth by:
- Promoting access to the right skills and collaboration between established businesses, entrepreneurs and other actors.
- Establishing a National Centre for Research in Digital Technologies.
- Supporting commercial access to knowledge and experts on the commercial application of digital technology.
- Marketing Denmark as a digital pioneer.

Strong environment for digital investments

To promote investments in digitalisation and new technology, it is important that tax-related depreciation rules are adapted to digital development. For example, the life cycle of computers, tablets, smartphones and other IT equipment is relatively short, which is not reflected in existing tax-related depreciation.

The Ministry of Taxation will carry out an analysis to assess the viability of modifying the depreciation rules for certain IT and telecommunication assets. The analysis should also include an assessment of the income-related consequences of any adjustment to depreciation rules and the motive of simple, easy-to-administer legislation.

The Government will

1.2 Overhaul rules for depreciation of IT and telecommunications equipment

"The development of new business models will ensure that Denmark is able to compete in the long term.

Strengthen research in digital technology

The Government will prioritise research in new technologies.

The agreement on the distribution of the research reserve and the 2018 Budget have prioritised funds for research in new technological opportunities and solutions. The Government will also propose earmarking a substantial amount of additional money from the research reserve for technological research in future years.

In addition, the funds allocated by Denmark's Innovation Fund for strategic and challenge-driven research will now be based on the new RESEARCH2025 topics. This will result in more emphasis on new technology and digitalisation in research investments.

The Government has already allocated DKK 50 million for new initiatives in digital technologies in universities. A total of DKK 30 million has been allocated for the country's eight universities, facilitating their initiatives within Big Data. In addition, the Government has allocated DKK 20 million for the development of virtual education technologies.

In the light of digital development, there is also a particular need to help ensure that all researchers have access to the necessary digital infrastructure. Digital infrastructure includes networks designed specifically for research purposes with high-capacity links to international partners and resources, supercomputers, data warehousing and applications and services that support and supplement the other e-infrastructure. The Ministry of Higher Education and Science is working with Danish universities to develop a new national strategy for e-infrastructure to support appropriate organisation and coordination of the actors in this area.

The Government will

1.3 Strengthen research to further new technological solutions
1.4 Develop a new national strategy for digital research infrastructure

2

Digital enhancement of SMEs

Danish trade and industry includes many small and medium-sized enterprises (SMEs). A digital transformation of Danish SMEs could strengthen Denmark's leading digital position, since their level of digitalisation is substantially lower compared to larger businesses. The use of new technologies could improve these companies' business development across several industries.

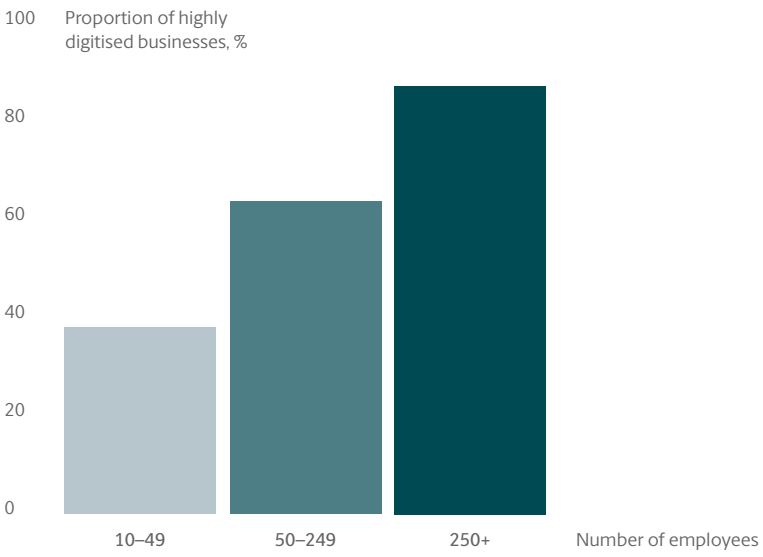
For example, the dispersal of IT has made operation and administration much easier. And the increase in e-commerce has allowed smaller businesses to sell to larger geographical areas as well as internationally.

The companies that use the new technologies have experienced more growth in productivity – SMEs that have used technology to analyse sales data, for example, know more about customers' individual needs and preferences. They can also provide more value for money as marketing becomes more systematic, and can sell to every part of the world via e-commerce (Epinion, e-commerce analysis 2016).

There are many examples of digital start-ups that have written new business success stories, in which technologies play a key role in the business.

But we have not seen enough success in this area for smaller companies for smaller Danish companies. Danish SMEs are much less digitised than bigger companies. Only a little over a third of smaller companies are highly digitised, while this applies to about 85 per cent of the biggest companies, cf. Figure 2.1.

Figure 2.1
SMEs are less digitised than the biggest companies, 2017



Report: The columns in the chart show the proportion of businesses that are highly digitised (use at least 7 out of 12 digital technologies). The discrepancy may be due to factors other than company size; for example, smaller companies may be more likely to be involved in industries with less potential for digitalisation or where digitalisation offers fewer rewards.

Source:
Use of IT in companies 2017, Statistics Denmark

If more of those companies for which the digital transformation offers the greatest benefits, but which are currently struggling to deal with digital transformation, made more use of the opportunities of digitalisation, this could unlock substantial productivity potential. Many SMEs that have not made much progress with digitalisation have come up against a range of barriers.

For example, many SMEs do not understand digital opportunities and how to approach the digital transformation. There is uncertainty and lack of knowledge about how to prepare a business case for digital investment. In addition, both the employees and management of some SMEs do not have the digital skills to apply new technologies effectively to new products, services and business models (Report on Denmark's Digital Growth 2016 and 2017).

In order to help these companies up the digital ladder, we need a targeted initiative to help clarify digital opportunities for the individual companies.

Smaller companies are also dependent on access to testing and demonstration facilities, particularly in regard to production. There are opportunities for this at Danish GTS facilities (Approved Technological Service Providers). Private initiatives providing businesses with access to test facilities have also been initiated.

It can often be difficult for new small companies to raise capital, particularly as they have less access to international investors than more established and larger companies do. Smaller companies depend on a well-functioning market for risk capital here in Denmark.

The Agreement on Business and Entrepreneurial Initiatives launched by the government in 2017 strengthens the market for risk capital in Denmark by strengthening the culture of owning shares and investing in non-listed companies. This will improve access to risk capital and help expanding the digital transformation.

Furthermore, the Government aims to simplify the current public trade and industry support scheme, which is used in particular by SMEs. The governement is also looking at the possibilities of furhter digitising the infrastructure around the support schemes, and has appointed a committee of experts to help streamline it.

Overall the Government will establish a range of initiatives, based on the needs and challenges of SMEs, which will give SMEs that have not made much progress on digitalisation concrete tools for digital transformation.

These initiatives build on measures initiated by the government to support Denmark's many SMEs, such as the new DKK 1.6 billion guarantee agreement between the European Investment Fund (EIF) and the Danish Growth Fund, which enables the Growth Fund to increase its financing for SMEs.

“

If SMEs integrate technological opportunities to a greater extent, this offers substantial productivity potential.

New initiatives in Digital enhancement of SMEs

SME:Digital – a digital transformation and e-commerce scheme for small and medium-sized enterprises

2.1 Establish a coordinated scheme, SME:Digital, to help small and medium-sized enterprises up the digital ladder

Better overview of technological opportunities and standards

2.2 Expand knowledge of new robot technologies to small and medium-sized enterprises

2.3 Development of international standards for small and collaborative robots

2.4 Increased emphasis on digitalisation in the innovation system

Other regulatory measures in Digital enhancement of SMEs

- The European Investment Fund (EIF) and the Growth Fund have entered into a new guarantee agreement worth DKK 1.6 billion, which enables the Growth Fund to further increase its financing for SMEs. These funds come from the EIF, whose InnovFin scheme guarantees loans and guarantees for SMEs in EU countries.

- In its latest round, the Market Development Fund selected 20 projects for co-financing to a total of DKK 46.4 million in 2018. This will help get the innovative solutions of these businesses to the market quickly and successfully. The 20 supported projects include 13 digital solutions.

SME:Digital – a digital transformation and e-commerce scheme for SMEs

A coordinated scheme, SME:Digital, is being set up to support the digital transformation of Danish small and medium-sized enterprises.

SME:Digital will give these businesses user-friendly, digital access to offers that satisfy their individual needs. With this scheme, the Government will help those Danish SMEs that are not currently digitised to climb the digital ladder. This will help them to renew their business, productivity and competitive ability.

As part of this, an e-commerce centre will be set up under the auspices of the Ministry of Industry, Business and Financial Affairs, which will promote Danish SMEs' use of e-commerce in collaboration with the Ministry of Foreign Affairs' export promotion initiative for e-commerce, including work on reasonable competition and framework conditions, and gather knowledge in this area.

Overview of SME:Digital

The scheme offers increased opportunities for ***digital transformation*** of companies by offering:

- *Grants for private consultancy* in order to clarify and develop a company's digital opportunities, prepare business cases for digital transformation and effectively implement newly acquired digital solutions.
- *Sparring* between smaller digital SMEs and more advanced digital SMEs. SMEs will be invited to participate in small sparring groups (2–5 peer companies) in which the challenges of transformation and use of consultants will be discussed to provide more long-term value.
- *Strengthen* the skills of business leaders via mentoring schemes, continuing education, identification of skills needed in the company and networking for business leaders.
- Grants for to buy private consultancy regarding *design* to use digital technology to improve Danish design.

The scheme also offers ***increased opportunities for e-commerce*** through the establishment of an e-commerce centre, which will offer companies:

- *Grants for private consultancy* in order to clarify and develop a company's e-commerce capacity, prepare business cases for converting to advanced e-commerce and effective use of e-commerce solutions.
- Guidance on regulation regarding e-commerce in the European Single Market.
- Referral for additional consultancy on e-commerce and e-exports in the Ministry of Foreign Affairs, including promotion of specific international market opportunities via access to e-commerce consultants in selected global markets.

