



**PUBLIC SERVICES
INTERNATIONAL**

The global union federation of workers in public services



ENGLISH

DIGITALIZATION

AND PUBLIC SERVICES:

A LABOUR PERSPECTIVE



**Report prepared by
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September 2019**



Digitalization and Public Services: A Labour Perspective

**This report was commissioned by PSI to Eckhard Voss¹, Wilke Maack GmbH in Hamburg and Raquel Rego², University of Lisbon in September 2019
[Manuscript completed in May/June 2019]**

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Foreword

The report “Digitalisation and Public Services: a labour perspective” provides a global overview and policy guidance for public services unions to ensure digitalisation lives up to its promise to enhance public service quality, effectiveness and accessibility for users, while improving working conditions and creating decent employment opportunities.

It looks at the shapes digitalization is taking in different public service sectors worldwide; how it affects delivery, quality and access; employment, working conditions and labour rights; what public service trade unions are doing about it; and what regulatory and governance considerations can be drawn from this review.

The research is based on the review of all main PSI sectors and on an interview sample of 20 public service trade unions representatives from all continents. The findings show that much of the impact of digital technologies on public services depends on how these are regulated and used, and on whether workers and their unions have a say or not on their development and introduction at the workplace. It was commissioned by PSI with the support of the Friedrich Ebert Stiftung (FES), and elaborated by Eckhard Voss, Wilke Maack GmbH in Hamburg and Raquel Rego, University of Lisbon.

It finds that digital technologies can improve public service quality and access and contribute to democratic accountability and citizens' trust in public institutions, while advancing workers' occupational health and safety (OSH). At the same time, it shows those same technologies can open the door to public service privatization, create a dangerous dependency of public institutions on private digital technology providers, and deepen inequalities among public service users.

The review concludes that:

- The introduction of digital technologies in public services is frequently driven by private corporate interests
- Corporate-led digitalisation is regularly associated with major public service user and data privacy abuse, resulting in a worsening of public service quality and efficiency
- Cost-cutting driven digitalisation tends to replace and slash public service jobs. It often uses new technologies for worker surveillance and performance monitoring, increases working time and extends job tasks
- It is urgent to establish an adequate regulatory framework for the introduction and use of digital technologies in public services and their workplaces. Such regulation must be developed in close dialogue with public services workers and their trade unions through meaningful participation, information and consultation, and by negotiating relevant wording in collective agreements.

Digitalisation and artificial intelligence are changing the way public services function for both users and public service workers. The way governments deal with the digitalisation process will influence those changes. Their actions will have negative outcomes if governments see digitalisation as a way to outsource functions, further abdicating their responsibilities and power. On the other hand, positive results could flow from governments leading the digitalisation process, defining rules, setting limits and implementing control procedures that can improve working conditions for public employees and make services more responsive and accessible for users.

Rosa Pavanelli
General Secretary
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Contents

Foreword	3
Executive Summary	6
Digitalization Glossary	11
List of Acronyms	16
INTRODUCTION	17
1 DIGITALIZATION AND PUBLIC SERVICES: A SECTOR-SPECIFIC OVERVIEW	24
1.1 Context and drivers	24
1.2 Central government	25
1.3 Local and regional government	30
1.4 Public utilities	34
1.5 Health and Social Services	37
1.6 Education and culture services	41
1.7 Security, border and emergency services	42
2 IMPACT OF DIGITALIZATION ON PUBLIC SERVICES QUALITY, EFFICIENCY AND ACCESS	46
2.1 Disentangling myth, ideology and reality	46
2.2 Impact on public service access and on the relationship between public services, citizens and users	48
2.3 Impact on privacy and security issues	49
2.4 Impact on efficiency and quality	50
2.5 Impact on public finances	52
3 IMPACT OF DIGITALIZATION ON PUBLIC SERVICE EMPLOYMENT AND WORKING CONDITIONS	54
3.1 Impacts on employment	54
3.2 Impact on working conditions: The overall picture	56
3.3 Skills and competence requirements	58
3.4 Occupational health and safety	60
3.5 Working time and work-life balance	61
3.6 Work monitoring and surveillance	63
3.7 Impact on existing and new inequalities in the labour market and workforce	64
3.8 ‘Digital Taylorism’: Emergence of precarious forms of employment	66
4 TRADE UNIONS AND PUBLIC SERVICE DIGITALIZATION	68
4.1 Involvement in digitalization-related public policies	70
4.2 Anticipation and managing of digital change and restructuring	73
4.3 Collective agreements setting frameworks for socially just digitalisation	73
4.4 Trade union guides and model collective bargaining agreements	75
4.5 Regulating the impact of digitalization on occupational health and safety	76
4.6 Local level bargaining and direct workers involvement	78
4.7 Shaping and regulating working time, telework and work-life balance	79
4.8 The right to training and qualification	80
4.9 Impact of digitalization on workers and trade union rights	82
5 CONCLUSIONS AND RECOMMENDATIONS	84
References	88
Annex: Trade unions participating in the study	92

Executive Summary

1. This **report** was commissioned by PSI. In addition to an extensive literature review, the study finds its main sources in interviews and information gathered from trade union representatives from PSI-affiliated organizations in different public service sectors around the world, including in Africa (Burkina Faso, Morocco), Asia (South Korea, Singapore, India), North America (Canada, United States), South America (Argentina, Brazil) and Europe (Denmark, France, Germany, Norway, Spain, and the United Kingdom). The interviewees represent a wide range of public services from central administration and local and regional government to health and care services, hospitals, utilities, police, emergency services and education and cultural services.
2. It **focuses on research questions that so far remain largely unanswered by current literature**. These questions pertain to the introduction of digital technologies across different public sector service branches and the motivations that underpin it (1), but also to the impact of public service digitalisation on service quality, effectiveness as well as access to public services (2). The report then addresses the impact of digital technologies and digitalised workplaces and work environments on public service employment and working conditions (3) and how trade unions have addressed these issues by own activities, within social dialogue and by collective bargaining (4). The analysis concludes with highlighting key results as regards the governance systems and regulatory tools that exist (or need to be developed) in order to secure the protection and interests of public service users and workers in the context of service digitalisation (5).
3. A large body of literature has already been published on digitalisation, the impact of new technologies on the world of work and the introduction of new technologies and related forms of work organization—including in government and public services. **Public service digitalisation is being actively promoted and fostered by international organisations** such as the United Nations (UN), the Organization for Economic Cooperation and Development (OECD) or the EU Commission to increase efficiency and improve the quality and accessibility of public services. According to the proponents of public service digitalisation, digital technologies and automation would also improve workers' working conditions, reduce health and safety risks and improve their work-life balance.
4. However, **there are good reasons to doubt digitalisation being a win-win recipe for all public services**. Evidence suggests that often the introduction of digital technologies and automation is mainly being driven by a will to increase productivity and work intensity as well as cutting jobs. Evidence shows that the provision of digital know-how, in both hardware and software, increases the pressure placed on public authorities to outsource essential activities, including those related to critical infrastructure. Furthermore, it is proven that while digitalisation and the increased use of digital devices can have positive effects on working conditions, they may also be used to monitor worker performance and behaviour, to intensify and compress work processes and surveillance, and to extend working time or at least availability.
5. **Digitalisation goes beyond past waves of technology-driven change**: The digitalisation of public services does not only concern the introduction and application of new technologies and tools such as sensors, smart devices, chatbots, cloud computing, data analytics, smartphone apps, machine learning, artificial intelligence or blockchain technology. More importantly, it concerns the far more

wide-ranging impact these technologies have on the way public services are provided, the relations between public services and citizens, and the type of labour needed. Since they are often developed, provided and owned by global tech companies such as Google, Apple or Microsoft, they also change the power relationship between public and private actors in the delivery and control of public services.

6. In **central government and administration**, the study shows that e-government and ‘digital first’ approaches in public services and administration are strongly promoted by international organisations such as the UN or the World Bank as the one and only path for government modernisation. Digitalisation of central government function can have positive effects, as was highlighted by trade union representatives in Brazil where newly digitalised public services such as online scheduling, online tax collection and e-processes in court have brought benefits to users in terms of public service efficiency and quality.
7. Large ‘smart government’ programmes—such as those implemented in Singapore, the introduction of digital identities and land registration in India, or tax payment practices based on blockchain technologies in Denmark—show that **digitalisation in central government and public administration is a global trend** and is being actively promoted by large multinational tech companies, whose key role as ‘enablers’ goes far beyond the basic function of delivering hardware and software. Public sector trade unions in the United States or Canada critically noted that the digitalisation of government and administration provides a huge opportunity for data gathering and use for large private tech companies. Technological dependency on big data corporations is problematic because public administrations often lack the resources to hire suitably qualified IT specialists and skilled

professionals to develop and manage digital-service technology, which further increases their overreliance on large private companies. The result is that governments have, for example, deployed Artificial Intelligence (AI) technologies and services by contracting private companies and remained dependent on them, creating additional risks regarding the sharing of citizens’ data with business actors.

8. This state of dependency is also an issue in **local and regional governments** where the ‘Smart City’ concept has emerged, ushering in the use of a variety of new, digital technologies such as data gathering and exchange and ‘digital first’ approaches in local public services, and thereby shaping new forms of interaction between public services and users/citizens. Evidence drawn from Smart City programmes in developing countries shows that underneath the glossy promise of making cities clean and “intelligent”, Smart City programmes are principally a tool to attract foreign direct investment for technology-driven PPPs and privatisation in local public services. Few Smart City programmes are oriented towards improving public service access, addressing inequality and citizens’ needs, or redefining data as common goods rather than a private commodity.
9. Data gathering and analytics have also become key drivers of **digitalisation in the utilities sector**, namely in water provision. Here digitalisation is increasingly affecting the way in which public utilities are modernised and managed. Technologies such as the Internet of Things, smart grids, predictive maintenance or smart metering are not only having an impact on how utilities are managed but are also transforming providers by changing their relations with users, the role of suppliers and the involvement of digital companies as essential parts of service provision. The utilities sector presents

significant technological gaps and increasing access inequality for new digital services and tools. The case of Argentina illustrates these gaps within a country: while smart electricity meters are in use and bitcoins have become a valid payment method for public transportation nationwide, in some regions, horses are still used by many citizens as a means of local transport.

