Digitalisation and digital transformation in Denmark

Implications for persons with disabilities

Steen Bengstson

This report has been developed under Contract VC/2020/0273 with the European Commission.

June 2021

EUROPEAN COMMISSION
Directorate-General for Employment, Social Affairs and Inclusion
Directorate D — Social Rights and Inclusion
Unit D3 — Disability and Inclusion

European Commission
B-1049 Brussels

EUROPEAN COMMISSION

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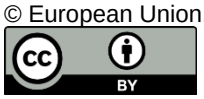
Luxembourg: Publications Office of the European Union, 2021



PDF ISBN 978-92-76-42560-1 DOI: 10.2767/930789 KE-07-21-022-EN-N

Contents

1 Executive summary

Digital strategies

Since the 1990s, Denmark has had an overall strategy for digitalising the entire society. It builds on a tradition of describing society in detail using statistics, and on the introduction of personal identification numbers in 1968 as a basis for statistics at the individual level covering a wide range of topics.

Strategies for digitalisation have been devised in 1995, 1999, 2001, 2004, 2007, 2011 and 2016, and a new strategy is likely to emerge soon. Ten years ago, a special agency, the Agency for Digitisation, was established to oversee the development. Digitalisation is financed mainly by the state, the regions and the municipalities. The financing is described in more detail in section 4.1.

Digitalisation has been rapid in Denmark and is seen as a condition for increased welfare. Disability organisations are following digitalisation closely, because new methods are required to make the new technology more accessible than older methods.

Disability inclusivity

In order to provide broad support, civil society, including organisations for people with disabilities and organisations for elderly people, has been involved in the development. Much has also been done to teach the public in general to address public authorities via the digital route (i.e. to use tools such as home pages, *E-Boks*, EasyID) instead of using paper and visiting offices.

The Agency for Digitisation estimates that 10 % of the population has difficulty using digital methods. The figure is based on the proportion of citizens who have signed up for Digital Post, and the proportion that use network-based services. It can therefore include both people with and without disabilities.

The Agency for Digitisation collaborates continuously with a number of authorities and organisations, including Disabled People's Organisations Denmark (DPOD) (Danske Handicaporganisationer – DH), to spread digitalisation.

Digitalisation and digital transformation in disability strategy

Digitalisation has not played any major role in the Danish disability strategy. The reason for this is that issues of digitalisation and disability are addressed under the digitalisation strategy. Organisations for people with disabilities participate with the Agency for Digitisation in the Network for Digital Inclusion.[1] This network has been established so that organisations can channel wishes and problems to the agency.

Digitalisation is, in many ways, a benefit for citizens in general, and it is beneficial for people with disabilities in particular. The latest state disability action plan from 2014[2]

[1] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/.

[2] https://www.regeringen.dk/aktuelt/tidligere-publikationer/handicappolitisk-handlingsplan-status-2014/ p 42-47.

points to these possibilities. In its last chapter, it gives some examples of how digitalisation can be used to support people with disabilities (section 3.1).

Persons with disabilities in digitalisation and digital transformation

Digitalisation has two sides: it is a new form of communication and information that offers great opportunities for everyone, and which must be adapted to people with disabilities. And it's a new technology that can be used to provide greater opportunities for people with disabilities. Before 2000, the second side characterised digitalisation in Denmark, then the first side dominated for some time, but in recent times the second one has reappeared.

Thus, there is now talk of digital health, including a strategy to make the citizen an actor, digital welfare where information technology is used to create better treatment processes across sectors, and artificial intelligence in the processing of social cases (section 2.2). Likewise, there is now talk of artificial intelligence to make faster diagnostics, for increased quality in general practice and in rehabilitation (section 3.2).

Good practices

Two examples of good practice can be mentioned. One is that the state, the regions and the municipalities have been aware since the 1990s that there was a new development that had to be actively pursued in order to develop the country and strengthen competitiveness, as a prerequisite for developing the welfare state.

The second is the Agency for Digitisation's involvement with civil society, including disability and elderly organisations, in the process of implementing digitalisation. Cooperation between government and organisations is the way that administration works in a modern welfare state.

Digitalisation is new to everyone and most people have difficulty getting used to the new tools, and in that context one can easily forget the needs of people with disabilities as a group. In addition, it took some years before they entered into collaboration on digitalisation, but since 2015, they have been heard via the Network for Digital Inclusion.[3]

Summary of recommendations

In continuing the development of digitalisation, one must think about how it can be used more broadly: to empower people with disabilities to live more independent lives; for new forms of democracy and participation in decisions; and for many other purposes.

It is often mentioned that digitalisation offers great opportunities for developing new forms of aids for people with disabilities, which may even be difficult to imagine today. It is therefore obvious to give the recommendation that research work be initiated with a view to translating the new possibilities in information technology and artificial intelligence into concrete techniques that can be used.

[3] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/.

A few projects have been initiated to shed light on these possibilities in more detail, and it is recommended that several such projects be launched.

2 Are government strategies and plans on digitalisation and digital transformation disability-inclusive?

2.1 Disability inclusion in generic strategies on digitalisation and digital transformation

The latest strategy for digitalisation in Denmark applies to the period 2016-2020. It is intended to launch a digitalisation strategy for 2021 and some years ahead.[4] However, the preparation of the new strategy has been delayed because of the current pandemic. However, a goal and result plan for 2021 has been prepared.[5]

Digitalisation is a process that has been going on for more than two decades. The latest strategy[6] follows six previous strategies: 1995, 1999, 2001, 2004, 2007 and 2011. The latest digitalisation strategy includes a section on providing better data on people with disabilities, and a section on making solutions accessible to people with disabilities[7]. The current situation can be understood only in the light of the previous strategies, which are described in the 2016 strategy as follows.[8]

The 2001 strategy introduced e-mail communication between the citizens and the public sector, as well as various forms of digital communication between authorities. In addition, it introduced a digital signature. Obviously, these measures provided great benefits for people with reduced mobility, who could now communicate from their homes. On the other hand, digital methods are difficult for people who are not used to them. The report will return to these difficulties, which are not so much related to disability.

The 2004 strategy created the platform sundhed.dk,[9] where citizens can communicate with the health service. The strategy contained a requirement for all citizens to set up an easy account, i.e. a bank account that the authorities can use to make payments to the citizen. In addition, it introduced secure email between authorities, e-invoicing and a platform for corporate communication with the authorities.

Sundhed.dk has made it possible to make available to all citizens medical records from medical doctors and hospitals. In 2018, sundhed.dk was used by 400 000 citizens a month and its use had doubled over the previous year.[10] In January 2019, sundhed.dk had over 60 000 visits a day.[11] For citizens in contact with the healthcare system, it is of great importance that they can see what the doctors have written down about their treatment and what blood tests and other laboratory responses say.

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4 See: https://digst.dk/strategier/cyber-og-informationssikkerhed/ny-national-strategi-for-cyber-og-informationssikkerhed-fra-2021/.

5 https://digst.dk/om-os/om-digitaliseringsstyrelsen/strategi-og-maal/

6 See: https://digst.dk/strategier/.

7 See: https://digst.dk/strategier/digitaliseringsstrategien/

8 *Et stærkere og mere trygt digitalt samfund – Den fællesoffentlige digitaliseringsstrategi 2016-2020*, https://digst.dk/strategier/digitaliseringsstrategien/.