The scheme will promote coordination between different public and private initiatives and activities aimed at SMEs' digitalisation and use of new technology, and help to support and mature a well-functioning private consultancy market.

An SME board will be appointed to head the scheme. The board will consist of representatives from relevant organisations, representatives of initiatives and activities that focus on promoting SMEs' digital transformation and e-commerce, and experts on digital transformation within SMEs, including within e-commerce. The initiative will be synthesised with the simplification of the trade and industry support scheme.

DKK 10 million has been allocated in 2018 along with DKK 20 million in 2019 and DKK 25 million in 2020-2021. DKK 35 million has been allocated from the national pool of regional funds to cover a nationwide initiative to improve the skills of managers of SMEs. Finally, co-financing of DKK 15 million has been contributed by the South Denmark Growth Forum and DKK 6 million by the Danish Design Society.

The Government will

2.1 Establish a coordinated scheme, SME:Digital, to help small and medium-sized enterprises up the digital ladder. Among other things, the scheme will give companies access to:

- Consultancy, sparring, etc. regarding the company's digital opportunities, preparation of business cases and implementation of digital solutions.
- Company-specific advice and guidance on better use of e-commerce and e-exports.

The SME:Digital scheme will help businesses where they need it, so that many more SMEs can make use of digital technology.

Better overview of technological opportunities and standards

Many SMEs find it difficult to get an overall sense of technological progress and how it can contribute to the development of their business. The Patent and Trademark Office will therefore produce technology overviews aimed at SMEs. These overviews will map the newest developments in robot technology and automation. They will help SMEs to identify relevant existing technologies and spot trends in technological progress. The initiative will promote the take-up of new, productivity-enhancing technology among Danish SMEs. It will be carried out as part of the Patent and Trademark Office's work on new technologies.

Danish companies also have a commercial advantage and interest in influencing the international standards that are currently being developed for a range of digital technologies. These include small and collaborative robots (cobots), an area in which Denmark has been a trendsetter in recent years. Danish Standards is actively working with a range of companies to influence standards for cobots, including international safety standards for robots that work together with people.

The Danish initiative for knowledge-based innovation also supports the innovative activities of SMEs by giving Danish companies an overview of and access to knowledge about the opportunities inherent in Digital technologies. However, there are still areas in which the innovation development system's focus on digitalisation could be strengthened. In connection with upcoming tenders and calls for action proposals as part of the innovation networks, "Advanced Technology Group ("GTS")" and the European Space Agency (ESA), we are focusing more on activities that can support the digitalisation of Danish companies, including SMEs. The seven innovation centres will also focus on digital technologies in their ongoing work.

The Government will

- **2.2** Expand knowledge of new robot technologies to small and medium-sized enterprises
- **2.3** Support the development of international standards for small and collaborative robots (cobots)
- **2.4** Focus more on digitalisation in the innovation development system in connection with upcoming tenders and calls for action proposals

3

Digital skills for all

Digital skills are the key to Denmark's digital future.

In order to retain and develop highly productive, well-paid jobs in Denmark, it is important that businesses have access to the skills they need, and which are important in order to develop and use new technologies to create innovation, new business models and growth.

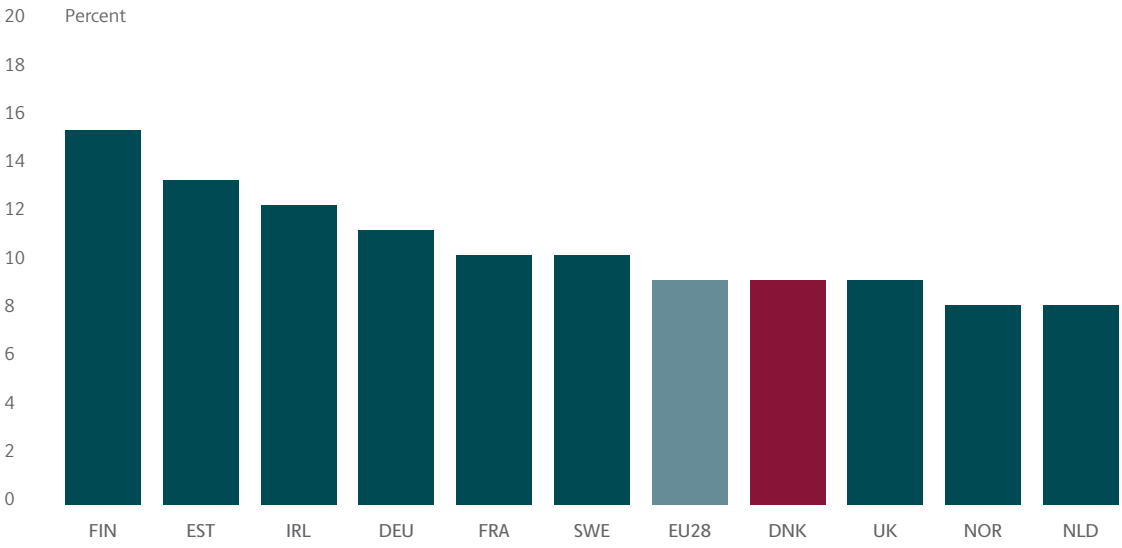
Future growth and progress in Denmark is also highly dependent on future generations becoming skilled IT users and understanding how to develop and analyse IT, so that individuals can not only participate in the digital society of the future, but also help to create it.

The companies' access to relevant skills is crucial in terms of which jobs can be established and retained in Denmark. Over time, the labour market adjusts to the supply of and demand for skills, e.g. through the educational choices of young people, continuing education, etc., salary adjustments and attraction of a foreign labour, but also through discontinuing and offshoring those roles that cannot be filled.

If businesses have access to skills in fields such as technology, digital and science, they will be able to use the new technology to develop cutting-edge new products and create new business models. Improved efficiency will thus strengthen the competitiveness of business. It will also create jobs in other fields.

If companies cannot meet their needs in areas such as digital skills, they are more likely to move jobs

Figure 3.1
Denmark has relatively few STEM-educated people in the workforce, 2013



Report: Proportion of the workforce with higher STEM education, 25–64-year-olds, 2013.

Source:
Eurostat and own calculations

Box 4
Demand for STEM jobs is increasing

Based on the increasing demand for IT specialists in recent years, one forecast estimates that by 2030 there will be an unmet potential demand for 19,000 IT specialists (Højbjerre Brauer Schultz, 2016, The need for digital skills in business). This is despite an expected increase of about 36,000 people by 2030 with an IT education.

The The EU agency Cedefop estimates that demand for science, technology, engineering and maths (STEM) skills in Denmark will rise by 28 per cent between 2013 and 2025, compared with 12 per cent in the EU as a whole. The lack of STEM skills is a challenge throughout the EU.

Calculations made for the Danish Society of Engineers (IDA) predicts a shortfall in 2025 of about 6,500 engineers and 3,500 natural science graduates (Engineer the Future, 2018. Shortfalls forecast for engineers and science graduates in 2025).

Demand for digital skills will only grow in future.

to countries where they can more easily find employees with the relevant skills.

Access to digital and technical skills

It is crucial for businesses to have access to employees with technical, digital and scientific skills (often known as STEM, which is an abbreviation of Science, Technology, Engineering and Mathematics). At the same time, we also need creative abilities and an understanding of business in order to develop, design and apply new technological and digital tools.

The proportion of the workforce in Denmark with higher-level digital or technical education is relatively low compared to other Northern European countries, cf. Figure 3.1. This also applies to the younger generations, although the admission in general numbers are rising for higher educations within technical, digital and scientific subjects, such as a variety of engineering and IT educations.

We are starting to see the effects of the general increase in admission to higher education for STEM subjects over the past decade are starting to show. As such Denmark is above the OECD average if we look at the number of completed STEM courses for the age group of 18–40 year olds. This is a positive development, which it is crucial to support in future.

On the other hand, the proportion of the workforce with vocational STEM education and training is declining.

Recruitment challenges may slow down growth

Denmark is already one of the European countries with the most employees in IT and STEM-related jobs (European Labour Force Survey, 2013). IT and technology are expected to continue becoming an increasing part of most people's private and working lives.

At the same time, we are in a situation in which companies face extensive challenges as regards recruitment in a variety of technical, digital and scientific fields, cf. Box 4. This may diminish the potential of a technological and digital transformation, and thereby the competitiveness of companies.

Some suggest that demand for a workforce with technical, digital and scientific skills will continue to rise, and there may be lacking around 10,000 engineers and natural science graduates by 2025.

The lack of digital skills can already present today. Approximately half of the businesses that tried to recruit IT specialists in 2016 report that their attempts were in vain (Report on Denmark's Digital Growth, 2017). Many other countries are facing similar challenges.

At the same time, there is a lack for a range of STEM profiles, including an extensive nationwide lack of programmers and system developers, mechanical engineers and electricians in the Danish labour market (The Ministry of Employment: Labour Market Balance (first and second halves of 2017)).

Greater focus on digital skills and technological understanding throughout the educational system

The Government has already taken several important steps to support its goal of strengthening the digital skills of individuals with reforms in both primary and secondary vocational education and training.

In the area of higher education, several new IT educations have been established in the recent years, while a more general focus has been applied to digital skills in many educations.

The Government wants to focus even more on how primary and lower secondary education, upper secondary education, higher education and adult and continuing education can equip the population with the right skills that match demand in trade and industry.

Primary and secondary education must focus on increasing technological understanding based on a basic democratic view that citizens should be able to participate in and influence processes and decisions that affect their lives. This also requires greater focus on technological understanding and digitalisation.

Higher education should train students to be among the best in the world so that Denmark can be a catalyst for both new technology and new business models. There will also be a greater need to provide adult or continuing education for the individual in areas such as new technologies and digital tools.

With the October 2017 tripartite agreement, the Government and parties of the labour market focused on creating an adult and continuing education system (ACE) that is both more flexible and meet the demand of the businesses. Finally, the ambition for the ACE system is to be better geared towards strengthening the digital skills of the entire workforce and adapt to the quickly fluctuating needs of the labour market.