10. The **ambiguity of the impacts of digitalisation** is very clear in **health and social services** and in **education services**. New digital technologies such as e-health or e-medicine, digital patient management, remote learning and digital medical devices can help and support doctors, nurses, teachers and administrative staff in the delivery of health and social services and have the potential to provide added value for patients, students and workers who need to update their skills and knowledge. Digital tools and technologies can also improve service access and enhance service provision in remote or rural areas. However, according to evidence from the United Kingdom, South Korea or the United States, digitalisation and automation are often used to **reduce the human factor and headcount** in these same labour-intensive public service sectors.
11. The increasing role and influence of powerful tech companies over public service digitalisation emerges as a constant across all surveyed regions. This is also the case of **digital technologies and artificial intelligence programmes used in security services, police or emergency services**. This raises questions not only about the dependence created between these vital services and private corporate actors, but also about their cost-benefit ratio, personal data protection, civil rights and behaviour surveillance and monitoring.
12. As regards the **impact of digitalisation on public services quality, efficiency and access**, the study has found that **digitalisation is significantly changing the content of public services and the way they are delivered, but not necessarily for the better**. Interviewed union representatives expressed concern that, while new technologies can bring improvements to the quality, efficiency and accessibility of public services, this ideal scenario is far from automatic and requires specific regulation and social framework conditions geared towards making digitalisation work for the common good rather than private gains.
13. In the case of service **accessibility**, the ‘digital first’ principle is self-contradictory when large parts of a country’s population have no access to the Internet and digital devices or are not IT literate. The elderly, people with disabilities, low-skilled workers and low-income groups are most likely not to see their access to public services enhanced as a result of their digitalisation. UK public service unions reported that in Britain 9 million citizens are practically excluded from digitalised services. In developing countries, access to digitalised public services is even more challenging as large shares of the population are unable to participate in the ongoing processes of digital change.
14. The ‘digital first’ approach, coupled with the outsourcing of digital systems development and the privatization of certain government functions also poses a **threat to the data security, privacy and protection of users and citizens** as well as **public service workers**. Interviewed unions emphasised the urgent need to rethink the design and objectives of public service digitalisation and adapt regulatory frameworks in order to effectively tackle the new risks it poses.

15. Digitalisation also has a **significant impact on public finances and public service budgets**. While some of the implications are direct, others are less immediately visible. The introduction of new technologies and processes to public services can represent a significant investment in infrastructure, tools and expertise (often brought in from external suppliers or via PPPs). Public sector unions in Canada and Germany highlighted that the outsourcing of certain activities, the leasing and maintenance of digital devices and the cost of licences or data security services are resulting in significant direct and indirect costs. These costs are often underestimated, as is the investment needed to train and develop the skills and competences of public sector workers when such new technologies are introduced.
16. However, this is not the only way in which digitalisation is impacting public budgets and income. The emergence of new forms of digital-based employment, such as **digitally-mediated service work and online platform work** also play a significant role. Indeed, working conditions in such digitally mediated and managed employment are often precarious and low-paid. Workers tend to be “self-employed”, which means that, even in cases where they are completely dependent on or fully available to the digital platform provider employing them, said platform does not pay any form of social security contribution into the social insurance system for their work. In addition, global tech corporations have developed sophisticated systems of corporate tax avoidance that starve public finances.
17. Digitalisation is also affecting **employment and working conditions**. The situation of private sector service workers, such as highly qualified IT specialists and managerial staff in high tech companies, engineering and consultancy services, who are benefitting from job creation and rising income levels, contrasts sharply with that of public service workers. As far as public service employment is concerned, interviewed public sector unions highlighted significant negative effects. One of these effects is the substitution of tasks and jobs that can easily be automated such as administrative work, invoicing and the handling of standard cases. Digitalisation and automation too often result in work intensification or higher stress levels. Furthermore, the spread of digitally mediated and platform work in public services, especially the health and care sector, are transforming employment relationship patterns at the expense of employees, who are often pushed to go into so-called ‘bogus’ self-employment or contracted under precarious conditions.
18. The study shows that **public service unions are not against digitalisation**, quite the opposite, as long as it serves public interest. The unions clearly acknowledge that these technologies can be beneficial to public service users and workers, for example by enabling social care workers to optimise their routes and spend more quality time caring for patients. Mobile devices and tracking software can also improve the safety of police officers and social workers when they find themselves in dangerous situations at work. However, the same technologies can also be used to constantly monitor employee performance and behaviour, to increase their pace of work and to limit pay only to the time spent with service users.
19. The study also shows that **public service trade unions from all continents are actively engaging and taking initiatives in order to address**

the challenges arising from the introduction of digitalisation and shape a just digital transition in public services.

20. Trade unions are **voicing their positions and demands with regard to top-down, government-led digitalisation programmes** in all major public service sectors and especially in health and social care, education, public utilities and local and regional government services.
21. Some unions have included digitalisation-related issues in their **collective bargaining agendas** at all possible levels, negotiating bipartite, tripartite and cross-sectoral agreements, as well as regional, municipal and workplace-based collective agreements to influence and shape the management of digital change processes in public services.
22. In some cases trade unions have succeeded in securing and placing value on **workers' representation and participation** as 'digital change agents' (e.g. Denmark or Norway). In other cases (e.g. United States, Germany or Italy) they have negotiated on the subject of digitalised work and employment conditions, such as 'telework', 'flexible' and 'smart' digital work, and thereby have asserted the 'right to disconnect' for public and private service workers as guaranteed by national legislation in France and Italy.
23. Trade unions are also making a critical contribution to a better understanding of the **health and safety risks** associated with digitalized public service workplaces. They are supporting workers through guidelines, model workplace and framework agreements at company and sector level (e.g. UK, US or Germany) and the negotiation of new and extended rights to training (e.g. Singapore).
24. More recently, trade unions such as the SPFQ trade union from Quebec, Canada or HK Kommunal in Denmark have initiated their own research projects or developed their own expertise as regards the **application of machine learning, process automation and artificial intelligence in public service processes and decision-making**.
25. Beyond public services, the report has shown that public service trade unions are also key actors in shaping the debate about the overall **future of work**, including the need to adapt the concept of employment and employment contractual relationships to the new forms of interaction that have arisen between workers, online platforms and other types of digital-based intermediaries.
26. Finally, public service unions are actively involved and often the ones to initiate public civic debate in their workplaces, communities and countries on core questions surrounding the **future of public services, as well as their role and contribution to democracy, equality, the common interest and investment in critical services and infrastructures for all, not for the few**.
27. The report clearly shows that, in the countries and sectors where strong, organised workers' representation exists and enjoys a powerful voice, it plays an important, **positive role in prompting and shaping the policies and regulation needed to accompany the public service digitalisation process**. Furthermore, countries and sectors in which trade unions were allowed to freely exercise their role and were involved and valued in the process from the beginning achieved better results in ensuring a **more socially just digital transition** for public service workers and users alike. 

Digitalisation Glossary

Term	Explanation
“Privacy by design” and “privacy by default”	Privacy by design or privacy by default means that appropriate software and hardware is designed and developed in such a way that relevant data protection measures are taken into account from the outset. The technology design is geared towards respecting data protection requirements in all areas. The European General Data Protection Regulation (GDPR), which entered into force in May 2018, mandates that “privacy by design” is compulsory for all companies with users in the EU.
Agile Work	Initially developed by IT experts with the aim of defining new ways of developing software with greater responsiveness to changing user needs. From this collaboration the ‘Agile Manifesto’ emerged, which put a focus on collaboration between self-organised cross-functional teams and their customers. Since then the ‘agile’ method of project and team work has spread to organisations of all types and sizes. Today, ‘agile’ is a business buzzword in management theory. It is linked to project management software such as Scrum or Kanban and the promise of doing things better, faster and more effectively than traditional teamwork-based processes.
Algorithm	In mathematics and computer science, an algorithm is a step-by-step instruction to solve a problem or carry out a task. Algorithms can process data and perform calculations, automated reasoning and other tasks. For example, they make it possible for navigation software to find the shortest way from A to B. Algorithms are also important in selecting individualised adverts, promotions or other suggested content that we receive when using programmes such as Google, Facebook or Instagram. Algorithms are also increasingly being used in the world of work, namely in HR and recruitment for screening purpose and for providing suggestions as to which candidates might best match a position in an organisation.
Artificial Intelligence (AI)	An area of computer science that emphasizes the creation of intelligent machines that work and react like humans. The use of artificial intelligence is present in all areas of everyday life, from national language processing (Siri, Alexa) to online chatbots or HR software that supports decision making when hiring and firing employees. According to the U.S. IT Magazine VERGE, in Summer 2019, 300 Amazon employees in Baltimore were dismissed because they did not match productivity targets. Both the productivity targets and the identification of the employees were done by AI.
Big Data (Analytics)	Data volumes that are too large, too complex, too fast moving or too weakly structured to be evaluated with manual and conventional methods of data processing.
Biometric data	Biometrics is the science of body measurement of living beings. Biometric data is known to be fingerprint, facial or iris characteristics, but can also relate to behavioural characteristics such as writing behaviour, lip movement or voice.
Bitcoin (or “Crypto currency”)	Bitcoin is a digital currency or virtual money. There are no physical coins or banknotes in this payment system. The fundamental difference between crypto currencies like Bitcoin and conventional money is that the digital means of payment function completely independently from banks or states. Bitcoin transactions are completely anonymous and decentralised and do not require the intervention of an additional authority, such as a bank, between the partners involved. Thus they are beyond the control of the state. In addition, the true identity of both actors remains hidden, since only the account balances and Bitcoin addresses used for transactions are visible to the public. Whether “digital” coins have the potential to become an alternative currency, however, will only become clear in the future, as the focus has been drawn to the speculation function rather than the online payment function, as the significant current Bitcoin hype proves.

