Visions and recommendations for Denmark as a digital pioneer

DIGITALISERINGS PARTNERSKABET

Preface

On 16 March 2021, the Danish government established the Danish Government Digitisation Partnership. We were tasked with preparing recommendations for the Danish government on how Denmark will take advantage of the opportunities of digitisation in the future. It is an exciting and very important task because continued digitisation and use of data are key conditions for continued growth, wealth, green transition and efficient, high-quality public services for citizens and businesses.

We have approached the task with an ambition to present visions and specific recommendations, which separately and collectively move society forward to expand Denmark's position as a digital pioneer. The recommendations are not exhaustive. They make up our best suggestion for how society can be improved by implementing digital solutions, increased use of data, and new technologies. The recommendations by the Danish Government Digitisation Partnership consist of proposals for accelerating initiatives already launched and new initiatives.

The pace of technological development is accelerating. This makes it necessary to identify and take action in other areas where digitisation can help create value for citizens, businesses and society as we start realising the potential of such proposals and new opportunities emerge.

On behalf of the Danish Government Digitisation Partnership,

Jim Hagemann Snabe

Content

5. Elaborated recommendations 62

1

Digital Denmark

During the last decades, digitisation has had an increasing impact on the lives of Danish people, had a major influence on the business sector's production and competitiveness, and contributed to the development of Danish society.

Today's public services are strongly shaped by digital solutions, greatly streamlining daily life for Danish citizens and businesses alike, while also making the administrative tasks of public authorities much less resource-intensive. At the same time, digitisation supports increased growth in society, and digital tools improve the productivity of Danish businesses and make it possible to develop brand new products and business models. A digitised business sector and digital public services for the business sector thus contribute to strengthened competitiveness, growth and increased exports for the benefit of the entire society.

In many areas, Danish businesses and the public sector have come a long way in digital development. However, there is an urgent need to speed up development even more. We need to digitise wisely if Denmark is to maintain its status as a digital pioneer with high growth and a high level of security. Accordingly, strong Danish research and development initiatives are a requisite for optimising the opportunities of digitisation.

Therefore, we need to accelerate digital developments. Suppose we fail to move the public sector and business sector into the digital future. In that case, it will be much harder for Denmark to remain competitive and tackle future challenges. We risk putting Denmark in an unfavourable position relative to comparable countries and reducing the basis for future growth and prosperity. Moreover, digitisation is to help address the major challenge of labour shortage seen in the private and the public sectors.

In other words, the opportunities offered by digital development are so good that Denmark cannot afford not to be first and best.

Digital solutions affect all Danes across age groups and life situations. Furthermore, digitisation has impacted the entire labour market and all parts of the business community – startups, small, medium-sized, and large enterprises. We need to make sure that the public sector takes advantage of new technology and data to effectively improve the quality of the public sector in the same way as businesses, regardless of size, manage to take advantage of the possibilities offered by digitisation and automation. That increases productivity and growth.

The development of technologies brings new opportunities as well as challenges. The Danish Government Digitisation Partnership believes that as a country, we need to take advantage of the opportunities while handling the challenges proactively.

This requires us to be ambitious and set the course for the digital future and the society we want – even when it is tough.

The Danish Government Digitisation Partnership focuses on creating value for citizens, businesses and society and not just digitising and using new technology simply because we can. We also need to create value for the many and not only the few. We believe that technology and data must be secure and responsible and with a focus on people.

The continued digital development in Denmark requires both prioritisation and choice. Even though the pace at which we implement new solutions and technologies is crucial, we need to ask ourselves several important questions along the way. Questions about how we will use data, how we are going to take advantage of new technologies, such as artificial intelligence, and what positions of strength Denmark needs to pursue.

The Danish Government Digitisation Partnership has not answered these questions but has considered them in our work.

In this report, the Danish Government Digitisation Partnership suggests the strategic course for further digitisation in Denmark and our recommendations in this respect. Recommendations that we believe have the greatest potential of creating value for the Danish society and specific and implementable recommendations, thus improving our ability to benefit from digitisation as soon as possible.

2

Work of the Danish Government Digitisation Partnership

2.1

The Danish Government Digitisation Partnership's task and approach to the work

The Danish Government Digitisation Partnership has prepared recommendations for the future digitisation of Denmark. The framework of the work has been four goals set by the government and three principles defined and pursued by the Danish Government Digitisation Partnership. The recommendations are divided into seven focus areas, each representing either sectors or key sector areas in the Danish society which we believe will currently benefit the most from digitisation. Moreover, four themes have been identified that form the foundation of the focus areas and the further digital development in Denmark. The correlation between the four levels – goals, principles, focus areas and foundation, is illustrated in Figure 1 on page 13.

Goals and principles for the recommendations of the Danish Government Digitisation Partnership

The Danish Government Digitisation Partnership has been tasked with discussing and making recommendations for how Denmark is to take advantage of the opportunities in the future, to make sure that digitisation and data make life easier for citizens and help businesses grow. The work is based on four overall goals for the Danish society laid down by the Danish government:

- An efficient public sector and high-quality service.
- The following steps in the green transition.
- Growth, export and a robust business sector ready for change.
- A society that continues to be fair and equal.

In our work to prepare recommendations to support these goals, we have pursued three principles. The Danish digital society must be:

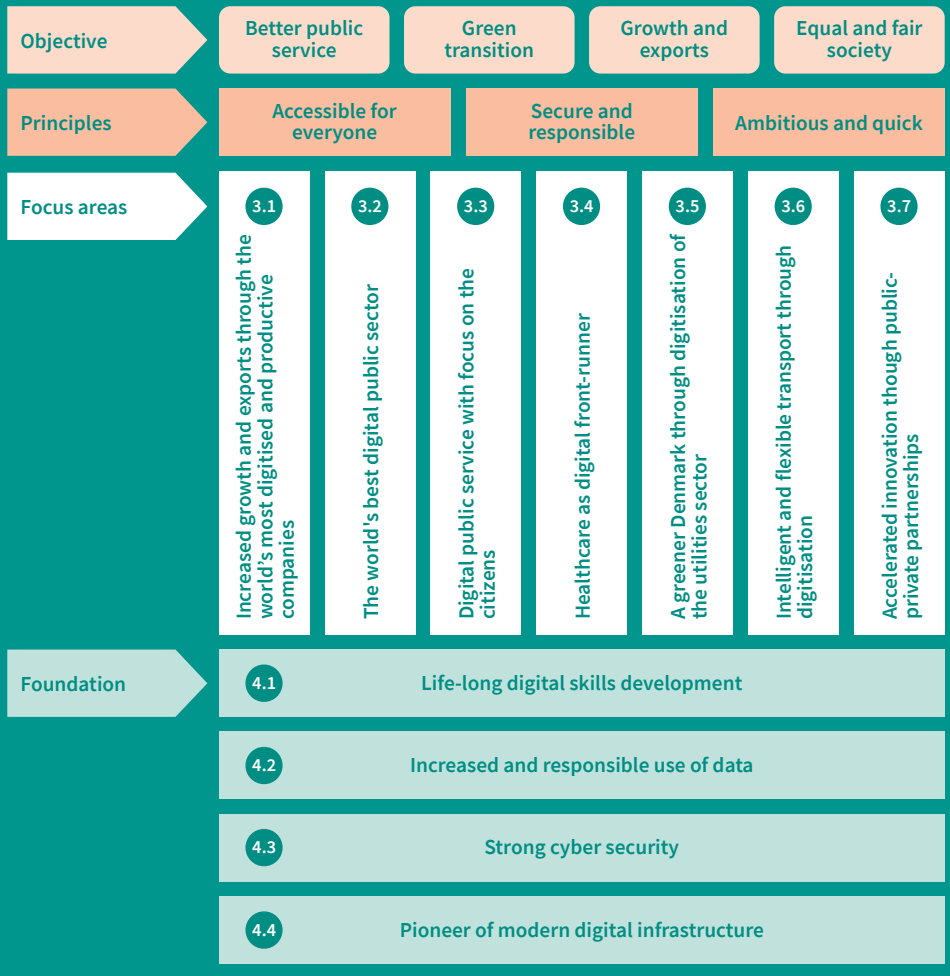
- Accessible for everyone: All citizens must have access to and be able to get on in the digital society.
- Secure and responsible: The digital development and use of new solutions must be responsible, transparent and focused on security and privacy.
- Ambitious and quick: New technologies must be implemented quickly and effectively to ensure that we are among the first to take advantage of the opportunities to create value for the citizens, businesses, and society.

The three principles should be considered at the core of decisions made with respect to implementing the specific recommendations. For example, the principles mean that 5G and broadband must be rolled out as quickly as possible throughout Denmark and peripheral areas.

Focus areas

Based on the overall goals and principles, the Danish Government Digitisation Partnership has decided to prioritise seven focus areas. The focus areas concern the private sector and the public sector but also their interaction. Moreover, focus areas have been set out for specific sector areas that we believe create high value for the citizens and society. They are of particular importance for digitisation in the future. Those sectors include healthcare, transport as well as green energy and utilities.

FIGURE 1
OVERVIEW OF THE WORK OF THE DANISH GOVERNMENT DIGITISATION PARTNERSHIP



For each focus area, the Danish Government Digitisation Partnership has set out a vision for the ideal development of the area when the digital opportunities are used in the best possible way. The recommendations are the first steps towards realising our visions for the future digital society. See Figure 2 on page 15.

It has been important for the Danish Government Digitisation Partnership to set out recommendations that can be implemented quickly. Furthermore, we have set out proposals for more comprehensive initiatives to be implemented in the medium and long term but which are essential for the long-term strategic development of digital Denmark.

The Danish Government Digitisation Partnership is fully aware that the focus areas will not cover all aspects of future digitisation. We have given priority to the focus areas, including the recommendations, which we believe are the most critical next steps and the foundation for further digital development.

The Danish Government Digitisation Partnership has focused on working indepth with the individual recommendations, describing both prerequisites and necessary action for implementing the recommendations. This has been done to increase the pace of the implementation of the individual proposals.

In the choice of recommendations, the focus has generally been on three parameters: Firstly, the choice of recommendations is based on assessing their potential for creating substantial value for many citizens and businesses. Secondly, the choice of recommendations is assessed based on their value concerning the government's four goals for Danish society. Thirdly, the recommendations have been assessed concerning the positive difference increased digitisation can make.

The Danish Government Digitisation Partnership has used a prioritisation tool for this prioritisation, illustrated in Figure 3 on page 15.

Foundation

The Danish Government Digitisation Partnership has identified four cross-disciplinary areas that provide the foundation for the focus areas and digitisation in general to support the prioritised focus areas The foundation for the digitisation of Denmark needs to be solid if we are to achieve the desired value of the focus areas. The foundation consists of the essential elements that must be in place and be developed if we are to realise our digital ambitions to develop and maintain the status of Denmark as a digital pioneer. To release the potential of the focus areas, it is therefore essential that we build on the foundation that forms the basis of the digital society today.

We believe that it will take considerable action and prioritisation in four critical areas if Denmark is to continue its digital development. The four key areas are:

1. **Life-long digital skills development:** In order for all Danes to benefit from the digital development, and for Denmark to pursue a *digital first* Strategy, it is essential that all Danes continuously and throughout life strengthen and develop their digital skills and understanding of the implications of digitisation on our everyday life and democratic society.
2. **Increased and responsible use of data:** To support growth and innovation and ensure prosperity in the future, we must take advantage of the total value of data while maintaining a high degree of trust in digital solutions. This requires increased and responsible use of data across society.
3. **Strong cyber security:** To reduce the risk of cyber threats having severe economic consequences as we increase digitisation and harming security and prosperity in Denmark, we must ensure a high degree of cyber and information security at all levels.
4. **Rapid rollout of modern digital infrastructure:** In order to successfully realise the value of digitisation as quickly as possible, it is essential that we accelerate the development of modern digital infrastructure and make sure that the technology is available to all Danes.

Furthermore, it is important that digitisation does not impair working conditions, and this has to be taken into account in the actual implementation of the individual recommendations.

The foundation is described in more detail in Chapter 4.

FIGURE 2
SPECIFIC RECOMMENDATIONS TOWARDS A VISION

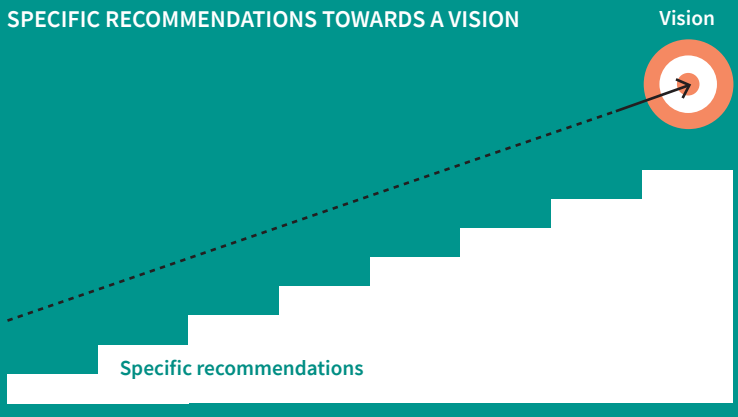
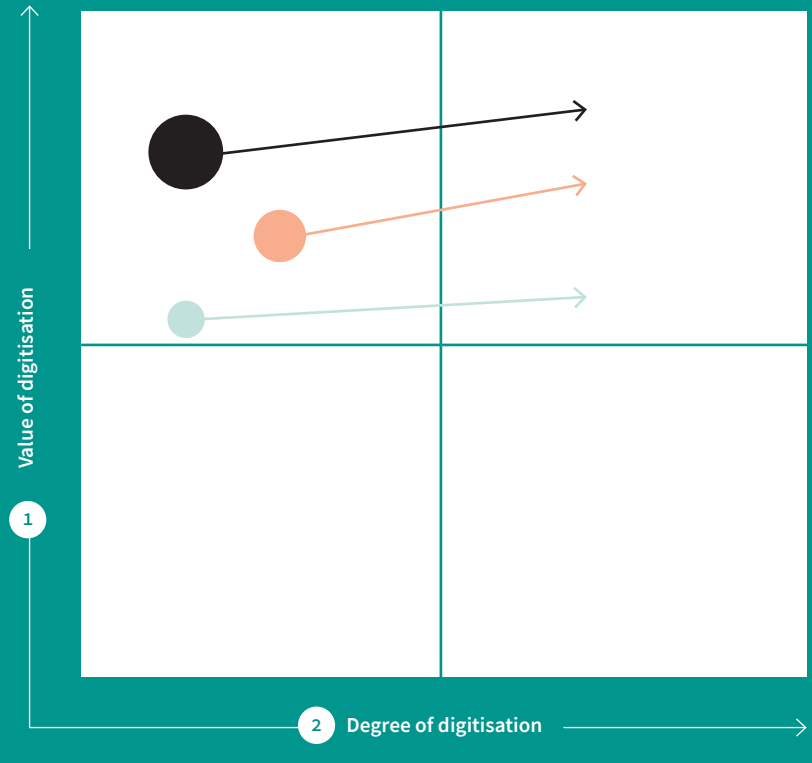


FIGURE 3
PRIORITISATION TOOL



2.2

Implementation

Economy

With the recommendations for the government, the Danish Government Digitisation Partnership takes an ambitious course for the future digital development of Denmark. It takes the willingness to make long-term investments and strict economic prioritisation to realise the value of increased digitisation. We need to be committed to ensure maximum value for the citizens and businesses.

We believe that investments are necessary to realise the goals of more efficiency and better public service, increased competitiveness and growth in the private sector, etc. The reason is that increased investments will create change and form the foundation for further prosperity. At the same time, investments in the public sector will result in efficiency improvements that free up resources. This will form the basis of a richer society for the benefit of all Danes. In other words, not making the investments may prove to be expensive.

When we look across the Danish Government Digitisation Partnership recommendations, we find that the investment need varies. The recommendations can roughly be divided into four categories:

1. Some of the recommendations are new initiatives that will require considerable investments for quite a several years.
2. Other recommendations can be realised through further development or acceleration of existing initiatives but will also require investments.
3. Some recommendations can be implemented at no cost through refinancing from existing initiatives.
4. Finally, several recommendations are not considered to require substantial new funding.

The extent of the investments depends on the foundation and level of maturity on which the individual recommendations are based. The Danish Government Digitisation Partnership finds it essential that the Danish Parliament prioritise digital development – also when it requires prioritisation in some areas to be able to perform the new task.

The Danish Government Digitisation Partnership has noted that with its recovery plan for Europe, the European Commission has set the stage for massive investments in green transition and digitisation. A total amount of EUR 672 billion has been set aside in the European Recovery Fund, of which 37% is to be used for green transition and 20% for digitisation. Moreover, digital investments are expected to become a substantial part of the green transition. Accordingly, it is to be expected that some of the recommendations of the Danish Government Digitisation Partnership can be funded by this, and increased demand for a digital solution is expected in all EU countries. Denmark must be committed to get the largest possible share of the funds.

For several recommendations, the Danish Government Digitisation Partnership believes that public-private partnerships can advantageously undertake the work. This is to increase the quality of the performance of tasks and ensure that resources across sectors and disciplines are used.

Legislation

In implementing the recommendations of the Danish Government Digitisation Partnership, the framework conditions set out by legislation will have to be considered. In several cases, the recommendations will require changes in legislation.

As part of this, the Danish Government Digitisation Partnership believes that there is a substantial need for legislation to be generally and continuously adapted to the digital reality we live in or wish to develop. This has to be done without compromising general rules of law.

The approach must ensure that legislation is future-proof to the greatest extent possible and can be administered smoothly for the benefit of citizens and businesses. This means that acts must be worked out to support a more user-friendly, readily accessible and transparent digital public sector and a simple framework easy for companies, especially SMEs, to interpret.

In other words, the changes in legislation must support effective and responsible digitisation – not stand in the way of it.

Further activities

The recommendations of the Danish Government Digitisation Partnership constitute our input for an overall digitisation strategy for Denmark.

When the recommendations are implemented, the Danish Government Digitisation Partnership needs to focus on coordination across the public sector and robust and binding cooperation with the private sector. This implies significant management focus on reuse of for example architecture and standards and the spread of technologies to provide the platform for innovation and prosperity. Therefore, the Danish Government Digitisation Partnership believes that a strong coordinating authority needs to take responsibility for the overall digital development, choice of essential shared technological elements, and implementation of digital solutions across Denmark. At the same time, decentralised ownership must be maintained to ensure that the implementation is going as planned.

The Danish Government Digitisation Partnership suggests that a digitisation council be established to maintain progress and stimulate cooperation among parties in this area. The digitisation council should be broadly composed of relevant parties from both the civilians, the public sector and the private sector in the digital area. The digitisation council must provide regular assistance to the current government on, e.g. the implementation and follow-up on the progress of the work implementing the recommendations of the Danish Government Digitisation Partnership and on the prioritisation of new focus areas, serve as a sounding board on the further development of the foundation for digitisation and make new suggestions for the further digitisation of Denmark.

It is proposed that the digitisation council should work according to the same method as the Danish Government Digitisation Partnership, where new potential initiatives are ranked according to their degree of digitisation and how much value they create for businesses and society, including for the green transition. Moreover, the digitisation council should make sure that the foundation is continuously and ambitiously developed. Finally, the Danish Government Digitisation proposes that the digitisation council organise an annual symposium at which digital development in Denmark is discussed and where the progress and challenges are followed up concerning the ambition of Denmark as a digital pioneer.

2.3

Europe sets the framework for digitisation in Denmark

The Danish Government Digitisation Partnership acknowledges that the digital development in Denmark is highly influenced by the EU's digitisation agenda. This provides an international framework for how we digitise and develop digital solutions in Denmark. At the political level, the European Council has identified digitisation as one of the most effective tools to prepare Europe to deal with social/societal crises, increase competitiveness and facilitate the green transition. This is reflected in the European recovery fund, which ensures financial support for investments and reforms in the Member States in the wake of the COVID-19 crisis.

The European Commission has specified a series of goals for digital development to set standards for the European value-based approach to digitisation. This involves a range of comprehensive regulation proposals, including in the area pertaining to data. It includes the already presented Proposal for a Regulation on European data governance (Data Governance Act) aiming to further regulate data sharing. In the field of artificial intelligence, a legislative package has been presented to update existing rules and set up a risk-based legislative framework for the use of artificial intelligence.

It is vital for the Danish Government Digitisation Partnership that Denmark strengthens the initiatives to influence a technical and legal framework for the future use of data in Europe. Denmark has a well-developed digital infrastructure and therefore needs to play an active role in preparing EU regulation to ensure that our solution, which citizens trust, can still be further developed and improved.

Moreover, the Danish Government Digitisation Partnership notes that the EU has set aside project funds for the establishment of what is known as sector-specific *data spaces* which are to increase the exchange of data across national borders, e.g. innovation, research and AI-based projects. We believe that Denmark should actively participate in and attract these European data spaces, particularly within the healthcare and climate areas.

Also, the Danish Government Digitisation Partnership believes that it is vital for Denmark's interest and for Danish businesses competitiveness in the European and global market that the government, in cooperation with the business sector and other stakeholders, actively seeks to influence the work, goals and agenda of the EU in the digital area. Within the EU cooperation, there are different views on and visions for Europe's future digital policy. Therefore, it is crucial that Denmark has a seat at the table and ensures that the EU regulation provides a good framework for growth and labour without the EU closing in on itself through active safeguarding of interests in both formal and informal forums.

Technological competition has become a key parameter in the superpower rivalry between the USA and China, and Europe is falling behind in this digital race. EU has a significant focus on protecting the individual citizen and ensuring responsible use of data. Moreover, the EU aims to ensure that data are stored in Europe and that global digi-

tal infrastructures comply with the principles and rules of the EU. The Danish Government Digitisation Partnership believes that it is crucial to find the right balance between citizens' rights and innovation to ensure that the European countries do not fall behind. Europe needs to define how we take advantage of technology with a human perspective and use this as a position of strength.

Denmark must take a proactive part in the groundwork and drawing up of EU regulation, focusing on ensuring that new EU regulation, taken as a whole, does not impose unnecessary administrative burdens on anyone. As a country, we should not over-implement the EU legislation as we will otherwise be losing ground in international competition and be losing pace. This is also important to make it attractive to establish startups in Denmark.

The Danish Government Digitisation Partnership is convinced that the EU's focus on digitisation creates unique opportunities for Denmark. The EU's digitisation agenda governs how we can digitise and work with new technologies, e.g., data protection, cross-border digital identities, and requirements for solutions that use artificial intelligence. This is where Denmark can help set the uniform standards to facilitate the digital use by citizens and businesses in the European Single Market – and implement the standards for achieving higher value as quickly as possible.

On this basis, the Danish Government Digitisation Partnership presents three specific recommendations described in more detail in Chapter 5.

RECOMMENDATIONS

1

A strengthened Danish Data Protection Agency serving a proactive function in society

To facilitate the digital transition and data protection in society, the Danish Data Protection Agency should receive more funds earmarked for more proactive consulting services, more employees with a technological area of expertise and strengthened Danish participation in the European data protection cooperation. (Learn more in chapter 5, page 64).