This can for example be done by establishing a national strategic digitalisation initiative for the entire ACE area. A development fund will be allocated for this purpose over the next four years. We are also setting up a transformation fund of DKK 95 million to support mobility in the labour market, particularly as qualification requirements evolve in line with the technological progress among other things.

With the *Strategy for Denmark's Digital Growth,* the Government will further strengthen the digital skills of Danes via a range of specific initiatives, some of which are aimed at employed and unemployed people, and some aimed at children and young people.

These initiatives build on a range of existing initiatives to help ensure that all Danes have the right tools to succeed in the digital transformation.

Among other things, this applies to the Government's initiatives on increased admission for higher education in STEM subjects, a national science strategy and a tripartite agreement on improved and more flexible adult, continuing and higher education in conjunction with labour market parties.

New initiatives in digital skills for all

Technology Pact – skills for a technological and digital future

3.1 Take the lead in establishing a Technology Pact

Test program to improve technological understanding in primary and lower secondary education

3.2 Initiate a four-year test program to try out various models for improving technological understanding in primary and lower secondary education

Digitalisation of vocational education

3.3 Centre for the application of IT in teaching in vocational education

3.4 Greater focus on digital skills in final examinations for vocational education

Digitalisation of higher education

3.5 Digital strategy for higher education

3.6 Action plan for more graduates from higher education STEM educations

3.7 Greater use of satellite-based data in higher education

Other regulatory measures in digital skills for all

- As of the 2017/2018 academic year, an optional subject in technological understanding has been introduced in primary and lower secondary education.
- As of the 2017/2018 academic year, a new optional IT subject (computer science) has been introduced in upper secondary education. This subject is being introduced as part of the upper secondary educational reform.
- In continuation of the 2016 upper secondary educational reform, digital examinations are being expanded to all subjects in upper secondary education.
- The Government will develop a national natural sciencestrategy for primary and secondary education. This is a follow-up to the upper secondary educational reform.
- Dimenstioning of thgehigher education in order to carry on creating bettercorrelation between how we educate and labourmarket needs.
- The Government has agreed with all the parties in the Danish Parliament to implement a reform of the grants system for higher education. Among other things, the new grants system will support a better transition to employment, and from 2019 to 2022, additional funds will be allocated to support increased admission for higher education in technical, digital and natural science subjects.
- The agreement on an adult and continuing education initiative from October 2017, through which a transformation fund was set up, along with a more targeted, flexible course portfolio and a new subject, "Digital FVU" (FVU stands for "Forberedende voksenuddannelse", which translates as "Preparatory Adult Education").

Technology Pact – skills for a technological and digital future

Denmark must embrace new technology and digital solutions to increase productivity, retain and develop good and well-paid jobs, and create the growth businesses of the future. The Government will therefore establish a Technology Pact in cooperation with trade and industry, educational institutions and public sector operators with the vision of creating skills for a technological and digital future.

With the help of business, the Technology Pact must get more people to take an education or acquire skills in technology, IT, natural sciences, and mathematics, also called STEM subjects (Science, Technology, Engineering and Mathematics) in order to meet the needs of trade and industry. This will provide a better basis for more people to develop and apply new technologies to create innovation, new companies and business models, and thus increasing growth.

The Technology Pact will provide a shared direction for national and local initiatives, and create a platform for evaluation, knowledge-sharing, development, expansion and setting up initiatives that promote interest in and knowledge about technology and IT. Together with a Technology Pact Council, the Government will set the strategic direction going forward and initiate further development. A secretariat will be appointed to gather knowledge and undertake evaluations across initiatives. A body of ambassadors, consisting of institutions, large companies, etc. will be set up to actively contribute to the development of new initiatives and bring in constituencies and networks.

All businesses, educational institutions and other relevant actors are encouraged to engage in the Technology Pact – for example by participating in initiativesto inspire and develop skills for the technologicaland digital jobs of the future.

DKK 15 million is being allocated in 2018, followed by DKK 20 million annually from 2019 to 2022, to implement the Technology Pact and support the Pact's initiatives.

In addition, the Government will initiate a project worth DKK 43.4 million under the national pool of structural funds to improve the coordination of education and continuing education across the trade and industry, educational and employment sectors in order to support technological and digital skills.

The Government will

3.1 Take the lead in establishing a Technology Pact, and in connection with this, set up initiatives to:
- Support pupil and student access to virtual laboratories
- Strengthen the development of talent in natural scientific subjects
- Generate digital enthusiasm via short projects in primary education

Objectives of the Technology Pact

More people to be *interested* in STEM subjects

- 150,000 people participate in the Technology Pact's initiatives in 2020
- 250 companies engage in the Technology Pact's initiatives in 2020

More people to become *educated* in STEM subjects

- 20 per cent more Danes will complete non-dimensioned higher education STEM education in ten years
- 20 per cent more will complete a STEM vocational education in ten years

More people to use STEM *subjects* in their jobs

- The STEM skills of the workforce are among the best in Europe
- Denmark will be at level with the Nordic countries in regard to problem-solving with IT
- Trade and industry will not experience extensive recruitment challenges regarding STEM skills in ten years

The Technology Pact will bring together trade and industry, educational institutions and the public sector in a joint initiative to ensure that Denmark has the skills for a technical and digital future.

Test program to improve technological understanding in primary and lower secondary education

Citizens need stronger technological skills in order to participate, have power over their own lives and influence processes and decisions that affect their lives. Primary and lower secondary education plays a key role in regard to this, and a decision will be made as to whether an entirely new subject or discipline regarding technological understanding should be developed.

The Government will therefore initiate a four-year test program which will test various models for improving technological understanding in primary and lower secondary education, as well as equipping schools for improving the effort by developing the skills of teachers. The program will then be evaluated, and will form the basis for decisions as to how technological understanding can be made a mandatory part of primary and lower secondary education, as an independent subject and/or via integration with certain existing subjects.

Ahead of the scheme, professional work will be carried out with external experts to provide input on skills that need strengthening and models that can be tested in regard to incorporating the topic in the range of subjects, including whether it should be a new subject and/or incorporated into certain existing subjects.

A key aspect of the program will be in regard to developing the skills of teachers. The test program will be discussed with the cross-party educational committee. A test is already underway on technological understanding as an elective subject in a range of primary and lower secondary schools. Experiences from this elective subject will be incorporated into the broader test program.

DKK 68 million has been allocated for the test program for 2018–2021.

The Government will

3.2 Initiate a four-year test program to try out various models for improving technological understanding in primary and lower secondary education

Digitalisation of vocational education

The Government aims to focus on digitalisation of vocational education.

- The Government will therefore set up a centre for the application of IT in the teaching in vocational education, in order to gather and expand knowledge about digitalisation in vocational education to help professionals get up-to-speed faster with the digital aspects of their fields and ensure that educational institutions have the requisite support in digitalisation processes.

- The Government will also support the incorporation of digital solutions in education and the final examinations for vocational courses, including the aptitude tests to promote students' learning and labour market readiness. The content and formats of the examinations for vocational courses must therefore be reviewed and developed to reflect the training and better support an assessment of students' digital skills.

DKK 18 million has been allocated for this initiative for 2018–2021.

The Government will

3.3 Set up a centre for the application of IT in the teaching in vocational education
3.4 Focus more on digital skills in final examinations for vocational education

Digitalisation of higher education

Admission of higher educational STEM educations rose from approximately 9,000 people annually to approximately 17,000 people annually between 2005 and 2016, an increase of 86 per cent. This is a positive development, and a good starting point for ensuring that applications for these courses remain high in the years to come.

In the Technology Pact, which the Government are establishing, the goal is especially to enhanced cooperation between local actors in trade and industry, educational institutions, etc. to drive the development and get more people interested in the technical, digital and natural scientific fields.

- The Government will also create an action plan to get more people to choose, be accepted on and eventually complete higher education in technical, digital or scientific fields.

- Demand is rising for people with strong technical, digital or scientific skills. The same applies specifically to people with strong digital skills. To complement the increased emphasis on STEM skills in general, the Government will also focus specifically on digital skills and the increasing impact of digitalisation on higher education. A digital strategy for higher education will be developed to help strengthen students' digital skills and support the expansion of digital tools in teaching.

- Many higher educational programs do not make adequate use of satellite-based Big Data from the EU's satellite programs, despite the fact that these data are of high quality and available at low cost. The Government will therefore initiate a dialogue with educational institutions to identify relevant courses in which satellite data can be used and equip staff to make better use of the data in the teaching. With this initiative, the Government will enhance companies' access to employees who can create data-driven business development.

This initiative will be paid for within existing budget allocations.

The Government will

3.5 Develop an action plan for more graduates from higher education STEM educations
3.6 Develop a digital strategy for higher education
3.7 Support greater use of satellite-based data in higher education

4

Data as a driver of growth

Data-driven innovation and business development is estimated to result in productivity improvements of 5 to 10 per cent across sectors.

The capacity of companies to use data is becoming increasingly important to core business and competitiveness. Nine in ten business leaders from the biggest companies in the world deem data as the most important resource of the future, making it as fundamental to businesses as buildings, workforce and machinery.

The amount of data produced worldwide is doubling every two years. Data-driven innovation and business development are estimated to result in productivity improvements across sectors of 5–10 per cent (OECD 2014, Data-driven Innovation for Growth and Well-being).

More and more companies are using data analysis to make strategic decisions or predict potential sales and customers. Data from the authorities can also help businesses improve efficiency and adapt their production. Data is also often fundamental to companies' ability to create new business models.

Companies all over the world are in the process of transitioning their business to data-based products and services. There is intense global competition to be the best at utilizing data, since better use of data can lead to competitive advantages and greater value creation within companies. Danish companies are lagging behind other countries we would normally compare ourselves to in areas such as data analysis, Big Data and the Internet of Things.

The most highly valued companies in the world are no longer oil companies, but companies whose core business centres around processing data, cf. Figure 4.1.