Term	Explanation
Blockchain	A blockchain is a database or ledger that consists of a chain of data blocks. This chain is constantly extended by new blocks in which transactions are stored. The principle can be compared to an accountant who, on a daily basis, writes all transfers in a network down on a sheet of paper and staples it into a large folder in the evening. The sheet of paper would be the data block, the folder the block chain. In a blockchain, all participants receive a copy of the updated block chain. Thus, since there are as many copies as there are users, the information in the blockchain is stored on thousands of computers around the globe. This makes it virtually forgery-proof compared to conventional, central databases. What information is stored in the data blocks and how it is used does not matter, be it Bitcoins, supply chain data, freight books, e-government data, medical records, power-grid management data, border control, or public utility data such as garbage disposal, urban public transport passenger data. Blockchain technology currently is actively promoted by innumerable software companies throughout the world, but in particular in China and other Asian countries.
Chatbot / bot	A chatbot (or simply 'bot') is a text-based dialogue system that allows one to chat with a machine. It has a dedicated area for text input and output, through which it is possible to communicate in natural language with the machine system behind it. Due to increasing computer power, chatbot systems can access more extensive data faster and therefore offer the user intelligent dialogue. Such systems are also referred to as virtual personal assistants. Prominent examples are the Google Assistant or Amazon's Alexa.
Cloud computing	IT infrastructure that is made available via the Internet. It is a business service that usually includes storage space, computing power or application software. In technical terms, cloud computing describes the approach of making IT infrastructures available via a computer network without having them installed on the local computer. The largest cloud computing suppliers are Microsoft, Amazon, Salesforce, SAP and IBM that have developed cloud computing as a new and increasingly important field of business (e.g. Infrastructure as a Service, Platform as a Service, Software as a Service).
Collaborative robotics (Cobot)	A collaborative robot (Cobot) is an industrial robot that works together with human workers.
Crowdsourcing	Crowdsourcing is the outsourcing of tasks or projects from a company to a group of internet users. The term crowdsourcing is made up of the words outsourcing and crowd. However, crowdsourcing does not mean the outsourcing of corporate tasks to third parties, but rather the outsourcing of tasks to a crowd of people, usually freelancers or smaller companies. Companies mainly outsource tasks to a large global crowd of workers in order to avoid direct labour contracts, which would include social security contribution obligations, and stimulate cost-competition between crowdworkers. See also Crowdworkers
Crowdworkers	Crowdworkers are people who accept work orders that are made available to a large number of internet users (crowd). The orders are usually offered via internet platforms (so-called crowdsourcing platforms) and, depending on the order/project, processed by one or more crowdworkers. Very different types of crowdwork exist, such as local services such as private cleaning, gardening or homecare services as well as IT- or Platform-based crowdwork for freelancers in the field of journalism, media or design where crowdworkers compete globally. See also Gig Economy
Crypto currency	See Bitcoin
Cyberattack	An attempt by hackers to damage or destroy a computer network or system. Larger cyberattacks that gained large media coverage were for example the attack of several public organisations, banks, the parliament and ministries in Estonia in 2007 or the attack on the Ukrainian electricity system in 2015.
Digital Identity	As opposed to an identity in the real world, where persons are characterised by attributes such as physical characteristics or personal data, digital identities rely on electronically processable characteristics. Such characteristics can be a username and password, smart cards and tokens or biometric data. Often, in both the digital and the real world, multiple attributes are combined to better secure unique identification.

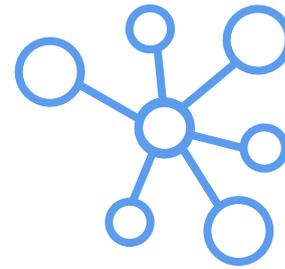
Term	Explanation
Digital-first	Principle of public service provision where the access of users to services and/or the communication between users and public service employees is done digitally, i.e. via the Internet, through computers and other digital devices.
Digital natives	The term digital native refers to a person of the social generation who grew up in the digital world. By contrast, the term digital immigrant exists as an antonym for someone who has only come to know this world in adulthood.
Disruptive technologies / innovations	In contrast to incremental or evolutionary innovations, disruptive innovations refer to those that change the rules of the game on the market and/or in user behaviour for digital devices and/or data. Disruption is often not triggered by the technology itself but by a change in its usage. One example is the MP3 audio format. This technology did not trigger any disruption, its use in the context of the functionality and user-friendliness of portable MP3 readers such as Apple's iPod or built-in smartphone applications did so.
E-government	E-government stands for electronic government. This refers to the increased use of modern IT technologies and electronic media for government, its administrative processes and service delivery. Forms of e-government include offices or authorities communicating with each other or with citizens electronically, such as online tax declaration portals, birth certificate requests or motor vehicle registration done online via a government's webpage.
eHealth, eMedicine	eHealth, also known as Electronic Health, refers to the use of digital technologies in the healthcare and medical sector. It refers to all tools and services that use information and communication technologies (ICT) for prevention, diagnosis, treatment, monitoring and management of pathologies, as well as clinical and patient data collection and processing. Considering the large amount of private health data gathered, data protection is an important issue.
Gig economy, Gig(s)	Refers to a part of the economy and labour market in which small orders are placed on short notice with independent, self-employed persons or freelancers through the use of digital platforms (e.g. Uber for auto-transport, Eat for food deliveries, etc.).
GPS tracking	A GPS tracker is a device that can be located via the satellite system and emits radio signals indicating its location that are received by an external reception device. They can be used to track objects and people. GPS tracking functions are integrated into smart phones and many other devices for daily use.
Gunshot detection platforms	A gunfire locator or gunshot detection system is a system that detects and conveys the location of gunfire or other weapon fire using acoustic, optical, or potentially other types of sensors, as well as a combination of such sensors. These systems are used by law enforcement, security companies, the military and businesses to identify the source and, in some cases, the direction of gunfire and/or the type of weapon fired.
Industry 4.0	After mechanization (Industry 1.0) based on steam technology, mass production (Industry 2.0) based on Taylorism and automation (Industry 3.0) based on electricity and analogue computing, the advent of digital technologies and of the Internet of Things and Services in manufacturing is leading to the fourth industrial revolution or Industry 4.0.
Internet of Things (IoT)	General term for information infrastructure technologies that make it possible to network physical and virtual objects (e.g. computers, cars, trash bins, traffic lights, etc.) and allows them to communicate through information and communication technologies. An example of this are self-scan products in supermarkets whereby an RFID (radio-frequency identification) chip emits the price and digital check out occurs automatically. Traffic management and smart traffic lights or sensor-based trash services in smart cities are also examples of IoT-based processes.
Data mining	Data mining is the systematic application of statistical methods to large amounts of data (in particular "big data" or mass data) with the aim of identifying correlations, cross-connections or trends that so far have not been detectable due to a lack of computer capacity. Data mining is not only carried out for scientific reasons but also by private actors in order to develop new solutions or business ideas, for example in the field of predictive maintenance or eHealth.

Term	Explanation
Machine learning	Generic term for the ‘artificial’ generation of knowledge from experience that mimicks human learning. An artificial intelligence system (a robot or a computer) can be set to learn from examples, interactions and experience and can embed them into its system as general rules after the learning phase has ended. It will then be able to use that information in the future in similar situations. Machine learning is a part of ‘artificial intelligence’.
mHealth	The term mHealth (also mobile health) stands for the support of medical procedures and health care measures by devices such as smartphones, tablets or personal digital assistants (PDA) as well as by lifestyle and health applications that can be operated via sensors. Mobile health includes a number of technical applications, for example the determination of vital signs such as blood sugar or body temperature, but also communication or motivation applications, which are intended to remind the user to take medication. The use of apps plays a major role here, because the sensors installed in the smartphones can capture and process a large amount of health-related data. The main field of application for mHealth is remote monitoring patients with chronic illnesses. Automatic SMS dispatch from health providers to patients is the method most frequently used for this technology, which is expected to expand in the future in the prevention and treatment of dementia, Alzheimer's disease and other neurodegenerative illnesses.
MOOC	Massive Open Online Course refers to online courses mainly used in higher education and adult education, which usually have large numbers of participants as they do not impose any access or admission restrictions.
Once-Only principle	The aim of the Once-Only principle is that citizens and companies only have to communicate certain standard information, such as name and surname, birthdate, sex and address, to public authorities and administrations once, thereby avoiding having to do it every time. In compliance with data protection regulations and with the explicit consent of the users, public administrations are then allowed to reuse the data and exchange them with each other. The Once-Only Principle aims to reduce the administrative burdens facing citizens and businesses.
PDA	Personal Digital Assistant, i.e. a small mobile handheld computer device used to write text or manage schedules, emails and telephone numbers. Many of these features are now typically embedded into smartphones.
Platform economy	The platform economy is economic and social action made possible by digital platforms that typically function as online matchmakers or technology frameworks and operate as intermediaries, putting offer and demand for a certain product or service in touch. The most common type by far are “transaction platforms” such as Amazon, Airbnb, Uber or Baidu.
Predictive analytics	Predictive analytics include a variety of statistical techniques such as data mining, predictive modelling, and machine learning that analyse current and historical collected data, extrapolate them and make predictions about future trends and events. Predictive analytics are used in marketing, financial services, insurance, telecommunications, retail, travel, mobility, healthcare, child protection, capacity planning, social networking and other fields. They represent an extremely valuable market and carry the potential for great influence in economies and societies.
Predictive maintenance	A maintenance process based on the evaluation of machine-processed data analysis collected from advanced manufacturing or industry 4.0. The real-time processing of the underlying data makes it possible to forecast maintenance needs and consequently reduce downtimes. In addition to the interpretation of sensor data, this requires a combination of real-time analysis technology and an in-memory database that can assign a technician to solve a problem before it occurs.
Robot Process Automation (RPA)	Robot Process Automation is a term that describes the application of algorithms and artificial intelligence to “copying” and conducting administrative and other work processes that had previously been carried out by humans in the field of pay rolling, accounting tasks or tax collection or basic functions of human resources management, for example.
Servicification	Term indicating that manufacturing activities and competitiveness in the world economy increasingly depend on services rather than products (vs. “commodification”).