2

Denmark at the head of European data spaces

Denmark should head the establishment of European data spaces, where initially we need to focus on Danish positions of strengths within the healthcare and climate areas. (Learn more in chapter 5, page 65).

3

Social media should not undermine democratic principles

The EU must work actively to ensure that social media do not undermine the democratic principles that are the foundation of our society. (Learn more in chapter 5, page 66).

Reading guide for the recommendations of the Danish Government Digitisation Partnership

In this report, we present 46 recommendations for the future digital Denmark within a number of themes.

Chapters 3 and 4 give a brief introduction to the recommendations.

Chapter 5 describes each recommendation in detail. This includes descriptions of the actual proposal, the value, potential and prerequisites of the recommendation and actions necessary to implement the recommendation.

3

Recommendations of the Danish Government Digitisation Partnership within seven focus areas

In the previous chapter, we described recommendations regarding Denmark's commitment in the EU in the digital area. This chapter presents 31 recommendations within the following seven focus areas:

1. **Increased growth and exports through the world's most digitised and productive companies.**
2. **The world's best digital public sector.**
3. **Digital public service with focus on the citizens.**
4. **Healthcare as digital front-runner**
5. **A greener Denmark through digitisation of the utilities sector**
6. **Intelligent and flexible transport through digitisation.**
7. **Accelerated innovation though public-private partnerships.**

The introduction to each of the seven focus areas includes the Danish Government Digitisation Partnership's vision for the focus area.

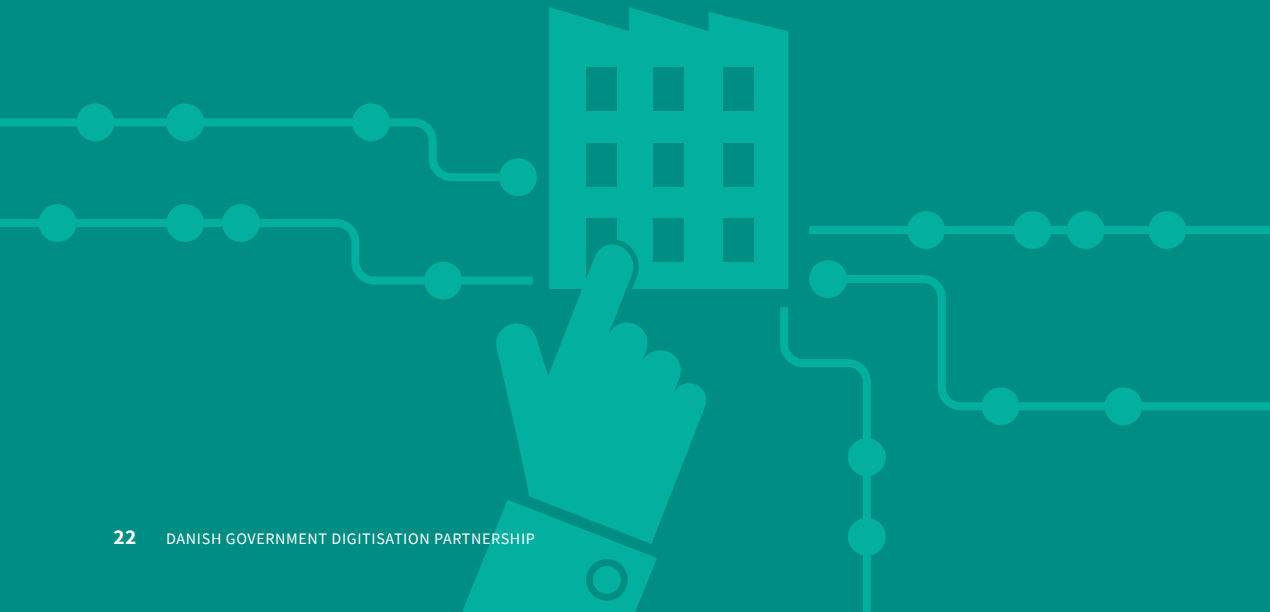
As specified in the reading guide, each recommendation is described in detail in Chapter 5, including the actual proposal, value and potential of the recommendation, the prerequisites, and actions necessary to implement the recommendation.

3.1

Increased growth and exports through the world's most digitised and productive companies

VISION

Danish businesses – small and large – should be world leaders when taking advantage of digital opportunities. We need to ensure that businesses use technology and data to develop competitive, automated, and green products and services. At the same time, digital solutions must create direct contact between businesses and customers, creating better opportunities for exports and services abroad. This will increase growth, exports and productivity for the benefit of all of Denmark, and at the same time, we will create modern workplaces and attract the best entrepreneurs.



Digitisation and digital tools add value and can make businesses more productive. This goes for startups, small, medium-sized and large enterprises. Moreover, digitisation can increase flexibility for employees and companies and open up new sales channels and products. This way, digitisation, new technologies and automation will strengthen growth, exports and competitiveness. For employees, we must use digitisation and automation to reduce repetitive tasks and heavy lifting to support a healthy, safe and productive workplace.

Denmark has a solid foundation, and the digital transition in the business sector is progressing at a high pace. However, we know that the smaller a business, the lower the digital level. The difference between large and small enterprises in Denmark has increased in recent years when it comes to using more advanced digital technologies. In the Danish business sector, SMEs account for 99 percent of all businesses. And two out of three private jobs are in an SME. It is crucial for growth and productivity that we focus on SMEs. The Danish Government Digitisation Partnership believes that all SMEs should have the tools and resources necessary to be digital innovative at their level – and help create the digital businesses and workplaces of the future. The Danish Government Digitisation Partnership particularly emphasises three key recommendations to boost the digitisation of Danish businesses.

Every year, Danish SMEs spend more than DKK 30 billion on people hours for invoicing, bookkeeping and reporting to the authorities. The Danish Government Digitisation Partnership has a vision that the solution 'Min Virksomhed' be developed to facilitate the administration of SMEs with data-driven solutions. This is to give a considerable boost by automatically reporting SMEs. Danish businesses should experience a new digital reality through automatic reporting of business data to the public sector and between businesses. This applies to financial data for the businesses' green data and their future CO_2 reporting for the benefit of the green transition.

Automation is a Danish position of strength, and we are far ahead of other countries. Often industrial robots can produce more while reducing errors and heavy lifting, and software robots can eliminate repetitive tasks and create an overview. We need to maintain that position of strength. This requires a boost of automation in Danish businesses, tiny and medium-sized enterprises.

SMEs say that lack of time is the main reason they are not as digital as they would like to be. Because they know that digital technologies have potential. We need to help them. Therefore, the Danish Government Digitisation Partnership recommends that the solid basis of the already existing SMV: Digital programme is used as a foundation that can be continued, strengthened and developed. SMV: Digital provides a simple, flexible, and tailored setup for SMEs' consultancy, resources, and competence development. SMEs can receive grants for investments in digitisation or private consultancy on their digital transition. The purpose is to significantly strengthen the use of and investments in digital technologies in small businesses to increase online sales and exports. By taking advantage of the excellent experience, SMV: Digital can benefit even more SMEs.

Furthermore, the Danish Government Digitisation Partnership realises that small businesses might have a substantial risk to live up to contracts with large companies because the cooperation may require digital development projects with a proven technological solution. The Partnership finds it essential that further work be carried out to look into this issue.

On this basis, the Danish Government Digitisation Partnership presents six specific recommendations described in more detail in Section 5.1.

RECOMMENDATIONS

4

MinVirksomhed

It must be straightforward to run a business in Denmark. Accordingly, Danish companies must encounter a new and significantly easier digital reality by automatically reporting business data to all relevant authorities and between companies. In the long run, the solutions should also be used for companies wanting to establish themselves abroad. (Learn more in chapter 5.1, page 68).

Five robot libraries – automation as a position of strength

Five robot libraries (competence centres for physical robots and software robots) must provide Danish companies with one collective outlet for knowledge, resources and consultancy and allow them to borrow robots for one month. (Learn more in chapter 5.1, page 69)

6

SMV: Digital – significant consolidation of online sale and export of small enterprises

Danish SMEs must receive a comprehensive offer from the public authorities to help them with consultancy, resources and competence development to support their digital transition. Accordingly, purpose-built 1:1 assistance must be provided to ensure the SMEs digital transformation in consultancy, guidance and investment aid. (Learn more in chapter 5.1, page 70)

7

Danish SMEs in a digital Europe

The right conditions must be in place for Danish SMEs and authorities to get financing for their digital transition and help deliver advanced digital technologies in Europe. This should be done by repossessing funds from the EU's *Digital Europe Programme by establishing* a new matching fund. (Learn more in chapter 5.1, page 71)

8

Employees must join the growth journey via employee shares

New companies must take their employees along on their growth journey through employee shares and transparent tax terms. This is to help ensure that more people get a share of the profits when companies are thriving. (Learn more in chapter 5.1, page 72)

9

Digital freeway for talent in Denmark

It must be more streamlined for Danish companies to employ foreign labour with the technical and digital skills that the companies demand. Therefore, a digital freeway needs to be created for getting talents to Denmark, making it more flexible, faster, and less bureaucratic to get foreign labour to Denmark. (Learn more in chapter 5.1, page 73)

3.2

The world's best digital public sector

VISION

We need to ensure that the public sector is among the first and absolute best to take advantage of the latest technology to deliver the best possible and most relevant service more efficiently. Therefore, the world's world's best digital public sector must continuously implement the latest technologies and work closely with innovative suppliers to provide new solutions quickly and efficiently.

Even though the Danish Public sector is among the most efficient public sectors globally, it takes continuous renewal, investments and use of new technology if the Danish public sector is to maintain its status as one of the best in the world. Without innovation and strategic investment in digital solutions, it will not be possible for the public sector to continue to offer high-quality services to citizens and businesses. Furthermore, we need to automate to prevent labour shortage in the future so that resources can be freed up for providing security to citizens.

For the public sector to be efficient, digital solutions must be based on the needs of the users, employees, and businesses and be developed to ensure that the solutions meet the requirements for IT security and data ethics. Otherwise, the employees, citizens and businesses will not have the necessary trust in the solutions. This means that the development requires the systematic involvement of the citizens, public-sector employees, and businesses to use a new solution. The Danish Government Digitisation Partnership also emphasises that public digital solutions should be developed to be used by as many as possible. We constantly take action to help citizens and businesses in the right digital direction. Closer cooperation across the state, region, and municipalities is crucial for increasing the value of the investments, reducing costs, and improving the quality in the public sector.

The Danish Government Digitisation Partnership finds it essential that the continued digitisation of the public service has a substantial focus on standardisation and reuse of solutions and the architecture behind the solutions. This ensures our standard digital building blocks, whether the shared secure login solution NemID/MitID, Borger.dk, Virk.dk or a new consent infrastructure – are used by as many as possible. The Danish Government Digitisation Partnership emphasises that when good global or European solutions are found, it should be established whether such solutions can meet the relevant requirements to ensure that Denmark does not make specific solutions that will be more expensive to maintain in the long term. One strong coordinating authority is to ensure regulation and shared direction for the continued strategic development.

Some of the development competences already exist in the public sector – others do not. It is essential that the public sector has the competences needed to ensure the development and implementation of modern, efficient and user-friendly solutions that can provide a consistent architecture across the solutions and, this way, reduce costs. In this connection, the Danish Government Digitisation Partnership has discussed the government's savings on the use of consultancy services, which also impacts the IT area. The Danish Government Digitisation Partnership finds that access to the best technical resources is of significant importance to the pace and quality at which the recommendations can be implemented. The public sector cannot solve the tasks alone. It will often require interaction between the public sector and private players.

The recommendations presented here help improve and streamline the public service and support the initiatives to maintain and further develop a public digital infrastructure that many other countries envy. The recommendations will help spread new technology, provide standard digital building blocks and ensure smoother data sharing across the public and private sectors.

Part of the public digital infrastructure consists of old, somewhat outdated IT systems and therefore needs modernising to make the public IT systems up-to-date, secure and reliable. Without these measures, too much money will be spent on the operation and maintenance of old technical debt, and we risk that old vital systems break down with severe consequences. Therefore, it is recommended to earmark an investment framework for repairing, modernising, and replacing old IT systems as quickly as possible. Moreover, relevant parts of the joint public-sector foundation must be further developed and used more widely to ensure that citizens and businesses face a coherent, efficient and user-friendly digital public sector.

Denmark is well on the way, but rapid digital development requires us to prioritise the digital public sector and increase cooperation and reuse across the public sector.

On this basis, the Danish Government Digitisation Partnership presents six specific recommendations described in more detail in Section 5.2.

RECOMMENDATIONS

10

Strong digital foundation for the public sector

Denmark's digital lead must be reinforced through extension, maintenance and stronger management of the shared digital foundation of reusable building blocks (e.g. NemID/MitID), which can be used across authorities to create coherent digital services for citizens and businesses. (Learn more in chapter 5.2, page 75).

11

Modernisation of the public digital infrastructure

Part of the public digital infrastructure consists of old IT systems and therefore needs modernising to make the public IT systems up-to-date, secure and reliable. A separate investment framework must therefore be provided for repairing, modernising and replacing old IT systems. (Learn more in chapter 5.2, page 76).

12

Up-to-date service to citizens using new technology

An economic pool must be established to commission and distribute solutions based on new technologies across the public sector to accelerate the public sector's use of artificial intelligence. The pool should also support initiatives that eliminate barriers of accessibility to, e.g. artificial intelligence. (Learn more in chapter 5.2, page 77).

13

A well-informed social sector

To ensure more timely, effective and coherent social services, more data sharing is needed in the social field, with a focus on citizens with chronic diseases, vulnerable children and families, and citizens undergoing treatment in psychiatry and municipalities (Learn more in chapter 5.2, page 78).

14

Efficient and flexible public procurement must create opportunities for more Danish businesses

Complex and rigid procurement rules result in a considerable waste of resources and loss of innovation in society. That is why the procurement rules must be radically simplified to allow a more significant number of businesses – large and small – to submit tenders for new solutions on the issues facing society. Furthermore, we ensure that Denmark does not interpret the Public Procurement Directive more strictly than other countries by looking to our neighbours. (Learn more in chapter 5.2, page 79).

15

Further digital innovations must provide new solutions

We must provide the optimum framework for digital innovation. That should be ensured by establishing a dedicated national point of contact for contractors intended to facilitate the navigation of public regulations and minimise *go-to-market* time for innovative solutions. Private players should also be invited into the new Centre for Public-Private Innovation (COPI) engine room, and the GovTech programme should be reestablished.(Learn more in chapter 5.2, page 80).

3.3

Digital public service with focus on the citizens

VISION

We need to significantly enhance service standards in the public sector and reduce time consumption and errors through digital solutions. The public sector must also be more proactive for the benefit of citizens across life situations. At the same time, we need to use digitisation to free up resources so that we can afford and have the possibility to use them where human contact is most valuable.

The public service is the core of our society. Everyone should experience coherent public services with a focus on citizens. We have new opportunities to ensure coherence in the digital age, faster and more attentive service, e.g., user-friendly and efficient digital solutions.

All Danes should be able to see that digital tools help make their daily lives easier. Help and support must be available to those who find it difficult to use digital solutions.

Good communication between the public sector and citizens is crucial for the experience of good service, and digitisation must ensure digital solutions that benefit the enduser and are easy to use. Most Danes are already on the digital channels and communicate digitally with the public sector. If we take advantage of the digital opportunities to strengthen communication between the parties in the years to come, we would improve the public service considerably and create more flexible services.

However, the new development requires new steps. It is the Danish Government Digitisation Partnership's ambition to move towards a public service which, in selected areas, is a *digital first* and which plays a more proactive role in relation to the life situations of the citizens. For the vast majority of citizens, this will make the public services more straightforward and more uncomplicated to access and benefit from. At the same time, the public service will become more cost-effective.

A multi-pronged approach will be needed to create more flexible contact with the public services to reach the goal. This includes a more straightforward and more secure administration of the consents provided by citizens in a standard digital consent portal. Furthermore, video meetings and the use of new technology in telephone contact are specific proposals for how new technology can benefit both the public sector and the citizens. This way, human resources can be prioritised to a higher degree where human contact is key to the citizens' service experience.

On this basis, the Danish Government Digitisation Partnership presents five specific recommendations described in more detail in Section 5.3.

RECOMMENDATIONS

16

The easy and safe consent (consent portal)

A shared consent infrastructure should be developed to make it easier and safer for citizens, businesses, and authorities to get an overview of and manage their consents, e.g., exchanging personal data, in a shared digital solution. (Learn more in chapter 5.3, page 82).

17

Virtual meetings as the new public communication channel

Communication with the public section should be as straightforward as possible. This means that virtual meetings must be promoted as an alternative to physical meetings between citizens and the public sector so that virtual meetings in selected areas or contacts become the norm. (Learn more in chapter 5.3, page 83).

18

Exploit new technology for phone calls

The public sector must use new technologies to optimise the large number of phone calls with citizens and businesses each day. (Learn more in chapter 5.3, page 84).

19

An informed and qualified choice of study – more people starting education and work

Data-driven counselling should, to an increasing extent, supplement existing counselling offers by supporting and qualifying students' choice of youth education and higher education. This should help minimise drop-out rates and give the individual student a broader and better-informed choice of study that also relates to a constantly changing labour market. (Learn more in chapter 5.3, page 85).

20

Digital tools are to support teaching in primary and secondary schools

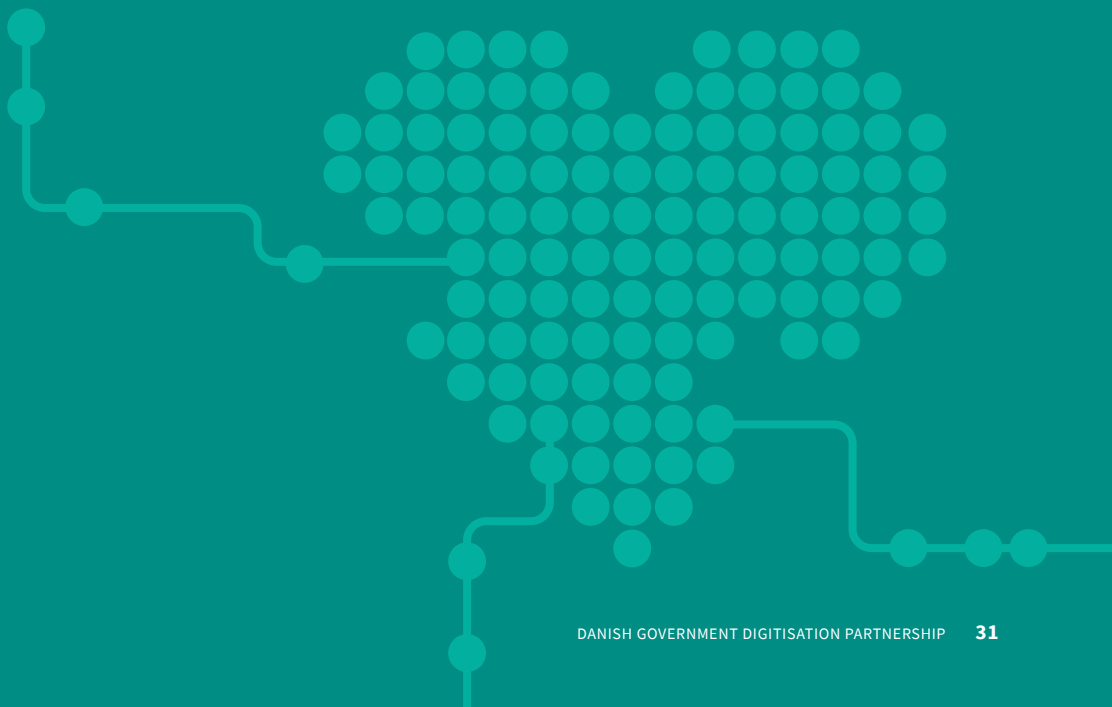
As one of the leading countries in the world, Denmark must make a national digital forum available where teachers can discuss relevant matters and share knowledge about various programmes, materials and ideas for teaching. The forum is to be accompanied by a set of guidelines and recommendations that teachers will update. This ensures that progress and good ideas are used for both preparing teaching and for which digital and analogue tools can best be shared for the benefit of all Danish teachers. (Learn more in chapter 5.3, page 86).

3.4

Healthcare as digital front-runner

VISION

We need to improve healthcare through digitisation and take advantage of developments to create a health sector – across private and public healthcare services – that supports a healthier life for the citizens and a health sector that is economically geared to meet future requirements. Access to data will enable us to diagnose potential diseases early with a view to prevention. The use of data, digital solutions, and automation ensure optimal prevention, treatment and rehabilitation, and efficient resources. Accessible, high-quality health data ensures that innovative businesses and research environments develop and find solutions that create growth and prosperity.



The healthcare area is relevant for all of us. At the same time it is an area where increased digitisation is of great value. Therefore, healthcare should be a digital front-runner that shows the value and creates trust in increased digitisation.

The Danish health sector must be the best in the world when it comes to taking advantage of the massive potential of digitisation, new technology, and health data to increase the quality and capacity of treatment and create a basis for groundbreaking research and new digital solutions in the business sector. Denmark is at the forefront of digitisation in the healthcare sector. The COVID-19 crisis has accelerated digital development, including standard digital solutions for the test and vaccine programmes and the increased use of video consultations. Danish health data are also among the best globally and contain unique knowledge about health and diseases.

However, there is a huge potential in using health data on a much wider basis. Increased and broader use of health data can help create value in diagnostics, treatment, hospital operation and research and as a basis for innovation, exports and growth in the private sector. The Danish Government Digitisation Partnership emphasises that health data must be used responsibly and securely with high trust from the individual patient.

Accordingly, health data can be used as a basis for new diagnostic and treatment methods and the introduction of new technologies for diagnostic and treatment purposes. We will need that in a health sector where capacity will be further stretched for many years ahead as the average age of the population increases. If we do not seize the opportunities of digitisation, the health sector will not handle its tasks and meet future requirements.

Digitisation and new technology can improve contact between the health sector and the citizen through more individualised and coherent treatment plans driven by health data.

As a result, citizens will be diagnosed and get treatment sooner. In the psychiatric treatment area, the potential for taking advantage of new technological opportunities is even greater. Digital psychiatry allows for new, well-documented types of therapy and wholly or partly automated treatment.

We need to take advantage of that potential to meet the requirements for the health sector in the future. At the same time, we need to take much more advantage of the vast growth potential of attracting pharmaceutical research and digital businesses to Denmark. For this to become a reality, we need to offer much easier access to high-quality health data. Therefore, the Danish Government Digitisation Partnership believes that health data must be accessible to maintain a world-class life science sector and research environment.

To take advantage of the tremendous digital development opportunities in the Danish health sector, the Danish Government Digitisation Partnership believes that data sharing across health players – both private and public – should be a high-priority area in the years to come. In this connection, we need to use the Danes' health data as an active part of the health services across treatment plans and players in the health sector. This must be done while taking into account the individual's right to privacy.

On this basis, the Danish Government Digitisation Partnership presents five specific recommendations which are described in more detail in Section 5.4.