Data analysis is also important in the development of technologies such as driverless vehicles, precision agriculture, smart cities and personalised medicine.

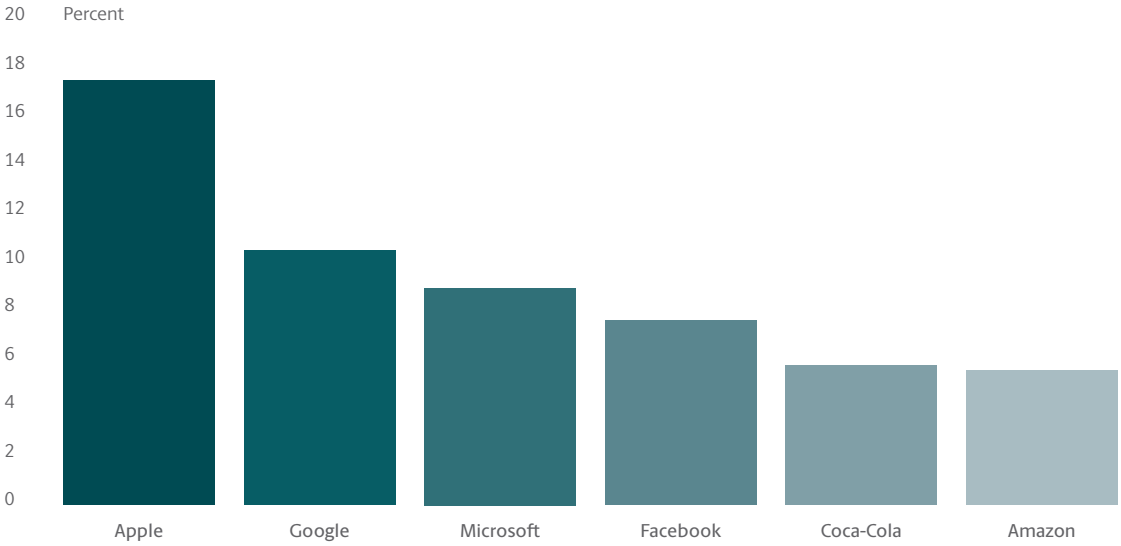


Figure 4.1
The six most valuable companies in the world, 2017

Source:
Own chart based on Forbes

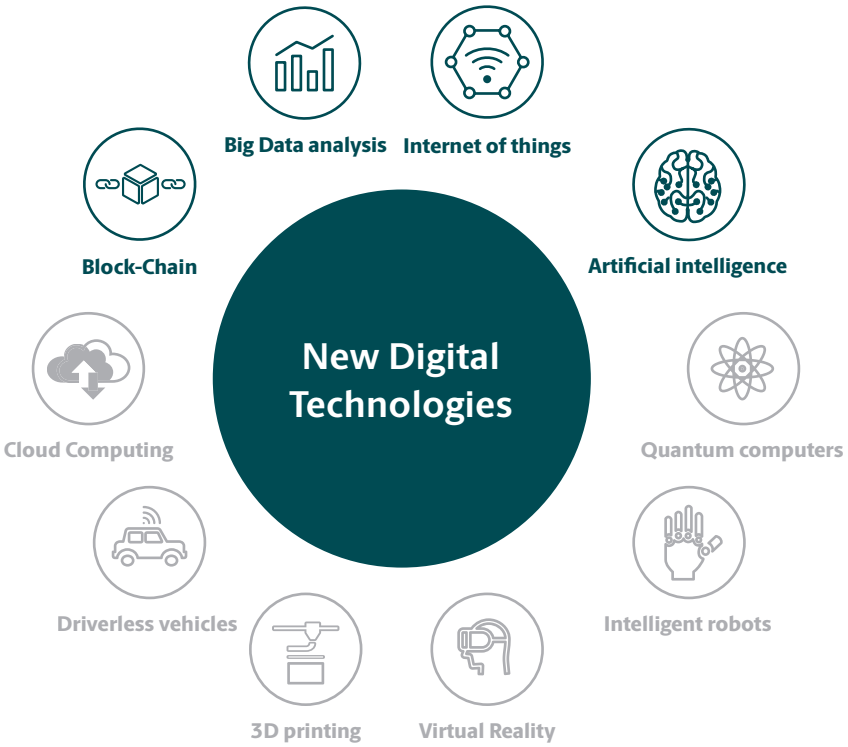


Figure 4.2
More new technologies facilitate business development via increased data usage

Source:
Own chart based on OECD, etc., 2016

The potential for growth does not lie in data itself. The potential lies in the combination between structured data, competencies in the companies and availability of relevant technologies. Technologies such as machine learning, artificial intelligence and computers with massive processing power for the enormous amounts of data and the competence to develop and use data in new business models, cf. Figure 4.2.

We are in a situation where the price of technologies and processing power is falling, thus making their application accessible to more companies, for example, fx via access to strong computer power through the internet (cloud computing). This also offers Danish companies an opportunity to be at the leading edge of using these technologies. It also requires companies to have access to relevant skills, an issue that the Government is also addressing in this strategy via the Technology Pact and Digital Hub Denmark.

Surveys indicate that the data economy in Denmark has the potential to make up almost 5 per cent of

The significance of the strategy to Denmark's digital growth

In the manufacturing industry sensors can collect real-time information on production and rectify faults with few production interruptions. By combining market, sales and manufacturing data, businesses can automatically optimise production and improve product quality.

In the retail trade supermarkets and chain stores have access to large flows of data via loyalty cards, enabling them to deliver tailored services to the individual consumer. It is also easier to quickly identify new trends in the market and adapt products and logistics more quickly.

In the utilities sector, which supplies Danes with essential utilities such as electricity, heating and gas, data is used to optimise the relationship between consumption and capacity. For example, data on Danish consumption patterns can be used to adjust the price to make energy cheaper at night, when the grid has greater capacity.

In the insurance industry analyses based on Big Data software are used to predict incidences of health insurance fraud and create tailored insurance coverage schemes that fit the individual needs of customers.

In the transport sector sensors and analysis of sensor data form the basis of autopilots, which are already found in some vehicle models, and will eventually result in driverless transport.

GDP in 2020 (European Data Market Study, 2017, p. 271), if the right legislation and framework are implemented.

Denmark is ahead of other European countries in use of the Internet, and Danish companies are also generally well ahead when it comes to digitalisation. We have the right starting point. But in regard to the use of Big data, Danish companies are lagging behind several countries we normally compare ourselves to, although many larger companies are well under way.

Only around 12 per cent of Danish companies with more than ten employees used Big Data analysis in 2016. The proportion is even lower for small companies. Danish companies are lagging behind businesses in the Netherlands, Finland and Estonia, cf. Figure 4.3.

The lower use of data in Danish companies could eventually become a competitive challenge. This may particularly affect small and medium-sized enterprises in Denmark.

20 per cent of Danish companies surveyed feel that various barriers to their use of data have led to job losses, lost orders or lost market shares (Barriers to companies' use of data, 2017, the Danish Business Authority). The companies point to lack of knowledge of the value of data, skills at both managerial and employee level, data availability, lack of knowledge on data protection and clarity about how the companies can collect and use data as the biggest barriers to their use of data.

It is the companies' own responsibility to utilize data – but the Government wishes to tackle the barriers experienced by companies, and strengthen the condition so that more companies become data-driven. Via SME:Digital, the Government will strengthen the skills of small and medium-sized enterprises.

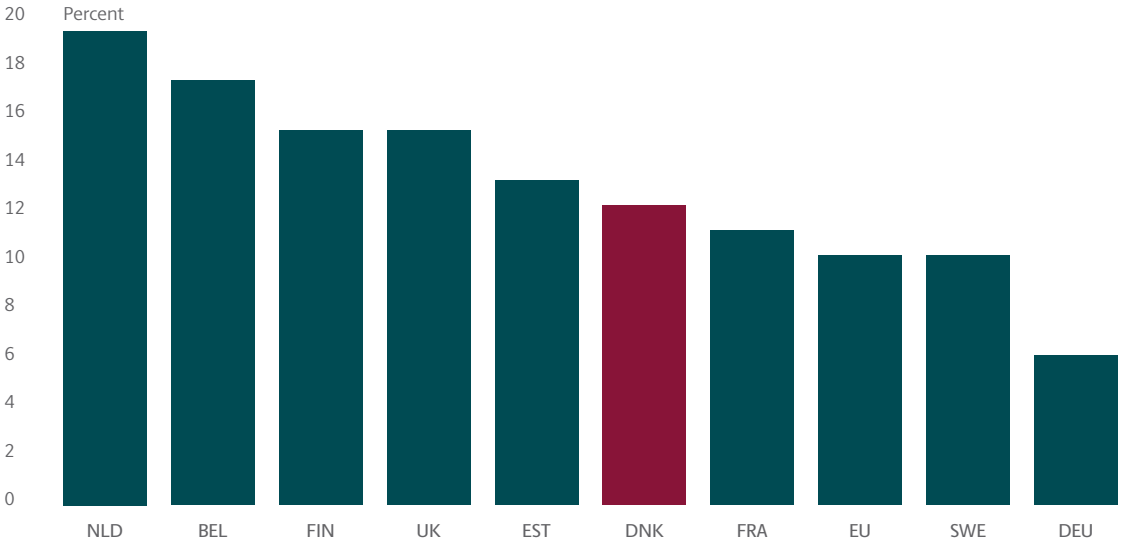
Denmark is well ahead in making a range of public data freely available in high quality through IT-platforms such as the Basic Data programme ("Grunddataprogrammet") and "Virk.dk", a platform for businesses digital reports to the authorities. This makes it easy for companies to access public data. It is important to build on this effort. Therefore the Government will work with trade and industry to identify and make more data with a commercial potential from the authorities available.

The Government will also support companies' use of their own data. Many companies are in possession of highly valuable data that is not being used. Unclear rules, competitive challenges and lack of knowledge about the potential of the use of data may put up barriers to companies' own digital and data-driven transformation. Good examples, showing the potential of the utilization of data, are needed.