9 See: https://www.sundhed.dk.

10 'Sundhedsjournalen bliver brugt af 400.000 borgere hver måned' ('The health record is used by 400 000 citizens every month'), press release, 13 March 2018, https://via.ritzau.dk/pressemeddelelse/sundhedsjournalen-bliver-brugt-af-400000-borgere-hver-maned?publisherId=10524793&releaseId=12437352.

11 See: https://www.sundhed.dk/borger/service/om-sundheddk/om-organisationen/sundheddks-strategi-2019-2022/.

The 2007 strategy made provision for EasyID (*NemID*), which is a key that the individual citizen can use to lock their personal page and receive confidential information – for example, from the bank, the health service and the municipality.[12] It also included digital mail (*E post*), which is a network mailbox where citizens can receive mail from public authorities, and where they can also receive mail from the bank. In 2021-22, EasyID will be replaced by a new edition, MyID (MitID).[13]

EasyID has made it possible for banks to set up online banking so that citizens can handle all payments from home. It has also made it possible for the municipalities to make various services available over the internet. In addition, the 2007 strategy created the platform borger.dk.[14] Here, people can get information about their rights and public schemes, and find, fill in and submit application forms, so it is often not necessary for them to attend a public office. Furthermore, the authorities developed a common IT infrastructure so that it became easier for them to communicate with each other.

With the 2011 strategy, public authorities began sending all mail to citizens and businesses through digital mail (*E-Boks*).[15] Furthermore, the system was developed so that citizens and companies can serve themselves over the internet. Finally, a basic data programme was started, in which the state builds a base of relevant data about the individual citizen that all authorities can draw on. This eliminates the need for the citizen to provide the same information over and over again.

The 2016 strategy aims for us as a society to be able to adapt and utilise the new technological opportunities to create welfare and prosperity. At the same time, it is important to maintain the level of security and trust in each other and in society, which is considered to be great in Denmark.[16] The administration is aware of the importance of political trust. Employees in the Agency for Digitisation have developed a model for preserving and strengthening trust in the digital solutions.[17]

The 2016 strategy is not only a strategy for digitalisation of the public sector in Denmark. It emphasises that the public sector must work closely with business and with interest groups (including disability organisations) to create the basis for an adaptable society in a world where digitalisation is advancing as a result of technological development, whether we like it or not.

The 2016 strategy is based on the previous strategies. The public sector has started early to build datasets and registers with high-quality data and to introduce IT solutions. In this way, the internet has become the primary gateway to public administration for most citizens and businesses.

Today, most Danes receive more letters in their email box than in their traditional mailbox, and digital self-service has been introduced in over 100 different case-processing areas. The closure of society due to the COVID-19 pandemic has also led to e-commerce growing faster than before. The development of e-commerce is a part

12 See: https://www.nemid.nu/dk-da/om-nemid/historien_om_nemid.
13 See: https://digst.dk/it-loesninger/mitid/
14 See: https://www.borger.dk/.
15 See: https://www.e-boks.com/corporate/da/om-e-boks/historie/.
16 Svendsen, G. T. (2012), *Tillid*, Aarhus University.
17 Kristensen, E. E., Brünner, F. N. and Duminski, E., 'Kan offentlig digitalisering vække tillid?' ('Can public digitisation inspire confidence?'), *Samfundsøkonomen*, 1/2021.

of the digitalisation that means that people with mobility impairments are becoming more equal in the goods market than they have been in the past.

Digital aids are also used in many connections where citizens are in contact with public employees. Teachers use digital teaching aids to make teaching more targeted to individual students. Home helpers use tablets both to document their work and to record changes in the health of the elderly.

Digitalisation, however, was under way before the current form of digitalisation had begun. Before 2000, Danish digitalisation policy was a little different than it later became. The first phase of digitalisation had a broader focus, while the second part was more geared to the needs of the competitive state. Birgit Jæger writes that the first actual digitalisation strategy came into being in 1994.[18] It was about how Danish society as a whole could adopt information technology for the benefit of both business and citizens.

The 1994 strategy[19] states that the technology must be used not only to create growth in the business sector and make the public sector more efficient, but to provide better opportunities for the unemployed, people with disabilities and other vulnerable groups, and to strengthen local democracy. At the same time, it warns against a polarisation of the population in which an A and a B team emerge, and the B team is disconnected from the development.

A subsequent strategy from 1999[20] sets the goal that the Danish administration must provide the Nordic region's best and most efficient public service by means of digital administration by 2003 at the latest. This must be done by, among other things, developing electronic forms, setting up public websites and implementing a law that gives citizens ownership of their own data. In addition, this strategy sets goals for open decision-making processes and for securing Danish culture on the internet.

Birgit Jæger states that around 2001-2002, there was a change of direction in Danish IT policy. From that point, it has been driven by neoliberal values such as efficiency, accountability and freedom of choice, and citizens are seen as customers who are free to choose between services provided by the public or by private providers. IT policy becomes part of what in Denmark is called 'necessity policy', which develops the competitive state and new public management.

This meant that digitalisation was depoliticised, so the policy was implemented with broad political agreement. In the first two decades of the new century, therefore, digitalisation has gained momentum. Governments with different political colours have pushed digitalisation forward on the premise that it is necessary for the country to survive in the future.

In 2011, the management of digitalisation of the public administration was transferred from the Ministry of Research to the newly established Agency for Digitisation under

[18] Jæger, B, 'Digitalisering af den offentlige sektor i et historisk perspektiv' (Digitalisation of the public sector in historical perspective), in: Hundebøl, J., Pors, A. S. and Sørensen, L. H. (2020), *Digitalisering i offentlig forvaltning* (*Digitalisation in public administration*), Copenhagen.

[19] Ministry of Higher Education and Science (Forskningsministeriet) (1994), 'Info-samfundet år 2000', Copenhagen.

[20] Ministry of Higher Education and Science (1999), *Det digitale Danmark – omstilling til netværkssamfundet* (*Digital Denmark – transition to the network society*), Copenhagen.

the Ministry of Finance. Birgit Jæger understands this as a centralisation of the management of digitalisation, with the Ministry of Finance at the head of the table. The work is still taking place in collaboration with the National Association of Local Authorities (known as KL in Denmark) and the Danish Regions.

However, Birgit Jæger sees signs that digitalisation policy has recently become more broadly oriented again. The latest strategy states that digitalisation in welfare has only just begun. We can predict what the future may bring in the way of new solutions to a lesser extent than we could previously. There may be new uses of artificial intelligence and extensive use of big data that we cannot yet imagine. The new technologies open up many opportunities, but also present many challenges for society.

It is part of the strategy that small and medium-sized companies also follow this development. To promote this, the Danish Technological Institute has set up a centre[21] that helps smaller companies get started with development in various ways.

The joint public Digital Strategy 2016-2020 consists of three sub-strategies. Under each sub-strategy, there are a number of initiatives. The strategy for welfare administration contains three sub-goals: a user-friendly and clear digital public sector; better use of data and faster case processing; and better and more coherent welfare. The initiatives under this item include more coherence for users; better digital communication; an overview of individual cases and services; better support for citizens and companies; and ensuring that all messages from the public sector are in digital format.

The strategy for policy also contains three sub-goals: 1) the public sector takes good care of data, 2) robust digital foundation, and 3) digitalisation for all. This last sub-goal means that people with disabilities must also be able to participate. The initiatives under this item are coherent welfare processes for citizens; better data on disability and vulnerable adults; the dissemination of digital welfare solutions; digital learning and teaching; and the digital competences of public employees.