RECOMMENDATIONS

21

Access to aggregated health data

The health platform Sundhed.dk and the personal health app MinSundhed must make it easy for patients and health-sector employees to get an overview of relevant information about their health in the form of appointments, test results, scanning images and other information in medical records. Therefore, the work on sharing relevant data via the joint-public infrastructure, which is a partnership between the state, the regions, the municipalities and the health professionals in private practice, must be developed and accelerated. (Learn more in chapter 5.4, page 88).

22

A healthier population based on data and new technology

Increased use of data and technology must make the health sector much more efficient, proactive and closer to the citizens. Initially, the initiatives must focus on treatment areas offering a particular potential, such as cancer treatment, orthopaedic surgery and major chronic diseases, and typical tasks such as diagnostics, administration and care where artificial intelligence and robot technology offer massive potential for improving quality and efficiencies. (Learn more in chapter 5.4, page 89).

23

Digital post throughout the health sector

Citizens must be able to view digital letters from public and private health providers in the same place. That is not possible today without the citizen giving active consent. (Learn more in chapter 5.4, page 90).

24

Better health services via the citizens' personal data collection

To create a better and more personal health service, the health sector must receive and use data collected by citizens, e.g., smartphones and other wearables. (Learn more in chapter 5.4, page 91).

25

Psychiatry as national front-runner in digital services to citizens

Psychiatry is to be a front-runner in the digital treatment of specific psychiatric disorders where new technologies in the psychiatric services have a well-documented effect. Therefore, a national innovation programme for digital psychiatry should be developed, focusing on maturing and upscaling up-and-coming technologies in psychiatric treatment or socio-psychiatric services. (Learn more in chapter 5.4, page 92).

3.5

A greener Denmark through digitisation of the utility sector

VISION

We must be a global leader in efficient and sustainable use of natural resources for Denmark to become CO_2-neutral. The use of utility and climate data is to help create the basis for this. At the same time, we need to take advantage of the inherent potentials of such data to pave the way for reducing the climate footprint of citizens, businesses and authorities. Finally, increased access to utility data of the entire sector is to support innovation to a much greater extent and ensure that we are leaders in in the export of green technologies.

The world faces significant climate change, which calls for massive action both short and long term. Several political initiatives have already been taken, but the target of the climate law for a 70 per cent reduction in CO_2 emissions by 2030 and climate neutrality by 2050 is still a long way ahead. To attain our objectives of green transition, much more extensive use of data is required.

Digital solutions can contribute to accelerating the green transition for the benefit of citizens, businesses and society. The 13 climate partnerships have already pointed out a number of possible solutions in this respect. On this basis, the Danish Government Digitisation Partnership has decided to supplement the work of the climate partnerships by presenting a few but essential recommendations focusing on the energy and utility area.

Worldwide, Denmark and Danish businesses are seen as strong drivers of innovation and competitive technologies to benefit the climate. So, as a country, we are doing well when it comes to digital solutions that support the green transition – in Denmark and through the export of Danish climate solutions.

However, to take advantage of the opportunities provided by digitisation, we must be much better at ensuring access to energy, utility data of adequate quality and with the right uses as a critical prerequisite for the next steps in the green transition. Data are to be used to support structural transitions, including more efficient energy production and distribution, but should also contribute to the development and more widespread use of solutions aimed at Danish businesses and citizens' behaviour and consumption patterns. This is particularly important because the Danish consumption-based climate footprint per inhabitant is among the highest in the world.

As a supplier of electricity, water and heat for the other societal sectors, the energy and utilities sector plays an essential role in the green transition. This applies to the transition from black to green energy and the provision of stable green energy from many different sources – regardless of whether it is sunshine, windy, or all production units in Denmark is running at full speed. Therefore, the Danish Government Digitisation Partnership believes that it is essential to ensure that all energy and utilities are coordinated through data and digitisation. This ensures valuable coherence across the sectors and supports Danish citizens' and businesses' access to data about their energy and resource consumption and insight into alternative options that might eventually lead to changes in behaviour. Overall, this will increase the contribution of the energy and utility sector towards realising Denmark's climate targets and help ensure that we use the resources most efficiently.

The Danish Government Digitisation Partnership recommends that an action plan be prepared for existing and future digitisation initiatives in the energy, utilities and climate area to ensure that the solutions are coordinated across the public and private sectors. Moreover, the massive focus must be on data sharing and connection across types of utilities and value chains.

On this basis, the Danish Government Digitisation Partnership presents three specific recommendations described in more detail in Section 5.5.

RECOMMENDATIONS

26

Long-term action plan for digital acceleration of the green transition

A long-term action plan for digital value creation in the energy, utility and climate area is to accelerate the development of digital solutions and reinforce Denmark's green position of strength globally. (Learn more in chapter 5.5, page 94).

27

Climate-friendly energy and utility services via increased access to meter data

Based on experience from the electricity sector, a basis must be established for digitising the gas, water and heating sectors to the wide use of remote meter reading. A good data basis must make it easy for citizens, businesses and authorities to keep track of and reduce their resource consumption and contribute to streamlining and innovation in the business sector. (Learn more in chapter 5.5, page 95).

28

Efficient green transition via a national data space for energy and utility data

Based on the electricity sector, a national data space must be established for energy and utilities. As the accessibility to data from the gas, water and heating sectors increases, such data are included in the data space. (Learn more in chapter 5.5, page 96).

3.6

Intelligent and flexible transport through digitisation

VISION

We need to create a digitised and intelligent transport system that gives citizens easy access to door-to-door transport across transport types, public and private – in an affordable, secure and sustainable manner. In the longer term, a network of self-driving electric vehicles makes transport time productive, eliminates traffic, parking, and pollution problems in the cities and forms part of a sustainable energy system.

Flexible and fast transport options are vital for the everyday life of many Danes. They are also the foundation for a Denmark that is tied together across urban and rural areas. However, the everyday life of many citizens and businesses is characterised by delays and time wasted in queues which are extremely expensive for society and harms the climate

Data and digitisation have enormous potential for creating specific value for citizens and businesses through more intelligent and more efficient mobility, just as data-driven transport solutions offer tools to accelerate the green transition of the transport sector. In this way, responsible and purposeful use of data and digitisation can provide significant contributions to greener, more intelligent and flexible mobility over the years to come.

We will not only enhance the efficiency of existing transport types and patterns. We need to provide the basis for new ones. As a result, data must be used responsibly to develop and spread innovative solutions that will make more people use public transportation, stimulate sharing-economy solutions and get more electric cars on the roads as a replacement for petrol and diesel cars.

Therefore, the Danish Government Digitisation Partnership recommends how data and digitisation can contribute to flexible and coherent mobility solutions and make getting A to B more straightforward and efficient.

Better traffic flow must be created, and the location and use of parking spaces and charging stations must be optimised to make sure that we can all reach our destination faster. Moreover, the Danish Government Digitisation Partnership finds it essential to make it much easier and more flexible for Danes to use public transportation and car-sharing as part of their daily journey.

On this basis, the Danish Government Digitisation Partnership presents three specific recommendations described in more detail in Section 5.6.

RECOMMENDATIONS

29

Less congestion and better flow of traffic

The national initiative to roll out intelligent traffic management must be strengthened, e.g. via shared structures for relevant sensor and mobility data. The initiative should be supported by incentive-driven use of the road network, for example. in the form of dynamic road pricing. (Learn more in chapter 5.6, page 98).

30

Optimised parking and charging infrastructure for greener mobility

Increased coordination of the parking and charging infrastructure must contribute to better diversion of traffic with a need for parking and charging. In this connection, sensors and data must make it easier for drivers to find a vacant charging station and parking space. (Learn more in chapter 5.6, page 99).

31

Streamlined from A to B through improved coherence across transport types

Nationwide use of an integrated digital platform solution must be ensured to create better coherence across transport types. The users of the platform must be animated to choose green transport. (Learn more in chapter 5.6, page 100).

3.7

Accelerated innovation through public-private partnerships

VISION

We need to develop new innovative solutions and growth successes in close cooperation between the research community, the business sector and the public sector.
We need to create the best growth conditions for startups and pilot projects and attract leading researchers. This way, we make sure that we are among the first to take advantage of new technologies, such as cloud, artificial intelligence and quantum technology, to create value and growth in the business sector and public sector and development for new and established businesses that can feed into digital export successes.

Denmark must remain on the forefront of the digital agenda. We have come a long way, but technologies are developing fast, and other countries are moving even faster than we are in Denmark. We need to exploit the technological opportunities and develop new innovative solutions that can create value for the citizens and contribute to Danish businesses' growth and exports. However, we also need to be equipped to meet the major societal challenges facing Denmark, particularly in the areas of welfare as a result of demographic change and in relation to the green transition. Challenges for which we might not have a solution yet. The Danish Government Digitisation Partnership will require close cooperation across the public and private sectors where knowledge, skills and resources are developed. That also goes for new digital areas, such as quantum technology.

The COVID-19 crisis has shown us that this is possible when a critical need arises. Within a short time frame, new digital solutions were developed, such as the COVID-19 track and trace app and the coronavirus passport. We have also previously seen that Danish businesses can develop leading digital solutions in cooperation with the public sector, subsequently forming the basis of export successes. The same applies to many solutions contributing to Denmark's constant top position in international surveys on public digitisation. That goes for the standard secure login solutions NemID and the new MitID, both established in a partnership between the public and finance sectors. This is a significant Danish position of strength. We should also reap the benefits when the Danish Government Digitisation Partnership recommendations are realised and in the further digitisation of society.

The public and private sectors must be each other's prerequisites to strengthen Denmark as a digital pioneer. The private sector and the university communities have the skills, solutions, ideas and market overview that can help strengthen the performance of tasks in the public sectors. On the other hand, the public sector has the data and knowledge that can help strengthen the competitiveness of businesses in the export markets. Tomorrow's solutions should therefore be found together. This is to increase the value for the users of the solutions and help create growth and export opportunities.

A key priority for the Danish digitisation initiative over the coming years should therefore be to ensure optimum interaction between the public, private, and university communities to strengthen innovation across all sectors. At the same time, we should ensure that the conditions for technology-based startups are improved to make Denmark an attractive place to stay when the business is upscaled internationally.

The Danish Government Digitisation Partnership believes that major action should be taken to strengthen the framework for better cooperation on large-scale and small-scale IT projects. New models for collaboration and partnerships for public IT projects and data-driven innovation should be explored. In addition, the framework for technology transfer from the universities to the business sector should be improved to make it easier for researchers and students to realise their good ideas. Finally, the public digital solutions that have made Denmark a front-runner should also be considered export opportunities.

On this basis, the Danish Government Digitisation Partnership presents three specific recommendations described in more detail in Section 5.7.

RECOMMENDATIONS

32

Stronger interaction between universities and the business sector as a driver of growth

If the next digital unicorns are to be born in Denmark, it will take a stronger interaction between universities and businesses. This requires a reform of the technology transfer between universities and the business sector to promote cooperation and better possibilities for IT entrepreneurship for researchers and students (Learn more in chapter 5.7, page 102).

33

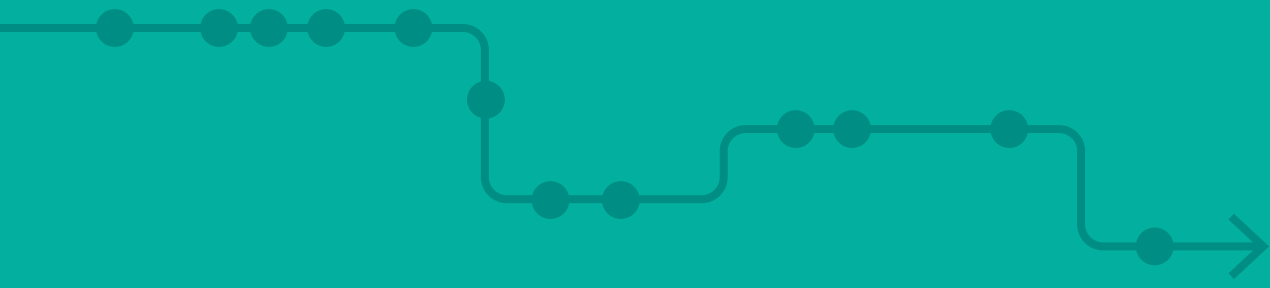
Partnerships on the key IT solutions of the future

More public-private partnerships must be behind the large procurements of key IT solutions. Based on learning from the shared secure login solutions NemID and MitID, private players and private authorities must enter into binding partnerships to develop the future, large public IT projects. (Learn more in chapter 5.7, page 103).

34

Taskforce is to strengthen exports and internationalisation of Denmark's digital solutions

Denmark's leading position in the field of public digitisation must be translated into Danish exports. A cross-sectoral task force is to prepare an action plan for Danish authorities bringing Danish digital solutions out into the world in partnership with the private sector. The experience gained from the energy and life science sector will be used. (Learn more in chapter 5.7, page 104).



4

Foundation for digital developments

Realisation of the previous recommendations requires us to further develop Denmark's strong, digital foundation. In this connection, the Danish Government Digitisation Partnership has identified four focus areas that provide the foundation for a strong digital society. It takes resources, speed and ongoing initiatives to maintain and strengthen the foundation.

The four focus areas are:

1. Life-long digital skills development.
2. Increased and responsible use of data.
3. Strong cyber security.
4. Pioneer of modern digital infrastructure.

The Danish Government Digitisation Partnership believes that for the next step in Denmark's digital development to be successful, the Danes must develop and further develop their digital skills throughout life, that Denmark ensures increased and responsible use of data, that we have robust cyber security and that Denmark is among the first countries in the world to roll out a modern digital infrastructure securely and responsibly continuously.

This chapter describes key elements of the foundation and the future focus and 12 specific recommendations for strengthening the foundation. This is to help move Denmark forward.

4.1

Life-long digital skills development

Digital development brings many new opportunities in terms of the green transition, development of the health sector and the digital transformation of Danish businesses. To reap the benefits, we need to be able to seize the opportunities. A broad and high level of competence in the population is a vital prerequisite for the Danish society and businesses to benefit from digitisation and develop new digital solutions to society's challenges. To do that, we need to priorities the area, because without the right competences, we will not be able to reach our goal of Denmark being a digital pioneer. The pace is vital if we are to reap the great benefits of further digital development. The work to increase the competence level at all levels in the educational system should start as soon as possible.

Continuous digital development means that digital skills must be gained, developed and updated throughout life. We all need to navigate the digital society, and more people need to acquire skills and expertise at an ever-higher level. If we are to succeed, it requires learning throughout the educational system and working life – it is about a general understanding of technology, more people with digital skills and a strong digital culture. Furthermore, the education of more IT specialists is crucial for digital development.

Moreover, digital skills and help and guidance for citizens with particular digital challenges are a prerequisite for being able to participate in society. At a minimum, all Danes should have basic digital skills and a fundamental understanding of technology.

Primary and secondary school education

The basic digital skills must be established early in life. All children and adolescents must have basic digital skills and understand the digital culture from attending primary and secondary school. This requires a more focused and fast rollout of teaching programmes pertaining to digital skills and understanding of technology. The programmes are to be based on experience from the existing pilot projects involving the subjects of digital culture and understanding technology at primary and secondary school.

Higher education

Higher education (short-term, medium-term and long-term) must focus more on digital skills – even if the educational programme's content is entirely different. This way, more people will have relevant digital skills when they enter the labour market.

Furthermore, more Danes with specialised IT skills are needed to meet the demand in the labour market. Generally, the demand for digital skills exceeds the available supply. This is a crucial challenge, and the Danish Government Digitisation Partnership expects this demand to increase further in the future. The lack of specialised IT skills inhibits Danish growth and innovation as well as Danish export opportunities. In this connection, the Danish Government Digitisation Partnership needs to emphasise that it is essential for society and the digital development that more women choose and complete STEM education. The Danish Government Digitisation Partnership also believes that it is vital that all qualified applicants be accepted to relevant IT educational programmes to ensure that we gain more IT specialists. Accordingly, the businesses must assume responsibility for ensuring a sufficient number of apprenticeships for IT apprentices.

Further education

The use of various digital tools is an increasingly integrated part of the work at most Danish workplaces. This development is expected to continue, and therefore continuous focus on upgrading the skills of employees and managers is paramount. Continuous updating of skills is necessary in all sectors and industries. Employees and managers need to update their digital skills as technological development progresses.

Employees and employers – both public and private – have a responsibility for ensuring the skill development occurs. All employees must keep their skill development up to date to be ready for today's and tomorrow's labour market, but employers share a large part of this responsibility. Therefore, the Danish Government Digitisation Partnership believes that further education and retraining focused on digital skills is an area which all social partners should focus on and take responsibility for to make sure that employees across industries and sectors, including skilled labour, upgrade their skills to a evolving digital labour market. This will help future proof the Danish workforce.

Recommendations to ensure digital skills and life-long digital learning

A joint action by the public and private sectors, employee and employers' organisations and civil society are needed to raise Denmark's digital competence level. This is essential to maintain cohesion and active participation in society and for growth and competitiveness.

The recommendations for the lifelong strengthening of digital skills include learning from the early digital training of children and adolescents over higher education and upgrading employees' skills through strengthened further education. Moreover, the Danish Government Digitisation Partnerships points out that the access to foreign talent, where a specific need exists, can be made less bureaucratic through improved and more digital processes.

Only through this broad approach to competences can we ensure a fair society, the next steps in the green transition, growth in the business sector and good public services.

On this basis, the Danish Government Digitisation Partnership presents nine specific recommendations described in more detail in Section 5.8.

RECOMMENDATIONS

Recommendations regarding digital skills in the educational system

35

Developing an understanding of technology for everyone in primary and secondary education, and vocational education programmes

An understanding of technology should become a mandatory subject in primary and secondary education, and vocational education programmes. (Learn more in chapter 5.8, page 106).

36

Higher education must be adapted to include developing IT knowledge and competences

Higher education within different subject areas must focus on providing students with the digital skills essential for getting a relevant job. (Learn more in chapter 5.8, page 107).

37

Larger cohorts on popular IT education programmes

More candidates need to graduate from IT education programmes to meet the increasing demand for IT skills. More people need to apply for the IT education programmes, and all qualified applicants should should be accepted on to the programmes.(Learn more in chapter 5.8, page 108).

38

More apprenticeships for IT apprentices in all types of businesses

Many IT apprentices doing school-based practical training should be reduced, and instead, they should be apprentices in a business. Therefore, it must be ensured that all IT apprentices have an apprenticeship at the end of their two-year basic programme. (Learn more in chapter 5.8, page 109).

Recommendations regarding the development of the digital skills of the workforce

39

All unemployed people must have basic digital skills

It must be ensured that all unemployed citizens, who are not expected to further education, have the basic digital skills increasingly necessary to gain employment. (Learn more in chapter 5.8, page 110).

40

Strengthened further education to upgrade digital skills

The workforce's digital skills must be increased by creating a better match between businesses and training providers to make it easier for employers to find relevant, high-quality further education courses. (Learn more in chapter 5.8, page 111).

41

Life-long skills development through personalised, digital skills upgrading offers

A digital tool must be developed that supports individuals in the choice of further education and training. The tool is to be personalised based on data from previous training, experience, interests and development, career and financing opportunities, focusing on strengthening the skills needed in a digital world. (Learn more in chapter 5.8, page 112).

Recommendations regarding the development of a workforce with digital skills

42

Digital platform for further education

As one of the first countries in the world, Denmark must develop a digital platform for further education that brings together and manages training offers where professional groups can find relevant learning material. This is to help create an overview, qualified guidance and access to skill development for the users. (Learn more in chapter 5.8, page 113).

Recommendation regarding digital inclusion

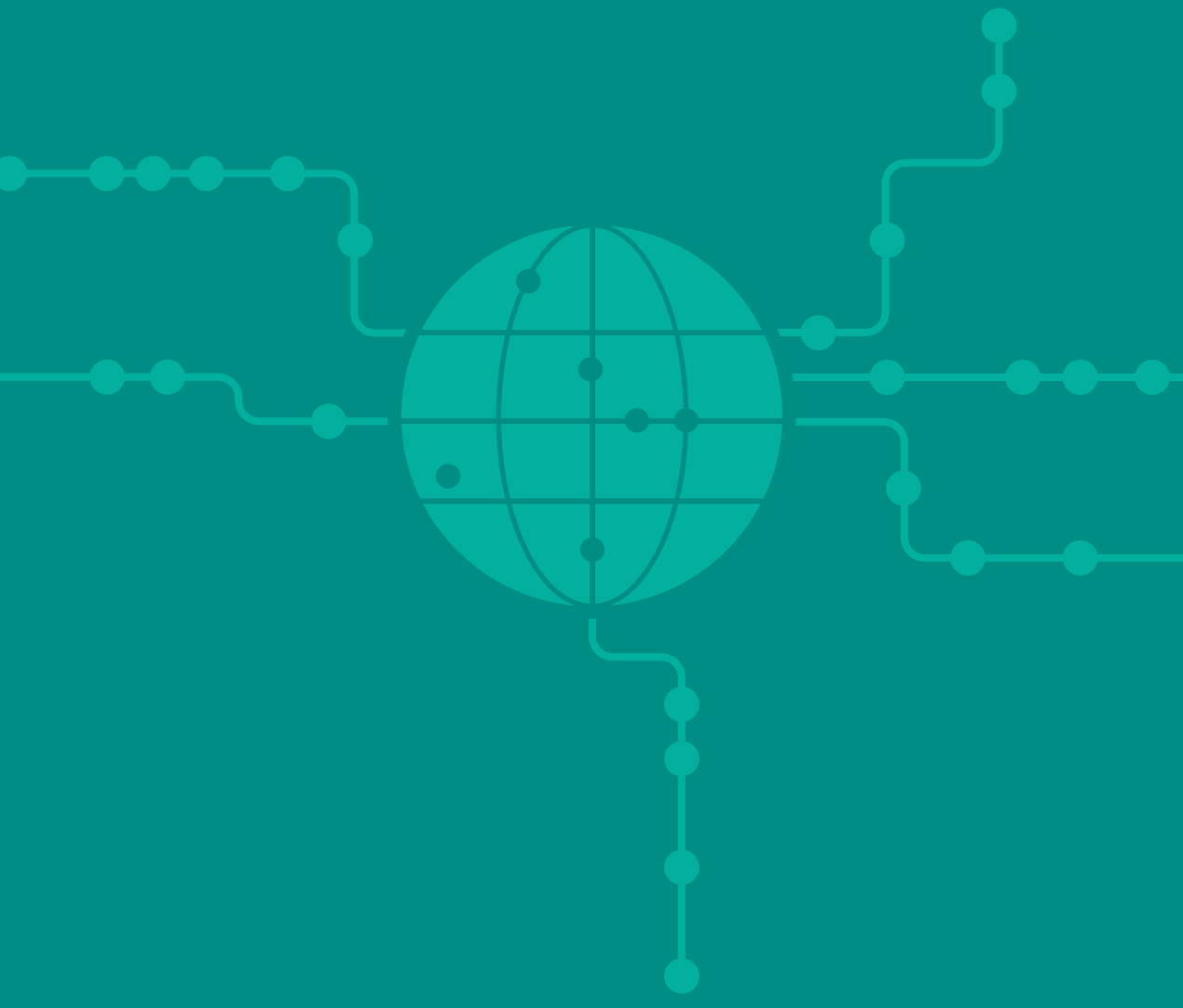
43

Everyone must be able to participate in Digital Denmark

It must ensure that digitally challenged citizens get the help they need to communicate with public authorities and use digital self-service solutions. That is necessary to be able to participate in society. (Learn more in chapter 5.8, page 114).

