

Resumé

Background and context

Digital technologies, in particular artificial intelligence and advanced robotics have reached a stage of development where they radically could transform our society across the public and the private sectors. The World Economic Forum calls this the *forth industrial revolution* to emphasise the fact that it is a technology leap that is expected to create profound societal changes with major shifts in occupations, and skills and the vary nature of work and how it is organised. The digital economy brings new possibilities, but it also entails potential risks of growing inequality if we do not acknowledge that digital advance could take quite different directions A dystopian future with growing inequality as a result of in particular the impact of Artificial intelligence and robotics is not inevitable. The advance in digital technologies are shaped through strategic choice with impact on the quality of public services as well as development opportunities through work or the opposite de-professionalization. The Confederation of Professionals in Denmark (FTF) , which is an umbrella organization for a range of unions for professional mid skilled workers such as the police, teachers, nurses, social workers, early childhood educators, financial sector employees, tax officials wished to kickstart a debate about the opportunities and risks afforded by digital technologies and how these are perceived in member organisations as the basis for collective action. The study was initiated after some member organisations reported that digital technologies increasingly are implemented as a cost-cutting measure in the public sector in many cases leading to de-professionalisation, whereas pilot projects have also demonstrated another reality showing that digital technologies can lead to more personalized public services and augment new work practices.

At the end of 2016 the Confederation of Professionals in Denmark (FTF) arranged a meeting with its member organisations to define how FTF could draw up a vision for and shape the future of digitalisation in Denmark. If FTF member organisations were to participate in building this future scenario it was in need of in-depth insight into how digitalisation has impacted the member organisations. Furthermore, the analysis should explore the differences and similarities in digitalisation across the member organisations, and how and to which extent difference in strategies have had implications if digitalisation on the quality of work, the wider work environment as well as skills requirements. Finally the study should examine measures the member organisations are taking to address digital transformation, and whether the organisations believe they will need to rethink services and outreach to remain relevant to the members in the context of a digital economy.

The analysis was based on an international literature study and interviews with chairmen of the FTF executive committee. The interviews were undertaken based on semi-structured interview guidelines. The executive committee is composed of representatives from the Financial Services Union, the Danish Union of Teachers, the Danish Nurses Organization, the Danish Union of Early Childhood and Youth Educators (BUPL), the Danish Association of Pharmaconomists, the Union of Education Denmark, the Danish Diet & Nutrition Association, the Danish Musicians Union, the Central Organisation of 2010, the Danish Association of Social Workers, and the Danish Association of Building Experts, Managers

and Surveyors. The interviews were carried out from February 2017 through the end of March 2017.

Previous developments

Digitalisation has been a recurrent theme for most of the member organisations within FTF particularly in recent years. The nature and speed of digitalisation vary substantially between the FTF member organisations. Some member organisations have seen a bottom up approach initially enabled by practitioners with interest in digital applications. However, over time digitalisation has become a public and political priority and increasingly top-down managed in most of the FTF member organisations. This is true of eg. the finance sector, the customs and tax department, the military, social services, and the police.

Looking back, several of the FTF member organisations have experienced that technology has been put in charge of implementation without sufficiently taking into account that digital technologies mediate jobs and professional identities in new ways. Lessons show that if digital technologies are implemented without taking into account their impact on the very nature of work and professional identity there is an imminent risk that practitioners are disconnected and get the feeling of "de-professionalisation" due to that implementation processes remain a technical issue ignoring how work is reshaped by technologies.

Cost savings and efficiency gains is a dominant driver of top down decisions regarding further digitalisation. In the compulsory education sector, Danish municipalities have required that learning platforms should be implemented to enable that teachers can share and reuse learning resources.

Learning platforms are currently implemented in compulsory education and in vocational colleges. Experiences until now indicate that if teachers do not have the time to truly learn and experiment with how the individual applications can support wider pedagogical goals, then technology will merely be an add-on that does not create any added value, as shown in an analysis by the OECD (OECD, 2015). International experiences with the implementation of learning platforms show that it is important that teachers not only receive further training in the pedagogical and organisational benefits of learning platforms, but also are allowed to experiment in their use, such as through cross-disciplinary projects and external collaboration. Currently, the Danish Union of Teachers and the Union of Education Denmark are both worried that learning platforms will result in standardised teaching procedures because of lack of time for proper organisational implementation and development of praxis.