Companies' use of data must also take into account privacy protection and responsible behaviour. This means that responsible, ethical processing of sensitive personal data is important.

If data is to be a driver for growth in business, it is also necessary for companies to have access to digital skills, resources and knowledge about the use of data. This is supported by initiatives such as the Technology Pact, SME:Digital and Digital Hub Denmark.

Figure 4.3
Relatively few Danish companies use Big Data, 2016



Report: Percentage of all companies with over 10 employees that use Big Data.

Source:
Eurostat, 2016

New initiatives in data as a driver of growth in trade and industry

Increased use of companies' own data

4.1 Clear guidelines for companies' use of data
4.2 Development of ethical recommendations for data
4.3 Blockchain solution for the Register of Shipping and certificates
4.4 Digital export certificates
4.5 Trial put & take database for tourism data

Data as a driver of growth – free access to DMI data

4.6 Free access to the DMI's weather, climate and maritime data

Further strengthen the use of public data within companies

4.7 Digital physical planning and planning data
4.8 Trial computer space for sharing data between companies and the authorities
4.9 Analysis and testing of the commercial potential of selected public data

Other regulatory measures in data as a driver of growth in trade and industry

The partnership for open public data

A partnership between Open Data DK, Local Government Denmark (KL), Regions of Denmark and the Danish Business Authority has been set up to promote the expansion and commercial use of open public data.

Progress with good basic data

This programme is about ensuring high quality in basic data about Denmark and Danish people which can be used by companies, among others. With this initiative, the Government aims to improve the existing basic data via consolidation and improving quality so that it is easier to use the data.

Smart City partnership

Many Danish municipalities and regions have set up projects involving Smart City solutions, in which technology is applied in the organisation of modern cities. There is thought to be substantial commercial potential for companies that are able to develop solutions to accommodate the global needs. The partnership has been set up for Smart Cities to create a shared approach for Danish municipalities in this area.

Promote the use of common standards for data

It is easier for companies to use public data if data and interfaces are well-documented in a uniform manner. The Government therefore aims to promote the use of common public standards for data and interfaces.

Increased use of data within companies

Many Danish companies currently possess data that can be used to generate growth within their own companies. For example, a company's own data can be used as an analytical tool, resulting in optimised business processes within the company, and may teach companies about individual customer needs, enabling them to develop more specialised products based on these needs.

The Government wants Danish companies to become even better at utilizing data. The Government will therefore:

Create clear guidelines for companies' use of data

The Government will develop business-oriented information and guidance material on the rules regarding responsibility, ownership and rights on the use of data. The development of the guidance material must be based on the needs of companies. To a great extent, this will be across the regulatory framework for data use, including personal data and other data types such as sales data, production data and so on. DKK 5 million has been allocated for 2018–2021.

Develop ethical recommendations for data

Danish companies are generally good at working responsibly. This is partly because Denmark led the agenda on corporate social responsibility. Taking inspiration from this work, the Government will support the establishment of data ethics as a competitive parameter for Danish trade and industry. Specifically, this topic will be discussed by the Disruption Council with the aim of developing ethical recommendations for data, including possibly a data ethics code for companies' use of data. Since the digital world crosses national boundaries, the Government will also initiate discussions on this topic in relevant international forums. A total of DKK 5 million has been allocated for this initiative for the period 2018–2020.

Establish a blockchain solution for the Register of Shipping and certificates

Registration of ships and amendments to information and certificates currently takes place in analogue form. The process requires a lot of resources. The Danish Maritime Authority therefore aims to digitise the Danish Register of Shipping to ease the burden on companies in this area. A new digital Register of Shipping will also allow companies to access data on registration type, quantity and application, which was not previously possible. The digital blockchain solution can be integrated and used by shipping companies. Data from the register will be available to companies and may form the basis of new business models regarding the type of ship that is being processed, where they are going and the activities they perform. A total of DKK 32 million has been allocated for 2019–2023.

Develop digital export certificates

Applications for digital export certificates for food companies are currently submitted and processed manually, and the area is encumbered with a lot of administration involving transport of hard copy documents, etc. Providing digital support for the entire process would ensure traceability and transparency from the exporter's application and effective use of digital data throughout the system. It also paves the way for brand new opportunities in the form of digital certification directly to the authorities in other countries, which is something countries such as China and Russia are already requesting. Furthermore the use of Big Data from the system will be utilized for smarter, more focused guidance for exporters on existing markets and their requirements. A total of DKK 9 million has been allocated for this initiative for 2018–2021. Furthermore, DKK 4 million has been allocated from 2022-2025, as it is an IT investment with a depreciation horizon.

Support a trial put & take data lake for tourism data

In order to promote the use of data within companies and between companies and public sector operators, the Government will set up a trial put & take data lake in the tourism industry, which will collect and publish data for companies and public sector operators. VisitDenmark will survey the options for establishing and financing a pilot project in conjunction with the tourism industry for a put & take data lake for Danish tourism. The Government's part of this initiative will be executed within existing budget allocations.

The Government will

Increase use of data within companies by:

- **4.1** Creating clear guidelines for companies' use of data
- **4.2** Developing ethical recommendations for data
- **4.3** Establishing a blockchain solution for the Register of Shipping and certificates
- **4.4** Developing digital export certificates
- **4.5** Supporting a trial put & take database for tourism data

Data as a driver of growth – free access to DMI data

The potential of the Danish Meteorological Institute's (DMI) meteorological data is not currently being realised. This is firstly because DMI's data is not easily accessible, and secondly because data is behind a paywall. In the electricity, district heating and agricultural sectors alone, there is an unused annual potential for efficiency improvement in the region of DKK 50–135 million.

To exploit the full socio-economic potential of meteorological data, countries such as Norway, Sweden, Finland, the UK, the Netherlands and Germany have already released their meteorological data.

The Government will release DMI's data for free and ensure that they are communicated appropriately. This will mean that data will be brought into play to a much greater extent, so that trade and industry can use this free access to data to develop new, innovative products and services for the benefit of citizens and business.

A total of DKK 82 million has been allocated for this initiative for 2019–2025.

The Government will

4.6 Ensure free access to DMI's weather, climate and maritime data

Strengthened use of public data within companies

The Government will continue to work on making more public data available to Danish trade and industry in areas of commercial interest, which may pave the way for businesses to scale up new business models and services.

The Government will therefore:

Digital physical planning and planning data

To ensure that planning processes are transparent and efficient companies, investors and people are given a better basis for construction, conversion and data-driven innovation, the Government will work with Local Government Denmark (KL) to analyse the opportunities for full digitalisation of physical planning and planning data. This initiative will be paid for within existing budget allocations.

Trial computer space for sharing data between companies and the authorities

Part of the work of the partnership for open public data between the Danish Business Authority, Local Government Denmark (KL), Regions of Denmark and OpenData.dk involves analysing the basis for establishing a computer space to support sharing of data between companies and between companies and the authorities. This initiative will be excecuted within existing budget allocations.

Analysis and testing of the commercial potential of selected public data

As part of the partnership for open public data, the initial focus will be on the fields of transport, mobility and food companies. In future years, the partnership will continue to attempt to make more data with commercial potential available in other fields. Another aspect of the partnership initiative involves activities to promote the use of data, such as challenges and hackathons involving public data. This initiative will be excecuted within existing budget allocations.

The Government will continuously evaluate and create the basis for the data-based business opportunities of the future, including how use of satellite data can be brought into play in trade and industry. Much is already happening here – for example, the establishment of a leading international geolocation test centre in the Port of Århus – and in the future other initiatives will be matured as opportunities to use satellite data continue to grow.

Later in the year, a proposal will be put forward for further digitalisation in the public sector as part of the Public Sector Reform.

The Government will

Further strengthen the use of public data in companies by:

4.7 Digital physical planning and planning data
4.8 Trial computer space for sharing data between companies and the authorities
4.9 Undertake analysis and testing of the commercial potential of selected public data

5

Agile regulation of trade and industry

“In general, the existing commercial regulations are not designed to take into account the way in which new digital technologies and business models can create new value for individual companies and society.

The development of new business models challenges existing regulation of trade and industry, and could impede the opportunities of businesses to exploit new technologies and business models. The use of digital technology is already affecting various markets today.

Use of agile regulation of trade and industry and more tests

The existing commercial regulations are not always designed to accommodate the way in which new digital technologies and business models can create new value for individual companies and society.

And there are other examples of ways in which it is difficult for companies to clarify whether it is legal to offer new digital solutions. In the Danish Business Authority's experience, companies find that the legislation impedes their business model, that it is impossible to find the right information, or that complex legislation hinders unambiguous answers.

It can also lead to long waits for answers from the authorities, resulting in delays and financial losses for companies, which may be forced to abandon new innovative technologies and business models. This may lead to some companies choose to set up elsewhere, resulting in Denmark losing potential growth companies.

The existing rules therefore need to be modernised to take into account the new digital business models that continue to proliferate, and it should be easy and straightforward for companies to get answers if they are unsure about the rules that apply when integrating a new technology or business model.

The digital development is moving too fast for the rules to keep up with the changes. This must be accommodated by providing better opportunities for companies to test new business models in areas where the potential for companies to identify new commercial solutions is already emerging, cf. Box 5.

Box 5
Technologies and new business models challenge existing regulation

Sharing economy

The growth of the sharing economy, in which many private individuals and the company share, hire and buy services to and from each other via digital sharing economy platforms, has led to uncertainty about the rules that need to be followed. If the sharing economy is to grow further, this increases the need for clarity about the rules.

The Internet of Things

The growing expansion of the Internet of Things demands a modernised digital infrastructure and regulation of data ownership.

Cloud computing

The rise of cloud computing gives companies access to cheap storage and processing power, but imposes requirements in regard to handling of IT security, digital infrastructure and access to sharing data freely across national borders.

Autonomous ships

The development of autonomous shipping technologies is moving rapidly, and is challenging aspects of maritime regulation because the latter is fundamentally based on the fact that ships are staffed. At the same time, the technology creates needs for cyber security and digital infrastructure to be in place.