4.2

Increased and responsible use of data



The use and sharing of data have great potential for creating specific value for Danish citizens, businesses, and society. Increased use of data is a prerequisite for realising many of the Danish Government Digitisation Partnership' focus areas. In Denmark, we have come a long way on the data agenda. Still, over the coming years, we need to accelerate the use of data not to lose ground in the international competition and take advantage of the opportunities to improve public service.

Globally, an increasing interest is seen in data and technology as an economic and security policy factor. The United States and China, in particular, stand out as technological superpowers, albeit with two very different approaches to issues such as data protection and ownership. The EU has a similarly strong focus on the potential offered by digitalisation and is advocating a third path in the field of data and technology with a focus on responsibility and European digital values.

Despite the role as a front-runner on the data protection agenda, the EU lacks the practical rollout of data-driven solutions and new technology. The Danish Government Digitisation Partnership finds that a European path focusing on people does not lead to extensive bureaucracy and regulation that will set back the European businesses' and authorities' use of data compared to the rest of the world. Law supports responsible digital development but must not slow down development by creating unfounded fear and unclear legislation.

In the years to come, we need to find a balance where we use data and new technology to a much higher degree to stimulate innovation, competitiveness and growth and efficient public services. However, at the same time, it needs to be done in a responsible manner that fosters trust and is based on our societal values. The vision of the Danish Government Digitisation Partnership for considerably easier and more widespread use of data in society requires ambitious and coherent action to accelerate the development of a well-functioning Danish data infrastructure. Such measures should, in particular, focus on influencing the EU data agenda at an early stage.

Initially, we must address the pervasive challenge of the lack of access to data. The public sector should therefore take the lead and make more data accessible. This concerns both open data, anonymised data to which selected businesses and institutions have access, public data to which everyone has access, and public personally identifiable data that must be protected but can still be used for specific purposes, such as research. First and foremost, such measures require that businesses, research institutions and authorities get an overview of the public data to which they may be granted access.

Secondly, investments are needed to improve the quality of public data. Such investments are targeted at the areas and initiatives that generate the most value for the users. Therefore, the Danish Government Digitisation Partnership recommends that priority be given to investments in data that meet specific demands rather than investments in extensive procurement of public data or aiming for all data to be open by default.

One of the most sought after things is data that can be used across different professional or sector areas to break down data silos. In the opinion of the Danish Government Digitisation Partnership, it is crucial that future data projects are coordinated and reuse good practices to ensure the necessary coherence and standardisation. This will make it easier to reuse data across sectors and European borders. It will require strong joint-public governance in the data area, and private players will need to help set priorities for public data projects in, e.g. with respect to the climate.

However, giving access to more and better data is not enough. Measures must also ensure that businesses and authorities generally use data ethically, responsibly, and that they are transparent, and secure. If we lose focus in this respect, there is a risk that citizens, businesses and employees lose trust in digitisation and find that it impairs their working or living conditions. Continued high levels of trust in the use of data despite increased usage is an essential prerequisite for the continued digitisation of society.

To reap the benefits of increased data sharing and at the same time maintain the citizens' trust, the Danish Government Digitisation Partnership believes that several tools should be used in the Danish measures to access and use data. In some situations, the best solution will be to let the citizen control the use of data through consent. In other situations, the statutory authority will be the best solution. Technological means, such as anonymisation or pseudonymisation of data, will be the right choice for several other uses. Selecting a approach depends on several factors. Therefore, the Danish Government Digitisation Partnership recommends that a framework tool be developed, in which the type of data, the sector from which data originates, the recipient of the data and the purpose of sharing and using the data will be vital for whether the data is used based on consent, statutory authority, anonymisation tools, etc. The general rule should be that the more valuable data is for society, the more data citizens, businesses and authorities should provide.

With the recommended data initiatives, the Danish Government Digitisation Partnership has pointed out areas, such as climate, health, education and transport, where particular consideration should be given to whether more tools for increased data sharing should be used. As part thereof, the Danish Government Digitisation Partnership recommends accelerating the use and development of tools that make it possible to share and use data in an anonymised form or where privacy is built into the solutions right from the start.

In addition, the Danish Government Digitisation Partnership makes three specific recommendations with respect to data measures. It is recommended that an overall plan be prepared for increased accessibility to public and selected private data. Several measures are initiated to ensure ethical, responsible and secure use of data and new technologies among businesses and the public sector. The recommendations also suggest initiatives in these areas that will create value in the short term for citizens and the public sector and form the basis for developing new business models and growth in the private sector.

On this basis, the Danish Government Digitisation Partnership presents three specific recommendations described in more detail in Section 5.9.

RECOMMENDATIONS

44

Roadmap for more and better public data

It should be easier for citizens and businesses to find and create value using public data. Therefore, a roadmap must be developed for available public data, and a plan must be prepared to make more and better public data available. A strong mandate and associated governance must be secured to create more coherence across public data measures. (Learn more in chapter 5.9, page 116).

45

Increased trust in digitisation

The trust in digitalisation in Denmark must be increased through clear ground rules, institutional initiatives focusing on responsibility, transparency and rights, and a better understanding of and focus on the benefits and results of digitisation. (Learn more in chapter 5.9, page 117).

46

Responsible and ethical digital transformation of society

Several initiatives must be launched to ensure that businesses and the public sector use data and new technologies in an ethical, responsible and secure manner that can support a democratic development of society. (Learn more in chapter 5.9, page 118).

4.3

Strong cyber security

Denmark is one of the most digitised countries in the world. When it comes to the digitisation of the public sector, we are one of the front-runners. This also applies to much of the privately-owned critical infrastructure. Digital solutions are critical to the operation of essential functions in society and for most Danish business sectors. Digitisation and technological development offer many opportunities and lead to increased vulnerability and continued change of the threat and risk pictures. The more digital systems we use and connect, the more places are vulnerable to attacks and the more damage can be caused.

The COVID-19 crisis has affected the threat picture. The transition to a greater degree of teleworking and remote working has increased the risk that hackers will succeed in their attacks on companies, organisations and authorities worldwide.

Denmark is being hit by cyberattacks daily, and the major cyber threat has become the norm. Criminals steal from Danish citizens and businesses via the Internet, and state actors carry out politically and commercially motivated espionage against companies and Danish authorities. The threat to cyber and information security is widespread. If attacks significantly affect the confidentiality, integrity or availability of citizen or business data and systems critical to society or businesses, it can adversely affect trust in authorities and companies. It may even have serious economic consequences and a negative impact on Denmark's security and prosperity. As a result, the area must be prioritised in both the public and private sectors.

Cyber and information security is partly about technical solutions and ensuring the necessary digital skills, proper organisation, and better security culture. Therefore, the Danish Government Digitisation Partnership finds it critical that the actions to strengthen cyber and information security are made within several areas and at all levels internally in organisations (from top management to employees) and society in general (at citizen, business and authority level). This also applies to the small Danish business that needs to assess its cyber security and know who to call in the event of a hacker attack. Strong cyber and information security is a vital element of the foundation to ensure that Denmark can realise the significant benefits of digital development and should therefore be an area in which the public sector takes the lead in using up-to-date solutions that provide better resistance to modern threats and in creating the suitable incentive structures for both the private sector and the citizens.

Furthermore, the Danish Government Digitisation Partnership believes that private businesses have a great responsibility for ensuring the proper security level, including updating and protecting their own IT systems, networks and data. In the same way, the individual citizen has a responsibility for protecting themselves against IT criminals. All of us need better digital skills – both in our private lives and at work.

The digital infrastructure, which is a prerequisite for digital development, is global and crosses national borders, and as a result, cyber and information security is also a global challenge. This is also why the topic is high on the European agenda. EU regulations provide the framework for digital measures to strengthen security. The Danish Government Digitisation Partnership considers it necessary for Danish businesses and authorities to strengthen their focus in the area.

Internationally, there is an increasing focus on norms and rules for responsible behaviour in cyberspace, including the EU, the UN and NATO. The Danish Government Digitisation Partnership believes that Denmark has an apparent interest in binding international cooperation that creates common ground between leading countries and ensures that actors that violate internationally agreed norms – e.g. through attacks on civilians, businesses or critical infrastructure – are held liable. Moreover, the Danish Government Digitisation Partnership believes that the private tech industry plays an essential role as first responders in the event of advanced cyber attacks, but also concerning providing information and developing joint solutions in the cyber area. The Danish Government Digitisation Partnership needs to emphasise that initiatives to strengthen cyber

and information security require ongoing dialogue and close cooperation between authorities, private businesses and civil society.

The cyber and information security work in Denmark is strategically embedded in the Danish Cyber and Information Security Strategy (2018-2021) and the joint-public digitisation cooperation. The strategic actions focus on strengthening the central cross-cutting support of authorities and companies and cooperation and dissemination of knowledge on how cyber and information security can be technically and organisationally strengthened.

In June 2021, the government entered into an agreement with the parties behind the Defence Agreement on strengthened cyber defence to enhance Denmark's ability to counter the rapidly increasing cyber threat facing companies, authorities, and citizens. Moreover, the Danish Government Digitisation Partnership notes that in the finance bill for 2022, the government has earmarked funds for a new Danish cyber and information security strategy which is expected to be launched at the end of 2021. The terms of reference for the strategy work specify that the measures focusing on cyber robustness in the private sector must be strengthened, particularly on SMEs. In that light, the Danish Government Digitisation Partnership has decided to describe matters of vital importance for strong cyber and information security rather than specific recommendations. However, we would like to emphasise that it is vital that the government strategy focuses on the entire public sector – state, municipalities and regions.

The Danish Government Digitisation Partnership believes that the area requires higher priority both politically and in the business sector. Cyber and information security is a fundamental foundation for all digitisation and needs continuous strengthening to keep up with development in the threat and risk picture. This necessitates strong international cooperation in the cyber area based on compliance with mutually binding norms and rules.

Furthermore, we need to ensure good cooperation at the national level, including close public-private partnerships and information sharing on specific threats, development trends, and best cyber and information security practices. In this connection, the Danish Government Digitalisation Partnership finds it crucial that the authorities, in addition to the designated sectors critical to society, strengthen their efforts by purposefully advising and guiding Danish companies, in particularly SMEs. Therefore, the Danish Government Digitisation Partnership emphasises that the cyber security of SMEs needs to be strengthened, e.g. by establishing a Computer Emergency Response Team (SME CERT). A Computer Emergency Response Team can offer relevant help and create the framework for ongoing knowledge sharing and thus help businesses get an adequate IT security level. The focus should be on strengthening the 25 per cent of all SMEs that have not yet implemented fundamental security measures.

Finally, the Danish Government Digitisation Partnership emphasises that Denmark needs to have the digital skills to understand the importance of information security. That applies to all citizens and consumers who need to pay attention to the opportunities of digitalisation but also its risks. It also applies to all employees in the public and private sectors, especially in the Danish SMEs, where many still lack fundamental security. It may seem like an impossible task, especially for small businesses. Still, the lack of security – in addition to consequences for the individual company – may have implications across sectors due to the interconnectedness of the IT systems.

Due to the increasing threat from both criminals and state actors, a confidential space should also be created between the intelligence services, the sector responsible authorities, and the critical infrastructure (CERT units) that can ensure prompt and essential knowledge sharing when attacks are attacked happening.

4.4

Pioneer of modern digital infrastructure

In the future, it is not just our mobile phones and computers, but also most of the things and machines that we surround ourselves with in everyday life and in our working life will be connected to the Internet. This will introduce new opportunities for citizens who use technology every day and for Danish businesses in the production sector, agricultural sector, health sector, and transport area.

The Danish Government Digitisation Partnership finds it essential to support competitiveness, an efficient and productive business sector and a society that brings together rural and urban Denmark. Denmark is at the forefront when new opportunities for enhancing the efficiency of our digital infrastructure emerge.

The rapid rollout of the infrastructure that supports faster Internet is a precondition for the rapid rollout of new technologies that require high-capacity stable, mobile access to the Internet. This includes technologies such as:

- Automation using Internet of Things (IoT) technology and robotics, e.g. in the industrial and health sectors.
- Advanced communication between vehicles in the transport sector, including driverless cars.
- Smart grids, reading of digital meters, electricity grid management, etc., in the energy sector.
- Green solutions, smart cities and climate adaptation initiatives.

Currently, the crucial technologies are fibre network, 5G and access to cloud solutions. The Danish Government Digitisation Partnership agrees with the Commission's ambition that everyone should access 5G and high-speed broadband as soon as possible. We need to aim for a rapid and broad rollout of such technologies, but we must bear in mind that new technologies are maturing on an ongoing basis. As a result, there is a continuing need for the modernisation of digital infrastructure.

Denmark is well underway with the rollout of 5G and fibre network. Still, the Danish Government Digitisation Partnership maintain that and acceleration is needed, including the erection of mobile phone masts and broad rollout of a fibre network and broadband, if we take the following steps in digital development. It is also a prerequisite for realising several of our recommendations. The pace of the rollout will impact how quickly we can benefit from digitisation.

The rollout of 5G and fibre network in Denmark is market-based. This means that the telecom operators, not the state, operate and establish the infrastructure. Therefore, it is necessary for efficient rollout that the regulatory framework is predictable so that the telecom operators experience efficient case management, e.g. in connection with the many excavation and mast erection projects required for the rollout. In addition, better opportunities must be provided for erecting mobile masts in remote areas. The regulation must also stimulate the rapid rollout of the technology throughout the country to ensure that as many people as possible get access to the new opportunities as quickly as possible.

Access to a secure cloud market in Europe

Various types of cloud services play an essential role in providing citizens access to high-quality services and data regardless of where we are. For businesses and public authorities, access to cloud services is essential for the fast and efficient development and upscaling of products and solutions to ensure that capacity can keep up as the behaviour patterns and needs of the users change.

The importance of adopting digital solutions to new behaviour and new capacity needs has become particularly obvious in connection with handling the COVID-19 crisis. Video meetings, online collaboration, distance learning, internet sales and services, the rollout of rescue packages, new digital solutions for handling tests and vaccine rollout, etc., have led to a massive demand for cloud solutions.

In the future, it will be crucial for the Danish business sector and public authorities that they have access to secure and sustainable cloud services with the necessary capacity.

As the need for data processing capacity for digital solutions increases, so does the need for being able to access solutions that have significant and at the same time flexible ability and are far more energy efficient and secure than those that many businesses can establish in-house. The need for more climate-smart and secure solutions are important reasons why there is a need to accelerate a transition to solutions with enough large-scale operation to establish security solutions and climate solutions that require significant investments.

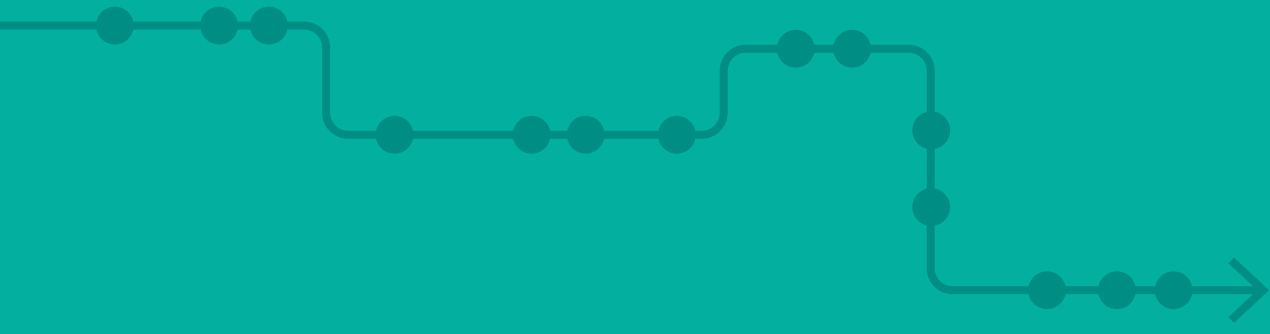
We know that the development of such cloud solutions also poses challenges. A few large global tech companies that built their services to work globally dominate the cloud services market. In continuation of this, there is a need for Denmark and the EU, in general, to ensure that data stored in cloud solutions are processed in accordance with the EU General Data Protection Regulation. This is essential to be able to protect data and privacy.

In particular, the Schrems II judgment has shown that the use of cloud solutions that contain personal data can be legally complex. As a result, many businesses and authorities are experiencing great uncertainty about legality and compliance requirements in connection with data transfers out of Europe, which is often included in cloud solutions. This hampers innovation and slows down development.

The European Commission has identified the lack of deployment of cloud services as a challenge for authorities and businesses. The Commission's target is for 75 per cent of European businesses to use cloud services and artificial intelligence by 2030 and for Europe to strengthen its cloud infrastructure and capabilities. It should be easier for users of cloud services to ensure that European legislation is complied with by all data processors.

Within the EU, actors in Germany and France have taken the initiative to define a uniform cloud standard that meets EU data rules and allows for better data sharing across different cloud solutions within Europe – known as the GAIA-X initiative. The GAIA-X initiative enables both European and global cloud providers to deliver cloud solutions that promote openness, transparency, and secure data sharing. The Danish Government Digitisation Partnership believes that Denmark should actively participate in the GAIA-X initiative to help shape the initiative, increase the accessibility of cloud solutions and increase the opportunities for sharing data across sectors and countries within the EU. Denmark should, in particular, work to ensure that the GAIA-X initiative promotes the highest standards of security and sustainability within Europe's digital infrastructure.

The Danish Government Digitisation Partnership also believes that it is in the clear interest of Denmark to promote a vision for Europe's digital sovereignty that is open to the outside world, promotes European positions of strength and builds on cooperation with other democracies.



5

Elaborated recommendations

In this chapter, the Danish Government Digitisation Partnership elaborates on the 46 recommendations presented throughout this report. The Danish Government Digitisation Partnership has given priority to explaining the individual recommendations in depth. The chapter elaborates on the value and potential of the recommendations and the prerequisites for the recommendations to be realised. In addition, the chapter describes necessary actions to be taken by actors in a society whose contribution is considered paramount by the Danish Government Digitisation Partnership for further digital development in the area. It has been important for the Danish Government Digitisation Partnership to point out these specific next steps to support rapid implementation and value creation.

We start by elaborating on the three recommendations regarding Denmark's involvement in the EU presented in section *Europe sets the framework for digitisation in Denmark.*

1

A strengthened Danish Data Protection Agency serving a proactive function in society

Proposal

To facilitate the digital transition and data protection in society, the Danish Data Protection Agency should receive more funds earmarked for more proactive consulting services, more employees with a technological area of expertise and strengthened Danish participation in the European data protection cooperation.

Value and potential

In line with the EU's extensive regulation of the digital area, relevant authorities must provide far more proactive consulting to Danish businesses and authorities. Already today, several parties requested increased advice on data protection. There are also concerns about the implications for digitisation, innovation and research collaboration. Ensuring that relevant supervisory authorities, such as the Danish Data Protection Agency and the Danish Business Authority, provide more proactive consulting to Danish companies and authorities will thus help to support responsible digital development without putting an unnecessary stop to the use of modern technology.

Prerequisites

- The framework established to discuss the consequences of EU regulation promoting digitisation and covering both industrial organisations and relevant authorities is actively used.
- All relevant authorities in the area play a proactive and supportive role.

Actions

The political parties need to set aside new funds for the Danish Data Protection Agency, which are earmarked for 1) Focus on proactive guidance and consulting to both businesses and authorities, 2) More employees with an IT background to better balance legal and technological core competences in the Danish Data Protection Agency and 3) Strengthening of the Danish Data Protection Agency's participation in European data protection cooperation to increase Denmark's influence on the interpretation and implementation of data protection at European level.

In the business sector, businesses need to engage in an active dialogue with the Danish Data Protection Agency and use the forums offered by the Danish Data Protection Agency for guidance and interpretation of, e.g. EU regulations.

2

Denmark at the head of European data spaces

Proposal

Denmark should head the establishment of European data spaces where initially, we need to focus on Danish positions of strengths within healthcare and climate.

Value and potential

European data spaces are IT environments for data processing and involve legal, administrative, and technical frameworks for accessing and sharing data. Such data spaces are a key component in the ambition of a single market for data, which is to form the basis for a flexible data economy where data can move within the EU and across sectors for the benefit of citizens, businesses, researchers and authorities.

Increased access to and sharing of data in the EU offer massive opportunities for accelerating data and technology use by Danish businesses and authorities since it increases the accessibility and quality of data. A proactive initiative based on Danish experience will make it possible to impact the EU's agenda to consider Danish interests when preparing standards for using and sharing data in the EU. Overall, this will further integrate Danish players in the European value chains, support new data-driven business models, promote growth and create better cohesion across sectors and borders.

Prerequisites

- Danish authorities and businesses must participate actively in joint European applications to establish data spaces and ensure that the necessary co-financing is provided to match the funding from the EU's *Digital Europe Programme*.
- The initiative must be linked to a strengthened initiative to impact the legislative framework for data sharing in the EU. Similarly, a link must be established to current Danish and European data initiatives, e.g. the industry-driven French-German collaboration GAIA-X.

Actions

The Danish authorities must ensure Danish participation in coordination and support actions for data spaces in autumn 2021. The public authorities must also ensure co-financing and create coherence and synergies between Danish data initiatives and European data spaces Danish businesses and civil society must regularly contribute to focusing and prioritising the Danish data space measures. The business community must actively join European partnerships and consortiums to build European data spaces.

3

Social media should not undermine democratic principles

Proposal

The EU must work actively to ensure that social media do not undermine the democratic principles that are the foundation of our society.

Value and potential

Social media have created a host of new ways of interacting and reduced barriers for citizens to express their views, show support, participate in like-minded communities, and organise. However, the flip side of social media is that they can have negative consequences for our democratic principles.

This is an area where it is difficult for Denmark to make a difference on our own in terms of the challenges we are facing. It is, therefore, extra important that Denmark exerts its influence in the EU.

Prerequisites

- The general political consensus in the EU to regulate Big Tech.
- Overall, digital education among citizens needs to be improved.
- A transparent and balanced display of content must be the starting point for any social media.