Term	Explanation
Sharing economy	This is a collective term for companies, business models, platforms, online and offline communities that enable the shared use of completely or partially unused resources such as real estate (AirBnB) or transport (BlaBlaCar) by connecting offer and demand for such goods and services.
Smart meters / grids	An “intelligent” or smart meter is an electricity, gas, water or heating meter that reads and transmits digital data regarding consumption and maintenance needs and is therefore integrated into a communication network connected to the provider. Such intelligent meters have been in use since the 1990s, primarily for large customers. They have also been available to private households since around 2010. Depending on the model, intelligent meters can also transmit data to the energy supply company at fast intervals, which should enable it to better manage its network and resources and anticipate peaks and downtimes (Smart Grid system).
Social rating/ credit systems	Social rating or credit systems are not new. In the past, financial lenders and mortgage providers were already tracing the timely manner in which clients paid their debts, giving them a score for solvency. Such systems have expanded in other areas, for example online shopping or in the rating of Uber drivers and passengers or restaurants and hotels (Tripadvisor, Booking, AirBnB). Building on these practices, current social rating/credit systems are being expanded to all aspects of life, and in the case of authoritarian states, used to judge citizens’ social behaviour and potential opposition to rulers.
Taylorism	Taylorism describes the principle of controlled work processes established by the American Frederick Winslow Taylor (1856-1915). It is a management system that predicated breaking down production into specialised, repetitive tasks in order to increase productivity and efficiency.
Tele-health	Tele-health covers the dissemination of health-related services and information (including patient’s information) via electronic information and telecommunication technologies. See also eHealth and mHealth
Telework	Forms of work in which employees carry out all or part of the work outside the employer’s premises. In the case of home work, this work takes place at the employee’s home. In most cases, the results of said work are then transmitted to the employer via digital channels (e-mail, shared server, website etc.).
Uberisation	Uberisation is a term that has generally come to indicate a highly unprotected employment relationship based on a digital platform in which services (such as Uber taxi services) are offered on short-term or instant demand through direct contact between a user and a supplier via a mobile application or website. The intermediary company (in this case Uber) neither owns cars nor employs drivers directly but earns a percentage on the service.
Virtual reality (VR)	Virtual reality or VR is the computer-based display and perception of reality in a real-time mode that often allows for interaction with the user, for example in the context of computer games. VR today is used in many areas, e.g. in surgery, remote maintenance and repairs or training (e.g. flight or train simulation).
Work on demand	Work on demand is a request put to an individual to deliver work for a specific, limited time. While work on demand has existed as a business practice for a long time (consultancies, short-term contracts, time-bound outsourcing etc.) the digitalisation of work and the rise of online platforms (Platform economy Uberisation) that operate as intermediaries for work on demand shone a new light on these practices. Work on demand is often presented as a ‘win-win situation’ by platforms: workers get to tailor their work time to their personal responsibilities outside the workplace, while businesses can adjust their workforce according to their short-term needs. This type of work principally generates non-standard form of employment.
Zero-hour contracts	Zero-hour contracts are an extreme form of flexible working used by some employers that do not specify a minimum number of working hours per week. By signing a zero-hour contract a worker agrees to be available for work at any time as required, while the employer is not obliged to provide any work and the worker is not obliged to accept the work offered. The worker is expected to be on call and receives compensation only for hours worked. This approach generates precarious employment as it typically shifts most risks and costs of the employment relationship onto the worker and away from the employer.

List of Acronyms

AFT	American Federation of Teachers (United States)
AUPE	Amalgamated Union of Public Employees (Singapore)
CFDT	Confédération française démocratique du travail (France)
CGT	Confédération générale du travail (France)
CNTSS/CUT	National Confederation of Social Security Workers (Brazil)
CSQ	Centrale des Syndicats du Québec (Canada)
CTM	Confederación de Trabajadores Municipales Confederation of Municipal Workers (Argentina)
DAMD	Danish General Practice Database
EGDI	E-Government Development Index
EPSU	European Federation of Public Service Unions
ETUC	European Trades Union Confederation
ETUI	European Trade Union Research Institute
FNV	Federatie Nederlandse Vakbeweging (Netherlands Trade Union Confederation)
FP-CGIL	Funzione Pubblica Confederazione Generale Italiana del Lavoro (Public Services Sectoral branch of the Italian Trade Union Confederation)
FSC/CC.OO	Federation of Services to Citizens (Spain)
GPS	Global Positioning System
HK	Handels- og Kontorfunktionærernes Forbund (Denmark)
ILO	International Labour Organisation
IoT	Internet of Things
IT / ICT	Information Technology / Information and Communication Technology
KMHU	Health and Medical Workers Union (Korea)
LED	Light Emitting Device
NHS	National Health Service
OECD	Organisation for Economic Cooperation and Development
OHS	Occupational Health and Safety
PPP	Public Private Partnership
PSI	Public Services International
PSIRU	Public Services International Research Unit
RPA	Robotized Process Automation
SFPQ	Syndicat de la Fonction Publique et Parapublique du Québec (Canada)
SYMEB	Syndicat des Médecins du Burkina (Burkina Faso)
TUAC	Trade Union Advisory Committee at OECD
UN	United Nations
UNISON	UNISON Trade Union (United Kingdom)
UNITE	Unite Trade Union (United Kingdom)
UNSA	Union nationale des syndicats autonomes (France)
ver.di	Vereinte Dienstleistungsgewerkschaft (Germany)



INTRODUCTION

Background and context: Digitalization and the future of work

New digital technologies and the digitalisation of communication, production and administration processes have become one of the key drivers of economic and social change on a global scale. In academic debates, the digital transformation of the economy has been compared to previous industrial revolutions and cycles¹ and described as the start of a new era of capitalism².

Digitalisation is a multi-dimensional term defined in different ways depending on the specific angle of observation and analysis. Narrower definitions focus on the adoption of digital technologies and processes in economic and social activities while broader definitions also refer to its transformational effects on human civilizations, societies, and the economy. This is illustrated by the following definition from the OECD:

"Digitisation is the conversion of analogue data and processes into machine-readable format. Digitalisation is the use of digital technologies and data as well as interconnection that result in new or changes to existing activities. Digital transformation refers to the economic and societal effects of digitisation and digitalisation."³

Beyond definitions, what ultimately matters is that digitalisation is having a powerful transformational impact. New and 'disruptive' technologies such as cloud computing, big data gathering and analytics, Internet of Things (IoT), machine learning or artificial intelligence (AI)⁴ not only affect all sectors of the economy, including public services, but also impact employment and how we work. As noted in 2018 by the ILO Global Commission on the future of work, "increased digitalization and automation is expected to

significantly affect both the quality and quantity of jobs. New types of jobs and employment are changing the nature and conditions of work by altering skills requirements and replacing traditional patterns of work and sources of income."⁵

This report defines digitalisation as the interaction between new digital technologies and the economic, social, employment and work-related transformation processes that result from the use and introduction of such technologies.

There is a growing awareness that digitalisation and digital transformation process are having and will continue to have a profound impact on the way public services are organised and delivered, as well as on the relationship between public services and citizens/users⁶. By contrast, the impact of digitalisation on public services from a labour perspective, including on employment and working conditions, but also on workers' rights and collective bargaining has not yet entered public debates.

For policy makers, business consultants, IT multinationals and the tech industry, digitalisation is synonymous with opportunities such as increased efficiency and cost-reductions in manufacturing and service work, access to new profit opportunities and economic growth, and IT-related job creation, with unexplored potential for innovation and a greener economy.

But digitalisation is not only about opportunities. It is also associated with the replacement of human work by digital processes and devices, robots, new forms of performance and behaviour control in the workplace and the unregulated collection of personal data. Digitalisation is also giving rise to new forms of employment relationships, e.g. the placement of jobs and 'gigs' under precarious conditions. All of this significantly impacts labour rights and collective bargaining conditions.

From the perspective of labour and work, digitalisation presents opportunities, but also risks and threats. This is highlighted in the following table that summarizes its main potential impacts.

Table 1: Overview of the main opportunities and threats related to digitalisation

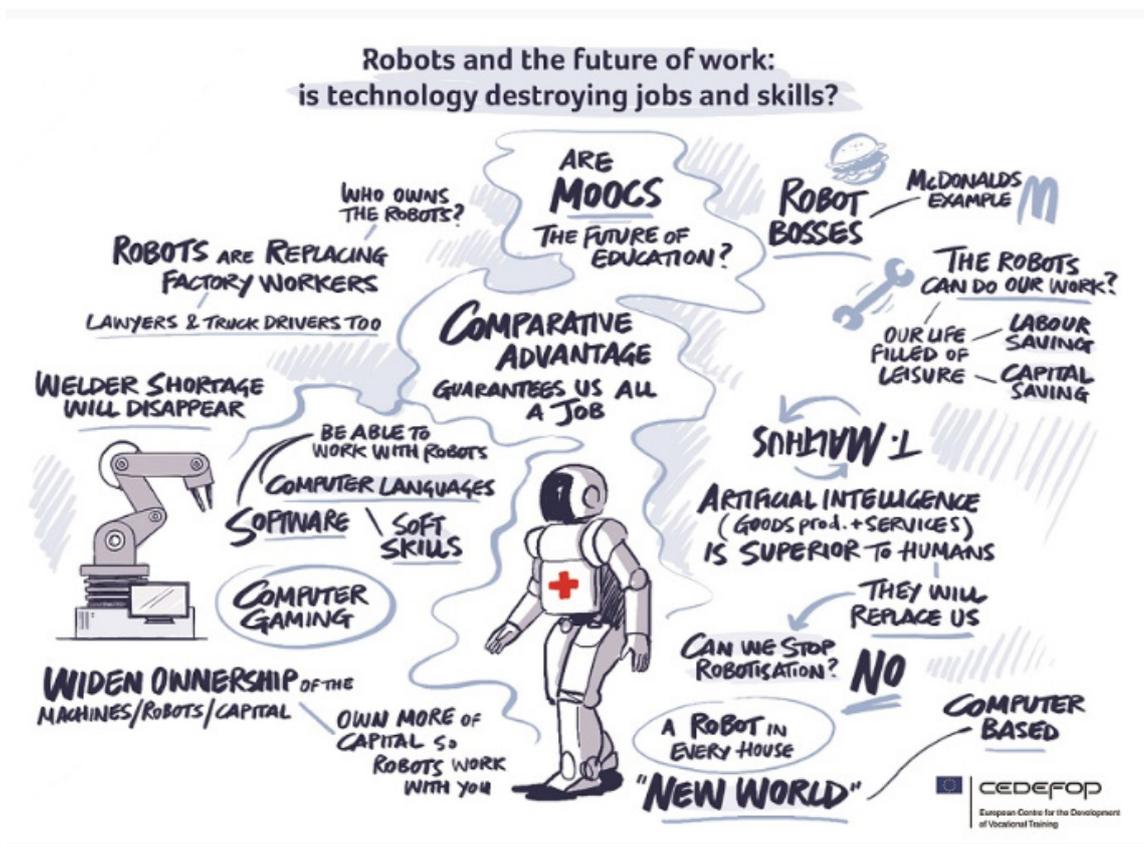
Opportunities	Threats
New jobs (computer engineers and scientists, network experts, maintenance etc.)	* Destruction of medium and low-skilled jobs (automation and computerisation)
* More 'agile' work organisation; new forms of more flexible and more autonomous work	* Intensification of 'anytime, anywhere' work; 'always-on culture'; 'hyper-connectivity' resulting in blurring of the boundary between private life and working life leading to stress and burnout
* Abolition of repetitive, low-skill and routine tasks, reduction or elimination of arduous or dangerous work. Improvement of occupational safety and health	* Loss of control by workers over their own expertise, know-how and free will (becoming the "tool" of a machine)
* Better ergonomics, help in performance of heavy or complex tasks	* Digital management, policing of workers, risk of mutual loss of trust between employees and management
* New forms of collaboration and cooperation among workers	* De-personalization of work, loss of face-to-face interactions, erosion of social skills at work
* Reshoring (return of industries and new 'smart' factories – and jobs – to their regions or country of origin)	* Precarisation of jobs and of employment relationships, dependence on 'data masters'; 'servification'
* Possibility of new ways of distributing productivity gains (working time reduction)	* Weakening of collective action and industrial relations; shrinking of traditional collective bargaining coverage
* Possibilities of social emancipation due to a new concept of 'work' and change of economic model based on peer-to-peer relations (where all participants/actors are equal) and common goods	* Skills and training/labour demand mismatch
	* Exacerbation of inequalities (as regards skills and competences, "core" vs. "peripheral" jobs and positions, etc.)
	* Wage level stagnation or decline due to an increase in highly flexible employment relationships and interrupted employment histories
	* "Digital Taylorism" and emergence of a class of digital workplace-based workers (crowd sourcing); world competition among workers for all jobs not requiring face-to-face contact
	* Erosion of country-based tax base and social insurance financing