Digitalisation has brought great benefits to people with disabilities. It means that a lot of communication with the public sector, which previously required attendance at a number of offices, can now, in almost all cases, be done from home on the PC. The public websites are accessible so they can also be used by people with visual impairments. Nearly all communication with the public is done via email.

Development has moved fast, and some people have had a hard time learning to use email. Therefore, it is possible to be exempt from email communication so that one still receives paper mail from the Government. However, it is uncertain whether this has to do with disability, or whether it is simply a matter of learning and getting used to new methods. This report will return to the pros and cons of digitalisation for people with disabilities in section 5.

In 2015, the Agency for Digitisation established a Network for Digital Inclusion[22] in collaboration with a number of organisations, including the disability organisations and the DaneAge Association (Ældresagen), an organisation for the elderly. The purpose is to involve the organisations in the work on public digitalisation.

[21] See: https://www.teknologisk.dk/ydelser/digitalisering-i-mindre-virksomheder/37956.
[22] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/.

The network must contribute to: ideas for how the target groups can be helped; identification of issues and suggestions for solutions; increased knowledge about the target groups; sharing messages and material to the target groups via member organisations' channels; exchange of experiences and methods across member organisations; and communication with the target groups.

As the members of the network are aware of the challenges that citizens may experience with public digitalisation, the network has been involved in the work on the annual action plans on communication and assistance in the joint public digitalisation strategy.

The Agency for Digitisation writes on its homepage that the network is open so that all organisations and authorities that represent or work with IT-challenged citizens can become members: The website mentions the organisations the agency works with. The list includes, among others, organisations for people with disability, organisations for young people, organisations for older people and organisations for immigrants.[23]

The Agency for Digitisation estimates that approximately 10 % of the citizens of the country are IT-challenged.[24] The figure is estimated on the basis of the proportion of citizens registered with Digital Post and the use of self-service solutions. The IT-challenged citizens are not only citizens with physical disabilities or mental health problems, but also a group who do not have the required understanding and interest to participate in society. Efforts to increase accessibility include language or physical challenges.

In 2020, the Agency for Digitisation has also set up an Advisory Board to advise on the legal framework for digital administration.

Digitalisation in the public sector has led to major changes in the way tasks are solved in the public sector today. It has also changed citizens' encounters with public authorities. Citizens and businesses receive Digital Post when in contact with the public sector, and they use EasyID (*NemID*) to log on securely to access the public self-service solutions.

The Advisory Board must help to ensure the legal framework for the digitalisation of public administration. This can involve legal issues and solutions in relation to common public infrastructure such as EasyID and Digital Post, digital administration and the use of new technology and artificial intelligence in the public administration. It is important that the transformation from an analogue to a digital administration takes place in a way that respects the fundamental rights of citizens and takes care of non-digital citizens. The Advisory Board is composed of 15 members with practical experience and knowledge of the development, applicability and implementation of digital solutions, including in relation to IT-challenged and digital inclusion. The members represent public authorities, social partners, the IT industry, lawyers, social workers and organisations for people with disabilities and the elderly.

[23] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/medlemmer/.
[24] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/netvaerkets-formaal/.

In addition to these formal co-operation bodies, Disabled People's Organisations Denmark have good co-operation with the Agency for Digitisation and hold meetings on various topics, most recently on coronavirus passports. DPOD also sits on the committee and advisory board for web accessibility. The topic is covered in detail on the website,[25] and readers are encouraged to report back if they experience inaccessible content anywhere on public homepages.[26]

2.2 Disability inclusion in focused or sector-specific strategies on digitalisation and digital transformation

The report will look at three areas: digital health, for which there is the Digital Health Strategy 2018-2022; digital welfare, where many interesting things are happening even though there is no real overall strategy yet; and digital education, where there is also an Action Plan for Technology in Teaching.

Digital health

The Government, the National Association of Local Authorities and the Danish Regions have drawn up a strategy which they have entitled *One safe and coherent health network for all*.[27] The strategy paper has also been translated into English and can be found on the same homepage.

The strategy aims to make the citizen an actor who actively participates in the solution of the tasks. It is also flexible, so that there is room for new local and national initiatives and so that technological development can be continuously taken into account.

There is a focus on five areas:
1) the citizen as an active partner;
2) knowledge on time;
3) prevention;
4) trust and security of data; and
5) progress and common building blocks.

Under these five focus areas, there are 27 specific initiatives that must be realised by 2022.

A national board has been set up with representatives from the state, the regions and the municipalities, who advise the minister on IT strategy, overall IT architecture, standardisation, etc. with a view to setting national requirements and standards.

Furthermore, the board must discuss developments in the area and be responsible for ongoing coordination and an annual follow-up to the Government and to the Danish Regions. In particular, it must assess the realisation of gains in relation to the milestones agreed in the annual financial agreements.

Finally, the Board of Directors must make proposals for new cross-sectoral investments. They can be the basis for discussions in the annual financial negotiations.

[25] See: https://digst.dk/digital-service/webtilgaengelighed/.
[26] See: https://digst.dk/digital-service/webtilgaengelighed/oplever-du-utilgaengeligt-indhold/.
[27] Government, KL and Danish Regions (2018), *Ét sikkert og sammenhængen de sundhedsnetværk for alle – Strategi for digital sundhed 2018-2022* (*One safe and coherent health network for all – Digital Health Strategy 2018-2022*), https://sundhedsdatastyrelsen.dk/da/strategier-og-projekter/strategi-for-digital-sundhed.

In this regard, the Board of Directors must ensure that there is a sufficient basis for decision-making in the form of positive business cases.

A number of indicators have been set up for the development, and the progress of the various indicators is continuously highlighted on the Danish Health and Medicine Authority's website,[28] where all citizens can follow the development.

However, the common public strategy for digital health does not stand alone. A strategy has also been drawn up by the Danish Regions, entitled *Health for You*.[29] The strategy describes how the regions see the future for citizens and employees in the digital healthcare system and provides examples of how the regions will work towards fulfilling this vision.

An example is personalised medicine, for which the Government and the Danish Regions have recently launched an updated national strategy.[30] It will ensure that patients receive accurate diagnoses and effective treatment with fewer side effects. New ways will be found to enable smart and secure use of data so that better treatments can be developed. Through the secure use of genetic information, tailored treatment can be provided that takes into account particular biological conditions.

The implementation of the updated strategy will aim at new possibilities for combining data sources that ensure the further development of personalised medicine, while maintaining public control over the use of patients' information. On an ongoing basis, several data sources, including imaging, will be included in patients' treatment.

The National Strategy for Personalised Medicine 2017-2020 has been implemented in the establishment of national collaboration structures; the establishment of the National Genome Centre; a grant of EUR 135 million from the Novo Nordisk Foundation for 60 000 whole-genome analyses; selection of the first 12 patient groups to be offered whole-genome sequencing; and collection of the first whole genomes in a secure national genome database.

The National Strategy for Personalised Medicine 2021-2022 continues with more patient groups being offered sequencing as part of patient care; updating of national collaboration structures; continued implementation of a national infrastructure for personalised medicine in healthcare and research using genetic information; and new options for combining data sources.

The development of personalised medicine will mean markedly better treatment of disease for people with different variants of genes, including many disability groups.

[28] 'Udmøntning af Strategi for digital sundhed 2018-2022' (Implementation of Strategy for digital health 2018-2022), https://sundhedsdatastyrelsen.dk/da/strategier-og-projekter/strategi-for-digital-sundhed/udmoentning-strategi.