Increased collection and use of data

Increased collection and use of data changes the competition in many markets and means competition rules need to be reviewed.

Crowdfunding

New forms of financing such as crowdfunding improve access to capital for small and medium-sized enterprises – but inconsistent regulation across national borders hampers the development of a market for these new financing forms.

Digitalisation affects competition

Digital development also affects competition in most markets. The volume of data is growing exponentially, as are the applications for it, while companies are better able to monitor one another's behaviour and prices online. Data therefore offers substantial market power. The competition rules do not currently take into account the fact that a company's assets, such as data, may be highly valuable and may affect competition, even if the company does not have a high turnover. Digital mergers that have a strong influence on the market are not necessarily covered by merger controls. It is also important to facilitate effective competition and counteract any market abuse from (for example) the big digital companies.

Regulation on the digital field is international

A substantial part of the commercial regulation of digital business models is implemented at EU level, such as that regarding data and e-commerce. In order to utilise the opportunities within the EU and worldwide, it is important that unnecessary regulatory barriers do not prevent companies from selling their products and services to companies and consumers in other countries. This applies in particular to entrepreneurs and smaller companies, who often find it harder than big companies to comply with various regulatory frameworks and specific national requirements.

It is easier today to quickly grow a company's activity in a market like the US one, which has a higher degree of shared frameworks and regulation than the EU, where in some areas companies are faced with 28 different sets of regulations when upscaling their business. A well-functioning digital European Single Market is therefore crucial.

Huge potential for easing the burdens on trade and industry

Digitisation also offers great potential in regard to strengthening public sector administration to benefit trade and industry, and development will require regulations to be adapted on an ongoing basis. The Government has an ambitious objective of reducing the burdens on trade and industry with DKK 4 billion by 2020.

Digitalisation of public services may make it substantially easier to do business. In regard to this, the automation of companies' business reports to the public sector offers great potential. The Government has therefore also begun automating economic and financial reporting to the public authorities, such as the annual report.

The Government will work to ensure that Denmark's regulation is modernised so that the country can attract and retain innovative companies that want to develop or apply new technologies and digital business models. This will also support effective competition, which will benefit consumers.

New initiatives in agile regulation of trade and industry

Regulation that facilitates new business models

5.1 Regulation that facilitates new business models

Digitalisation for the benefit of consumers

5.2 Digitalisation for the benefit of consumers

Effective competition in the digital arena

5.3 Digitalisation-ready competition legislation

5.4 Ensure competition and prevent market abuse via digital platforms

Protection of Danish interests

5.5 Innovation-friendly digital European Single Market

5.6 Strengthen Danish efforts to combat global digital trade barriers

Digitalisation of public services and regulation

5.7 Strategy for digital construction

5.8 Training website on tax reporting for start-ups

5.9 Tax folder for companies

5.10 Continue to improve efficiency of property registration

5.11 Faster case processing via machine learning in the Danish Safety Technology Authority

5.12 Analyse the opportunities to adapt outsourcing rules for financial undertakings

Other regulatory measures in agile regulation of trade and industry

- Strategy for the sharing economy, which will create a good framework for the sharing economy. As part of this strategy, the Government has set up a single point of entry to public authorities for sharing economy companies via the "deleøkonomien.dk" online portal. Companies can clarify doubts about the rules for their sharing economy business concept, regardless of the authority responsible for their supervision.

- An agreement has been reached on "Simpler rules, less bureaucracy – legislation in the digital reality", in which the parties have agreed on six principles for "clear legislation on digitalisation", which will contribute to more efficient public sector administration and digital case processing at individual level.

- The Government has made it possible to initiate tests involving autonomous transport, and these are already being carried out..

- The introduction of data-driven controls on new company registrations based on machine learning and better data sharing between public authorities, which can counteract fraud in a more targeted manner.

- New access to regulation of FinTech companies, making it easier to establish and upscale new companies.

- Tests to automate businesses financial and economic business reporting to the public sector, such as the annual report.

- New Payment Act to facilitate contactless transactions.

- Promote opportunities for testing and commercial expansion in areas such as autonomous shipping.

§ Regulation that facilitates new business models

Denmark must have good regaulatory conditions, which can attract and retain innovative companies that use new digital technologies and business models. Regulation and enforcement of the rules by the authorities should make it easy to use new technologies and business models and facilitate tests. We must also keep track of foreign regulation and look for inspiration to keep Denmark at the cutting edge of regulation in the digital field. The Government will implement a range of initiatives to ensure that companies can employ new business models:

5 principles for agile regulation of trade and industry

As of 1st July 2018 it will be mandatory for authorities to assess whether commercial regulation is agile based on the following principles:

1. Facilitates the integration of new business models
New regulation will be assessed to see whether it supports the realisation of new business models, including creating better testing and trial options and the use of new technologies, while taking account of important socio-economic or protection-related factors.

2. Technology-neutral
It will be assessed whether new regulation can support companies in keeping up with the technological progress , among other things by avoid to set requirements regarding the use of specific technologies or solutions as a prerequisite for complying with the intention of the law.

3. More simple and purposive approach
A clear focus on purpose instead of process requirements could improve companies' ability to innovate. Where possible, new regulation should avoid detailed requirements and specific descriptions that make it difficult for companies to apply new technologies and business models.

4. Holistic approach
Where possible, authorities should ensure that new regulation takes into account any interaction with other regulatory areas which could impact companies' use of new technologies and business models.

5. Ensure user-friendly digitalisation
Good digital implementation of new regulation is important for the intersection between business and the public sector. Where relevant, new regulation should contain a description of how commercial digital solutions can be made user-friendly to make it cheaper and easier to do business.

These principles are included in the Ministry of Justice's legal quality guidelines as part of the section on "Clear legislation on digitalisation". As part of the assessment of the commercial and economic consequences of new regulation, as of 1 July 2018 authorities must assess regulation in accordance with these principles. In connection with screening commercial legislation for commercial and economic consequences, the Ministry of Industry, Business and Financial Affairs will follow up on the assessment of the principles by the authorities.

A single, cross-ministerial point of entry

Companies should be able to quickly clarify whether they can use new technologies and business models within the framework of existing regulation. The cross-ministerial collaboration in this area must therefore be supported by the establishment of a cross-ministerial point of entry, through which companies receive coordinated answers from relevant authorities. Where possible, the answer should be provided within three months, or alternatively establish a dialogue with the company as to when clarification can be expected.

Check-ups on regulation in neighbouring countries

Through a single point of entry, we will continuously study whether the existing commercial regulation is outdated and should be modified in regard to digital development. This will include a digital check of our neighbouring countries' regulation in relevant legislative areas.

Better opportunities for tests

The potential for digital growth is already emerging in a range of areas such as mobility, construction, financial services, the consumer field and health. We must therefore look at facilitating tests in these sectors while ensuring that the overall purpose of the law and protective intention are maintained. For example, tests regarding credit marketing could be carried out in the consumer field.

A total of DKK 26 million has been allocated for this initiative for 2018–2021.

The Government will

5.1 Work towards agile regulation of trade and industry by:
- Establishing five principles for agile regulation of trade and industry
- Establish a single point of entry for new business models
- Perform a digital check-up as to whether existing commercial regulation is up-to-date compared with neighbouring countries
- Improve opportunities for testing in fields with particular potential for digital growth

Digitalisation to benefit the consumers

Smart use must be made of the new digital opportunities to benefit Danish consumers. The Government's vision is for it to be easier to be a consumer, regardless of whether you are shopping online or taking out a complex mortgage. Danish companies must have the best opportunities to create new innovative solutions that can make it easier to be a consumer. The Government will therefore propose a consumer policy initiative during the first half of 2018, in which the Government will:

- Work to ensure that the information companies need to provide to consumers digitally has actual value for the consumer. The intention is not to restrict consumer rights or weaken their position, but to improve consumers' ability to compare products and conditions across vendors. It should also ensure that companies are better able to develop innovative solutions to benefit consumers.
- Make it easier for consumers to use own data from public registers, such as payslips, tax information, etc. to obtain quotes from companies, including mortgage quotes.
- Make condition and electrical installation reports more user friendly and create a single digital point of entry to relevant information and functions and a cohesive value chain of digital interactions between house buyers/sellers, companies and the authorities.
- Improve opportunities to develop new innovative solutions, e.g. on smartphones or tablets, which can make it easier for consumers to scan the market for mortgages.

This initiative will be paid for within existing budget allocations.

The Government will

5.2 Help consumers to benefit from digitalisation by putting forward a proposed consumer policy that will:
- Work to ensure that the information companies need to provide to consumers digitally has actual value for the consumer
- Make it easier for consumers to use own data from public registers to obtain quotes from companies
- Make condition and electrical installation reports more user-friendly and create a single digital point of entry
- Improve opportunities to develop new innovative solutions that can make it easier for consumers to scan the market for mortgages

Effective competition in the digital field

Digital development affects competition in most markets. For example, effective use of data can give just a few companies substantial power in a market. It is therefore important to enforce competition legislation effectively so that it continues to support well-functioning markets and thus counteract any future market abuse. The Government will initiate the following:

- On a national scale, an amendment to the Competition Act will be proposed in order to adapt the rules for registering mergers to digital business models.
- At EU level, Denmark will continue to work on ensuring that the general rules on competition apply in areas such as platforms and portals. This will increase growth and reduce the pressure for less expedient special rules.
- Furthermore, the Danish Competition and Consumer Authority are investing in digital solutions to strengthen the enforcement of the Competition Act, e.g. tools for identifying coordination of prices online.

A total of DKK 4 million has been allocated for this initiative until 2021.

The Government will

5.3 Promote digitalisation-ready competition legislation and supervisory enforcement by proposing an amendment to the Competition Act in order to adapt the threshold value for registering mergers to digital business models
5.4 Ensure competition and prevent market abuse via digital platforms

Protection of Danish interests in regard to international conditions for digital growth

The economic potential of digital commerce and cross-border data transfers for Danish companies is huge.