Source: Adaptation from Degryse, 2016: Digitalisation of the economy and its impact on labour markets.

The potential threats posed by the many facets of digitalisation are exemplified in the following vignette about the potential implications of automation, robotisation and AI for the workplace. These risks raise a number of important questions, such as how to deal with job destruction and the replacement of workers

by robots, how to ensure that skills and competence development keeps pace with digitalisation, and how to manage adult learning so that all can benefit from new learning opportunities in order to ensure employability in a digitalised world.

Figure 1: Robots and the future of work: is technology destroying jobs and skills?



Source: CEDEFOP: Digitalisation and the future of work, available at: <http://www.cedefop.europa.eu/de/events-and-projects/projects/digitalisation-and-future-work>

Digitalisation and the ongoing developments of new technologies will continue to have a major impact on workers' everyday life. Digitalisation has enabled the rise of a range of new forms of work, such as platform work, digitally mediated service work or the 'gig-economy'⁷ that often mixes or contains elements of traditional forms of precarious work such as dependent self-employment, work on demand or crowd working⁸. Those involved in these increasingly widespread forms of work operate under a higher

risk of job insecurity as they are less protected in terms of labour rights and social security coverage than workers in more traditional forms of employment⁹. Digitalisation is likely to add new types of precarious work, especially in the grey area between salaried employment and self-employment and will increase the number of people in flexible, mobile and temporary employment¹⁰.

Workers in the gig economy are also vulnerable in terms of unpredictable working hours, variable income levels, lack of training opportunities, poor or no access to employment rights and social protection, and inadequate pension coverage¹¹.

Therefore, it is important to view digitalisation not only as a purely technological issue, but also as a social and political process with wide-ranging, long-term implications, as it relates to the role of work and human labour in our future economies and societies. It is necessary to analyse the social impact of digitalisation on production and service sectors as well as on employment and labour, social conditions and cohesion, workers' rights and the power relationship between capital and labour.

A 2018 survey and cross-sectoral consultation with European national trade union and company level employee representatives¹² highlighted that, from the perspective of trade unions and workers, digitalisation is linked to two fundamental challenges: first, anticipating, managing and shaping the effects of new disruptive technologies and digitalisation on established industries, services and 'traditional forms' of work. Second, actively shaping the digital transformation of workplaces and of the labour market in a manner that limits risks and threats, fosters fair solutions for all workers and builds on the potential positive impacts and opportunities digitalisation can bring.

Digitalization and public services

Digitalisation and new technologies are having a huge impact on employment and working conditions in public services. On the positive side, digital technologies could improve health and safety by reducing the strain and repetitiveness of work while also improving democratic accountability and strengthening quality public services¹³. In a 2002 report the U.S. public services trade union, AFT, stated that "technology opens new avenues for job innovation, workplace design and professional development. Planned or negotiated telework plans can offer employees alternatives to work from home or a telework centre closer to home. New concepts for the

scheduling and place of work offer alternatives for our changing culture and the demands of our changing workforce.¹⁴"

Cases of new technology improving working practices in public services include the use of phone applications to track and direct social or homecare workers to their appointments. The use of this technology can be a benefit to workers, for example by allowing them to optimise their routes and spend more time caring for patients. Mobile devices and tracking software can also improve the security of police officers and social workers when working in dangerous conditions by reducing the time needed for rescue and recovery operations in emergency or assault situations.

However, the same technologies can also be used to monitor the performance of employees, increase their pace of work and limit pay only to time spent with service users, excluding travel time. Therefore, it is important that the power to control and decide how to use a new technology is not left uniquely in the hands of employers, but that their application is regulated and monitored in the public interest. There is a need to define clear rules that respect workers' rights and involve workers and their representatives in defining the terms of use of new technologies, including through collective bargaining.

Given this complexity, the net, exact impact of digitalisation and digitalised public services on employment, working conditions and workers' rights is far from clear. It very much depends on existing or emerging regulatory framework conditions at an international, national and workplace level, including whether employees and their trade unions have a say or are denied participation in modelling digitalisation projects and introducing new technologies into public services.

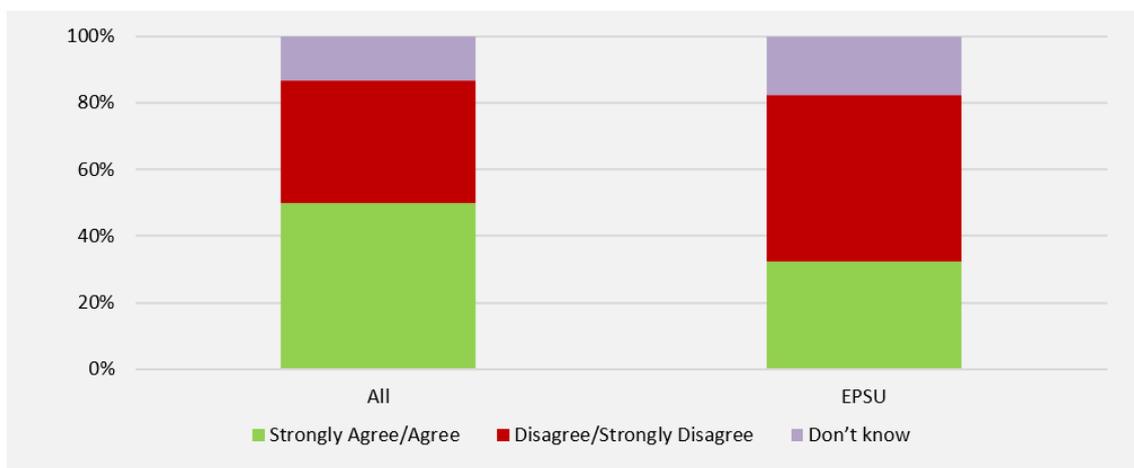
It is therefore hardly surprising that digitalisation is a polarising issue for trade unions and workers' representatives. The previously mentioned 2018 survey of European trade unions found that about half of all respondents from all economic sectors and from more than 30 European countries thought that the opportunities resulting from digitalisation would outweigh the risks for their respective country, sector or

company. However, a strong minority of over a third of respondents believed that digitalisation would bring more risks than opportunities, while the rest simply did not know.

When comparing responses from public service trade unions with the overall results, it seems that workers representatives and trade unions in public

services appeared more sceptical regarding the positive impact of digitalisation on their respective country, workplace or job. Around 50% of all respondents from public service unions (compared to 37% on average across all sectors) disagreed or strongly disagreed that digitalisation would provide more opportunities than risks in their respective country, workplace or job.

Figure 2: Do you think that digitalisation will provide more opportunities than risks for your country, company or job? (% of responses, n=771 (all sector), n=70 (public services))



Source: Voss, E. 2018: “Digitalisation and Workers Participation – What Trade Unions, Company level Workers

While similar global surveys have not yet been carried out to our knowledge, based on the interviews carried out with representatives of PSI-affiliated trade unions in non-European world regions within the framework of this study, overall scepticism can be confirmed. Indeed, very few respondents referred to the opportunities linked to digitalisation and digital public services, whereas a majority stressed existing risks and potential further negative effects on working conditions and employment.

Purpose of this report

Given the general research gap surrounding the impact of new technologies and digitalisation on public services, the main purpose of this report is to provide a broad global overview of the introduction of digital technologies in the sector and to look at the ways in which they are impacting employment, working conditions and labour rights as well as service delivery, quality and accessibility.

In line with its 2017 Congress Programme of Action, the Public Services International (PSI) global union¹⁵ decided to prioritise work on digitalisation and commissioned the present report, with the support of the Friedrich Ebert Stiftung (FES)¹⁶. By addressing the topic of digitalisation through a global lens, the report aims to reduce this research gap and serve as a basis for global debate and consultation amongst public service trade unions worldwide.

Methodology and scope of the study

PSI required researchers to address five main topics related to digitalisation, employment and working conditions in public services:

- The forms digital technologies are taking in different public service branches and services and how they are being introduced;
- Their impact on the quality, effectiveness and accessibility of public services for users and communities;
- How digital technologies are changing employment and working conditions (including occupational health and safety, employment levels, job tenure, equality, etc.) in public services;
- The impact of digital technologies on public service workers' rights and trade unions, namely through collective bargaining and alternative forms of participation;
- The regulatory tools and governance systems that exist (or should be established) to oversee the introduction and impact of digital technologies on public services and protect workers and users.

In addition to the analysis of these questions and their contextualization, the focus of this report is largely empirical: the authors tried to draw on concrete practice experiences and the lessons learned from both the desk research and the interviews and materials gathered from respondent PSI affiliate

representatives. Specific attention was paid to trade union demands, recommendations and practices that aim to ensure that new technologies in public services live up to their promise to enhance service quality, effectiveness and accessibility for users, while also improving working conditions and creating decent employment opportunities.