[29] Danish Regions, 'Sundhed for dig' (Health for You), https://www.regioner.dk/sundhed/digitalt-sundhed-for-dig.

[30] Ministry of Health and the Danish Regions (2021), *National strategi for personlig medicin* (*National Strategy for Personalised Medicine 2021-2022*), https://sum.dk/nyheder/2021/marts/national-strategi-for-personlig-medicin-sikrer-maalrettet-behandling-til-patienterne.

Digital welfare

Focus area 3 in the joint public digitalisation strategy[31] is about better and more coherent welfare. Under this focus area, there are five points, and under each of these points, there are a number of initiatives.

One initiative is an effort to create better coordination and coherence in some cross-cutting cases in the welfare areas by means of data standardisation, data sharing, IT support, better workflows and possible legislative changes. The initiative is aimed at welfare processes that go across sectors.

For three welfare processes, analyses are carried out in which business procedures and legal basis are mapped; data-sharing needs and data quality are described; and optimisation possibilities are developed. The three courses are:

1) cross-sectoral coordinating efforts for citizens who have both comorbid psychiatric diagnosis and substance use problems;
2) the cooperation of job centres, educational guidance centres and educational institutions on educational orders; and
3) deployment and removal from prison to the municipalities.

In addition, pilot tests of a common approach to flexible and uniform data sharing across welfare areas are carried out. The tests will, among other things, consist of workshops, development and testing of interactive prototypes in test laboratories and in the operating environment (production maturation) and will result in a consolidated decision basis for data sharing and IT architecture.

Another initiative is a project to achieve better data in the field of disabled adults. This must be done by classifying, structuring and standardising the professional concepts used in the assessment of citizens in the field of disability in relation to the concept of functional ability, and in relation to the specific goals for citizens' development across authority and performance. Similarly, a joint action catalogue must be developed for each of the areas.

When structured and classified concepts are implemented in the IT systems, it provides an opportunity to follow the development of citizens over time in a structured way and to compare the effects of different initiatives. It creates a basis for communication about and with the citizen as well as the exchange of data in a common language between the actors in the social field. In the longer term, the work will also create a basis for data sharing and collaboration across disciplines and sectors.

Digital education

The Ministry of Education has produced an Action Plan for Technology in Teaching.[32] The Digital Strategy 2016-2020 also contains initiatives for digital learning and teaching. IT and technology have great potential to support teaching and strengthen the collaboration between students, parents, teachers and educators.

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[31] See: https://digst.dk/strategier/digitaliseringsstrategien/initiativer-i-strategien-2016-2020/bedre-og-mere-sammenhaengende-velfaerd/.

[32] Ministry of Education (2018), 'Handlingsplan for teknologi i undervisningen' (Action Plan for Technology in Teaching), https://www.uvm.dk/publikationer/folkeskolen/2018-handlingsplan-for-teknologi-i-undervisningen.

There is a need for a coherent effort based on the needs that are current in the areas in question, just as experiences from ongoing and implemented digitalisation initiatives must be used across the areas. There is already a lot of experience in increasing the use of IT in primary school, including creating new knowledge about how IT can support students' learning.

The activities in the initiative in the latest strategy include:
1) a common user portal as a digital entrance to primary school for pupils, parents, teachers and preschool teachers;
2) a general spread of a collaborative platform for children, parents, and preschool teachers in the day care area until 2020;
3) that the written tests in upper secondary school and in primary and lower secondary schools in nine out of 10 classes are conducted digitally;
4) to examine how common IT standards and infrastructure for upper secondary education can support the exchange of data so that schools' digital platforms and teaching aids can work together;
5) a cross-sectoral framework for education data; and
6) a number of projects aimed at promoting the use of IT in primary and lower secondary schools.

The municipalities make a comprehensive effort to digitise teaching in the primary and lower secondary school, and the National Association of Local Authorities supports this with a number of initiatives.[33]

Since 2012, IT has been introduced in primary and lower secondary schools with the spread of digital teaching aids and IT infrastructure and learning platforms, and this development has been supported with IT didactics. This development must be evaluated as a starting point for continued development.[34]

Another initiative is an effort to give students in primary and secondary education opportunities to use virtual laboratories in the teaching of natural science.[35] Virtual simulations can increase the students' motivation and learning in natural science and can complement the traditional physical and chemical equipment used to conduct experiments that are not otherwise possible.

Schools use PCs and other digital teaching aids, and reading on these digital devices takes up a lot of space both in school and in society. Research has pointed out that digital reading can present a problem for the general learning of reading in school. Therefore, there is a need to qualify teachers' knowledge of reading on digital devices.[36]

A fourth initiative is a collection of experiences from high schools that use IT and digital teaching aids in an innovative and successful way.[37] Through action research

[33] See: https://www.kl.dk/kommunale-opgaver/boern-og-unge/digitalisering-paa-boerne-og-ungeomraadet/it-i-folkeskolen/.
[34] See: https://www.kl.dk/kommunale-opgaver/boern-og-unge/digitalisering-paa-boerne-og-ungeomraadet/it-i-folkeskolen/.
[35] See: https://www.uvm.dk/publikationer/2019/190425-forundersoegelse-og-vidensnotat-om-anvendelsen-af-interak-laboratorier-i-naturfagsundvis.
[36] See: https://www.videnomlaesning.dk/projekter/laesning-paa-digitale-enheder/.
[37] See: https://www.eva.dk/ungdomsuddannelse/it-digitalisering-gymnasiet.

methods, new working methods must be developed and disseminated that can support the work of upper secondary schools in implementing the digital competences.

As a fifth initiative, a research project is being carried out with a focus on how digitalisation can support teaching in upper secondary schools.[38] It will examine how the use of IT and digital learning tools in high school supports professionalism, knowledge and general education, and how we can evaluate to what extent students achieve the desired competences through digitalisation.

A sixth initiative is to set up a centre for digitalisation in vocational education and training. It must support the work of vocational education with IT in teaching.

A seventh initiative is a national strategic effort for the digitalisation of adult and continuing education. Among other things, projects on digital platforms and digital learning processes and experimental schemes for e-learning must be implemented.

Finally, it is worth mentioning that IT-based inclusion of students with developmental and attention problems in primary school is also one of the initiatives. Research shows that the use of digital means in teaching can be a help for students with special needs.[39] The Ministry of Education has developed a knowledge package that can support and develop teachers' work with digital means that are targeted at students with developmental and attention problems who are integrated into regular primary school classes.

Digitalisation in Denmark has been an overall strategy, which early in the process established its own administrative organisation. The Agency for Digitisation has been proactive in involving organisations, including organisations for people with disabilities and the elderly.

The development has thus been led by public actors, which have retained the initiative so civil society and the market have not been given a role as initiators. This means that digitalisation has not become part of the disability strategy – there was already a strategy for digitalisation that took disability into account.

This also means that factors such as financing, education and the development of e-commerce have not had any independent influence on the development of digitalisation in Denmark. The state's initiative to start digitalisation and give it momentum has come first and has been greatest.

Digitalisation has been perceived as apolitical in the first two decades of this century. This has meant that it has been possible for development to proceed in broad political agreement without encountering obstacles. This development has been perceived as a broad national interest on which a large majority can agree.

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[38] Ministry of Education, 'Digitale teknologier forandrer kernefagligheden i gymnasie' (Digital technologies are changing the core subjects of high school), 20 December 2019, https://www.uvm.dk/aktuelt/nyheder/uvm/2019/dec/191220-digitale-teknologier-forandrer-kernefagligheden-i-gymnasiet.