Actions

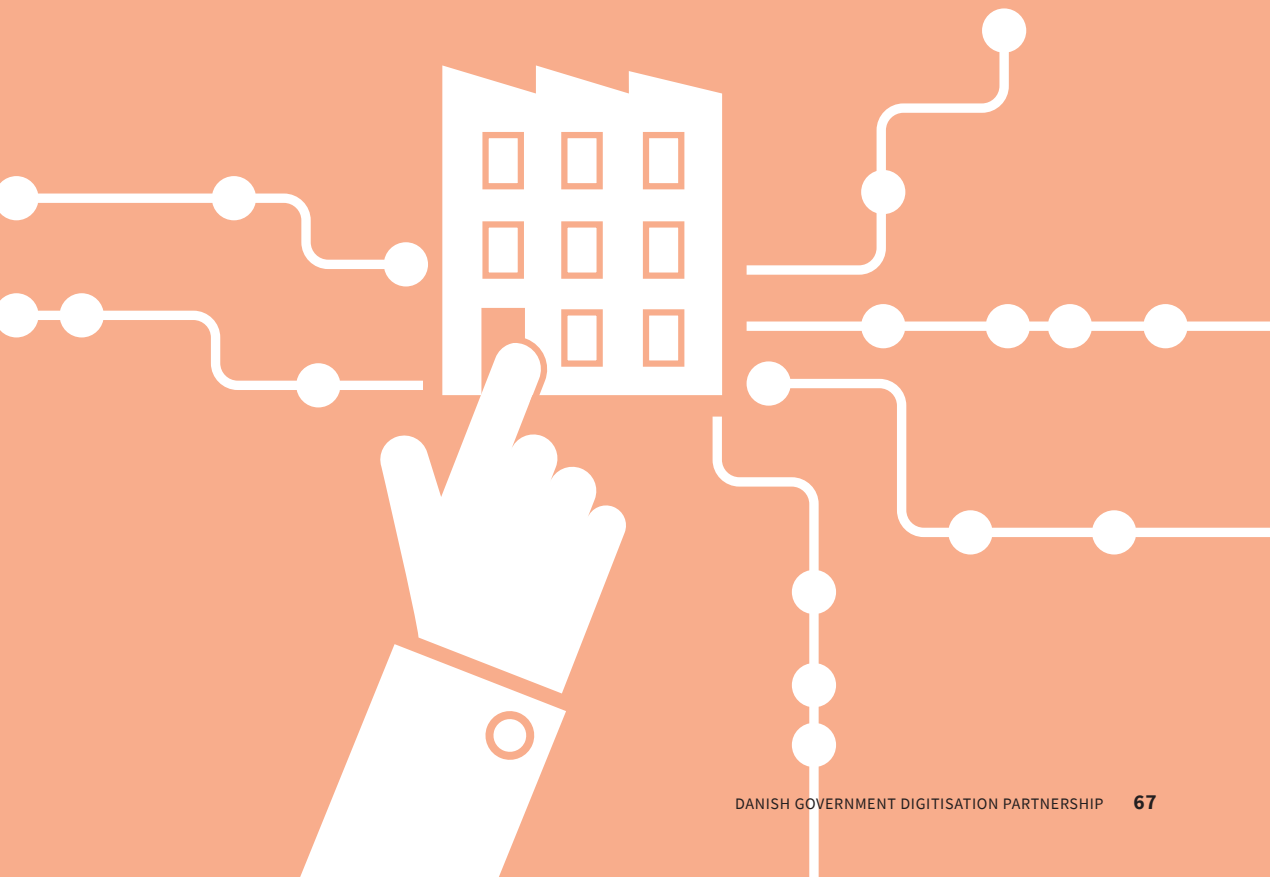
The EU action must be intensified to impact Big Tech to increase the transparency of their algorithms. National political players must support democratic principles when they use online campaigns – especially in connection with elections. This should permeate the European partnership. In the EU, Denmark must work to strengthen the initiatives to stop and declare fake news on social media. A digital ombudsman function can be established in Denmark to keep an eye on and fact check selected content featured in the most shared debates and claims on social media. The digital ombudsman should be authorised to impose fines for particular undemocratic behaviour.

In Denmark, the business sector must validate profiles on social media (e.g. via NemID/MitID).

5.1

Elaborated recommendations

Increased growth and exports through the world's most digitised and productive businesses



4

MinVirksomhed

Proposal

It must be easy to run a business in Denmark. Accordingly, Danish businesses must encounter a new and significantly easier digital reality by automatically reporting business data to all relevant authorities and between companies. In the long run, the solutions should also be used for businesses wanting to establish themselves abroad.

Value and potential

Danish SMEs spend more than DKK 30 billion on person-hours for invoicing, bookkeeping and reporting to the authorities. That equals approximately DKK 70,000 per business. Therefore, the measures will considerably reduce the businesses' burdens for the benefit of growth while combatting cheating and fraud at the same time.

The businesses meet stricter requirements for documentation and reporting of their environmental and climate footprint also provides a foundation for the green transition. Credible and standardised ESG data makes it easier to distinguish between green and non-green projects that allow, e.g. businesses and banks, to choose green projects actively.

Prerequisites

- Digital standards and infrastructure need to be established.
- Rules targeted at businesses must be formulated to prevent the use of new digital technologies.
- Standardised methods for ESG data is being prepared to standardise the businesses' reporting basis.

Actions

Various specific initiatives will be launched to automate reporting, e.g. via a public-private partnership, automated bookkeeping and standardised green ESG and product data with shared formats and guidelines. An efficient infrastructure for sharing financial and green data must be developed. For this purpose, initiatives will be launched to remove barriers to using new technologies in new and existing business legislation.

In the long run, all types of business data must be reported to the authorities and exchanged easily and securely between businesses in real-time by 'the click of a button'. This applies to both financial data and the CO_2 footprint of products, etc. This will enable businesses to automatically enter data in their books, report tax and VAT and provide more accurate credit ratings of business activities. At the same time, MinVirksomhed will support the development of new business opportunities and products. The solutions should also be used across EU borders when Danish businesses are based or want to establish themselves abroad.

5

Five robot libraries – automation as a position of strength

Proposal

Five robot libraries (competence centres for physical robots and software robots) must provide Danish businesses with one collective outlet for knowledge, resources and consultancy and allow them to borrow robots for one month.

Value and potential

Automation is a Danish position of strength that creates growth, exports and new business opportunities for the Danish business sector. However, SMEs experience various barriers to investing in new automation solutions. These include high costs of procurement, consultancy, competence development, etc., and lack of time for development. The lending of robots allow businesses to test products and production flows in a small setup before a full-scale rollout. More businesses may choose to invest in robots when they can test and support how robots in production can help ensure uniform quality and reduce production costs. The good examples of streamlining production through small projects can also help accelerate automation in Danish businesses by sharing experience.

Prerequisites

- Companies must have access to get help for installation and use, technical expert advice, tools and technological demo equipment for testing in automation.
- A strong rollout of 5G networks is also a prerequisite for developing and using intelligent IoT products and a faster and more agile rollout of robots and automation.

Actions

DKK 75-100 million will be earmarked over three years for creating five robot libraries as a pilot project. Here, Danish businesses are given one collective outlet offering knowledge, resources and consultancy related to robots and lending of robots that can be tested in the businesses' production for one month. After borrowing a robot, the business must be able to buy it. After three years, it must be considered whether the project should continue.

The robot libraries across Denmark are established in collaboration between Odense Robotics and other relevant clusters, the Danish Technological Institute, inter-municipal commercial houses and GTS institutes. The robot libraries should be integrated with the activities at relevant business colleges to support the link between education and the implementation of new technology. At the same time, technology experts must provide new knowledge and guidance for SMEs within robot technology solutions.

6

SMV: Digital – significant consolidation of online sale and export of small enterprises

Proposal

Danish SMEs must receive a comprehensive offer from the public authorities to help them with consultancy, resources and competence development to support their digital transition. Accordingly, purpose-built 1:1 assistance must be provided to ensure the SMEs' digital transformation in consultancy, guidance and investment aid.

Value and potential

As in other countries, Danish SMEs generally lag behind major businesses when applying digital technology. There are indications that this gap has widened over time when it comes to advanced technology. At the same time, more than 99 per cent of all Danish businesses are SMEs, which underscores the vast potential. Danish SMEs state that lack of time and resources stops them from taking the next digital steps.

The demand for SMV: Digital has been considerable. From November 2018 to June 2021, the programme received approx. DKK 215 million and initiated more than 2,000 digital projects in SMEs throughout Denmark.

Prerequisites

- It is a prerequisite that the enterprise knows about new digital technologies and how they can strengthen its business and that the enterprise can earmark the necessary time for development.
- The SMEs must also possess the proper management and employee competences to spot any digitisation opportunities.

Actions

The Danish Business Authority is charged with continuing SMV: Digital in the same simple and straightforward setup it has today. Moreover, SMV: Digital will be extended to provide extra offers to the SMEs, e.g. funding for procuring technology and IT (investment aid), competence development directly linked to SMV: Digital consultancy programmes, and new and short themed consultancy programmes. By earmarking DKK 300 million in 2022-2025, this work will be able to help approx. 2,800 enterprises.

The work should also be scaled by developing e-learning tools based on insights about interdisciplinary challenges from the many SMV: Digital projects. This must be used to share the good experiences with more SMEs in an easy and cost-efficient manner. The business sector can take up the reins of this development work.

The Danish Government Digitisation Partnership emphasises that funding from SMV: Digital should only go to enterprises offering fair wages and working conditions.

7

Danish SMEs in a digital Europe

Proposal

The right conditions must be in place for Danish SMEs and authorities to obtain financing for their digital transition and help deliver advanced digital technologies in Europe. This should be done by repossessing funds from the EU's *Digital Europe Programme* through the establishment of a new matching fund.

Value and potential

Digitisation is high on the EU's agenda where the new *Digital Europe Programme* is to spend DKK 55.9 billion from 2021 to 2027 to strengthen the development and implementation of advanced digital technologies. This particularly applies to quantum technology and supercomputers, cloud technology and artificial intelligence. Out of this amount, the EU will spend DKK 17.1 billion during the first two years (2021-22) on applicants from all over Europe.

The programme, e.g. test facilities for artificial intelligence, will give Danish SMEs easy and direct access to advanced digital technologies and support increased use of data, test and validation of AI solutions on secure and reliable terms. Based on validated solutions, the products of the Danish enterprises can easily be rolled out on a large scale throughout Europe. Moreover, receipt of EU funds will give Danish SMEs access to an extensive network of European businesses.

Prerequisites

- Participation in the EU's *Digital Europe Programme* usually requires national co-financing of up to 50 per cent, of which a share must come from public funds.

Actions

A new matching fund will be established (possibly in collaboration with the business sector) in the order of DKK 50-100 million in total for the period 2022-2025. The purpose is the support of the financing of Danish SMEs' digital transition via a Danish repossession of EU funds through co-financing of Danish applications under the *Digital Europe Programme*. The fund is to help Danish enterprises make project applications to the EU's programme and provide government co-financing for the applications. The selection of projects should focus on enterprises that are expected to be successful with their projects, e.g. based on previous growth in turnover, the scope of exports and the ability to attract private venture capital. The fund's work will be evaluated in 2024.

8

Employees must join the growth journey via employee shares

Proposal

New businesses must be able to take their employees along on their growth journey by means of employee shares and transparent tax terms. This must make it possible to create a scheme where more people share the profits when businesses thrive.

Value and potential

Better employee shares create better opportunities for businesses to attract and retain the talents needed to create new solutions and increase value creation. However, Index Ventures state that the framework for using employee shares in Europe may offer some challenges compared with the USA. At the same time, the dispersal of capital income in society will create more millionaires and fewer billionaires.

Prerequisites

- The tax terms for both businesses and employees are often quite complex. That is why attractive and transparent pay conditions for employees holding shares are needed.
- It is also a prerequisite that employees are hired on fair pay and working terms.

Actions

The rules on taxation of employee shares need to be overhauled to make the rules easier to use in practice for both businesses and employees. Tax only needs to be paid when the shares are sold by the employees, with due consideration given to neutral taxation. The overhaul must include recommendations and experience from the expert group on valuation-related ownership transfer and the expert group on democratic businesses. The work must continue to ensure normal pay and working conditions and must be completed in 2022.

Moreover, the business sector must develop a new digital calculation model that should be easy to use for both businesses and employees and which must be able to calculate the valuation using the same method as the tax authorities.

9

Digital freeway for Danish talent

Proposal

Danish businesses must be more accessible to employ foreign labour with the technical and digital skills they demand. Therefore, a digital freeway needs to be created for getting talents to Denmark, making it more flexible, faster, and less bureaucratic to get foreign labour to Denmark.

Value and potential

Today, businesses often miss out on new labour because of lengthy case handling. Ensuring fast and flexible case handling when recruiting foreign labour will make it easier for Danish businesses to attract and onboard foreign labour with the technical and digital skills that the companies demand to benefit growth and employment in Denmark.

Prerequisites

- It is a prerequisite that the Danish Agency for International Recruitment and Integration (SIRI), which is currently charged with the case handling, has the resources to carry out this work.

Actions

The necessary resources supporting fast, flexible, and non-bureaucratic processing must be available when foreign labour enters Denmark. The work undertaken by SIRI, which recently launched 22 digital application solutions, can be extended, and various other initiatives already aim at attracting and retaining international talents.

All four ICS centres (International Citizen Service) should, to the extent possible, issue NemID/MitID together with civil reg. no. as the ICS centres in Copenhagen and Aarhus already do. In this connection, it should be investigated why the rules are interpreted differently in the four municipalities having an ICS centre to ensure that the procedure used in the centres that already offer a fast and efficient process is used in all parts of Denmark.

It must be identified whether a pilot programme can be established for foreign digital talents who have been hired by a Danish business on standard pay, working and tax terms and who want to test whether Denmark is the right fit for them for 90 days. This initiative should draw inspiration from the Finnish pilot programme ('90 Day Finn').

5.2

Elaborated recommendations

The world's best digital public sector

10

Strong digital foundation for the public sector

Proposal

Denmark's digital lead must be reinforced through extension, maintenance and stronger management of the shared digital foundation of reusable building blocks (e.g. NemID/MitID), which can be used across authorities to create coherent digital services for citizens and businesses.

Value and potential

A strong foundation of building blocks contributes to coherence, recognisability and security for citizens and businesses and helps increase the degree of digitisation in society. Building blocks should be seen as cross-functional services, reusable software components, cross-cutting standards and technical specifications, and supporting guidelines and architecture models. Existing building blocks like NemID, Digital Post and basic data registers such as the Central Population Register (CPR) and the Central Business Register (CVR) are used in thousands of solutions across the public and private sectors. In several areas, the development of new building blocks needs to be accelerated, and relevant parts of the foundation need to be modernised. This means that the authorities can focus more on the IT development that they specialise in.

Prerequisites

- In selected areas such as digital self-service, consent and power of attorney, the use should be better controlled, e.g. via an architecture review and 'follow-or-explain' requirements imposed on the authorities to use standard building blocks when developing new public digital solutions.
- Shared building blocks should only be developed when a shared-public need exists, and the benefits outweigh the drawbacks, e.g. increased coordination across areas. They must be planned while keeping track of decentral implementation costs.

Actions

Joint-public frameworks must be established to maintain, improve, and expand building blocks, including a shared vision, goal, and long-term plan for developing existing and new building blocks. Furthermore, an up-to-date catalogue of standard building blocks should be developed. Ongoing control of and resources for development and operation must be provided in the areas where relevant authorities participate in the decision making and where a strong coordinating authority leads it. Suppliers and private businesses must be involved in the development, distribution and use of reusable building blocks.

11

Modernisation of the public digital infrastructure

Proposal

Part of the public digital infrastructure consists of old IT systems and therefore needs modernising to make the public IT systems up-to-date, secure and reliable. A separate investment framework must therefore be provided for repairing, modernising and replacing old IT systems.

Value and potential

Efficient and coherent digital public sector requires modern, secure and reliable IT systems. Obsolete IT systems can prevent the public sector from providing excellent and efficient service to the citizens and businesses, and public-sector employees will experience an outdated workplace. At the same time, obsolete systems increase the risk of breakdowns and security breaches. If the public digital infrastructure is not continuously maintained, developed and replaced, the public sector will not keep up with the digital development. Some major systems have been replaced, but we still have a long way to go.

Prerequisites

- Public authorities must regularly map their IT portfolio and identify technical debts to gain an overview of the state of their IT portfolio and to be able to apply for funds.

Actions

Many authorities have difficulty catching up with the maintenance and development backlog of their IT systems in their budgets without negative consequences for their work. Accordingly, a particular overall investment framework needs to be provided as we know it from the transport sector. The framework should span over ten years and aim to continuously develop IT infrastructure in the public sector that is critical to society and businesses. So this is a long-term initiative. The authorities' existing appropriations can be included as partial financing of the framework.

The framework must be spent using the arm's length principle at the political level. The funds must be prioritised based on project applications reviewed by an external, independent board. The board must prioritise relevant and realistic state, regional and municipal projects with a particular sector impact.

Spending must consider that the projects are widely based on standard building blocks to contribute to a more coherent digital public sector.

A secretariat will be established to provide the analytical basis for the board's work to prioritise and follow up on supported projects.

12

Up-to-date service to citizens by means of new technology

Proposal

An economic funding pool must be established to commission and distribute solutions based on new technologies across the public sector to accelerate the public sector's use of artificial intelligence. The pool should also support measures that eliminate barriers of accessibility, e.g. artificial intelligence.

Value and potential

Artificial intelligence can help save lives in hospitals, reduce case processing time, support concrete decisions, and target service offers to the citizens, etc. The challenge is that the technology is currently only used sporadically in the public sector and its expansion is proceeding too slowly.

Increased use of innovative solutions and new technologies must support the up-to-date service offered to citizens in all of Denmark. Promising potential for exploiting the possibilities of technology to provide better service to the citizens has been documented, particularly in the administration and health care areas.

Prerequisites

- The necessary innovative development environments must be created in parts of the public sector, including, e.g. 'sandbox environments' where new technologies can be tested. The pool should also be used for initiatives that address some of the known challenges of using artificial intelligence, e.g. the challenge of CE marking algorithms.

Actions

The political parties need to earmark funds for the pool. Moreover, the state's role is to define the specific framework for the pool, e.g. inviting proposals for new projects that can be funded by the pool and a framework for identifying and prioritising initiatives that create opportunities. More public institutions must initiate projects that use new technologies that can be co-financed by the pool. The private sector must be involved in the projects and the development of good solutions.

13

A well-informed social sector

Proposal

To ensure a more timely, efficient and coherent social action, a higher degree of data sharing must be secured in the social sector to focus on citizens with chronic diseases, vulnerable children and families and citizens registered with the psychiatric treatment services or the municipalities.

Value and potential

Citizens with chronic diseases, vulnerable children and families, and citizens undergoing treatment in psychiatry and municipalities must experience more timely, effective and coherent treatment or intervention. More data sharing in the social sector as part of the collaboration between municipalities, regions and the state will lead to a digital transformation of the social sector as a whole. Greater coherence and knowledge about one's programme will create confidence and trust in the help provided by the authorities when the citizens and their families find themselves in a vulnerable situation. Reusing and sharing data and coordination will also create a more efficient public sector and high-quality public services.

Prerequisites

- Efficient data sharing and data use require legislation prepared for digitisation and clear ethical guidelines for how and when data can and should be used.
- Wider use of data standards, uniform standards for data exchange and digital building blocks, and competence development.
- Implementation of new routines for many employees and functions across authorities to ensure, i.a., data registration of adequate quality.

Actions

Legislation must be adapted to enable sharing of relevant data across players. A one-year cross-sectoral task force must be established to identify the primary barriers and prerequisites for data sharing and prepare a plan for realising optimum data sharing and benefits to citizens and society. A pilot project must be launched to create an experience for two small target groups in that connection. Municipalities and regions will then be tasked with realising the measures proposed by the task force as part of a four-year initiative. As part of this initiative, non-governmental organisations must provide input for how data can be shared while taking the individual citizen's interests into account and handling the citizens' sensitive personal data securely.

14

Efficient and flexible public procurement must create opportunities for more Danish businesses

Proposal

Complex and rigid procurement rules result in a considerable waste of resources and loss of innovation in society. That is why the procurement rules must be radically simplified to allow a larger number of businesses – large and small – to submit tenders for new solutions on the issues facing society. Furthermore, we must ensure that Denmark does not interpret the Public Procurement Directive stricter than other countries by looking to our neighbours.

Value and potential

Currently, complex procurement rules and rigid interpretations demand significant resources on both sides of the table, and even minor errors can make a tender non-compliant. Many IT providers, therefore, find it too costly and risky to participate in public procurement. This means that the public sector misses out on new solutions to the issues facing society.

Prerequisites

- Clear political statement about the need for radical, innovative thinking.
- The government's savings on consultancy services, which also impacts the IT area, should not prevent public authorities from getting help from the best technical resources.
- The right to appeal should not foster a misguided zero-fault culture.

Actions

As a supplement to the Danish Competition and Consumer Authority's evaluation of the Danish Public Procurement Act, a binding neighbour check will be undertaken of the United Kingdom, Germany and Sweden to see how they interpret the Public Procurement Directive to promote innovation. This should involve the Forum on Public-Private Partnerships. Moreover, proposals to amend the Danish Public Procurement Act from June 2021 by the Confederation of Danish Industry, the Danish Construction Association, the Confederation of Danish Enterprise, SMVdanmark, IKA - association of public purchasers in Denmark, FMI (The Danish Ministry of Defence Acquisition and Logistics Organisation), FH (Danish Trade Union Confederation), Danish Regions, KL (Local Government Denmark) and SKI (National Procurement Ltd.) should be implemented to simplify current rules and ensure that stricter rules are not imposed on the business sector and contracting entities than in other countries.

The neighbour check recommendations should radically simplify the procurement rules to ensure greater flexibility, improved market access, and more reusability. Similarly, a new practice must be established for interpretation that focuses on dividing contracts into smaller pieces, quality over price, the possibility of focusing on green transition and a departure from the zero-fault culture. In this context, strengthened EU measures are also essential.

Moreover, expectations should be matched to those of the businesses, which, to the broadest possible extent, should engage in a market dialogue and draw attention to any challenges already after the market dialogue – and not after the contract has been awarded.

15

More digital innovation must provide new solutions

Proposal

We must provide the optimum framework for digital innovation. That should be ensured by establishing a dedicated national point of contact for contractors intended to facilitate the navigation through public regulations and minimise go-to-market time for innovative solutions. Private players should also be invited into the new Centre for Public-Private Innovation (COPI) engine room, and the GovTech programme should be reestablished.

Value and potential

Denmark is a frontrunner when it comes to public digitisation and we need to aim higher. We need to do so because digital solutions and new technology can improve our health care sector, turbo-charge climate action and free up time for citizen-centric services. However, this requires that we are not afraid to prioritise innovation and remove barriers provided by regulation to promote digital entrepreneurs and new solutions.

Prerequisites

- Increased awareness and knowledge of flexible types of procedure.
- Amendment of the procurement rules to allow a broader and more dynamic interpretation.
- The right framework for inspiration and innovation.

Actions

The Danish Business Authority should establish a single entry for new business models to get advice about any barriers – e.g. regulatory barriers – preventing their solutions from reaching the market. The point of contact should serve as first aid for the contractors inside the bureaucracy and ensure that more businesses get their innovative solutions on the market.

Moreover, a governance structure should be established in the new Centre for Public-Private Innovation that invites the private sector inside, e.g. as part of aboard. The centre must focus on the flexible and broad use of procurement rules and procedures by preparing a guide. It must also support digital innovation by identifying and initiating specific procurement and innovation projects to provide an innovative solution to actual problems in the public sector.

This requires funds for continuing the GovTech programme, which must be extended to include the actual procurement stage. Finally, digital innovation should be prioritised politically by earmarking a more significant share of IT investments for innovation.