The study is based on two complementary methodological approaches. First, an extensive literature review and associated desk research looking at digitalisation and public services from several angles: the introduction of digital technologies into public services; the impact of digitalisation on service quality, effectiveness and accessibility; the impact of digital technologies on working conditions and labour rights; and digitalisation as addressed by trade unions and collective bargaining.

Secondly, the study included interviews with a sample of 20 PSI-affiliated trade union organisations from 5 continents: Europe, Asia-Pacific, Latin America, North America and Africa. Contacts were facilitated by PSI, and interviews were carried out between autumn 2018 and the beginning of 2019 based on a semi-structured questionnaire (see annex 2). Interviews were conducted in English, French, Spanish, German, Portuguese and Swedish. The complete list of organisations that participated in the study is available in the annex.

While PSI affiliates from the European region were the most responsive with 11 participating public service unions, the scope of the report remains global as 10 interviews were conducted with trade union representatives from other regions: 2 from North America, 2 from Latin America, 3 from Asia-Pacific and 1 from Africa.

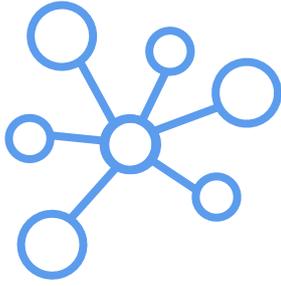
As regards the study's sectoral scope, the research covers all the main branches represented by PSI: central government administration; local and regional (municipal) government; utilities (electricity, water and waste services); health and social services; education and culture; firefighting, police and emergency services.



Structure of this report

This report is composed of 5 chapters. Chapter 1 provides an overview of the context, drivers and frameworks of digitalisation in public services. New technologies and digitalisation in public services are discussed from a sectoral perspective (central government, local and regional government, public utilities, health and social services, education and cultural services, security, border and emergency services). The impact of digitalisation on the quality, effectiveness and accessibility of public services, including privacy and security issues, service efficiency and quality as well as public finances is the focus of chapter 2. Chapter 3 gathers evidence from desk research and from interviews on digitalisation's impact on employment, working conditions and workers' rights in public services. Chapter 4 describes trade union practices and approaches to digitalisation, including efforts and strategies to influence and shape the digital transformation process in public services. It presents the way in which trade unions around the

globe are involved in public policy and reform, social dialogue and collective bargaining practices pertaining to digitalisation, as well as the direct involvement and participation of unions and workers representatives in the introduction of new technologies and in the development of major criteria for good digital public services. The report closes with chapter 5 drawing some conclusions and issuing recommendations on how digitalisation can be turned into a driver for better public services and jobs for all, while identifying strategic areas for future research that fit such a vision. □



1.

DIGITALIZATION AND PUBLIC SERVICES: A SECTOR-SPECIFIC OVERVIEW

1.1 Context and drivers

Digitalisation is part of a broader modernisation trend in public services. Technological innovation has led to the introduction of digital technologies, tools and processes such as machine learning, artificial intelligence or blockchain technology across all public services with the aim of increasing resources and cost efficiency and making services and interactions between service providers and users more efficient.

Such changes have been strongly supported by national governments on all continents through e-government, e-citizenship or e-health initiatives. Additionally, Internet giants located mainly in the Silicon Valley¹⁷ and China have triggered a new cycle of innovation primarily based on artificial intelligence. This cycle is currently ongoing and might shape the future of public services even more substantially. These changes are linked to relatively new ways of organising and providing public services, often associated with the buzzword ‘smart’: ‘smart administration’, ‘smart cities’, ‘smart metering’, and even ‘smart legislation’. Large tech companies such as Google,

Apple, Microsoft and many others know that digitalisation is a lucrative business across all public service sectors, and thus have channelled large private investments into new technology development. They have entered public services as new players and important drivers of disruptive technologies such as machine learning, artificial intelligence or blockchain technology.

In contrast to previous waves of technological change in public services, digitalisation also includes new forms of services that did not exist in the past. These new services are often related to the gathering and analysis of private data from citizen/users, new channels of communication and interaction with citizen/users (digital platforms) or brokerage of services (e.g. in health and care, transport). They are very much driven by large multinational companies active in IT and telecommunication, medical services, transport, facilities, software and digital application development. For these companies, digital technologies such as cloud computing, big data analytics or machine learning and AI form the basis of new business models applicable to industry and public services alike. The involvement of private companies in public service provision and development goes beyond data control and commercialization. It



correlates with the privatisation of private data as opposed to their classification as a public good and the expansion of the commons.

According to all interviewed union representatives, this latter dimension of digitalisation goes beyond earlier phases of technological change because it blurs the boundaries between public and private services, including their financing and control. Increasingly important ethical questions arise from recent trends in algorithm development and use in new areas such as ‘social rating’, worker-machine interactions, and HR robotics or chat bots, etc.

This section of the report provides an overview of digitalisation trends in major public services. It seeks to describe the new technologies and drivers that are changing public service delivery, as well as the framework conditions and actors that trigger digital change, impacting work and the employment relationship.

1.2 Central government

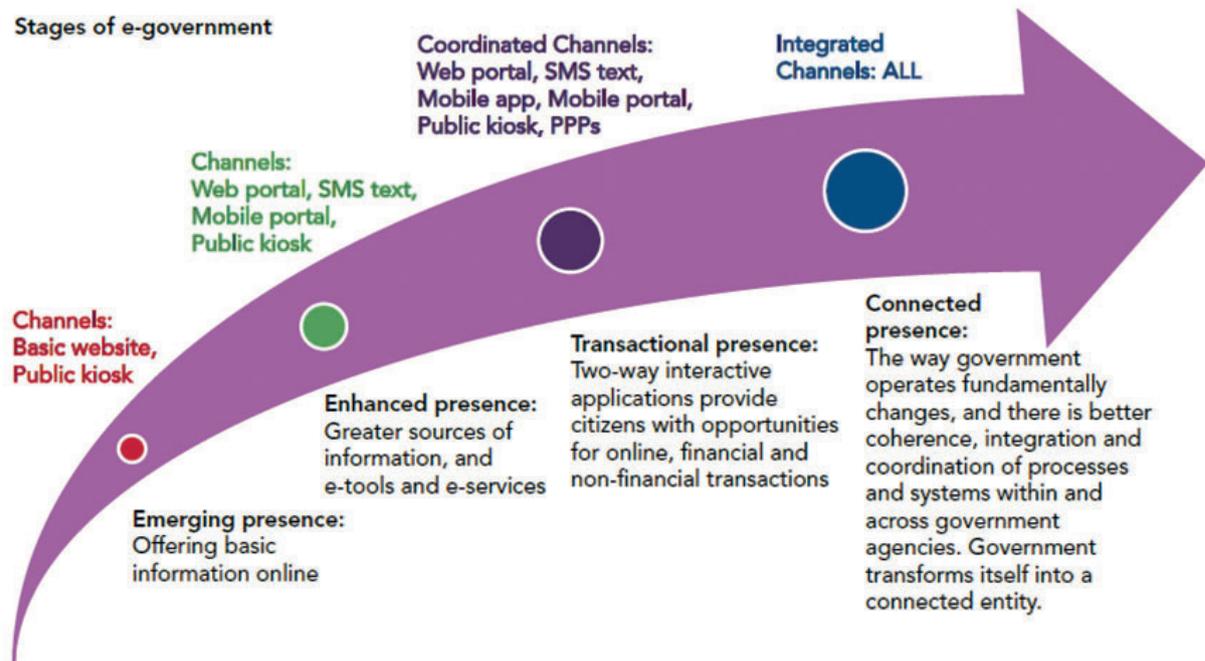
PSI’s 2017 Programme of Action says¹⁸, “Digitalisation of central administration work is taking place under the guise of reducing the administrative burden to business and citizens. These efforts include the delivery of services digitally, through a single contact point or a one-stop shop.”

According to a 2019 OECD report, digitalisation of government was optional in the past, but today becomes increasingly “imperative”.¹⁹ This implies a move from selected e-government projects towards a “whole-of-government” approach that integrates various central government services including administration, ministries, tax authorities and tax collection, court processes and jurisdiction, prison services, border security, police and other emergency services.

This strong pressure to digitalise government processes and services, especially in developing countries, also represents a means to attract foreign direct investment. This approach is promoted by the OECD, which states: “Digital technologies should not only be used to digitise analogue processes and services, but as an opportunity to fundamentally rethink and reorganise government processes, procedures and services as being digital by design, and facilitate the involvement of people’s preferences and user needs as drivers of change. In line with this approach, countries are increasingly adopting a “mobile first” approach to digital government.” (OECD 2019, p. 41)

Since 2001, the UN has regularly published e-government surveys to benchmark the state of e-government worldwide. These surveys have documented that the number of countries adopting e-government systems has increased, not only as regards the development of e-government channels but also in relation to their integration.

Figure 3: UN model of e-governance



Source: UN e-government Survey 2014, p. 113.

According to the 2018 edition of the UN Survey²⁰, Denmark leads the world in providing government services and information to citizens/users through the Internet, followed by Australia and the Republic of Korea. The remaining countries in the top 10 are the United Kingdom, Sweden, Finland, Singapore, New Zealand, France and Japan.

The number of countries providing online services in terms of information and communication with citizens through document exchanges and services by emails, SMS/RSS feed updates, mobile apps and downloadable forms has globally increased. For instance, up to 176 countries now provide digitally archived information online compared to 154 in 2016.

However, despite some developmental gains and major investments in several countries, digital divides persist in a majority of world due to lack of access to IT hardware (computer machines) and software; lack of infrastructure (non-electrified areas, erratic electricity services); and low digital literacy among the

population. Fourteen countries in the low-end of the UN E-Government Development Index (EGDI)²¹ group are African and number among the world's least developed countries. Only 4 countries out of 54 in Africa score higher than the world EGDI average.

Generally, there is a positive correlation between a country's income level and its e-government ranking. This is not universal, however. 22 upper middle-income and 39 lower-middle income countries have EGDI scores below the global EGDI average, while 10 countries in the lower middle-income group have scores above the global EGDI average. The lower income countries, on the other hand, continue to lag behind due to a relatively low level of development in all EGDI Index components.