[39] Andersen, H. V., Sorensen, E. K., de Lopéz, K. J. and Jensen, R. H. S. (2016), *It-baseret inklusion af elever med udviklings- og opmærksomhedsforstyrrelser i folkeskolen* (IT-based inclusion of students with developmental and attention disorders in primary school), https://vbn.aau.dk/ws/portalfiles/portal/255984669/It_baseret_inklusion_af_elever_ONLINE.pdf.

3 Do disability strategies address the potential of and challenges pertaining to digitalisation and digital transformation?

3.1 How digitalisation and digital transformation are addressed in the national disability strategy

The disability strategy contains almost nothing about digitalisation. This may come as a surprise, as digitalisation is a process that will change the conditions for everyone over the next few decades, and in particular will mean a great deal for the equality of people with disabilities. The reason why the disability strategy is silent on this point is probably that digitalisation is considered to belong to the digitalisation strategy.

However, the Disability Policy Action Plan from 2014 includes a section on digitisation and welfare technology, which mentions the possibilities of digitisation[40]. In its last chapter, it gives some examples of how digitalisation can be used to support people with disabilities. The chapter discusses, for example, easy access to knowledge about accessibility, focus on IT accessibility, and a strategy for digital welfare. Later disability policy reports, however, do not contain much about these possibilities in digitalisation.

On the other hand, digitalisation plays a major role in the strategies in specific areas to be described in section 3.2. However, these are formulated below not as actual strategy texts, but rather as the author's descriptions of practices in the areas in question.

The latest national disability strategy is the Disability Policy Statement 2018. This statement usually comes with a two-year interval. The reason why there has been no disability policy statement for 2020 is probably that the COVID-19 pandemic has taken all the attention in the past year.

Given how far digitalisation has progressed, it may come as a surprise that the *Disability Policy Statement 2018* document contains only three pages on the subject. The section is entitled 'Digital accessibility', but is also about digitalisation in general. The other sections of the document do not contain anything about digitalisation.

The section on digital accessibility in the Disability Policy Statement contains two points on network accessibility. One point relates to the Act on the accessibility of public bodies' websites and mobile applications, which implements Directive 2016/2102 / EU of the European Parliament and of the Council of 26 October 2016.[41] The other point is about improving accessibility on the platform skat.dk, where citizens communicate with the tax authorities.

The section on digital accessibility contains four points with more general content. One of these points concerns the political media agreement and the public service agreements that the Government enters into with the television companies that have public service obligations. Mention is made here of both the requirements for accessibility that the directive on audio-visual media services will place on television

[40] https://www.regeringen.dk/aktuelt/tidligere-publikationer/handicappolitisk-handlingsplan-status-2014/

[41] 'Digitalstyrelsen har gennemført 42 tilsyn i 2020, som har udløst påbud til 29 forskellige myndigheder for grove overtrædelser af loven' ('The Danish Digital Agency has carried out 42 inspections in 2020, which have triggered injunctions to 29 different authorities for serious violations of the law'). (Version 2, 19.04.21).

stations, and a funding pool of EUR 1.35 million annually for initiatives targeted at blind and partially sighted people.

Another point is about visual interpretation and subtitling of new Danish films. It is highlighted here that the Ministry of Culture supports Danish Film Institute (DFI) initiatives for subtitling and visual interpretation with a total of EUR 0.135 million. The money goes to subtitles for Danish films, where the DFI demands that the films be submitted with Danish subtitles, as well as for visual interpretations of Danish feature films, which are available via a free app. The films have been selected in collaboration with the Danish Society for the Blind.

A third point concerns the sign language interpretation of materials on digital inclusion. The Agency for Digitisation has prepared information material to support IT-challenged citizens. It consists of, among other things, short animated films that are intended to motivate and guide the use of public digital communication. There is also material to guide IT-challenged citizens on digital proxies, GDPR and IT security. All these materials have been interpreted in sign language and made available on the Agency for Digitisation's website.

A fourth point, which opens the section on digital accessibility in the Disability Policy Statement, is about testing the welfare technology solutions of the future. It is mentioned here that in the period 2014-2016, grants were awarded for eight pilot and large-scale projects in regions and municipalities within digital welfare in the social and health area, including disability.

The Agency for Digitisation mentions some test projects on its website.[42] One of them is testing telemedicine for new patient groups. Another involves testing an app for teens with diabetes. A third project concerns an app that can prevent hospitalisation of elderly people. The website contains reports from these, and a large number of other, projects. A fourth project is entitled 'Longer at home together – a sensor-based alarm system for people living at home with dementia'. These and other projects are about how to use welfare technology to implement the necessary health treatment in a way that involves less intervention so that the patient can continue his normal life.

The Danish disability strategy does not mention anything about the great benefits of digitalisation, although it could be argued that these are points of great importance for the equality of people with disabilities in society.

Given that it has long been clear that digitalisation will mean a revolution in the entire welfare field, it is surprising that the disability strategy does not contain much more about the opportunities that digitalisation will provide for people with disabilities. As digitalisation has various effects – for example, as an opportunity both to improve the offer to the citizen and to save resources for the authorities – it can be expected that there will be a political struggle for prioritisation in connection with its implementation.

3.2 How digitalisation and digital transformation are addressed in specific disability-related strategies

Digitalisation plays a major role in many strategies that are relevant to people with disabilities. One of the new technologies that is very promising in this regard is machine

[42] See: https://digst.dk/digital-service/digital-velfaerd/afproevningsprojekter/.

learning or artificial intelligence. Artificial intelligence can improve public service in many ways.

However, there is currently little experience with such technology in the public sector. Therefore, in 2020, the Government, the National Association of Local Authorities and the Danish Regions have initiated a number of projects that will provide experience with artificial intelligence in municipalities and regions.[43] The projects will initially receive grants totalling EUR 9 million.

The projects include: artificial intelligence for faster and better diagnosis of acute patients; artificial intelligence for quality development in general medical practice; intelligent rehabilitation and targeted offers for citizens; correct case management in matters of sanctioning unemployed citizens; targeted employment efforts for unemployed citizens, with better matching between unemployed citizens and businesses; intelligent distribution and diarising of emails to offer citizens faster case processing; and offering citizens faster visits from cleaning help with new technology.

A project which aims, by using artificial intelligence, to diagnose acute patients faster and better than is currently the case is taking place at the Sygehus Lillebælt hospital.[44] The project uses artificial intelligence and can thereby get the results of biochemical and microbiological analyses significantly faster. Therefore, the patient's condition and need for treatment can be assessed within a few hours, and it is expected that the new technology can reduce both mortality and hospitalisation time.

A project using artificial intelligence in rehabilitation is taking place in Aalborg.[45] In a number of cases, citizens do not get the optimal effect of physical exercise and rehabilitation. Therefore, the project will utilise artificial intelligence to offer and target the citizens with the training that they are most likely to get the most out of.

The purpose of rehabilitation is to help the citizen to live an independent and meaningful everyday life. The project will develop a solution with models and statistics that support the individual caseworker's professional assessments of the individuals' rehabilitation, the need for training efforts, the use of aids and the prevention of falls.

In the project, artificial intelligence should support and guide municipality employees in case processing and in the assessment of citizens' needs. The employees will thus sharpen their focus on training and prevention of falls. Therefore, it is expected that more citizens will be trained, and that it will give citizens a greater degree of self-help and postpone the need for other municipal services such as practical help or care.

The municipality can offer fall prevention and training. It is expected in the project that artificial intelligence will be able to predict what services it is relevant to offer each citizen.