5.3

Elaborated recommendations

Digital public service with focus on the citizens

16

The easy and safe consent (consent portal)

Proposal

A shared consent infrastructure should be developed to make it easier and safer for citizens, businesses, and authorities to view and manage their consents, e.g., exchanging personal data, in a standard digital solution.

Value and potential

Trust in data and digitisation is established via an extensive overview of how authorities and businesses use personal data and a flexible infrastructure that makes it straightforward to handle consents. By creating an overview, easing administration and ensuring standardisation, this action will increase the possibility of using personal data for innovative services while respecting the citizens' data control. Synergies are expected to be achieved by integrating the measures with better digital support for powers of attorney proxies.

Prerequisites

- Shared data standards are needed in the central consent infrastructure and the individual domain/dedicated system. This will also involve standardised interfaces (APIs).
- Central components must be developed for, e.g. signing, withdrawal, revocation and marking consents as private. For this purpose, standard components must be developed for recording and retrieving consents so that consents made on paper or orally can quickly be recorded.
- Nationwide use requires that public and private players prioritise joining the infrastructure and adapting processes, dedicated systems and self-service solutions for obtaining and presenting consent. Domain-specific consent storage that complies with the uniform standards may need to be developed.

Actions

Politically, decisions need to be made to develop a consent architecture with accompanying standards and governance. Subsequently, a central consent infrastructure must be developed that should be improved regularly to accommodate the users' business needs.

The business sector must ensure correlation to and usability for private players, including developing technical specifications and pilot areas. Civil society can enter into a dialogue about the citizens' requirements in relation to the infrastructure and perform user tests on an overview. The shared consent architecture and infrastructure can be developed under a public-private partnership.

Finally, the public and private players play a crucial role in informing the citizens about when and why consent is needed in Denmark.

17

Virtual meetings as the new public communication channel

Proposal

Communication with the public sector should be as straightforward as possible. This means that virtual meetings must be promoted as an alternative to physical meetings between citizens and the public sector so that virtual meetings in selected areas or contacts become the norm.

Value and potential

Experience gained during the COVID-19 pandemic has shown that dealings with the public sector in some areas could be handled with virtual meetings instead of physical meetings for the benefit of many citizens. Increased virtual meetings will result in a more accessible and modern public sector that accommodates the citizens' need for flexibility. Virtual meetings can provide better accessibility, more excellent proximity, and equal access to services, whether you live in rural or urban areas, e.g., specialists at hospitals. Virtual meetings can facilitate communication with the public sector for citizens with physical and mental challenges who are at increased risk of not showing up for physical meetings.

Prerequisites

- Virtual meetings must be a supplement to physical meetings and only be used when it makes sense.
- A joint-public video solution must be prepared to offer a high degree of security and privacy to avoid using different video meeting apps for various service areas.
- Legislation and underlying incentive structures must be adapted to support increased use of virtual meetings in the public sector where appropriate.
- A competence initiatives aimed at employees and citizens is crucial. The availability of video equipment and good broadband coverage throughout Denmark are prerequisites for spreading virtual meetings.

Actions

Virtual meetings must be established as a new public communication channel. Accordingly, a joint-public video solution must be developed, preferably inspired by existing solutions that live up to user-friendliness, security, and identification requirements that all authorities should generally use. Video meetings should be promoted across the public sector, and the Danish Government Digitisation Partnership recommends accelerating the rollout by starting in five selected areas: selected hospital consultations, consultations with general practitioners, school-home consultations, day-care consultations and selected consultations in the field of psychiatry. Rollout requires that it is deemed relevant and secure.

18

Exploit new technology for phone calls

Proposal

The public sector must use new technologies to optimise many phone calls with citizens and companies each day.

Value and potential

The public sector has millions of phone calls with citizens and companies. The use of new technologies such as speech synthesis and speech-to-text, which can make automatic file entries, can support and automate case handling related to phone calls and therefore offer the potential for significant savings and boosting quality through faster case handling.

It will take vast data volumes to realise the benefit of developing technology-driven solutions. Still, once the solution has been created, the subsequent basic models will can be more easily extended to other case management areas on a larger scale.

Prerequisites

- A joint-public strategy must support development and dissemination since few individual authorities in Denmark have the capacity and data basis needed to develop sustainable solutions for new phone call technologies.
- Implementing the new technologies that will replace manual case handling with automatic handling and prediction in connection with phone calls must consider the security related to using the citizens' data. The use of the new technologies must not change the confidential space that the contact with the public sector can be.

Actions

A joint goal for and collaborative management of the work to develop digital solutions for phone calls must be established. For this purpose, an economic pool must be earmarked for pilot projects that should involve public and private players and research institutions. This should result in developing a digital solution for documenting conversations and speech synthesisers, and the relevant players must use these. A panel consisting of companies with practical experience with relevant technologies must be established during the development process.

19

An informed and qualified choice of study – more people starting education and work

Proposal

Data-driven guidance should, to an increasing extent, supplement existing advisory options by supporting and qualifying students' choice of youth education and higher education. This should help minimise drop-out rates and give the individual student a broader and better-informed choice of study that also takes a constantly changing labour market into account.

Value and potential

By helping young people choose studies that to a greater extent match their interests and skills as well as the constantly changing demands of the labour market, the initiatives – besides benefiting the young people – will help companies and society because of an increased level of education and job readiness, more graduated candidates per year group and more students who stay in the educational system to improve their qualifications and specialise themselves.

Prerequisites

- Existing guidance needs to be developed further. The technical solution should obtain existing education data from other platforms, partly through interaction with the student to identify interests, skills, etc. and link these data to possible educational programmes. Similarly, the solution must include data about drop-out rates and job opportunities.
- Since the tool will be using potentially sensitive data, it is paramount that the exchange and use of data respect the person's integrity. Data security and ethics are therefore, crucial for the realisation of this tool.

Actions

This will require a decision on and investments in improving existing solutions such as Uddannelseszoom, a tool for comparing different education programmes, and/or UddannelsesGuiden, a guide helping students choose their studies. In this connection, it must be identified whether such improvements will require new legislation.

Moreover, a strategic partnership must be established regarding improving data-driven guidance to ensure that the social partners and other relevant players in the educational sector are included. In that connection, the social partners must contribute with data about changes in job functions so that the educational programmes, not least the students, can react to this knowledge.

20

Digital tools are to support teaching in primary and secondary education

Proposal

As one of the leading countries in the world, Denmark must make a national digital forum available where teachers can discuss relevant matters and share knowledge about various programmes, materials and ideas for teaching. This forum must be accompanied by a set of guidelines and recommendations that the teachers must update regularly. This ensures that progress and good ideas are used for both preparing teaching and for which digital and analogue tools can best be shared for the benefit of all Danish teachers.

Value and potential

Teachers in Danish schools already use many different digital teaching materials and tools. However, the way individual teachers, teams and schools use technology in their teaching still differs considerably. The school sector is still expected to undergo rapid digital development when it comes to digital tools. This requires that the individual teacher have the knowledge, skills and latitude to make professional choices between the different types of teaching material. Accordingly, teachers across schools and municipalities must exchange experience, ideas, benefits and drawbacks, programmes, courses and much more in a professional, digital forum.

Prerequisites

- Skills development of teachers and managers, including the didactic understanding of the use of digital tools.

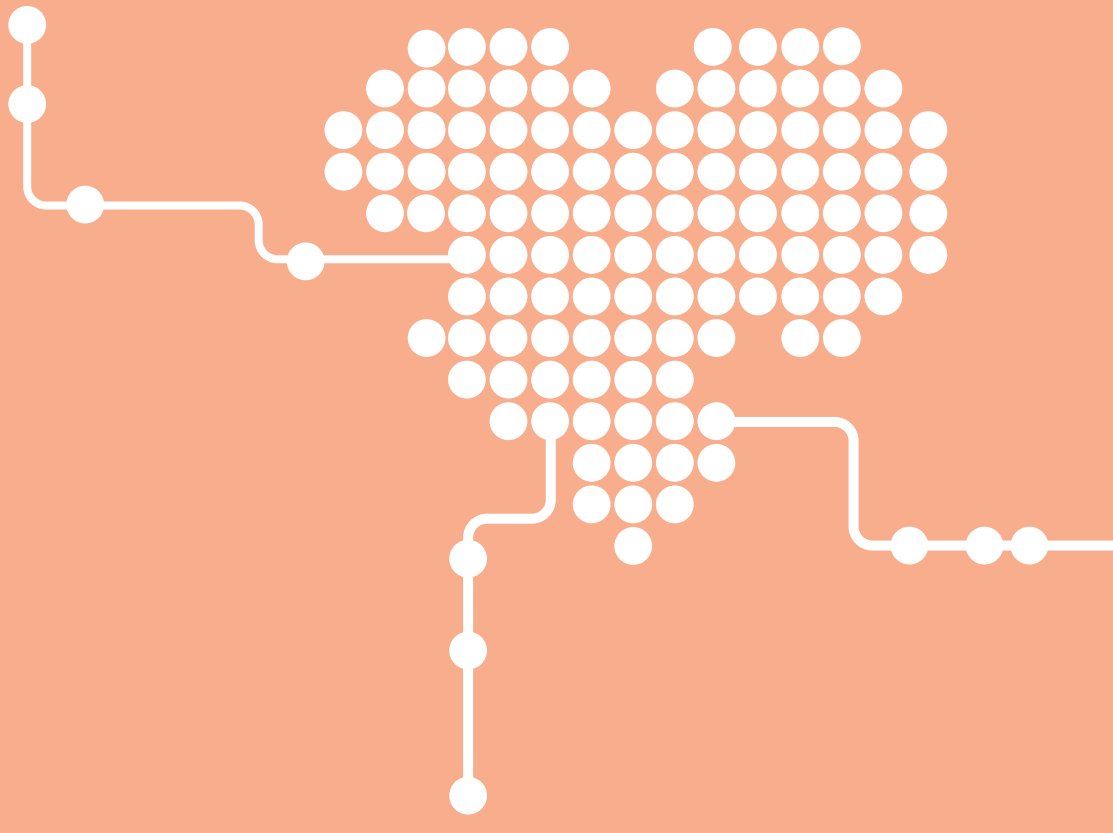
Actions

Politically, an investment framework must be provided for establishing a digital forum. At the same time, teacher training must be supported to better prepare teachers to use digital tools in the classroom. A national strategy must be prepared for how the teaching forum, to a greater extent, can interact with and support the teachers' overall goal for the teaching. The focus should be on ensuring that the teachers use the new forum.

5.4

Elaborated recommendations

Healthcare as digital front-runner



21

Access to aggregated health data

Proposal

The health platform Sundhed.dk and the personal health app MinSundhed must make it easy for patients and health-sector employees to get an overview of relevant information about their treatment plan in the form of appointments, test results, scanning images and other information in medical records. Therefore, the work on sharing relevant data via the joint-public infrastructure, which is a partnership between the state, the regions, the municipalities and the healthcare professionals in private practice, must be developed and accelerated.

Value and potential

Patients and relatives are very interested in sharing health data that makes it easier to be active players in their treatment plans. In addition, easy access to all the patients' data for health-sector employees can improve the overall quality and contribute to efficient procedures.

Prerequisites

- The programme Et Samlet Patientoverblik and the health data record Sundhedsjournalen provide central solutions for creating access to health data and thus deliver a more coherent solution to the patients. Both solutions must be developed further to increase data sharing, user-friendliness and functionality.
- Legislative amendments must be implemented across the Danish Health Act, the Danish Social Services Act and the Danish Psychiatry Act so that data exchange does not encounter legal barriers.
- IT security should naturally be high so that citizens do not lose trust in the health sector.
- All parties in the health sector must be prepared to share data. Alternatively, data sharing must be ensured through political initiatives.

Actions

To realise increased sharing of health data for the benefit of patients, a political vision must be formulated for patients' and healthcare professionals' access to health data across sectors. The vision musts be supplemented by a goal and an action plan that is backed up politically. The action plan must describe specific goals, e.g., sharing data across sectors and incentive structures for registration and sharing practices.

22

A healthier population based on data and new technology

Proposal

Increased use of data and technology must make the health sector much more efficient, proactive and closer to the citizens. Initially, the measures must focus on treatment areas offering a particular potential, such as cancer treatment, orthopaedic surgery and significant chronic diseases, and typical tasks such as diagnostics, administration and care where artificial intelligence and robot technology offer massive potential for quality improvement and efficiencies.

Value and potential

The initiative holds excellent potential for offering patients, an increasing number of elderly people, and people with chronic diseases tailored treatment courses when the health sector lacks finances and labour. The initiative will also contribute to more targeted and efficient treatments. Finally, the initiative will provide better access to data for third parties to contribute to innovation and attract more research and companies to Denmark.

Prerequisites

- Long-term funding, e.g. venture capital, as well as freeing up human resources for innovation collaborations, with a particular focus on scaling up new technology solutions.
- Clear legal framework, possibly by legislation, and weighing of data ethical restrictions and opportunities.
- Increased focus on quality and registration practice, including securing access, the right data volumes and uniform standards, and data security.
- Greater uniformity and easier access to health data for third parties.

Actions

A multi-annual pool should be established for developing and scaling data-driven solutions and releasing staff for innovative partnerships that private providers can also join.

Moreover, a new long-term strategy for digital renewal and development of the health sector must be prepared. It must include specific, long-term goals both for digital patient treatment plans and for national use of digital tools across doctors in private practice, regions, municipalities and other healthcare offers. Trade associations, companies and NGOs must be involved, and inspiration should be found in countries that have come further than Denmark.

Finally, a massive effort must be made to ensure access to health data for third parties via technical interfaces for data exchange and more uniform handling of data processor agreements. This is also an area where inspiration can be found abroad.

23

Digital post throughout the health sector

Proposal

Citizens must be able to view digital letters from public and private healthcare providers in the same place. That is only possible today if the citizens give their active consent.

Value and potential

When citizens enter the health sector, they experience differences in communication depending on the provider they contact. Hospitals use Digital Post, but the practice sector or private hospitals cannot use Digital Post without consent from the citizen. However, their examinations and treatments are paid for by public funds and are carried out on behalf of the public sector. The change in communication during a treatment plan seems illogical and unwise to the citizens, and the private healthcare providers find it challenging to contact the citizens on other platforms. The public service will be experienced as more coherent and user-friendly if the citizens can get digital letters from public and private healthcare providers on the same platform.

Prerequisites

- A market for mailbox providers must be established so that the end-user can get their letters on the same platform. That will require that letters are forwarded between both private and public mailbox providers.
- Accordingly, this calls for a legal basis that does not violate competition, state-subsidy or EU law.

Actions

In the short term, it must be investigated whether there is an easier way for private healthcare providers to get digital consent for sending invitations to patients through Digital Post. In the long term, the legislation on Digital Post and any health legislation must be amended to ensure that citizens can view letters from both public and private healthcare providers on the same platform. It is necessary to support private agreements in the market between various mailbox providers In terms of the business sector, the private healthcare providers' systems must be adapted to send and receive digital letters.

24

Better health services via the citizens' collection of data

Proposal

To create better and more personalised healthcare services, the health sector must receive and use data collected by the citizens, e.g. from smartphones and other wearables.

Value and potential

The use of the citizens' health data offers excellent potential for providing relevant and citizen-centric healthcare offers and for better supporting, e.g. proactive diagnostics, early detection and interventions, and prevention when the citizens carry out an increasing number of measurements in their own home. Moreover, international demand for solutions that utilise the citizens own data is increasing, and this initiative will lead to considerable growth and export opportunities for Danish companies. Furthermore, to the broadest possible extent, third parties should also be given access to data collected by the citizens.

Prerequisites

- Digital infrastructure needs to be developed that the citizens can use to upload their health data and share it with healthcare professionals. Here, a national guide for health apps can provide a better overview of digital solutions that meet the data-security requirements.
- Legislation must be adopted to allow healthcare professionals access to the citizens' data and use them actively in the treatment of the citizen.
- Moreover, data quality must be ensured, and the roles and responsibilities for when the citizens' data are shared and used must be defined.

Actions

The Danish Parliament must adopt legislation allowing the citizens' health data, and a technical setup must be established for the secure and straightforward collection of such data. This will involve prioritising between different use scenarios, targeting trials and rapid scaling to where citizens' data can add most value.

Suppliers, trade associations, patient societies and other civil society organisations must contribute to mapping and qualification and participate in innovation partnerships to develop new solutions that use the data collected by the citizens.

25

Psychiatry as a national frontrunner in digital services to citizens

Proposal

Psychiatry is a frontrunner in the digital treatment of specific psychiatric disorders where new technologies in psychiatric services have a well-documented effect. Therefore, a national innovation programme for digital psychiatry should be developed, focusing on the maturing and upscaling of up-and-coming technologies in psychiatric treatment or socio-psychiatric services.

Value and potential

This recommendation creates value for Danes who get a mental disorder at some point in their life. Digital solutions create coherence across sectors and better-integrated treatment offers. The patients get more control over their treatment plan, and much of the treatment can be carried out in their own homes. Digital psychiatry allows for new types of therapy and fully or partially automated treatment. Businesses in this area will be able to grow and export if the barriers such as access to clinicians and researchers and handling of, e.g. security standards, are removed. Evidence of treatment effect, compliance with ethical and security standards are national and international competitive parameters.

Prerequisites

- Psychiatry is the apparent frontrunner for digital treatment, and the potential is well-documented for, e.g. Internet-based therapy, digital self-monitoring and virtual reality. The necessary development means and national framework for the businesses', research units' and clinics development of the recommended technologies must be made available.
- Compared to the rest of the health sector, psychiatry and the social sector lag in introducing a national IT infrastructure. Therefore, investments are needed in the necessary hardware, software, and organisational development within a short span of years.
- Finally, psychiatry faces skills barriers. For the potential to be realised, therapists, patients and relatives need to improve their digital skills.

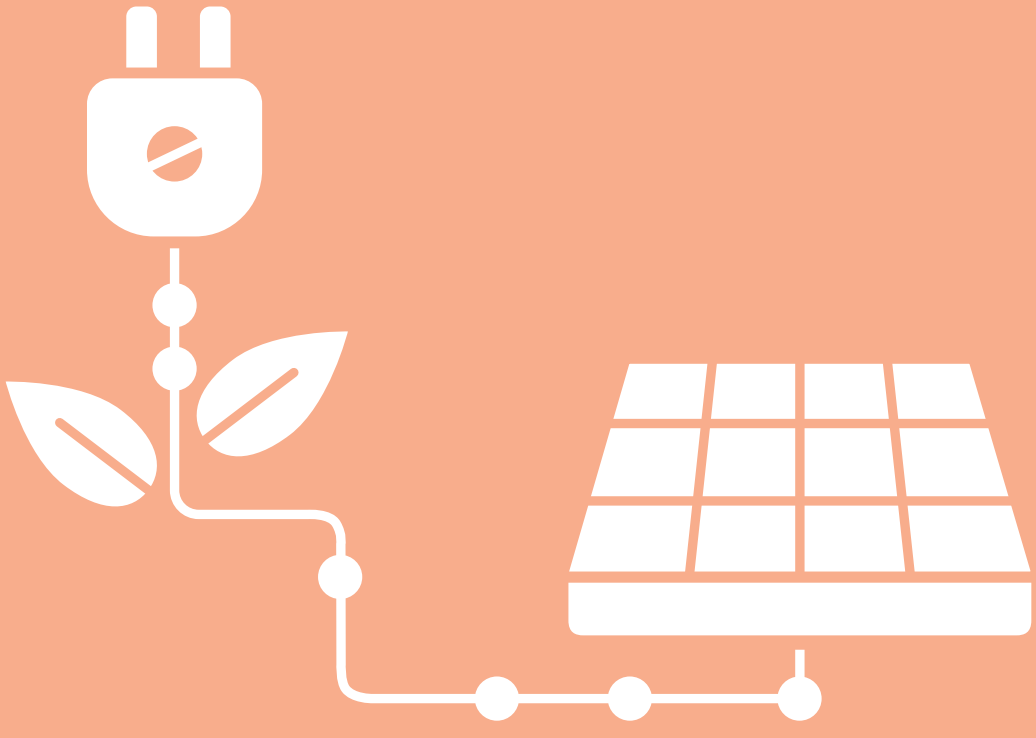
Actions

A national framework needs to be established to develop digital psychiatry, including an innovation programme that brings the field together to realise the technologies holding particular potential in psychiatry and social psychiatry. An optimum framework must be created for public-private partnerships and the link to researchers. Finally, digital psychiatric offers should be integrated into the broad healthcare reforms, e.g., new healthcare clusters.

5.5

Elaborated recommendations

A greener Denmark through digitisation of the utility sector



26

Long-term action plan for digital acceleration of the green transition

Proposal

A long-term action plan for digital value creation in the energy, utilities and climate area is to accelerate the development of digital solutions and reinforce Denmark's green position of strength globally.

Value and potential

The Danish energy and utility system is facing a fundamental transformation where the fluctuating energy from, e.g. wind and solar power, will become more critical. Increased digitisation of the energy and utility system is vital for high supply security and efficiency no matter how much the wind blows or how much energy the customers demand.

However, there is no overall direction, prioritisation and coordination of existing and new digitisation initiatives in the area.

Integrated planning and prioritisation of existing and new digitisation initiatives must support efficient green transition through increased links to the sector and flexibility in the overall energy and utility system for the benefit of businesses and consumers of energy and utility services and society whole.

Prerequisites

- A cross-sectoral task force must be established to prepare a long-term action plan for digitisation initiatives in for energy, utilities and climate. The action plan should, as a minimum, reach ten years out in time, should regularly take the development into account and include any new, relevant focus areas.
- The task force must regularly discuss, coordinate and prioritise digitisation measures that can be included in the action plan, including possibilities of removing barriers to potentially value-creating digitisation measures by, e.g. improving the framework or adapting legislation, etc.

Actions

A task force in energy, utilities and climate must be established with representatives from relevant national and decentral authorities, businesses and business organisations. This broad involvement must ensure that challenges are identified and solved jointly on an ongoing basis. Those future solutions are initiated based on a joint mandate and commission from authorities and the business sector. The task force should prioritise keeping track of the establishment of national data space for energy and utilities.

27

Climate-friendly energy and utility services via increased access to meter data

Proposal

Based on experience from the electricity sector, a basis must be established for digitising the gas, water and heating sectors to ensure wide use of remote meter reading ultimately. A sound data basis must make it easy for citizens, businesses and authorities to keep track of and reduce their resource consumption and contribute to streamlining and innovation in the business sector.

Value and potential

Data is the driver behind the intelligent green transition. However, the maturity of data collection differs in the energy and utility sectors. Experience from the electricity sector shows considerable value creation of digital remote access to meter data. Increased access to data from all energy and utility sectors is crucial for efficient green transition, which, on one side, supports the political climate goals through a better overview of actual resource consumption and encouragement of behavioural changes and, on the other side, creates a basis for innovation via new, data-driven business models.

In this connection, measures should be introduced within digital nudging that help ensure that the improved overview of resource consumption results in actual behavioural changes. Similarly, additional measures must be initiated to support CO_2 reductions via increased access to other data.

Prerequisites

- A prerequisite for broadening the use of digital remote meter reading in the gas, water and heating sectors is establishing a positive socio-economic case. It is thus crucial to look at value creation across the various sectors as it is far from certain that the sectors separately will be able to achieve a positive case on their own.