- The Government will work toward a true digital European Single Market based on common rules, transparency, innovation and promotion of new business models, including cross-border data transfers.
- There are a growing number of requirements regarding enforced data localisation worldwide. Via the EU's free trade agreements with third-party countries, the Government will work to ensure the freedom to transfer data across national borders so as to avoid unnecessary barriers to trade for the service sector and to ensure the future digitalisation of production companies. The freedom to transfer data must be conditional upon basic principles in regard to the protection of personal data being respected.

This initiative will be paid for within existing budget allocations.

The Government will

5.5 Work toward an innovation-friendly digital European Single Market
5.6 Strengthen Danish efforts to combat global digital trade barriers

Our laws and regulations should be one step ahead of development and support the new digital opportunities.

Ease the burdens on trade and industry via digitalisation

Use of digital solutions in public services could ease the day-to-day burdens on companies. The Government will intervene in a number of areas by:

- Develop a strategy for digital construction that, among other things, removes specific national requirements regarding the use of ICT in the construction industry. Furthermore, as the country's biggest landlord, the Danish Building and Property Agency must lead the way and make knowledge and best practice information on the use of digital tools such as Building Information Modelling (BIM) available to construction operators.
- Develop a training site for start-ups to help them manage reporting to SKAT.
- Create a tax folder for companies which gives companies and other operators such as auditors a quick overview of the information SKAT (the Danish Customs and Tax Administration) holds about the company without needing to check all the different reporting systems. In particular, this solution will ease the work of companies and auditors on annual accounts, tax accounts and self-assessment. It is estimated that around 220,000 companies, funds, associations, etc. and their auditors will benefit from the solution. Information from the accounting sector indicates that the overall easing of the burden, with some uncertainty, would be valued at approximately DKK 250 million annually. This includes both internal easing within companies and easing of the burdens on company auditors.
- Analyse the opportunities for further optimisation of the property registration system, including an emphasis on full digitalisation and improvement in the quality of consultations with surveyors, Government authorities and the Danish Geodata Agency in connection with the formation of property.
- Increased use of automation and robot technology in the Danish Safety Technology Authority to issue immediate approval of standard applications, enabling companies and consumers to progress quickly. The use of data-driven risk assessment will also be increased, with the Danish Safety Technology Authority using data to target checks on the most material safety risks.
- Analyse the options for adapting outsourcing rules in the area of finance so that financial undertakings can make more extensive use of e.g. cloud services without taking on additional risk.

This initiative will be paid for within existing budget allocations.

The Government will

5.7 Develop a strategy for digital construction
5.8 Develop a training website on tax reporting for start-ups
5.9 Create tax folders for companies
5.10 Analyse the options for continued improvements in the efficiency of property registration
5.11 Work toward faster case processing via machine learning in the Danish Safety Technology Authority
5.12 Analyse the opportunities to adapt outsourcing rules for financial undertakings

6

Strengthened cyber security in companies

If Danish companies are to convert digitalisation into growth, customers and business partners need to trust the digital systems and data processing of companies. This trust may be weakened, if a growing number of companies are hit by cyber attacks and leaks of business-critical or personal data.

Approximately 65% of Danish companies were subject/exposed to a cyber attack in 2017, cf. Figure 6.1.

65 per cent of companies were exposed to a cyber attack in 2017, and this can have serious economic consequences.

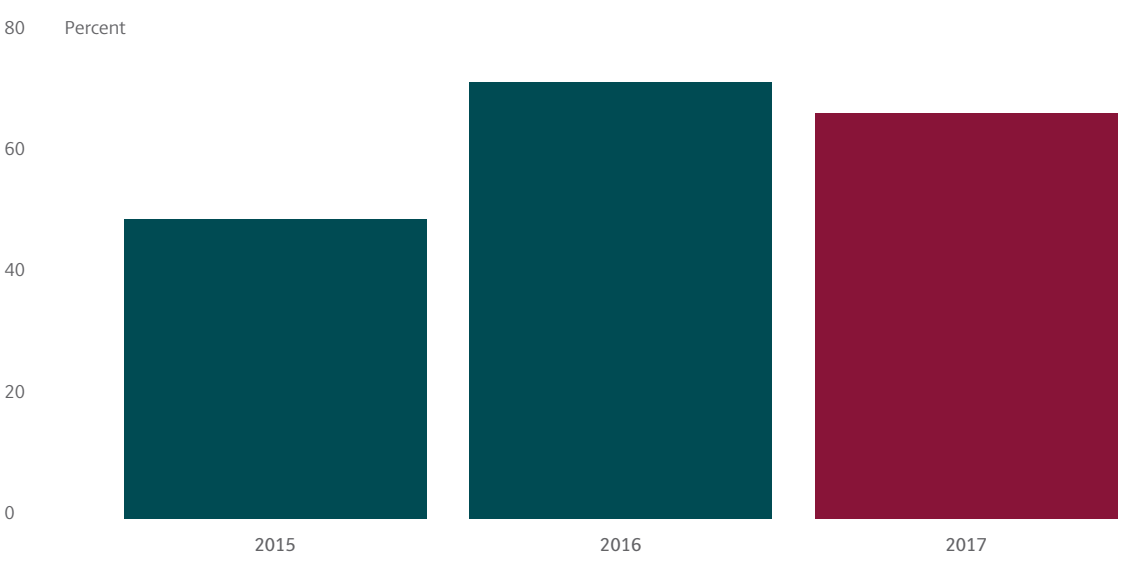


Figure 6.1
Increasing numbers of companies are exposed to cyber attacks, 2017

Report: The number of companies that have experienced a cyber or ransomware attack.

Source:
PWC, 2017

The Centre for Cyber Security estimates that cyber espionage and cybercrime pose a serious threat to Danish businesses. However, only 38 per cent of companies in Denmark have an IT security policy. This puts Denmark ahead of several other Northern European countries, but well behind the front runner Sweden , which is out in front by a good margin, cf. Figure 6.2.

Cyber attacks can have major economic consequences for both individual companies and society as a whole: direct losses due to damaged systems or loss of data, and indirect costs in the form of loss of trust and credibility with customers, and indirect costs in the form of weakened company credibility and loss of customer confidence.

Small and medium-sized enterprises in particular are lagging behind on this issue. Only 25 per cent of companies with fewer than 50 employees increased their investment in IT security in 2017, while the equivalent figure for companies with over 100 employees was 47 percent (Statistics Denmark, 2017).

If companies are unable to withstand cyber attacks, this could mean loss of trust and make it difficult to maintain customer confidence in digital solutions.

This growing threat means companies must work harder on IT security and responsible data processing. It also means that regulation that companies come up against must be easy to comply with, and up-to-date information must be made available to companies, so they can safely make use of digital opportunities.

In future, IT security and responsible processing of data are expected to become significant competition parameters, in that companies that are good at protecting their data will be regarded as trustworthy business partners.

Overall, the Government will support IT security in Danish business by making it easier to report IT security incidents via a single digital point of entry for reporting, and by providing specific tools for companies to better equip them to handle the rising threat scenario.

The Government will also propose a new cyber security and information security strategy, which will include further initiatives.

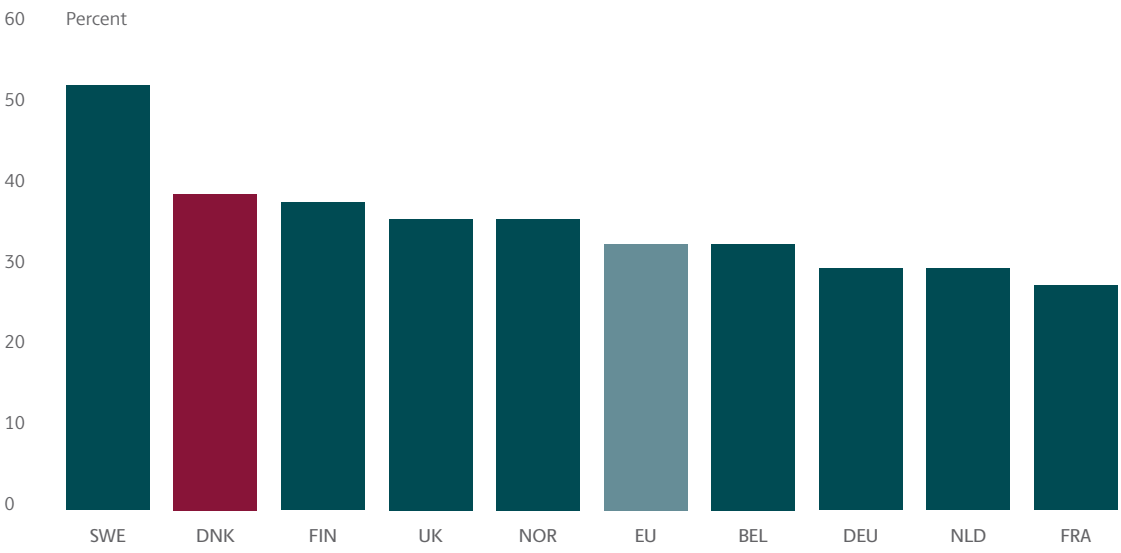


Figure 6.2
More Swedish companies than Danish ones have an IT security policy, 2015

Report: The proportion of companies stating that they have an IT security policy, i.e. a description of the company's security level and the organisational framework and plans for IT security.

Source:
Eurostat, 2016

New initiatives in strengthened cyber security in companies

Strengthened cyber security in companies

6.1 Enhancing cyber security in small and medium-sized enterprises

Easier to report security incidents

6.2 A single digital point of entry for reporting of IT security incidents

Other regulatory measures in strengthened cyber security in companies

- In 2018 the Government will launch a national strategy for cyber security and information security, which will focus particularly on authorities and institutions that perform functions that are critical to society.

- The Government's proposal for a new Defence Agreement for 2018–2023 paves the way for significantly stepping up Danish cyber defence.