Members in the Danish Nurses Organisation have been among the front-runners who have recognised the opportunities afforded by technology. The organisation has drawn up quality demands related to technological implementation in nursing, and they have as such played an active role in shaping how technologies can drive a quality agenda. The Danish Nurse Organisation have a long-standing tradition for dialogue on medical technology assessment. In practical terms this means that technological solutions are seen as being part of a wider context, and relevant praxis and tools are developed before any investment is made.

The Financial Services Union and the Danish Musicians Union are the two organisations where digitalisation has had the greatest effect on employment, and both have implemented strategies to help their members. Digitalisation was also at an early stage a

trade union issue for nurses, construction management technicians, and diet and nutrition professions, as ICT increasingly influenced work organisation, job content, and work environment - which for example was improved for the diet and nutrition professions through technology implementation that reduced or eliminated the need to lift heavy objects. At present, however, technology's effect on work environment and job quality cannot be said to be unequivocally beneficial.

Technological development poses central questions about the future of the Danish welfare society, and what constitutes public core services and the quality of these rather than merely as an instrument of increased efficiency. This is especially true for example for the Union of Education Denmark, the Danish Union of Teachers, the Danish Association of Social Workers, and the Central Organisation of 2010.

The FTF member organisations all recognise that digital technologies can improve quality of services and jobs, but it is all about strategic choice. Organisations such as the Danish Association of Pharmaconomists the Financial Services Union, the Danish Diet & Nutrition Association, and the Danish Association of Social Workers indicate that digitalisation can improve the quality of guidance and counselling because automation of routine tasks can free up resources, which can be targeted to the diversity of needs of clients. The Danish Customs and Taxation Association was one of the public sector services, which was digitalised as part of e-government services at an early stage. The implementation led to major cuts of staff governed by a belief that the new systems would replace human expertise and ingenuity. However, taxation is an increasingly complex field of praxis and legislation where in quality depends on a technological environment that supports work processes rather than the opposite, which has been the Danish case. The Custom and Tax Organisation recently conducted a study the analyse the impact of digitalisation arguing that highly automated processes such as taxation require higher-level hybrid professional analytical competences - including the ability to validate data quality and advise enterprises and individuals.

Task displacement

Digital technologies can sometimes lead to a "double-bladed" task transformation. Pharmaconomists are in some hospitals now in charge of medicine dispensary. Digitalisation of the Diet and Nutrition Association fields has led to increased demand for dietary advice and some members have become self-employed, often part-time. There are new job opportunities for the Danish Association of Building Experts, Managers and Surveyors; as more sensors are embedded there is a growing demand for data driven facility management that can assure better indoor climate and energy savings. Nurses are able to participate in operations with the help of robot technology.

Several of the chairmen indicated that digitalisation has mostly been seen as a technical process rather than as an organisational change process. If digitalisation is to support quality development, then it cannot merely be a question of technique but must also include changes in roles, task flow and distribution, collaboration, and external user and customer service experience. What tasks shall technology support and, ultimately, what vision is in place for the services to be delivered and for the organisation that as a unit must accomplish this? It is crucial that professional practitioners be involved in development and implementation processes.

The deployment of artificial intelligence and service robots are in an early stage of implementation. Counselling and advisory services are examples where AI-based expert

systems can strengthen professional competence and augment its quality, as suggested by several of the FTF member organisations. Concurrently this means that relation-based and communicative competences become more important, since it is the professional who will interpret and mediate the data-based results in dialogue with the client or user and with an understanding of his or her overall situation. The Danish Association of Building Experts, Managers and Surveyors, the Customs and Taxation Association, and the Danish Association of Social Workers also indicate the importance of an integrator function. For example, professionals with an education in one field who at the same time have sufficient insight in digital technologies could support the overall organisational integration of ICT and propose improvements with focus on the end user and task quality. But digitalisation also leads to changed and in some cases increased competence demands.

Semi-skilled workers have more or less disappeared from the professional fields in the Danish Diet & Nutrition Association, as they are no longer necessary in institutional catering centres. Digitalisation has reduced the number of skilled labour employees among the members of both the Financial Services Union and the Customs and Taxation Association. The police force increasingly hires university graduates with an ICT background who then receive further training in the police profession. Their salary levels are typically higher, and it has become a central case for the Danish Police Union to ensure that their members are the logical choice as needs emerge for different specialist profiles where police work still constitutes the core in new forms of hybrid profiles.