Actions

Legislation must be adopted, allowing collection and liberation of data in the gas, water and heating sectors. The business sector must be involved to identify value-creating data within and across various utility types. Similarly, an appropriate financing model must be agreed to for rolling out digital meters.

Finally, authorities, the business sector, and knowledge institutions must identify and prioritise measures to provide increased access to other climate data and measures that support a reduction of the climate footprint targeting citizens and businesses. These initiatives should be integrated into the action plan for digital acceleration of the green transition and the proposal for a guide for more and better public data.

28

Efficient green transition via a national data space for energy and utility data

Proposal

Based on the electricity sector, a national data space must be established for energy and utilities. As the accessibility to data from the gas, water and heating sectors increases, such data are included in the data space.

Value and potential

A national data space must support the link to the utility sector and contribute to society's efficient and robust green transition via flexible and secure data sharing. This initiative will support a more dynamic energy and utility system where siloes are broken down. Many of the existing manual processes can be replaced by digitised and automated processes. This will lead to a high level of supply security and financial efficiency.

Initiatives must be coordinated with the European development in the area and strengthen Denmark's opportunities for impacting the development of a European climate data space.

Prerequisites

- Adequate technical knowledge is deemed to exist to be able to establish a national data space for energy and utilities since the focus is not on creating a new IT system but rather to develop various governance and management principles that provide frameworks and standards for data collection and sharing across parties, service types, sectors and borders.
- The necessary link and integration with the EU *Digital Europe* Programme must be ensured as part of the development of the national data space.
- In addition, the development of the data space must comply with national and EU data protection legislation.

Actions

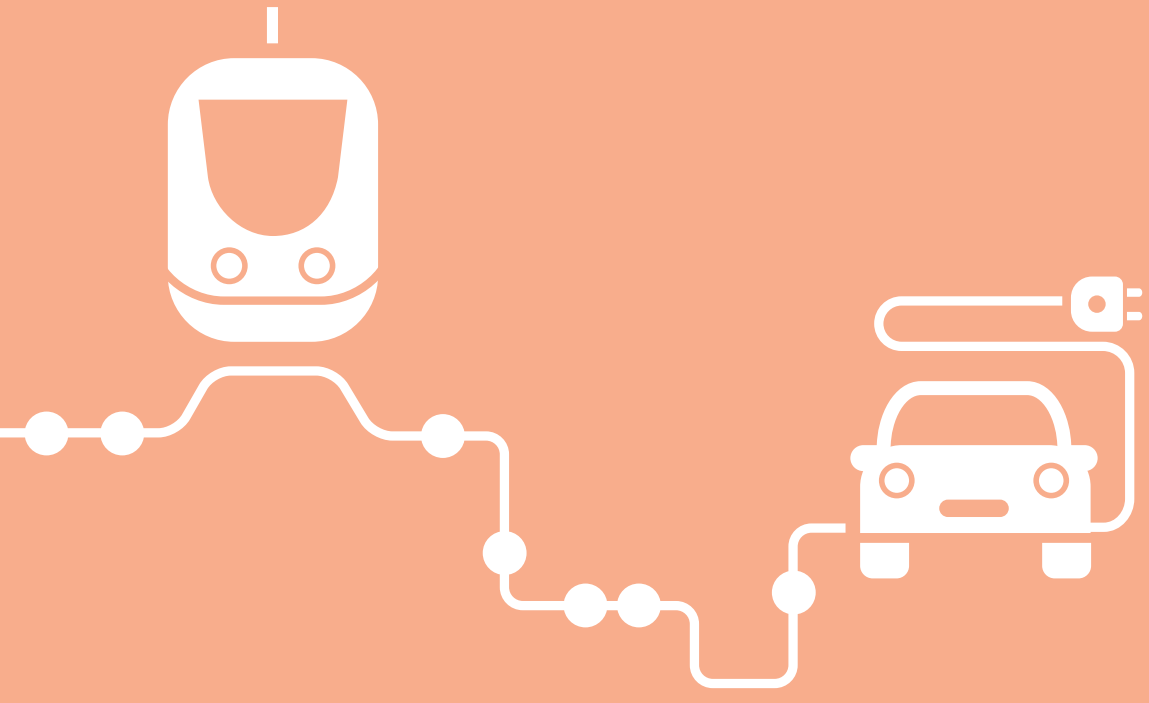
The development of data spaces must be entrenched in a broad partnership across sectors. Ongoing identification of technical, legal and security matters to be addressed and mapping suitable solutions in connection with the work should be an integral part of the partnership in the data space under the long-term action plan for digital acceleration of the green transition.

Public and private players should therefore be involved in the initiatives to ensure that focus is on realising potentials for creating value and sector links in the energy and utility sectors and the industries and segments that depend on the services of the sectors.

5.6

Elaborated recommendations

Intelligent and flexible transport through digitisation



29

Less congestion and better flow of traffic

Proposal

The national measures to roll out intelligent traffic management must be strengthened, e.g. via a uniform structures for relevant sensor and mobility data. The measures should be supported by incentive-driven use of the road network, e.g. in the form of dynamic road pricing.

Value and potential

Intelligent traffic management involves various intelligent transport systems, including dynamic traffic signals and signs, to improve traffic flow.

Increased focus on scaling intelligent traffic management and incentive-driven use of the road network contributes to the green transition by reducing the transport sector's climate footprint and increasing productivity by reducing transport and wasted time due to congestion. Moreover, intelligent traffic management and better handling of accidents on the motorway will ensure improved and more efficient public service through increased data sharing across authorities.

Prerequisites

- Uniform data standards are needed to ensure adequate data quality and coherence across public and private players to create a basis for scaling.
- Sharing and use of road traffic data require full compliance with European and national legislation. If data is sensitive, it will require consent or anonymisation before private players share data with public authorities.
- Using the data to manage traffic signal systems and special events better, will require increased management and coordination across road authorities.
- The rollout of dynamic *road pricing* requires some degree of technological maturing. Relevant experience can be gleaned from, e.g. Singapore, Belgium and Germany to underpin the measures taken.
- In future, more traffic management will occur directly inside the vehicle and less via road signage. Collaboration with international players in the area is needed to actively steer and connect automated vehicles.

Actions

The initial focus should be on breaking down institutional barriers to ensure that work is carried out across road administration boundaries to benefit traffic throughout the road network. That might be via strategic partnerships to which both public and private players contribute actively.

Similarly, the business sector and civil society must ensure that drivers use updated digital solutions, e.g. receive data or as maps in navigation systems.

30

Optimised parking and charging infrastructure for greener mobility

Proposal

Increased coordination of the parking and charging infrastructure must contribute to better diversion of traffic with a need for parking and charging. In this connection, sensors and data must make it easier for drivers to find a vacant charging station and parking space.

Value and potential

Climate and the economy can benefit from making it easier to find an available parking space and charging station.

Moreover, the practicalities related to charging constitute a barrier to citizens considering getting an electric car. This initiative is expected to support more people choosing electric cars by supporting a better overview of charging options and thus optimising the placement and usage of the charging infrastructure.

Similarly, the measures will contribute to growth and exports since the demand for optimised charging and parking infrastructure will increase globally, together with increased congestion problems and the emergence of electric cars

Prerequisites

- The Danish Commission for Green Transition of Cars recommends that the market largely drives the extension of the charging infrastructure. In this connection, several commercial measures have been launched following the industry agreement by the Danish Electric Vehicle Alliance, which means that data about, e.g. price, operating status and charging speed are made available via a European roaming platform.
- Studies are underway that use, e.g. sensors to give an overview of available charging stations and parking spaces. Collaboration and knowledge sharing across public and private actors and developing an overall map system that efficiently directs drivers to available charging stations and parking spaces are needed to scale such solutions.
- Coordination of initiatives requires increased digitisation of parking areas in the municipalities. The need for coordination is particularly relevant concerning the curb mounting chargers for owners of electric cars without access to private parking spaces.

Actions

A decision must be made about the action to take, and financing must be secured for it, including for any mounting of charging and parking sensors in major cities and the development of public strategies for optimised placing and use of parking spaces and charging stations. It should also be considered whether more incentives should be made to mount and use the charging infrastructure in a way that prevents overloading the electricity grid during peak periods.

31

More streamlined from A to B through better coherence across transport types

Proposal

Nationwide use of an integrated digital platform solution must be ensured to create better coherence across transport types. Users of the platform should be encouraged to make green transport choices.

Value and potential

The Danish Parliament has developed a MaaS app (Mobility-as-a-Service), which ensures easy journey planning and ticket sales across public and private transport offers. This entails a merger and extension of the features offered by Rejsekort (Travel Card) and the Rejseplanen (Journey Planner). It is crucial to support nationwide use of the app, e.g. by making it attractive for businesses to join.

This initiative contributes to green transition via optimised journey planning, promotion of the sharing economy and green transport options. A nationwide rollout of the app will improve the use of the transport system and reduce congestion for the benefit of the climate and the economy. In addition, more cohesion across public transport can improve the public service, and data should, to the broadest possible extent, be made available to the market to support growth and new business models.

Prerequisites

- National use of the MaaS app requires data sharing across mobility providers. EU legislation demands free access to statistical data and recommends sharing real-time data. Furthermore, a EU process has been initiated to promote data sharing related to the resale of tickets. This requires the harmonisation of data.
- Incentive schemes are needed to make it attractive for small and large mobility providers to join the app.
- Efficient use of the app so that citizens are encouraged to change their behaviour. To this end, digital nudging or green filters can be applied to showcase benefits in the form of, e.g. time savings and reduction of climate footprint by switching from, e.g. car to public transport.

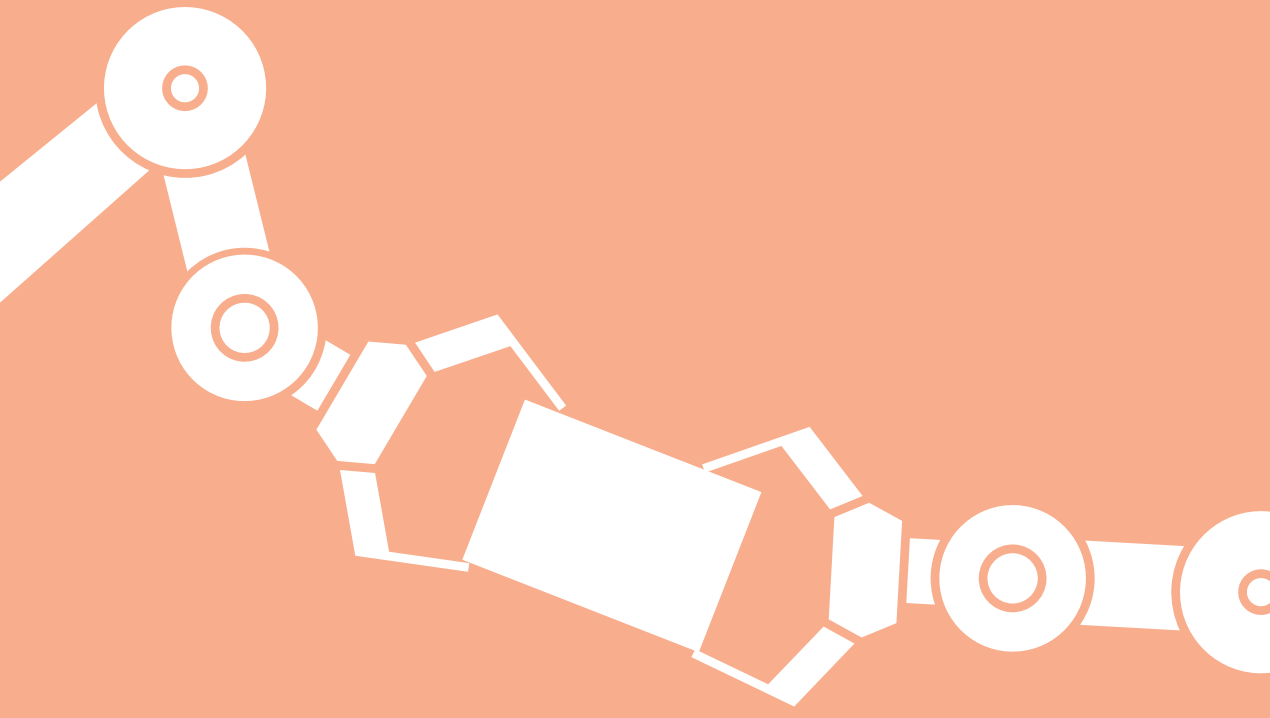
Actions

In 2022, the DKK 40 million provided under the infrastructure agreement must be spent on speeding up the development of the Maas app. The public parties must create a basis for all relevant transport means being made available in the proper formats so that a platform solution can be developed that enables searching for and comparing all types of journeys. As part of the app's development, businesses and civil society, including researchers, must contribute to green mobility behaviour.

5.7

Elaborated recommendations

Accelerated innovation through public-private partnerships



32

Stronger interaction between universities and the business sector as a driver of growth

Proposal

If the next digital unicorns are to be created in Denmark, a stronger interaction between universities and businesses is necessary. This requires a reform of the technology transfer between universities and the business sector to promote cooperation and better possibilities for IT entrepreneurship for researchers and students.

Value and potential

Students, researchers and businesses – large and small – possess the skills, ideas and expertise that can become the next Danish export adventure. But that will require more and better collaboration across sectors, so that experience, competences and solutions are utilised the best.

Prerequisites

- EU legislation related to technology transfer should not be interpreted too strict.
- The universities must have enough employees with IT skills.
- Tech trans offices must exchange standardised and straightforward contracts for partnerships between universities and the business sector.
- Flexible frameworks that enable researchers to collaborate with the business sector.

Actions

From a policy perspective, new commercial goals need to be set for tech trans offices, focusing on collaboration rather than patents and licenses. In addition, a neighbour check must be performed that focuses on how other countries interpret relevant EU legislation to provide more space for innovation and collaboration. Moreover, to a greater extent, the students must be able to earn ECTS points from business start-ups and work. Whether there is any demand for a TeamDenmark model for young IT entrepreneurs on the youth and higher education programmes must also be checked.

To a greater extent, the business sector must invest in research and development, collaboration with Danish and international universities and other knowledge institutions and utilise knowledge and inventions emerging from research commercially. Young potential IT entrepreneurs should be identified from education programmes.

The universities must initiate mutual harmonisation of standard agreements and terms for collaboration and sale of rights. They should also increase special fast-track programmes for research partnerships with businesses, entrepreneurs, and researchers to commercialise their ideas.

33

Partnerships on the key IT solutions of the future

Proposal

More public-private partnerships must be behind the large procurements of key IT solutions. Based on learning from the shared secure login solutions NemID and MitID, private actors and private authorities must enter into binding partnerships to develop the future, large public IT projects.

Value and potential

More partners involved from the design phase to implementation and maintenance will ensure more resources and greater control measures during the process. To this end, strong public-private partnerships must ensure the legitimacy and support successful implementation. That might be in connection with implementing the Danish Government Digitisation Partnership's recommendation for a new infrastructure for digital consent that will be a central element in the digital infrastructure of the future and relevant to both the public and private sector. Therefore, it will be natural to engage in a close partnership on the development of projects in areas where there is a shared need and demand if we want to increase the value of the digital infrastructure of the future – for both the public and the private sector.

Prerequisites

- The shared need for an IT solution across the public and private sectors.
- Shared investments and co-financing and frameworks for hedging of risks.
- Joint leadership and willingness to commit to a binding partnership.

Actions

Future central IT projects must be identified to assess whether they can be developed in a partnership between public and private players. Generally, in areas where a shared need exists, more IT projects must be developed as part of a binding partnership, and procurement must be flexible in finding the right partners. Then, a shared programme organisation can be established with a governance setup, joint financing and leadership based on learning from previous projects. Moreover, a contract basis outlining clear principles for collaboration and financing, e.g. unforeseen expenses, can be established.

Commercial players need to submit tenders for projects to develop the central IT solutions of the future. They must be willing to join partnerships with joint leadership and joint financing.

One project might involve the development of an infrastructure for digital consents for which the Danish Government Digitisation Partnership has prepared a recommendation.

34

The task force is to strengthen exports and internationalisation of Denmark's digital solutions

Proposal

Denmark's leading position in the field of public digitisation must be translated into Danish exports. A cross-sectoral task force is to prepare an action plan for how Danish authorities bring Danish digital solutions out into the world in partnership with the private sector. The experience gained from the fields of energy and life science will be used.

Value and potential

Many, especially SMEs, seek backup from and collaboration with Danish authorities to support their exports and internationalisation. There is also a growth layer of SMEs whose long-term success and competitiveness will depend on getting into the export markets. In the wake of COVID-19, many countries are planning a major investment in public digitisation. At least 20 per cent of EU recovery funds have been earmarked for digital transition in the member states. That creates a massive export potential. A strengthened export initiative will support growth in Denmark's digital ecosystem if we add to existing experience from, e.g. Trade Council, Digital Hub Denmark and the trade associations as well as other sectors such as the production industry, energy, agriculture, and life science.

Prerequisites

- Political prioritisation and anchoring among Danish authorities supported by a strengthened public-private marketing consortium.
- The potential release of may years worth of workhours in Danish authorities to be able to meet international demand for Danish experience.

Actions

A cross-sectoral and fast-acting task force consisting of public and private players must be established. Based on an analysis of the export potential in selected markets, the task force will prepare an action plan that enhances the political narrative, Danish positions of strength, removal of existing barriers and means to promote digital exports. This will result in 2-3 pilot projects in selected markets, e.g. targeted authority collaboration, digital alliances, providing advice to the sectors and promotion.

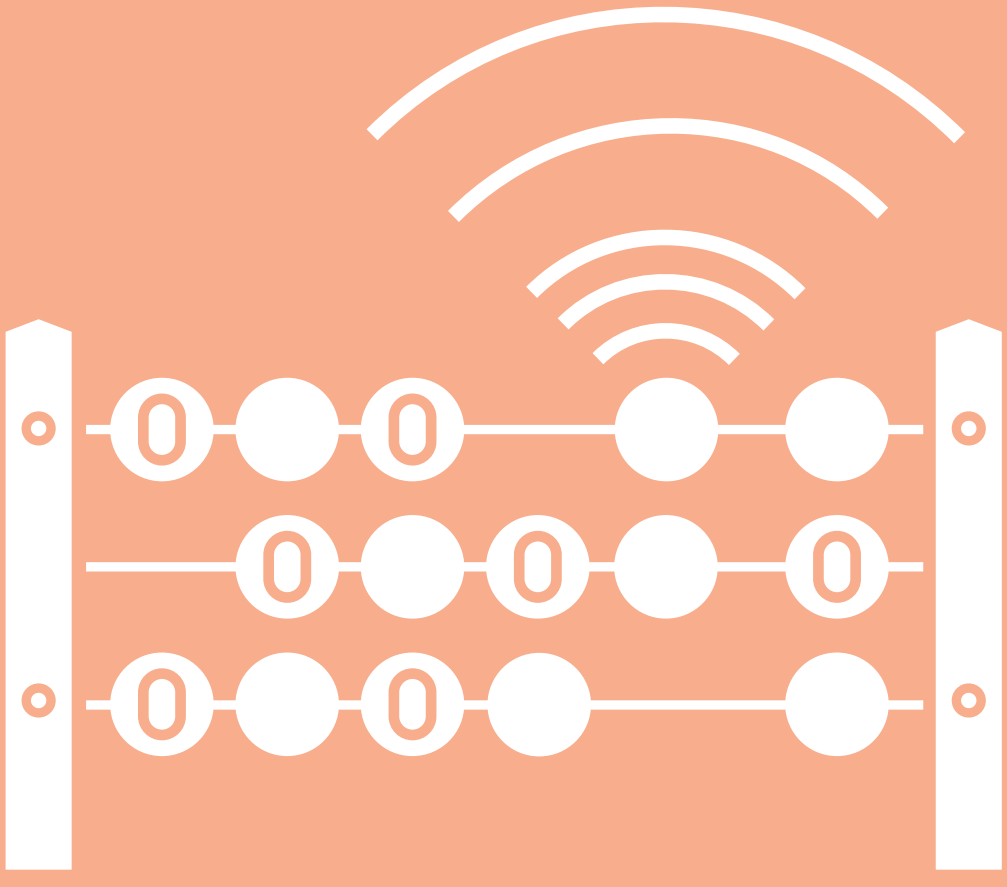
The business sector must help identify countries and solutions that appear to have considerable export potential. Business and trade associations should play an active role in this respect.

Moreover, relevant players in the area should support export and internationalisation initiatives by disseminating knowledge about Denmark as a digitised nation and planning and carrying out delegation visits.

5.8

Elaborated recommendations

Life-long digital skills development



35

Creating an understanding of technology for everyone in primary and secondary education and vocational education programmes

Proposal

Technology understanding should become a mandatory competence in primary and secondary education and vocational education programmes.

Value and potential

Many businesses and workplaces are undergoing massive digital changes. This requires that the future workforce has a good understanding of technology so that everyone can contribute to the labour market of tomorrow.

All children leaving primary and secondary education, a youth or vocational education programme must have basic digital skills and digital culture that enables them to transition to educational programmes, the labour market and society where digitisation is a major source of change.

The recommendation points to the fact that knowledge about digitisation and technology must become an integral part of teaching. All students have the required digital education and necessary technical skills.

Prerequisites

- An investment framework must be provided for teaching digital skills throughout the education system.
- The extent to which teachers can include new and relevant digital tools across academic topics must be assessed regularly.
- Long-term development of academic environments is needed in all educational environments, and teachers must be involved in carrying out a needs analysis and developing teaching materials.

Actions

The government must take the initiative to formulate a long-term plan for skills development and capacity building as soon as possible. To this end, further education in the new teaching competence must be provided to create professional environments that can develop the new proficiency. Accordingly, a plan must be prepared for extending digital skills to the various education levels and making IT learning an integral part of other competences. At the same time, teaching material adapted to the various educational levels must be developed and be developed further in sync with technological developments.

Relevant businesses must be involved as cases in the teaching to make actual problems relevant and concrete. Relevant interest groups should also be involved in the development of teaching material for individual educational programmes.

36

Higher education must be adapted to include relevant IT understanding and competences.

Proposal

Higher education programmes within different areas must focus on providing students with the digital skills that are essential for getting a relevant job.

Value and potential

The digital transition requires that higher education programmes understand and can apply relevant IT within their subjects and that the students get a chance to learn new technologies. The importance of IT may differ depending on the educational programme. However, it must be ensured that graduates in relevant fields have the digital skills to carry out increasingly digitised tasks.

Prerequisites

- More educational programmes must start digital mapping content to identify the individual programme's need for increased interaction between academic and digital content. This applies to both technical skills but also the actual understanding of databases, algorithms, etc.
- Skills development among teachers and upgrading of teaching material.
- Investment in new teaching programmes.

Actions

Politically, the learning objectives for higher education programmes should undergo a digitisation check and be updated to match the newest technology. For this purpose, an investment framework must be established for the educational system as a whole. All higher education programmes must undergo a digitisation check. Higher education programmes must keep relevant and detailed records of what types of jobs their students get and what skills they need.