Singapore – Objective to become a ‘Smart Nation’

The Singaporean Government has had a computerisation plan since the 1980s. In 2014, it announced its goal to become a ‘Smart Nation’, of which Digital Government is an integral aspect. Singapore has been embracing e-government as a whole-of-government approach in its national development strategy. Its small population and land area, accompanied by a very high human capital development and high GDP per capita, allow the government to develop a full suite of online services for its citizens, businesses and visitors. Additionally, the high mobile and smartphone usage rate in Singapore allows the government to provide electronic access to services for citizens through mobile applications. The government’s objectives include platforms for public private sector services, the introduction of a National Digital Identity by 2022, putting most government services on the cloud (by 2023) and piloting the deployment of autonomous vehicles in public transport by 2022. According to the Singaporean public service trade union, AUPE, digitalisation in the Singaporean government reflects not only technological feasibilities but also changes in employment and society: there is a significant shortage of labour in many social services such as the health and care sector and citizens expect faster, efficient and more convenient services.

Source: Interview with a representative of AUPE, the Amalgamated Union of Public Employees in Singapore

In 2018, an estimated 1.1 billion people worldwide—mostly people living in poverty, migrants, refugees, those in rural communities and other disadvantaged groups—had no legal identity²². In view of this, digital identities are offered as a promise to provide these vulnerable groups with legal identities in order to expand financial inclusion and prevent fraud and corruption in the delivery of public services.

However, as the example of the Aadhaar programme in India (see textbox below) shows, digital identity programmes—if uncontrolled and implemented with weak transparency and democratic control—can entail massive problems in terms of data privacy and security.

India: The Aadhaar digital identity programme

As early as 2009 the Indian government introduced the Aadhaar biometric identity programme in order to respond to the wastage of subsidised food and misuse of existing legal identities. As of June 2017, the Aadhaar biometric database had 1.2 billion registered citizens and was the largest biometric database in the world. Enrolment in the programme is outsourced to private providers. It aims to provide the entire population of India with digital identities, and currently covers at least 80% of the population in most Indian States. It serves as the basis for interaction between the government and its citizens at various levels, while granting public service access. Aadhaar captures a biometric profile consisting of an iris scan, fingerprints and a photograph. Data are stored centrally in the Unique Identification Authority of India (UIDAI) and, since 2016, registration is compulsory for access to most welfare and social services²³. Even entering a bar or visiting a restaurant might require identifying oneself by the 12-digit identification number. In the future it is planned to connect Aadhaar with individual health data. In September 2018, after alerts launched by data protection and human rights experts, the High Court of India declared the programme to be compatible with the Indian constitution and national data protection legislation despite significant doubts as to the security of private data.

Sources: Various, see for example the Time article of 28 Sep 2018: <http://time.com/5409604/india-aadhaar-supreme-court/>

This risk of selling off public goods is exemplified by blockchain, a key piece of technology that is increasingly being used in public services in developing countries, including India. Blockchain is originally linked to the invention of the Bitcoin crypto currency and is currently being applied to a wide variety of public services and activities such as tax filing, voting, land and asset registry, healthcare or the management of identity cards as well as financial transactions. It is being massively promoted by private tech companies, including internet companies that manage data for public agencies, which raises the question of data and process control, management and ownership.

According to a 2018 report released by a global private consultancy company²⁴, blockchain has experienced a dramatic boom during the last 3-5 years and will have an impact on our economies and societies comparable to that of the Internet in the 1990s. Public agencies in more than 20 countries—including Canada, the United Kingdom, Brazil, Singapore, South Korea, China and India — are running pilots, tests, and trials examining both the architecture's broad utility as a basis for government service provision and procurement and developing individual blockchain-based applications for internal use.

Denmark is one of the countries where the digitalisation of public services and central government functions (tax collection, judiciary, legislative processes) is among the most advanced in the world. In 2011 Denmark established an Agency for Digitisation in charge of the government's digitisation policies, including the implementation of the public sector Digital Strategy 2016-2020, setting the course for Danish public-sector digitalisation efforts as well as their interaction with businesses and industry. Denmark has also made digital government-citizen interactions mandatory by law²⁵. Each Danish citizen has his/her own electronic ID and letterbox for communication with government agencies (the so-called ebok that was introduced in 2001), and since 2014 public authorities are legally obliged to communicate with citizens through digital means exclusively. According to interviews carried out in the context of this study, 9 out of 10 Danes in 2018 were using the Internet as their principal tool to communicate with public authorities.

According to interviewed Danish and Swedish trade unions, the rapid digitalisation process undergone by public services was facilitated by the high level of trust placed in the government and public administration by citizens and their feeling that digitalisation is beneficial for all. For the **HK Kommunal** trade union, this trust seems quite baffling as there have been massive problems with data security and privacy in Denmark, both as regards the digitalisation of the tax administration and healthcare data security (see chapter 2.3).

Denmark: Towards digitisation-ready legislation and digital court case processing

Since 2018, the Danish government has made it mandatory for all Ministries to assess "whether new legislation is digitisation-ready". According to the government, legal rules in some areas are highly complicated. At the same time, exercising professional discretion is often mandatory in case processing. Thus, complex legislation including several exceptions, vague terms or many procedural requirements would prevent efficient digital public administration. Therefore, the Danish government wishes to simplify legislation and integrate public court case processing and technology. "Unnecessary and complex legislation should be simplified and new legislation should be easily understandable and digital processable. Future legislation must be drafted in a way that is both easily manageable and enables digital administration." According to the Danish Digitisation Agency, "digitisation-ready legislation will underpin an easier everyday life for public employees and an efficient public sector that is capable of serving both citizens and corporations."

Source: <https://en.digst.dk/policy-and-strategy/cutting-red-tape-in-denmark/digitisation-ready-legislation-principles/>

The Danish HK Kommunal trade union that represents workers in Danish municipalities and regions highlighted the following risks related to the approach taken by digitisation-ready legislation:

- Digitisation increases standardisation and one-size fits-all solutions regardless of issue;
- Decisions made by machines²⁶ might alienate citizens and weaken trust in the government;
- Employees are unable to use their skills and become increasingly dependent on machine-based processes and decision making;
- There is the risk that the trust of users and their support for the Danish welfare state is dwindling because of the loss of personal relationships, communication and interaction.



Trade unions across different countries have raised concerns about mandatory digital services and ‘digital first’ approaches in government services, in particular when it comes to communication and interaction between public services and citizens. By promoting a mandatory digital first approach, governments may inadvertently create new digital divides by excluding those who cannot use online services.

Additionally, due to the accelerated development of AI, chatbots are spreading throughout all kinds of private and public services, be it informing foreign visitors about the functioning of a city or government, providing individualised information on travel (e.g. in London²⁷) and cultural events, or documenting complaints regarding public services (as for example in Singapore²⁸).

In the **United Kingdom (UK)**, trade union representatives of **UNITE** and **UNISON** have highlighted survey results showing that around 12% of the population has no access to the Internet and up to 20% of UK citizens do not have the skills or ability to communicate via email, use a search engine or conduct transactions online²⁹.

In a statement delivered in the context of this study, the public service trade union **ver.di** of **Germany** notes that the German governing parties have also included a commitment to ‘digital first’ in their 2018 coalition agreement as well as in the government action programme. According to ver.di, the decision to make use of new digital technologies is too often driven purely by considerations of technological innovation and productivity, while lacking any reflection on the way this may impact both the quality of the services and citizens/users and employees.

In French-speaking **Canada**, the public service trade union **SFPQ** highlighted several cases of technology-driven digitalisation projects that aimed to solve public government and administration problems but did not go according to the initial plan. One prominent example was that of an integrated system for payment and invoicing management (SAGIR). This was to be implemented comprehensively across all public administration sectors within five years. In the end, the system took 12 years to be set up, cost 750% more than its original estimation and, in the

end, did not work as it should. Reports by public auditors and independent experts that were published in 2015 highlighted the problematic role of private IT/software companies as well as private consulting firms involved in SAGIR as regards their assignments, remuneration and the efficiency and quality of work carried out by consultants and IT suppliers. Above that, it was noted that no serious risk assessment was carried out and the new system has created new dependencies between public servants and private consultants (as regards the assessment and approval of the quality of the work)³⁰.

As reported by the **United States (U.S.)** public service employee trade union, **AFT**, some U.S. states have adopted a digital first approach. In Kansas, authorities have completely eliminated any possibility to apply for social benefits elsewhere than online. This is regarded as problematic because there is no longer any human relationship between the social service departments and the citizens. This digitalisation of communication and interaction will increase further in light of the increasing tendency of public authorities to introduce chat bots for communicating with users, as is the case for vehicle registration in Illinois. AFT stressed that digitalisation is also causing major risks and challenges, which need to be urgently addressed, such as new divides as regards the access to digital infrastructure, cybersecurity breaches, or the need for skills development and adequate employee training.

Several interviewed union representatives also raised concerns regarding the strong dependency on private IT providers and business consultancies



experienced by governments when carrying out e-government programmes and the digitalisation of administrative services. The **Canadian SFPQ** union called attention to the fact that large Canadian and multinational companies were playing a key role in developing, delivering and implementing digitalisation solutions for public administrations. The key actors who, according to SFPQ, are dominating the e-government market in Canada are CGI, LGS (part of IBM) and Microsoft.

As illustrated by the aforementioned case of SAGIR in Canada, this dependency is problematic because public administrations often lack IT specialists and suitably qualified and skilled professionals, which further increases their dependency on large private digital tech companies and private IT consultants. The concern is that a government will, for example, deploy AI-based services relying on these private digital tech companies and then remain dependent on them, thereby causing additional privacy and security risks by sharing citizens' data with the private sector.

However, several unions also highlighted some positive effects stemming from the digitalisation of central government functions. For a representative of the National Confederation of Social Security Workers of **Brazil, CNTSS/CUT**, new digital offers and services such as online scheduling, fiscal collection and e-processes in court have brought benefits to public service efficiency as well as to service quality.

1.3 Local and regional government

Although central governments play a leading role in developing and rolling out digitalisation programmes and initiatives, most public services tend to be delivered at municipal, local, or regional government level, particularly in regionalised or federal states, which is also where public administrations interact and communicate most directly with citizens and service users.