It is hoped that employees will find that their focus on training and fall prevention is sharpened, which will probably result in more citizens receiving more training or fall

[43] See: https://digst.dk/nyheder/nyhedsarkiv/2019/oktober/kommuner-og-regioner-skal-afproeve-kunstig-intelligens-for-at-loefte-kvaliteten-i-den-offentlige-service/.
[44] See: https://digst.dk/nyheder/nyhedsarkiv/2019/oktober/kommuner-og-regioner-skal-afproeve-kunstig-intelligens-for-at-loefte-kvaliteten-i-den-offentlige-service/.
[45] See: https://projekter.au.dk/air/.

prevention measures. It will postpone the need for services such as practical help or care, and the citizen will achieve a greater quality of life.

The development of artificial intelligence is handled by the Aarhus University Department of Engineering. The company DigiRehab, which has developed an IT tool for digitally supported training targeted at the elderly in home care, participates in the technical development and project management. The project runs from May 2020 to December 2021.

The artificial intelligence developed will be made available as an open-source software model for other municipalities after the end of the project period. The software model will be available on gitlab.au.dk for three months after the end of the project. It will thereby be made available to municipalities and other stakeholders by Aarhus University.

The experiences with testing of how artificial intelligence can support case processing in the rehabilitation process among senior citizens will be disseminated in a report to the participating municipalities, interested municipalities and nationally to the Agency for Digitisation and the National Association of Local Authorities.

The projects mentioned here are all examples of the great potential of digitalisation and the use of artificial intelligence in the field of welfare. They generally provide methods for using unmanageable amounts of data and large amounts of experience in a way that is efficient, and at a speed that cannot be achieved otherwise.

This enables us to reach decisions faster than was previously possible, and those decisions are more likely to be well-founded and professionally correct than was previously the case. The methods are general and apply to both technical and social administrations, and their application is, in all cases, revolutionary.

4 Promoting disability inclusion through funding, education and training

4.1 How funding promotes disability-inclusive digitalisation and digital transformation

The various elements of digitalisation are predominantly financed by the state, the regions and the municipalities. The health portal is part of the financial agreement between the state and the counties.[46] The banks have helped to build and finance EasyID.[47] Borger.dk is financed by the state, the National Association of Local Authorities and the Danish Regions.[48] Skat.dk is financed by the Ministry of Taxation.[49]

The financing of digitalisation in Denmark has thus involved the major public actors, the state, the regions and the municipalities as those mainly responsible. As Danish disability policy is based on the sector responsibility principle, one element of the financing of digitalisation that it should be inclusive (if there is compliance with applicable rules on public websites). This is also reflected in objectives such as digitalisation for all.

Digitalisation per se has not been criticised by disability organisations or organisations of older people in recent years. The DaneAge Association came forward with criticism of public digitalisation in 2012,[50] but after it entered into collaboration with the Agency for Digitisation in 2015, as mentioned above, it signalled a change in approach. Now, on its website, the DaneAge Association provides detailed guidance on the use of the digital tools, of which it has given up making any criticism.[51]

Disabled People's Organisations Denmark are also supporters of digitalisation as such. However, the implementation of the EU standard for digital accessibility does not take place by itself. DPOD says on its website that, together with Microsoft, it has prepared the report *Accessibility for all*, which shows that awareness of the EU standard for digital accessibility is very low, and that accessibility is mentioned in only two thirds of the public tenders for digitalisation.[52] Microsoft writes on its website about how it works with the Danish Society for the Blind to solve problems with the availability of digital tools.[53]

In addition to the aforementioned large projects, special financing schemes have been created so that there is room for experimentation, and so that digitalisation can be spread to the whole country.

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46 See: https://www.sundhed.dk/borger/service/om-sundheddk/om-organisationen/historien-om-sundheddk/.
47 See: https://finansdanmark.dk/aktuelle-emner/nemid-og-nemkonto/.
48 See: https://digst.dk/it-loesninger/borgerdk/om-loesningen/organisering/.
49 See: https://www.skat.dk/.
50 'Kritik af offentlig digitalisering: Ældresagen kritiserer nu de offentlige digitaliseringsplaner, der lader de ældre medborgere i stikken' (Criticism of public digitalisation: DaneAge Association criticises public digitalisation plans that leave senior citizens in the lurch), *DR*, 8 September 2012, https://www.dr.dk/nyheder/regionale/oestjylland/kritik-af-offentlig-digitalisering.
51 See: https://www.aeldresagen.dk/viden-og-raadgivning/vaerd-at-vide/d/digitalisering/nemid.
52 See: https://news.microsoft.com/da-dk/tilgaengelighed/.
53 See: https://news.microsoft.com/da-dk/tilgaengelighed/.

The Government has taken the initiative to set up an investment fund,[54] which is providing EUR 55 million in 2018-2022 for testing technology locally and disseminating well-tested solutions throughout the country. The investments must contribute to the development of innovative solutions which can lessen the amount of administrative work so that there are more funds available for efforts directly with the citizen – that is, replacing 'cold hands' with 'warm hands'. The initiatives are anchored locally and the Government proposes that municipalities and regions co-finance the initiatives.

The fund is a continuation of a fund in the health area, which in 2018 was expanded to support initiatives in all welfare areas. The investment fund responds to the slow adoption of new methods such as 'screen visits' in elderly care and other digital welfare solutions in use in the public sector. Therefore, the Government will, through the fund, push for development so that municipalities and regions adopt digital solutions more quickly.

Several places in the public sector today use screen visits in elderly care, along with other welfare technology solutions. These solutions help to raise the quality of the public service and can free up staff and ensure more welfare for the money spent.

The fund must help to ensure that digital welfare solutions are spread more quickly in the country, and that artificial intelligence, machine learning, software robots and other new technologies are tested in the public sector.

Although there is potential in digital welfare solutions, several places in the public sector are reluctant to try out new technologies and adopt digital welfare solutions. One of the barriers may be that the financial incentives are lacking. It is not always those who invest in the solutions who reap the rewards.

This investment fund has a disability perspective in the sense that one of the key aims is to free up staff to ensure more welfare. However, the approach of more welfare for money also means the possibility that the projects can be used to achieve the same welfare for less money. There is also a disability perspective, in that it will raise the quality of the public service.

Another fund that intends to influence digitalisation is the Broadband Pool.[55] Its purpose is to support the introduction of broadband internet connection in the sparsely populated parts of the country. This will make it possible to conduct business online in parts of the country where, without the pool, there would be no internet. It will also enable more citizens in peripheral areas of the country to make use of the digital opportunities.

The disability perspective in this regard is that it makes it possible for a number of people with disabilities, who would otherwise have had to settle in an urban area, to live in a part of the country where it is cheap to buy or rent a home, and where the natural scenery is beautiful.

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[54] Ministry of Finance, 'Ny investeringsfond skal sætte skub i udbredelsen af digitale velfærdsløsninger' (New investment fund to boost the spread of digital welfare solutions), 23 October 2018, https://fm.dk/nyheder/nyhedsarkiv/2018/oktober/ny-investeringsfond-skal-saette-skub-i-udbredelsen-af-digitale-velfaerdsloesninger/.

[55] See: https://ens.dk/ansvarsomraader/bredbaand/bredbaandspuljen.

4.2 How disability inclusion is promoted through the education and training of digital professionals

As mentioned, digitalisation in Denmark is an overall policy. Education is part of this policy, and as a result of the sector responsibility principle, disability inclusion is part of the programme from the start. Disability and accessibility are part of education in the IT field. The reason is that the students who are educated in IT must live up to the requirements of network accessibility.