A dialogue must be started with the business sector and educational institutions to ensure up-to-date IT skills and define future requirements for the labour force.

37

Larger cohorts on popular IT education programmes

Proposal

More candidates need to graduate from IT education programmes to meet the increasing demand for IT skills. More people need to apply for the IT education programmes, and all qualified applicants must be accepted.

Value and potential

Suppose Denmark is to continue the digital transition of society and retain its global lead in digitisation. In that case, the increasing demand for IT skills in the private and public sectors must be accommodated.

The recommendation should also support underrepresented groups choosing IT education programmes, including more women, to increase diversity and social mobility. In this way, this focus area contributes to a society that remains fair and equal.

Prerequisites

- A financial incentive must be created to encourage the universities to increase the number of places at IT programmes.
- Academically strong research environments provide a basis for IT programmes at a high international level.
- Study guidance for potential applicants for the IT programmes should be improved and targeted.

Actions

More places must be created on popular IT programmes so that all qualified candidates can be accepted. The universities' focus on creating more skilled IT candidates differs, and the price of various programmes differs too. Accordingly, a real financial incentive must be provided to get the universities to provide more graduates from the IT programmes.

The business sector must be involved in advisory capacity to offer insight into the prospects of choosing various IT programmes and marketing the opportunities to work in the IT industry. Moreover, targeted study advice should first be provided in primary and secondary education and later at youth and vocational training programmes.

38

More apprenticeships for IT apprentices in all types of businesses

Proposal

Many IT apprentices doing school-based practical training should be reduced, and instead, they should be apprentices in a business. Therefore, it must be ensured that all IT apprentices have an apprenticeship at the end of their two-year basic programme.

Value and potential

More IT apprentices taking their apprenticeship in business results in a more qualified workforce once they leave school. If more apprenticeships reduce drop-out rates, society and businesses may also benefit from more people holding an IT degree. For the individual students, it will mean greater insight into and experience with processes in the workplace and thus a better start to working life. More IT graduates will support a robust business sector ready for change.

Prerequisites

- It is a key prerequisite that businesses take responsibility and help train the IT graduates of the future.
- However, this demands that the businesses know what the IT graduates, who become IT supporters or data technicians specialising in infrastructure or programming, have to offer and how they can create apprenticeships.
- At the same time, the businesses must have the motivation to create apprenticeships.

Actions

An information campaign aimed at both the public and private sectors must collaborate with the business sector to provide information about the skills of IT graduates and the lack of IT apprenticeships. The campaign should be aimed at all types of businesses – not just IT businesses.

The Danish Government Digitisation Partnership urges the public sector and businesses to create more apprenticeships for IT apprentices to reduce the number of apprentices in school-based practical training.

39

All unemployed people must have basic digital skills

Proposal

It must be ensured that all unemployed citizens, who are not expected to further education, have the basic digital skills increasingly demanded to get a job.

Value and potential

Many unemployed people do not get access to digital skills upgrading via the labour market and therefore risk being overtaken by the digital development and being unemployed for extended periods. The recommendation will support skills upgrading of unemployed people who are ready to get a job and create stronger cohesion between labour market demand and the job centres' initiatives to reduce unemployment.

Prerequisites

- Broad municipal support for skills upgrading and collaboration across municipalities to ensure local anchoring matches the specific unemployed target group in the area.
- Identification of the skills considered as basic skills for the area of employment.
- Skills upgrading must not result in prolonged unemployment, and the target group must have some prospect of getting employed based on upgrading their skills.

Actions

A national mapping must be undertaken between educational programmes and possible job types and industries, regularly updated based on labour market demand. This requires a digital upgrade across the municipalities' job centres. Moreover, an algorithm must be developed to help job centres match unemployed citizens with available jobs. All municipalities must upgrade the basic IT skills of those unemployed as part of the employment initiative. The effort should be realised in collaboration with the municipalities.

Moreover, collaboration must be started with businesses to upgrade the citizens' digital skills. Businesses must be encouraged to hire unemployed people on a trial basis, e.g. digital storage workers, test managing librarian, etc. Moreover, unemployment insurance funds should help unemployed people in relevant IT upgrading courses.

40

Enhanced further education to upgrade digital skills

Proposal

The workforce's digital skills must be increased by creating a better match between businesses and training providers to make it easier for employers to find relevant, high-quality further education courses.

Value and potential

Analyses from PIAAC (OECD), the Danish IT Society and the Danish Evaluation Institute indicate that a need exists for upgrading the basic IT skills of adults and that one in two businesses experiences unskilled or skilled labour with inadequate basic IT skills. An upgrade of the employees' IT skills can, in part, prevent that part of the workforce from becomes disconnected from the digital development and has difficulty navigating society and, in part, strengthen the businesses' commercial digital transition so that they become more productive and thus able to control growth and exports.

Prerequisites

- Businesses must know their employees' IT skills and an overview of how upgrading their skills can strengthen the business.
- Businesses and employees must be motivated so that employees can upgrade their IT skills on an ongoing basis. The public and private sectors currently offer a wide range of IT courses, but it must be easy to find the right course of high quality (e.g. via user ratings).

Actions

A better match must be established between businesses and training providers. Enterprise centres, RAR/VEU coordinators and educational institutions will work together to implement the initiative and develop the scheme. One element should involve a databased approach using, e.g. a rating tool (as known from VisKvalitet, a nationwide evaluation tool, where participants rate the adult vocational training system (AMU)) to help employees and employers find relevant further education courses of high quality. Businesses are encouraged to join communities to share experience and offer courses that will help upgrade the digital skills of the relevant group of employees.

The Danish Government Digitisation Partnership urges individual businesses to prioritise and plan further education courses to upgrade digital skills in collaboration with their employees in the same way they currently plan holidays. The planning of further education should be facilitated by offering virtual courses.

41

Life-long skills development through personalised, digital skills upgrading offers

Proposal

A digital tool must be developed that enhances support to individuals with regards to choices of supplementary and further training. The tool is to be personalised based on data from previous training, experience, interests and development, career and financing opportunities, focusing on strengthening the skills needed in a digital world.

Value and potential

Further education and regular upgrading of skills are crucial to society, businesses and the individual citizen. When employees have the necessary skills, their labour market attachment increases, and businesses access qualified labour. By making the choice of further education clearer for the individual citizen and thus allowing more people to become inspired and motivated to upgrade their skills, the initiative is expected to contribute to growth, export and a business sector that is ready for change and fair and equal society.

Prerequisites

- The initiative demands considerable collaboration between data owners regarding data utilisation and the widespread inclusion of relevant players, including the social partners and supplementary training committees. In this connection, a potential tool will require focus on the quality of data, including in particular maintenance and classification of historical training data.

Actions

A decision must be made, invest in the further development of existing initiatives, including voksenuddannelse.dk and eVejledning. In this context, an overview must be provided of existing data that, in connection with coordination, can contribute to a more user-centric further education guide.

Finally, a strategic partnership must be established, e.g. in the form of an advisory board with representatives from both public-sector and private players. The board should assist with the ongoing development of the digital tool. Various user groups, e.g. citizens with different educational backgrounds and experience, will qualify relevant display and use of data.

42

Digital platform for further education

Proposal

As one of the first countries in the world, Denmark must develop a digital platform for further education that brings together and manages training offers where occupational groups can find relevant learning material. This is to help create an overview, qualified guidance and access to skills upgrading for the users.

Value and potential

Today, institutions and players offering further education are experiencing rapid technological development, which the individual institutions have difficulty coping financially and skills-wise. The skills of the working force must be maintained and updated regularly for the benefit of the individual citizen and society as a whole. This requires further education offers that keep up with the technological development, making it easy for employees and employers to navigate and find relevant further education offers. Interactive, virtual courses and certifications, etc., which can be carried out as either complete digital programmes or courses that combine virtual and physical elements, hold great potential.

Continuous, fast and efficient further education requires joint investment in a platform that can be developed and adapted regularly to allow new skills upgrading courses to be launched locally using new technological aids.

Prerequisites

- The many existing further education institutions and offers need to be mapped.
- The data from various further education institutions must be uniform, combinable and of adequate quality.
- The digital platform must be operated in collaboration with relevant parties in the labour market.
- A link must be established to NemID/MitID as a condition for creating personalised further education offers.
- This recommendation should be closely coordinated with existing initiatives in the area.

Actions

An investment framework should be provided to finance and operate a digital further education platform. An overview must be established of existing further education offers that provides advice and gives the user access to skills upgrading via learning material that can be accessed digitally.

A strategic partnership must be established with representatives from relevant public areas, relevant organisations and social partners. The digital platform must be prepared with user-friendliness in mind.

43

Everyone must be able to participate in Digital Denmark

Proposal

It must be ensured that digitally challenged citizens get the help they need to communicate with public authorities and use digital self-service solutions. That is essential for being able to participate in society.

Value and potential

No citizen should be lost in the rapid technological development and digitisation of our society. Some citizens have so few digital skills that they have a special need for help, adapted digital solutions or pedagogic, social support to prevent them from being excluded from society.

Prerequisites

- The user's digital skills must be integrated much more in the development and use of public systems.
- Private businesses must take responsibility for the parts of their client base that are not digital.
- Network coverage throughout Denmark is a prerequisite for everyone becoming digital.

Actions

Politically, it must be ensured that all public digital solutions are user-friendly for all groups and feature simple personalised solutions for relevant groups with special needs. Moreover, digitally challenged citizens must be offered support to use basic digital solutions, and they must be able to have personal contact. This involves the development of a power of attorney solution for digitally challenged citizens, digital solutions with icons and graphic guides and videos to ensure that everyone can use the solution. This should be supplemented by IT course offers to care and support staff to help citizens use digital solutions and requirements for phone support for digital solutions. All citizens must have access to a device (mobile phone, tablet or computer) that can be used for basic digital solutions.

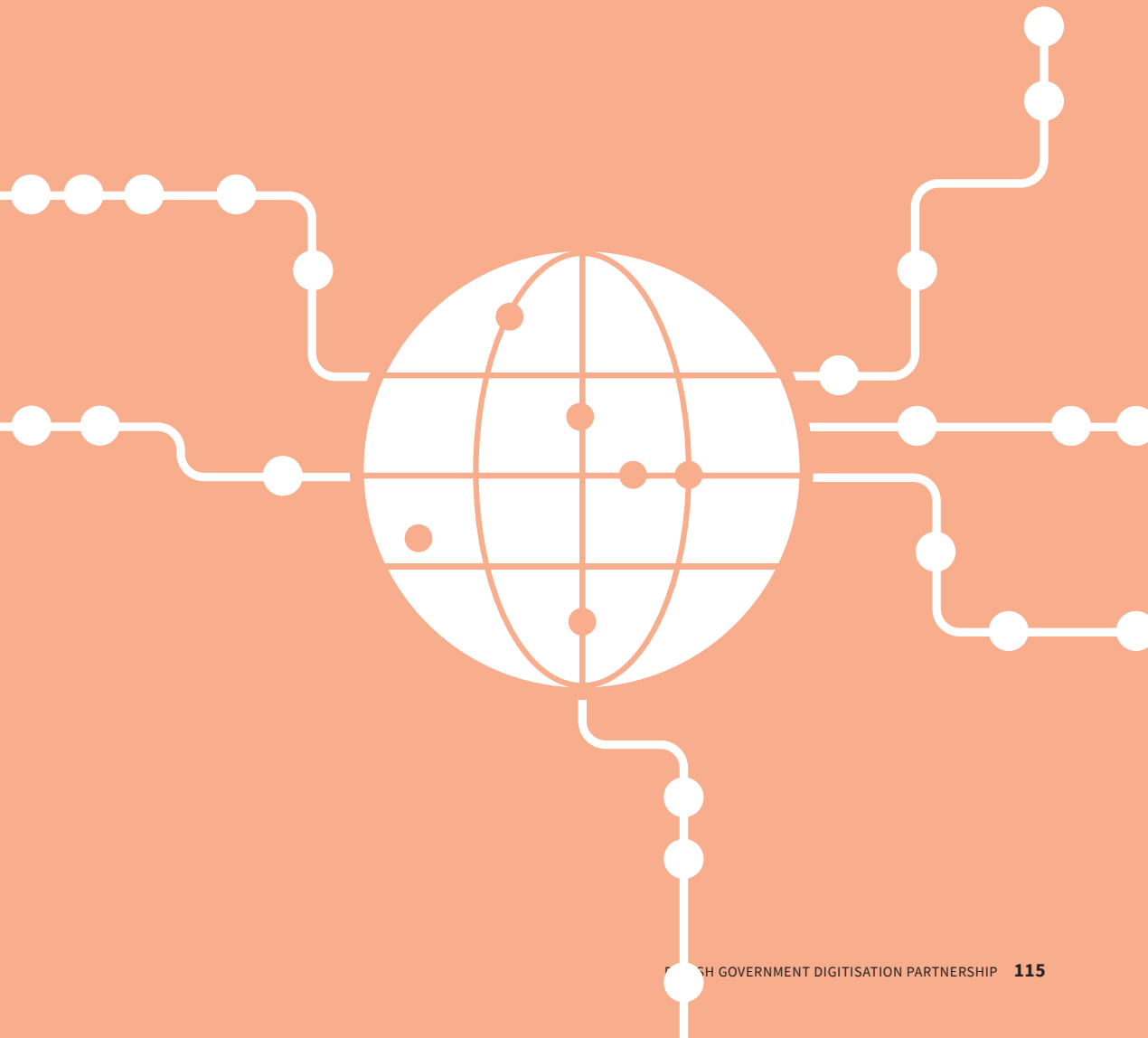
Moreover, private businesses that operate websites and apps must be required to provide alternative support means. Workplaces must offer help to digital solutions if their employees need them, and the business sector must be encouraged to ensure more user-friendly digital solutions via the Danish label for IT security and responsible digital use, D-mærket.

Citizens must be offered digital skills upgrading so that they can use basic digital solutions.

5.9

Elaborated recommendations

Increased and responsible use of data



44

Roadmap for more and better public data

Proposal

It should be easier for citizens and businesses to find and create value using public data. Therefore, a roadmap must be developed for available public data, and a plan must be prepared to make more and better public data available. A strong mandate and associated governance must be secured to create more coherence across public data initiatives.

Value and potential

Public data offer great potential for creating value for citizens, authorities and businesses via, e.g. new business models, growth and research, and improved public services. A roadmap for public data must create a much better overview of already available public data, which, according to the Office of the Auditor General of Denmark, are available in 88 different places. Strong governance can increase the value of the Danish data initiatives by ensuring better coherence, availability and quality of still more public data.

Prerequisites

- A clear data catalogue in the form of a roadmap is a prerequisite for users to find and assess available public data that are already provided on existing platforms.
- To ensure simpler access to public data, descriptions of data, licence terms, technical interfaces, etc., need to be standardised in areas where the users' lack of uniformity is a challenge. To the extent possible, European standards should be applied.
- Experience shows that it takes strong governance to ensure that more valuable public data are available and coherent across, e.g. sectors. Accordingly, binding joint-public and public-private partnerships must be established.
- Measures to improve the availability and quality of data must be prioritised according to demand. Therefore, the users must have a single point of contact for making requests, which can subsequently be assessed, qualified, and prioritised based on strategic considerations about what creates the most value.

Actions

The government must make a decision to launch a roadmap with descriptions of public data are already available. A long-term plan for data initiatives in Denmark, which provides a clear mandate to regularly prioritise and coordinate new data projects, must be prepared and financed. An accompanying service organisation must gather requests for public data.

45

Increased trust in digitisation

Proposal

The trust in digitalisation in Denmark must be increased through clear ground rules, institutional initiatives focusing on responsibility, transparency and rights, and a better understanding of and focus on the benefits and results of digitisation.

Value and potential

Trust in digital solutions and digitisation in the broader sense is crucial for the digital development of the future and therefore calls for a multi-pronged approach to ensure that the Danes' trust is maintained at a high level. However, this trust is challenged by the rapid technological development, which might create great opportunities and come with complex challenges. Technology and data must therefore integrate democratic societal values.

Prerequisites

- Adequate focus on visualising the benefits of sharing data – e.g. health data.
- Clear communication about purpose, use and potential of using data and new technology.
- A wider understanding of data ethics as reflections on the relationship between technology, citizens' basic rights, the rule of law and basic societal values must be ensured. It must be clarified how data ethics is different from, e.g. GDPR or IT security.
- The right skills must be ensured in management and employees concerning data ethics and responsible use of data.

Actions

All citizens must be offered a course in technology comprehension and source criticism. Businesses and authorities must always be able to explain decisions made using artificial intelligence or other technologies. Together with the business sector and civil society, politicians must choose the ten best examples of confidence-inspiring solutions that should be communicated to the Danish population Establishment of sector partnerships in collaboration with relevant trade associations to promote responsible use of data and the appointment of ambassadors for digital solutions. The SMEs' work with data ethics should also be supported.

The business sector must create a trust to brand good digital solutions that are already used by businesses. Relevant trade associations must participate in spreading knowledge about data ethics as part of a bridge-building initiative and help ensure business commitment.

In civil society, public service must increase knowledge about new technology, and the media must articulate their role in democratic development in a digital age.

46

Responsible and ethical digital transformation of society

Proposal

Many initiatives must be launched to ensure that businesses and the public sector use data and new technologies in an ethical, responsible and secure manner that can support a democratic development of society.

Value and potential

Digital development in Denmark must be in keeping with our democratic values. Collection and use of data and new technologies in the public sector and businesses must be undertaken in a data ethical, responsible, transparent and secure manner.

Prerequisites

- Strong focus on EU cooperation on data ethics, security standards and use of new technologies.
- Tools for carrying out risk assessments in connection with data pooling and a tool for carrying out impact analyses of solutions using artificial intelligence.
- Experience from data ethics work from the Danish Business Authority's, the Danish Ministry of Foreign Affairs and the Danish Data Ethics Council's work with responsible use of new technology.
- A wider understanding of data ethics as reflections of the relationship between technology, citizens' basic rights, the rule of law and basic societal values must be ensured. It must be clarified how data ethics is different from, e.g. GDPR or IT security.

Actions

The Danish Parliament must ensure that ministries make the necessary ethical considerations pertaining to data when drafting important new legislation. A voluntary data ethical labelling scheme must be widely used, e.g. the D-mærket. Methods must be prepared for data ethical practice and principles on problems and solutions in collaboration with businesses and organisations.

Support and advisory services about data ethics and the use of new technology must be provided to all businesses.

6

Appendix

TABLE 1
RECOMMENDATIONS OF THE DANISH GOVERNMENT DIGITISATION PARTNERSHIP

No	Recommendation
1	A strengthened Danish Data Protection Agency serving a proactive function in society
2	Denmark at the head of European data spaces
3	Social media should not undermine democratic principles.
4	MinVirksomhed
5	Five robot libraries – automation as a position of strength
6	SMV: Digital – significant consolidation of online sale and export of small enterprises
7	Danish SMEs in a digital Europe
8	Employees must join the growth journey via employee shares.
9	Digital freeway for Danish talent
10	Strong digital foundation for the public sector
11	Modernisation of the public digital infrastructure
12	Up-to-date service to citizens by means of new technology
13	A well-informed social sector
14	Efficient and flexible public procurement must create opportunities for more Danish businesses.
15	More digital innovation must provide new solutions.
16	The easy and safe consent (consent portal)
17	Virtual meetings as the new public communication channel
18	Exploit new technology for phone calls
19	An informed and qualified choice of study – more people starting education and work
20	Digital tools are to support teaching in primary and secondary schools.
21	Access to aggregated health data
22	A healthier population based on data and new technology.

TABLE 1 – CONTINUED
RECOMMENDATIONS OF THE DANISH GOVERNMENT DIGITISATION PARTNERSHIP

No	Recommendation
23	Digital post throughout the health sector
24	Better health services via the citizens' personal collection of data
25	Psychiatry as national front-runner in digital services to citizens
26	Long-term action plan for digital acceleration of the green transition
27	Climate-friendly energy and utility services via increased access to meter data
28	Efficient green transition via a national data space for energy and utility data
29	Less congestion and better flow of traffic
30	Optimised parking and charging infrastructure for greener mobility
31	Get more streamlined from A to B through better coherence across transport types
32	Stronger interaction between universities and the business sector as a driver of growth
33	Partnerships on the key IT solutions of the future
34	The task force is to strengthen exports and internationalisation of Denmark's digital solutions
35	Creating an understanding of technology for everyone in primary and secondary education and vocational education programmes
36	Higher education must be adapted to include relevant IT understanding and competences.
37	Larger cohorts on popular IT education programmes
38	More apprenticeships for IT apprentices in all types of businesses
39	All unemployed people must have basic digital skills
40	Strengthened further education to upgrade digital skills
41	Life-long skills development through personalised, digital skills upgrading offers
42	Digital platform for further education
43	Everyone must be able to participate in Digital Denmark
44	Roadmap for more and better public data
45	Increased trust in digitisation
46	Responsible and ethical digital transformation of society

TABLE 2
THE MEMBERS OF THE DANISH GOVERNMENT DIGITISATION PARTNERSHIP

Jim Hagemann Snabe, chairman of the board of directors for Mærsk and Siemens
André Rogaczewski, CEO and founder, Netcompany
Brian Mikkelsen, CEO, Confederation of Danish Enterprise
Casper Hansen, CEO, Technicon
Claus Jensen, President, Danish Metal Workers' Union
Esben Gadsbøll, chairman of the board of directors, The Association of Tech Startups in Denmark
Eva Berneke, former CEO, KMD
Gordon Ørskov Madsen, Chairman, Danish Union of Teachers
Gregers Kronborg, CEO, Rulebreaker Ventures
Jacob Bundsgaard, Chairman, Local Government Denmark
Kim Fausing, CEO, Danfoss
Kim Simonsen, President, Union of Commercial and Clerical Employees in Denmark
Lars Sandahl Sørensen, CEO, Confederation of Danish Industry
Lars Aagaard, CEO, Danish Energy Association
Lizette Risgaard, Chairman, Danish Trade Union Confederation
Mads Nipper, CEO, Ørsted
Martin Præstegaard, Vice Chief Executive Officer and Chief Financial Officer (CFO), ATP
Michael Holm, CEO, Systematic
Michael Rasmussen, CEO, Nykredit
Mikkel Flyverbom, Professor (with special responsibilities), Copenhagen Business School
Nana Bule, CEO, Microsoft Denmark & Iceland
Natasha Friis Saxberg, CEO, The Danish ICT Industry Association
Per Christensen, President, 3F
Rikke Zeberg, Branch director, DI Digital, Confederation of Danish Industry
Rikke Hvilshøj, CEO, DANSK IT
Stephanie Lose, Chairman, Danish Regions
Stephen Alstrup, CEO, SupWiz/professor, University of Copenhagen
Stine Mangor Tornmark, CEO and co-founder, Legal Monster

Visions and recommendations for Denmark as a digital pioneer

Design: BGRAPHIC
Photo: iStock, Johnér and Unsplash

ISBN 978-87-94088-25-1 (Print version)
ISBN 978-87-94088-26-8 (Online version)

The publication is available at
www.fm.dk

DIGITALISERINGS
PARTNERSKABET