Although digitalisation results in changed competence requirements, it is not all education programmes, which have been updated to take into account changes in occupational profiles. The building expert programme has continuously integrated technological developments into its core professional courses, and the nursing profession has for many years included technology assessment as a core qualification requirement. The Financial Services Union has created an incubator environment for fintech enterprises as a means to better support members, and both the Danish Union of Early Childhood and Youth Educators and the Danish Musicians Union have produced courses that target their members. But in other professions development has had the character of learning by doing.

Future developments

Job quality, professional identity, and competence development are prime focus areas for all FTF organisations in order to support their membership in forming technological development and its strategic direction. This requires members with insight into the dynamics of digitalisation's development. In the media there has been a tendency to discuss the digital transformation in a deterministic way. The organisation chairmen mention they need to carefully balance and nuance the discourse so that members understand that the further digitalisation in Denmark to a large extent is about choice, and that their members have a role to play in shaping decisions and implementation at their work places.

Several FTF organisations have initiated efforts to strengthen their members' opportunities to affect developments, to support their ability to participate in the development and implementation of new technology, and to furnish them with the tools to assess the value of a given technology in their profession. The Danish Union of Early Childhood and Youth Educators, the Danish Union of Teachers, and the Union of Education Denmark all point out how important it is for their members to have the tools to evaluate the pedagogical

value of the abundance of teaching platforms and digital teaching aids that are constantly launched. They also propose the formation of a national independent taskforce, which can advise the public sector players about suitable technologies and approaches to implementation in a Danish context. One of the risks are that many applications in the education sector are developed for other markets and do not necessarily fit the Danish pedagogical traditions. Professionals must therefore be able to evaluate new digital teaching aids from a pedagogical and didactic perspective that takes its point of departure in concrete target groups. Several organisations have also started initiatives that explicitly target shop stewards. Others are planning efforts that include outreach activities to members at their work places in order to have a concrete discussion about opportunities and initiatives and as a basis for future strategy.

Several of the chairmen believe that digital development will lead to changed competence requirements. Some indicate that this will entail a need for a higher qualification level as more job functions become automated; others point to coming changes in competence requirements. For example, members' professional qualifications must allow them to deal with large volumes of data; this is true of the police using new systems to analyse criminality patterns, or pharmaconomists basing their advice on clients' health data, which increases demands to their competences in clinical pharmacology beyond a mere understanding and use of data. Developments in construction have resulted in construction processes being planned and managed through building information modelling (BIM), which requires greater skill in understanding data and their link to physical construction. Increased embedding of sensors in buildings offers building experts new opportunities for consultancy in operations and maintenance of buildings through data driven facility management.

The chairmen emphasise the importance of education and further and continuing education if their members are to be able to critically approach technology. The education programme for nursing has integrated technological understanding as an officially stated outcome of its programme. The Danish Association of Building Experts, Managers and Surveyors has also integrated technology awareness and use in its building expert qualification, but this is far from the case in all of FTF member organisations. In general there is a need for a review of the university college professional programmes because technology is in the process of creating a demand for new hybrid professionals, such as described above in the Customs and Taxation Association. Technological development leads also to new professional roles, especially related to integration and advisory services. Several chairmen indicate that the growing volumes of data and of artificial intelligence systems heighten the importance of the ability to evaluate profession-related data to assure quality in AI-based expert systems. Experience from the USA shows a latent risk for bias in AI-bases expert systems due to a bias in the underlying algorithms - for example related to framework conditions for parole from the prison system, to recruitment systems, and to credit rating systems used in the financial sector. Several chairmen point out that with the gradual development and roll-out of AI-systems it is thus important for professionals in the involved trades to have an understanding of the risks related to data quality and to be able to support the implementation of digital technologies as an organisational change process.

Increased digitalisation can lead to efficiency improvement; but several chairmen also mention that digitalisation raises fundamental questions about what constitutes good professional praxis in public service. If technology is primarily a tool for efficiency gains,

job automation, and standardisation, then there will be negative consequences for job quality and work environment. The Danish Union of Early Childhood and Youth Educators (BUPL) has taken this up as a central order of business; digitalisation is described as a focus area in the BUPL work environment strategy for 2013-2017:

An important element in the Central Work Environment Team is to assure relevant digitalisation of the work environment in collaboration with the digitalisation until. Digitalisation can refer to the construction of databases with all members of the work environment organisation, competence plans and work environment, where knowledge and learning can be exchanged and accessed through relevant links, data sheets, and workplace instruction manuals, through QR codes, e-learning, etc.¹

The Danish Union of Teachers, the Union of Education Denmark, and BUPL see a potential risk in tablets and standardised software packages - perhaps developed in countries with different pedagogical traditions - becoming a replacement for professional interaction with children and students. The three organisations find it crucial that debate about early childhood development and how to organise schooling be carried out in a larger forum; basically, the debate is about what type of society we wish for and how we want to form the development of our welfare society.