The head of the IT University's design department, Lone Malmborg, has worked extensively on accessibility and has been a member of the Danish Disability Council since 2011. Accessibility is also included in the university's teaching. An example is the course on 'Usability and accessibility' at the IT University, about which the website[56] says the following:

> 'Some of the topics we will work with: Usability, accessibility, Universal Access, Inclusive Design, cognitive psychology, human factors psychology, design processes and methods, design standards and guidelines, user profile / persona creation, task analysis, heuristic evaluation, usability laboratory selection and set-up, evaluation methods, design for disabled people, mobile interfaces, cost-benefit of usability plus planning for a usability budget.'

The other major central provider of IT education, the Department of Engineering at the Technical University of Denmark (DTU),[57] also focuses on disability and accessibility. For example, the DTU has a partnership with the Bevica Foundation entitled 'Technology leaving no one behind'.[58] The DTU will develop methods to ensure that engineering students see inclusion and accessibility as a natural part of designing and developing new technical solutions.

Since 2016, the Agency for Digitisation has offered teaching material[59] on IT accessibility for all educational institutions. It is aimed at technical education, social sciences and humanities in higher education. It consists of a collection of ready-made teaching modules that teachers can use directly or customise as needed.

4.3 How digital inclusion and accessibility is addressed in the education and training of accessibility and inclusion professionals

Digital inclusion and accessibility are largely addressed in the training for the staff who deal with services for people with disabilities.

At Copenhagen University College, which trains staff for municipal services of various types, from teachers to therapists, research is being conducted in digital administration to support teaching.[60] There is also research into digitalisation in schools.[61]

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56 See: https://learnit.itu.dk/local/coursebase/archive/www/course04fb.html?course_id=915070&mode=search&lang=en&print_friendly_p=t&goto=1582807252.000.

57 See Technical University of Denmark (DTU) website (in English) at: https://www.dtu.dk/english.

58 See: https://bevica.dk/projekter/technology-leaving-no-one-behind.

59 See: https://digst.dk/nyheder/nyhedsarkiv/2016/februar/it-tilgaengelighed-paa-videregaaende-uddannelser/.

60 See: https://www.kp.dk/forskning-og-udvikling/digital-forvaltning/.

61 See: https://www.kp.dk/forskning-og-udvikling/digitalisering-i-skolen/.

Researchers and teachers from Copenhagen University College have edited a book on digitalisation in public administration, which is aimed at teaching in professional colleges and universities.[62]

There are courses in digital technologies used in various areas of education on data protection, as well as on digital service and innovation,[63] for those who have to manage the digital development.

Another example is University College Absalon's bachelor's degree in administration.[64] This degree course offers an education that builds on education in individual service areas, such as social work, therapy, education and other areas.

The course involves the acquisition of practical skills; knowledge of the development of public digitalisation; change management and the implementation of IT systems; and the role of artificial intelligence and robots. It provides an introduction to the societal, legal, ethical, economic and administrative consequences of artificial intelligence in practice. It provides cases from Denmark and abroad to understand how these machines change the public sector.

The two vocational colleges mentioned above are the most active in teaching on digitalisation, but others are also involved. In addition, Komponent – the municipalities' development centre, which trains employees from the municipalities – runs continuing education courses in the subject.[65] Here, staff who were trained before digitalisation became an overall strategy, or who chose other topics when they trained, have a chance to get involved in digital development.

4.4 How digital inclusion is addressed via the training of people with disabilities

Digitalisation has taken place at a rapid pace in Denmark, and in all parts of the population there are people who have not learned enough about IT and the internet and who feel insecure about the new solutions. A great effort is therefore being made to get as many people as possible to learn the new methods.

Most municipalities arrange and provide information about courses in IT and internet use. For example, Aarhus Municipality states on its website that there are courses on the subject at the municipality's libraries, local centres and volunteer houses[66]. Viborg Municipality provides an overview[67] of the library's offers, the offers of the DaneAge Association and data rooms, and refers to the demo environment[68] on the website borger.dk.

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62 Hundebøl, J., Pors, A. S. and Sørensen, L. H. (2020), *Digitalisering i offentlig forvaltning* (*Digitalisation in public administration*), Copenhagen.

63 See: https://www.kp.dk/videreuddannelser/digital-service-og-innovation/.

64 See: https://phabsalon.dk/uddannelser/administrationsbachelor/uddannelsen/uddannelsens-moduler/valgmoduler/robotter-og-magt-digitalisering-og-digital-styring-i-praksis/.

65 See: https://www.cok.dk/digitalisering-pa-arbejdsplads.

66 See: https://www.aarhus.dk/borger/borgerservice/digital-borger/kurser-i-it/.

67 See: https://viborg.dk/service-og-selvbetjening/pas-koerekort-sundhedskort-og-id/digital-post/digital-post-for-borgere/kurser-i-it/.

68 See: https://demo.borger.dk/.

DPOD does not arrange courses or guidance in the use of IT and the internet, but some of its individual member organisations do so, and they also use the internet to communicate with members. The DaneAge Association has long been very active in teaching elderly people about IT and the internet.

As mentioned in section 2.1 above, the Agency for Digitisation involves organisations of people with disabilities and organisations for elderly people in development in several ways, and consults them with a view to facilitating their integration into the society of the future.

The Agency for Digitisation estimates that about one tenth of the population is not sufficiently familiar with IT and the internet.[69] It is not primarily an issue involving the elderly people or people with disabilities – it affects people of many kinds, including many young people.

[69] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/netvaerkets-formaal/.

5 The opportunities and challenges presented by digitalisation and digital transformation to the rights of persons with disabilities

5.1 The most significant opportunities presented by digitalisation and digital transformation for persons with disabilities

Digitalisation, in its initial phase, acts as a form of rationalisation that can make workflows a little faster and easier and facilitate the use of information. Thus, some of the first benefits of digitalisation may be a reduction in administrative costs. Of course, that is always an advantage.

Digitalisation has, in its first phase, consisted of replacing physical communication between citizens and authorities with electronic communication over the internet, and replacing part of the communication between citizens and authorities with communication between authorities themselves and communication between companies and authorities. This means that the citizen can now manage contacts with authorities from home in a short time. It is an advantage for everyone, but it is a greater advantage for people with mobility impairments as it is now necessary to attend a public office only in a few cases.

When digitalisation is pursued further, and it is not just administration but also the treatment of the individual person that is enriched by rapid, comprehensive and efficient use of information, one sees that digitalisation is about more than rationalisation. It is a revolution in welfare that we cannot yet see the scope of.

The digital world we live in today is already very different from the world we lived in a quarter of a century ago. There are no longer public offices where we turn for many different purposes, or bank and post offices where we go to pay. We mostly arrange all that over public websites and with online banks. This means equality for people with reduced mobility in these areas of daily life.

However, we can as yet see only a few of the great opportunities that were expected to improve the quality of social case management and decision making. There is an expectation that there are great opportunities to improve the performance of the various service functions, but some of those we still see only in project form.

It seems possible to develop an artificial intelligence that draws on all the expertise available and all the experience gained in dealing with social issues for people with disabilities, so that the quality of services is significantly improved both by the ability to offer better solutions and in the way that the estimates exercised will be as uniform as possible and in accordance with the rule of law.