- In September 2017, the European Commission presented a Cyber security Pack, which includes a proposed directive on cyber security. The directive focuses on strengthening cyber security and information security within the EU and increasing trust in the European Digital Single Market by strengthening the mandate of the European Agency for Network and Information Security (ENISA) and Europe-wide ICT certification.

Enhancing cyber security in small and medium-sized enterprises

A growing number of companies are being affected by security incidents, and cyber criminals are increasingly skilled and more advanced. This places added demands on companies' IT security measures, resulting in challenges for small and medium-sized enterprises in particular, since they often do not have the understanding and tools to know where and how to strengthen their IT security activity. This initiative is therefore targeted at small and medium-sized enterprises.

With a range of concrete initiatives, the Government will support companies in enhancing their IT security in a way that adapts to a growing, evolving threat scenario.

A coordinated initiative will be launched, which aims to strengthen cyber security and information security in small and medium-sized enterprises by:

- Establishing a coordinated information portal to provide better access to knowledge, specific tools and guidance on IT security.
- An initiative to strengthen IT security knowhow of companies' primary advisors, so they can operate as bridge-builders. Promoting that company advisers (eg. accountants, lawyers etc.) include IT security issues in their dialogue with small and medium-sized enterprises.
- Business Council for IT security Committee, which will support the dialogue with the business community and identify additional measures to strengthen the IT security of small and medium-sized enterprises.

A total of DKK 18 million has been allocated for this initiative for 2018–2021.

The Government will

6.1 Enhance IT security in small and medium-sized enterprises

Easier to report security incidents

The Government also wants to make it easier for companies affected by IT security incidents and personal data security breaches to report these to the relevant authorities.

A single digital point of entry for reporting of IT security incidents to public authorities, which will make it easy and simple for companies and authorities to report IT security incidents and personal data security breaches.

A total of DKK 20 million has been allocated for this initiative for 2018-2025.

The Government will

6.2 Develop a single digital point of entry for reporting of IT security incidents

The Government's follow-up on the strategy

Technological and digital development is evolving rapidly. We cannot make every decision about the digital transformation right here and now. The strategy paves the way for a continuous effort. In this strategy, the Government is setting the direction as to how we can seize the opportunities inherent in digital transformation and tackle the challenges through the initiatives laid out here.

The Government will continuously monitor whether the strategy is achieving its goals
In order to assess whether we are on the right track, the Government will follow the development in digital transformation and the progress of the strategy, based on the established objectives and benckmarks, cf. the box on page 11.

The benchmarks should be used as indicators as to whether digital development in Denmark is moving in the right direction. They cover the use of digital technology by trade and industry, companies' basis for digital transformation and digital preparedness of Danish people. The Government will monitor how things are going in these areas, including in the Report on Denmark's Digital Growth.

Collaboration with trade and industry
The strategy is partly based on the recommendations provided by the Government's Digital Growth Panel with the involvement of representatives from trade and industry and professional organisations, which were delivered to the Government in May 2017. The strategy is also based on discussions in the Government's Disruption Council.

In a range of areas, the strategy will also be implemented in close collaboration with trade and industry.

The Government invites trade and industry to participate in the realisation of a range of strategic initiatives, including Digital Hub Denmark, SME:Digital and the Technology Pact, where the involvement of trade and industry will be of crucial importance to the success of the initiatives. Trade and industry will also be brought on board for initiatives such as the Business Council for IT security, the development of more agile regulation of trade and industry and tests involving new business models.

There is also a need to collaborate with organisations such as research and knowledge institutions and other parts of the public sector, which have contributed to the digital transformation in Denmark for many years – through the roll-out of NemID and e-billing, for example. Furthermore, early liberalisation of the telecommunications markets has helped to secure Denmark's current position as a digital frontrunner in the area of infrastructure.

The Government will also continue to appoint new "growth teams" consisting of representatives from trade and industry, to provide recommendations in selected positions of strength relating to digitalisation and new business models as a general focus.

"The Government will hold an annual digital summit in conjunction with trade and industry, organisations, and so on.

Execution and evaluation of the initiatives in the strategy

The Government is appointing a ministerial group to implement the Strategy for Denmark's Digital Growth. This will consist of the Minister for Industry, Business and Financial Affairs (chair), the Minister for Higher Education and Science, the Minister for Education and the Minister for Employment. This ministerial group will ensure that progress is made with the strategy, including convening an annual digital summit for the strategy, at which the Government will outline the status of the initiatives and discuss the need for new initiatives as digital development and transformation generate new opportunities and challenges.

The Government will also focus on measures that support digital transformation in discussions relating to the Disruption Council, the Public Sector Reform and in future policy negotiations and agreements.

The Government will

- Convene political discussions about the initiatives in the strategy. This will take place as follow-up to the *Agreement on Business and Entrepreneurial Initiatives*
- Appoint a ministerial group which will have as a task to ensure progress with the strategy
- Hold an annual digital summit in collaboration with trade and industry, organisations, and so on
- Evaluate the strategic initiatives in 2021 with the aim of continuing to take action where it matters most
- Focus on measures that support digital development and new business models in future policy negotiations and agreements

Appendix: All 38 strategic initiatives

1 Digital hub for a stronger growth environment

1.1 Digital Hub Denmark – partnership for digital growth
1.2 Overhaul of rules for depreciation of IT and telecommunications equipment
1.3 Strengthen research to further new technological opportunities and solutions
1.4 National strategy for digital research infrastructure

2 Digital enhancement of SMEs

2.1 SME:Digital – a digital transformation and e-commerce scheme for small and medium-sized enterprises
2.2 Expand knowledge of new robot technologies to small and medium-sized enterprises
2.3 Development of international standards for small and collaborative robots
2.4 Increased emphasis on digitalisation in the innovation system

3 Digital skills for all

3.1 Technology Pact – skills for a technological and digital future
3.2 Test program to improve technological understanding in primary and lower secondary education
3.3 Centre for the application of IT in teaching in vocational education
3.4 Greater focus on digital skills in final examinations for vocational education
3.5 Digital strategy for higher education
3.6 Action plan for more graduates from higher education STEM courses
3.7 Greater use of satellite-based data in higher education

4 Data as a driver of growth

4.1 Clear guidelines for companies' use of data
4.2 Development of ethical recommendations for data
4.3 Blockchain solution for the Register of Shipping and certificates
4.4 Digital export certificates
4.5 Trial put & take database for tourism data
4.6 Free access to the DMI's weather, climate and maritime data
4.7 Digital physical planning and planning data
4.8 Trial computer space for sharing data between companies and the authorities
4.9 Analysis and testing of the commercial potential of selected public data

5 Agile regulation of trade and industry

5.1 Regulation that facilitates new business models
5.2 Digitalisation for the benefit of consumers
5.3 Digitalisation-ready competition legislation
5.4 Ensure competition and prevent market abuse via digital platforms
5.5 Innovation-friendly digital European Single Market
5.6 Strengthen efforts to combat global digital trade barriers
5.7 Strategy for digital construction
5.8 Training website on tax reporting for start-ups
5.9 Tax folder for companies
5.10 Continue to improve efficiency of property registration
5.11 Faster case processing via machine learning in the Danish Safety Technology Authority
5.12 Analyse the opportunities to adapt outsourcing rules for financial undertakings

6 Strengthened cyber security

6.1 Enhancing cyber security in small and medium-sized enterprises
6.2 A single digital point of entry for companies to report IT security incidents

Appendix: Financial overview

Together with the Danish People's Party and the Danish Social Liberal Party, as part of the political agreement from February 2018 called Initiatives for Denmarks Digital Growth the Government has allocated almost DKK 1 billion until 2025 for the implementation of the initiatives in the strategy. DKK 75 million has been allocated in 2018, DKK 125 million annually from 2019 to 2025, and DKK 75 million permanently thereafter.

With the political agreement Initiatives for Denmark's Digital Growth the funds have been allocated until 2021. A transverse evaluation of the major initiatives will be carried out in 2021.

Certain of the initiatives – such as the Technology Pact, Digital Hub Denmark and regulation that facilitates new business models – are intended for long-term financing. Decisions will be made on this regard as part of the evaluation together with the parties to the agreement. At the same time there is funding to launch new initiatives.

The allocated funds are a "seed capital", which will help to set up a range of initiatives that are of a test nature or public-private partnerships. It is expected that in several cases, that private operators will help to scale up the initiatives. There will also be initiatives that are covered within the remits of the individual ministries.

Table B.1: How the pool for the Strategy for Denmark's Digital Growth for 2018–2021 will be spent

	2018	2019	2020	2021
Pool (DKK million)	**75**	**125**	**125**	**125**
1. Digital hub for a stronger growth environment	**20**	**25**	**20**	**20**
Digital Hub Denmark – partnership for digital growth	20	25	20	20
2. Digital enhancement of SMEs	**10**	**20**	**25**	**25**
SME:Digital – a digital transformation and e-commerce scheme for small and medium-sized enterprises	10	20	25	25
3. Digital skills for all	**28**	**46**	**43**	**44**
Technology Pact – skills for a technological and digital future	15	20	20	20
Test program to improve technological understanding in primary and lower secondary education	10	21	18	19
Centre for the application of IT in teaching in vocational education	3	5	5	5
4. Data as a driver of growth in trade and industry	**6**	**17**	**21**	**21**
Clear guidelines for companies' use of data	2	1	1	1
Development of ethical recommendations for data	2	2	1	-
Blockchain solution for the Register of Shipping and certificates	0	3	8	8
Digital export certificates	2	5	1	1
Free access to the DMI's weather, climate and maritime data	0	6	10	11
5. Agile regulation of trade and industry	**5**	**9**	**8**	**8**
Regulation that facilitates new business models	5	7	7	7
Digitalisation-ready competition legislation	0	2	1	1
6. Strengthened cyber security in companies	**7**	**9**	**9**	**8**
A single digital point of entry for reporting of IT security incidents	3	4	4	4
Enhanced cyber security and information security in small and medium-sized enterprises	4	5	5	4
Total	**75**	**125**	**125**	**125**

2018
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