BUPL sees advantages in establishing a cross-profession national pedagogical council as an independent institution that can advise the public sector regarding central investment priorities. Such a committee could also provide a framework for a quality standard/certification as documentation that for example a given digital solution or software package adheres to joint quality standards.

Digital developments have led to an increase in non-standard forms of employment because it is increasingly easy to deconstruct jobs into smaller tasks. This has led to the development of platform enterprises that mediate supply and demand of specific and very limited tasks without third parties such as temp agencies. This tendency is still rather limited in Denmark. If platform enterprises increase their market share, however, it can threaten efforts to include the most at-risk citizens in the labour market. The business model for platform enterprises employs very few, and the virtual character of these enterprises makes it difficult to arrange many of the social programmes that target employment (for example reduced hours for handicapped compensated by the social services), as pointed out by the chairman for the Danish Association of Social Workers. In addition, foreign ownership of platform enterprises is a challenge to the Danish flexicurity model itself, because the owners are not subject to collective labour rights legislation regarding for example sick leave, maternity leave, and paid vacation.

One of the challenges noted by the chairmen is how to on the one hand engage their members in the digitalisation agenda as something which the trade unions should participate in to assure good jobs and work environment, while at the same time ensuring that members themselves proactively take matters of continuing competence development into their own hands. The Financial Services Union has in response to this initiated "Work Life Investment", which is a broad based initiative to engage members in shaping their own future and opportunities supporting members with counselling services and assessment and identification of relevant training needs.

¹ [http://www.bupl.dk/iwfile/BALG-A3RK6Z/\\$file/Arbejds miljoe strategi_2013_2017_1.pdf](http://www.bupl.dk/iwfile/BALG-A3RK6Z/$file/Arbejds miljoe strategi_2013_2017_1.pdf)

In many respects these are all profound transformation processes, and organisational proximity to and dialog with membership is important. Even though digitalisation offers new opportunities for communication, physical meetings remain crucial to dialog. Some of the organisations are beginning to focus on how membership data can be used to assure relevance in services offered to members. The Danish Diet & Nutrition Association is carrying out a member survey as input to future developments, given that the association has a very varied membership where some are self-employed and others are part-time employees.

Several of the organisations are considering digital opportunities to support new professional communities. The Customs and Taxation Association, the Central Association of Army Regulars, and the Police Union could for example consider a joint further education programme about economic and cyber criminality, which could strengthen members' job mobility. The Danish Association of Social Workers, the Financial Services Union, the Danish Diet & Nutrition Association and the Danish Association of Pharmaconomists could find commonalities in the use of expert systems based on artificial intelligence related to consultancy and advisory services.

FTF can and should play a major role in framing a broader vision for a more digital Denmark and for a discussion about those values that we wish to maintain. This is especially relevant to the development of the public sector and the possibilities of public-private partnerships on digital innovation as the basis for the future of the welfare society. The analysis has been one of several steps FTF is planning as input to their digital strategy.

Since the study was completed several of the member organisations have held seminars for their local union representatives to discuss which actions they need to take- and how they can enable that the local union representatives have a sufficient understanding of development trends and dynamics of digital technologies to enable that they as unions are engaged at an early stage in any decisions regarding the adoption of cognitive systems and advanced robotics. At present, the police is implementing a predictive analytics system to be used in identifying potential terror threats and economic crime. Through negotiations the police union has enforced that the implementation will occur over a period of five years, which is substantially longer than normal practice in the public sector. The implementation will be supported by substantive training and pilot measures recognising that the technology platform now implemented will have a major impact on formalisation of reporting practices in the police workforce. The police union is concerned that the implementation of advanced analytics and decision making technologies can lead to educational substitution, which is already seen within the police- as more computer scientists replace police investigators. The Union of Finance is at the start of a major project to strengthen their internal capacity to capture global trends shaping changes in the financial sector, work processes- jobs and skills. We are collaborating on a methodology, which combines horizon scanning, delphi methods, real time labour market analysis of job adds, and case studies to feed into career guidance and development of training offers for the members. Two years ago the Danish Finance Union created a fintech incubator on their premises, which now has 60 companies. The fintech incubators has signed a collaborative agreement with the Singapore fintech cluster with the aim of supporting exchange visits, joint training offers and thematic studies.