Another area where attempts are being made to develop new methods is vocational rehabilitation. Here, the perspective is that all the experience gained in all the country’s job centres over a number of years can be put into play in individual case, so that the probability of a successful rehabilitation is significantly increased.

All in all, it can be said that digitalisation can bring great benefits to people with disabilities in several ways.

One way is that digitalisation is the first real rationalisation of welfare work that is happening. By making the service cheaper, it is possible to provide more. Another is

that it allows for quality improvements by making it possible to utilise larger amounts of information in connection with the work.

5.2 The most significant challenges faced by persons with disabilities in relation to digitalisation and digital transformation

There are two types of challenges in relation to digitalisation and digital transformation. One has to do with the fact that part of the population has difficulty keeping up with and adapting to the new conditions in society. The second has to do with the fact that digitalisation is not a unique process. Like all other policies, it contains options where we must prioritise which goals we think it is most important to achieve.

A number of citizens have a problem with keeping up with the developments. This problem can be tackled in several ways, first by teaching people to use the new methods. The Agency for Digitisation, in collaboration with other authorities, has produced materials that can provide digital education. Another way involves guiding people in the use of such methods, and for this purpose there is support in connection with many digital services.
A third way is by making it possible to continue using the traditional methods. This too has been used in some cases – for example, it is possible to be exempted from using digital mail (*E post*) and instead get traditional paper mail from public offices.

However, there is also a political challenge in that development is moving so fast. This means that in large circles of the population there will be a reluctance to move to the new, especially in the period before people get to know it and become familiar with it. It will be difficult for disability organisations to take an active part in the development of digitalisation if a large proportion of their members react by opposing digitalisation per se.

There have previously been doubts as to whether digitalisation could be completed as quickly as desired. In 2012, Statistics Denmark reported that although 65 % of 16-89-year-olds had submitted information digitally to the public sector, and 81 % had a simple ID, less than half of citizens over the age of 65 had done so.[70] In recent years, however, we have seen reports that older people too are happy with digital solutions.[71]

The Agency for Digitisation estimates that 10 % of the population has difficulty coping with digital methods.[72] Some years ago, the agency started a collaboration with various parties, including organisations for people with disabilities and the elderly, to facilitate public communication to these groups.

It was mentioned in section 2.1 that the Danish Digitisation Agency has established a Network for Digital Inclusion; that one of its goals is digitalisation for all; and furthermore that it makes a special effort for people with language and physical

[70] Statistics Denmark, 'Svage grupper tabes i den digitale udvikling' (Weaker groups are lost in the digital development), 16 August 2012, https://www.dst.dk/da/Statistik/bagtal/2012/2012-08-16-svage-grupper-tabes-digitalt.

[71] See, for example, 'Ældre patienter er også klar til digitale løsninger!' (Elderly patients are also ready for digital solutions!), 16 March 2021, Measurelet website, https://measurelet.com/aeldre-patienter-er-ogsaa-klar-til-digitale-loesninger.html.

[72] See: https://digst.dk/digital-service/digital-inklusion/netvaerk-for-digital-inklusion/netvaerkets-formaal/.

challenges. We do not know whether there is a special disability that has to do with digitalisation – a ‘dysdigitia’, just as there is dyslexia and dyscalculia.

The second type of challenge has to do with the fact that digitalisation is not a unique process. Digital development can be set in motion in many directions, depending on one’s interests. In this connection, it is important that the disability organisations take part in the development and work to ensure that the developments that will benefit people with disabilities are included.

There is a need for disability organisations to do something to participate and help set the goals for a large part of the trials and developments that are carried out as part of the state, regional and municipal disability strategies.

Organisations should also find ways to influence the more utopian or future parts of developments in the field. One can imagine many things, some more fantastic than others. In the author’s view, one of the most important things with regard to disability is to start researching methods that can support people with intellectual disabilities in their use of the digital forms of contacting and communicating with authorities.

In this regard, the disability organisations must be aware that they can influence the type of offers and solutions that will be used in the future, by initiating experiments with digitalisation in the forms that they themselves prefer.

6 Conclusions and recommendations

6.1 Conclusions

Digitalisation has transformed everyday life over the last two decades at a rapid pace. For the majority who have acquired the new methods of communicating with the public sector and with businesses, it has provided great relief in everyday life and new opportunities in many fields.

For those who have not kept up, and for those who have difficulty acquiring the new technology, the development has meant new problems. Attempts have been made to solve the problem by involving the organisations of people with disabilities and elderly organisations in the process. However, the digitalisation and development of artificial intelligence also provides an opportunity to develop new forms of support to people with disabilities. In the recent years there has been more focus on this side of the issue.

However, it is still necessary to focus on the accessibility of the new techniques, which are not always in practice as great as the rules say they should be.

6.2 Recommendations

Digitalisation has been implemented quickly in Denmark, and it has provided great benefits to people with disabilities, especially mobility disabilities. So far, the process has been considered apolitical, but there are many indications that the on-going process requires a more political stance.

In that situation, it is necessary for the continued process to move away from implementing digitalisation as a purely new public management (competitive state) project, and over to grounding it more broadly. In future, digitalisation must not be just about finding methods to produce more services of higher quality for less money. Efforts must also be made to develop the new professional opportunities that have been discussed.

The Agency for Digitisation should therefore launch broader initiatives – for example, with the aim of creating new forms of democracy, more participation in decisions and more freedom of choice. It may also be advisable to put greater effort into supporting research that examines possible new uses of information technology in different professional areas, not only in the medical field but also in social work.

Municipalities should focus more on developing their service to support people with disabilities to live more independent lives. In recent years, the municipalities have been criticised for a decline in the number of people receiving their personal assistance in the form of user-directed personal assistance (BPA)[73] and for surveillance of the users.[74] It should be about the kind of support that sets the citizen free. The author

[73] 'Færre borgere med handicap får tildelt personlige hjælpere' (Fewer citizens with disabilities are allocated personal helpers), *DR*, 24 April 2021, https://www.dr.dk/nyheder/indland/faerre-borgere-med-handicap-faar-tildelt-personlige-hjaelpere-de-har-ikke-kunnet-se.

[74] 'Tilliden mangler: Grænseoverskridende BPA-overvågning af borgere er blevet mere almindeligt' (Confidence is lacking: Cross-border BPA monitoring of citizens has become more common), Dansk Handicap Forbund, 18 February 2021, https://danskhandicapforbund.dk/da/nyheder/tilliden-mangler-graenseoverskridende-bpa-overvagning-af-borgere-er-blevet-mere-almindeligt/#gsc.tab=0.

would specifically recommend a project that examines how information technology can be used to promote this type of support in a way that satisfies all parties.

Disability organisations should also do more to make their members aware of the developments that are already well under way in many areas of society and are of great importance to people with disabilities. Both these measures will ensure that everyone is taught to be part of the new society, and inspire people to think about and discuss how to prioritise aims in digital development.

Digital solutions are usually developed in such a way that they transform the actions that have previously been performed into digital methods. People with cognitive disabilities often have difficulty communicating with public authorities, banks etc. However, the digital forms that are used, provide opportunities to facilitate this communication. Some projects have been initiated with a view to solving these difficulties, for example by using digital banking[75]. It is recommended to start many more similar projects.

However, the new possibilities, and especially those involving the use of artificial intelligence, are not very well described yet. It must therefore also be recommended to launch research with the purpose of translating the new information technology into new forms of support for people with disabilities.

[75] https://www.sus.dk/itbanken-dk-ny-hjemmeside-goer-nemt-finde-digitale-redskaber-mennesker-handicap/

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