The local and regional levels of government are therefore highly relevant and on the frontline of the introduction of new digital processes and technologies in public service provision, as well as in terms of the numbers of workers involved and impacted. In Germany for example, around 85% of all public services are provided by local government, including services in the field of education and care, policy, public space management, waste collection and disposal, road infrastructures, public transport and social housing.

The “Smart City” concept has spread as a catchword to describe a very heterogeneous set of trends, technological and organizational changes occurring at the level of local and regional governments. The overall idea pertains to the use of information and communication technologies to improve public services provided by local governments through a more efficient use of resources (e.g. water, public lighting, waste etc.), resulting in cost and energy savings and reduced environmental footprints; but also to offer additional services in fields such local transport (e.g. traffic management and real time information, on-demand services, information and communication with public authorities (e.g. via apps, websites or chatbots), crime detection, schools, libraries, hospitals, and other services. Thus, smart cities are based on features that are very closely related to the Internet, sensors, digital devices and data gathering and analysis of large amounts of information³¹.

While smart cities can simply encapsulate a select few landmark projects, it can also encompass a wide range of different city services and municipal

departments. For example, **Tokyo's** Smart City plan focuses heavily on sustainability, exploring how technology can reduce food waste and energy usage. On the other hand, cities such as **Barcelona**, also operating under the Smart City policy umbrella, are implementing over a hundred Smart City solutions in education, energy management, environment, healthcare, mobility, social inclusion and urban development. By contrast, Smart City programmes in developing countries in **Asia, Africa** as well as in **Latin American** countries are often used as a tool to attract foreign direct investors for technology or as a door for privatisation projects. An example is **India** where the Smart City programme is closely linked to the government's Industrial Corridor Project, a joint industrial development project between India and Japan launched in 2006. The Delhi-Mumbai Industrial Corridor Project is one of the world's largest infrastructure projects with a 1,500 km long freight corridor, spreading across six Indian states and consisting in, among other things, the development of 24 industrial regions, 8 smart cities, 2 international airports, rapid rail transport and logistical hubs³².

Smart cities are actively promoted by international organisations such as the UN³³ and the World Bank (see textbox below) but also by large global tech and consulting companies³⁴. The promotion of smart cities is driven by the overall promise to make urban government and administration more efficient, foster innovation and promote inclusion. Furthermore, smart cities are based on a vision of "doing more with less" (World Bank).

However, such promises have yet to become reality and the close linkage between Smart City technologies and investments and the business interests of large private companies and consultancies casts significant doubts on whether this will ever be the case. As illustrated by the Smart City policy in India described below, smart cities often pursue strategies and practices that are quite different to those highlighted by the World Bank description above³⁵:

Smart cities according to the World Bank

"Pragmatically, old and new cities alike have begun to incorporate smart technologies into the everyday fabric and complexities of their existing urban centres to drive greater efficiencies in city operations; provide a platform for innovation at a citywide scale; and promote social inclusion through heightened accountability, citizen empowerment, and smarter decision making. (...) "By collecting large amounts of data and then translating these data into insights, cities are able to boost the efficiency and responsiveness of their operations. Data help cities better match the supply of public services with real-time needs and uncover emerging problems before they turn into crises. Smart city technologies make this possible in several ways. Automated optimization translates data from cameras, sensors, and anonymized cell phone records into intelligence to, for example, help optimize traffic flows in real time. Predictive analytics uses such data to track and predict everything from rainfall to crime hot spots to possible landslide areas. Evidence-based decision making and planning can continuously monitor milestones and targets to ensure cities can quickly take corrective actions as needed to achieve their goals."

Source: World Bank: World Development Report 2016, p. 240/41

Most cities in **India** are characterized by strong dichotomies as regards social, spatial and economic conditions. Against this background of urban inequality and inadequate living conditions, the Smart Cities Mission (SCM) was launched by the Government of India in June 2015 with the objective of creating 100 'smart cities' in the country by the 2023. As of June 2018, the Ministry of Housing and Urban Affairs had chosen 99 cities to be developed as 'smart cities', on the basis of the Smart City Proposals submitted to them within the competition framework of the India Smart Cities Challenge. These projects should be funded by both public funds and private investments³⁶.

Smart Cities India: Smart for whom?

The development strategy proposed by the 'Smart City' model is characterized by the creation of enclaves of high investment, high concentrations of information and communications technologies, and 'smart' services, including free Wi-Fi, improved traffic control, intelligent sensors, and better utilities. India's selected smart cities have chosen to implement a retrofit and redevelopment model with a focus on attracting investment to cities. The cost of developing these 'smart enclaves,' while facilitating the expulsion of low-income groups to city peripheries under the guise of 'permanent housing,' will have to be borne by the residents who continue to live in these areas, not all of whom are wealthy.

Taking stock of three years of practice, a recent evaluation report indicates that the Smart City initiative raises strong concerns both about who benefits most from the initiative's added value and regarding the impact it may be having on urban challenges and social and living conditions³⁷. The following problematic aspects were highlighted amongst others:

- * The rationale of selecting only 100 of India's over 4,000 cities and towns and furthermore focusing only on select areas within each city without an inclusionary approach.
- * The initiative favours the development of 'smart enclaves' while facilitating the likely expulsion of low-income groups to city peripheries. Within the cities, factors indicate that user charges for essential services, including the provision of water, have already increased and that the costs of real estate are likely to rise, fuelling the threat of market-led evictions and the gentrification of 'smart' neighbourhoods.
- * There is a lack of integrated city development models and adequate standards for project implementation, including in such fields as housing, water, sanitation, health, and environmental sustainability. Furthermore, the guidelines do not include any human rights-based indicators and monitoring tools that analyse the impact on low-income and other disadvantaged groups such as secluded castes, tribes or other minority groups.
- * While housing for low-income groups has been identified as an area of concern in almost every selected proposal, cities have approached the issue differently, labelling low-income settlements ('slums') as threats or weaknesses. None of the cities have recognized housing as a human right or included standards of adequate housing. In fact, forced evictions and demolitions of homes have been documented in around one third of all smart cities.
- * New and emerging technologies tend to capture personally identifiable information and household-level data about citizens, which gives rise to serious concerns about violations of people's privacy through misuse of big data.
- * The Smart Cities initiative is linked to strengthened investment and an accelerated transition towards the privatisation and corporatisation of Indian cities with significant implications for local governance, service provision and their residents' fundamental rights as regards democratic participation, access to and quality of public services.

One of the Smart Cities initiative's clear objectives is to secure foreign investment in urban projects and development. Various foreign governments and multinational corporations have committed funding. The actual amount of remittances and the conditionalities attached to these investments are not known. There are therefore concerns about the level of control that local governments will have over decisions and outcomes related to Smart City projects.

Source: Based on Housing and Rights Network 2018: India's Smart City Mission. Smart for whom? Cities for whom.

In view of these features and trends, as well as the lack of both local resident and community participation and trade union involvement in Smart City concepts, the president of **India's Nagpur Municipal Corporation Employee Union (NMCEU)** union was very critical of the Smart Cities Initiative. According to him, smart cities reflect the overall trend in local and municipal government towards reducing costs, increasing user fees and subtly privatising services.

According to critics, the experience of smart cities in India illustrates that 'smart' and 'modernisation' labels can be used to allow the implementation of policies that neither improve local government services and provision nor benefit residents, but rather promote business and private investment. The example of India's smart cities and that of **Kenya's** Konza Technopolis and Silicon Savannah projects³⁸ illustrate that some of these initiatives are not primarily oriented towards serving public interest but rather meant to attract private investors. This "for-profit" approach to smart cities and related digitalisation processes can be rightly labelled as 'corporate-led digitalisation' as opposed to 'public-led digitalisation'.

Few Smart City projects aim to improve the social and working conditions, environmental standards, democratic structures, transparency and democratic participation of city dwellers and local communities. Such goals would also imply the retention of technological sovereignty (e.g. open source blockchain technologies); the development of 'ethical digital standards'; and the avoidance of private data commodification and 'surveillance capitalism'.³⁹

One example of progressive local administration that goes in this direction is **Barcelona, Spain** (see text-box beside), which illustrates a case of 'public-led' digitalisation. Rather than being driven by private corporate interests, digitalisation in public services should be oriented towards the public interest and to build the commons as well as improving service quality and access. 'Public-led' digitalisation policies have a potential to expand the commons and geolocalization data as a public good, publicly owned, collected, handled and managed with accountability and in a way that is respectful of the privacy and rights of individuals, be they citizens, service users or workers.

Barcelona: Smart City, technological sovereignty and public goods

Barcelona intends to become the most connected city in the world and is making true on this promise by investing considerably in IoT applications for the city. However, the broader objectives of the Barcelona Smart City approach differ from most other similar practices: since 2015, the left-wing municipal council of Barcelona has been implementing the Smart City concept in a way that uses new technologies and digitalisation for the good of the public rather than in service of private commercial interests. Smart City Barcelona is about remunicipalisation (e.g. of water), participation and citizen involvement, affordable housing, good healthcare, sustainable mobility, green public spaces and reduced CO2 emissions. In contrast to other Smart City concepts, the municipal government is trying to avoid selling off infrastructure management and data handling to large private companies and has developed its own systems and tools, which are characterised by transparency and the democratic control of data⁴⁰. The city's digital transformation process, which started with a decision taken in 2016 by the Barcelona City Council that public services be provided through digital channels, was framed from the outset by guidelines that included the use of open standards and open software as well as an ethical data strategy focused on privacy, transparency and digital rights. According to the city's Ethical Digital Standards, "all municipal digital policies give priority to the protection of citizens' digital rights, reflect their wishes and are based on their participation"⁴¹.

The city is connecting devices and collecting a plethora of data that can then be translated into meaningful insights to guide daily municipal decisions. For example, in order to reduce energy costs in public buildings the council installed Smart LED lamps equipped with motion-sensitive sensors. The initiative allowed them to save 30 percent in energy. The sensors also capture a range of data from noise level to air pollution and humidity levels, which is later used to inform the council's decisions. Ultimately, the city is hoping to cut costs and increase social wellbeing by managing its resources more efficiently and using data to inform investment decisions.

Source: various sources, see also: <https://ajuntament.barcelona.cat/digital/ca>



1.4 Public utilities

In 2010 the UN recognized clean water and sanitation as basic human rights and critical to achieving good health for all. Water and sanitation, energy production, transmission and distribution, and waste collection and treatment are fundamental public services. However, the provision of these services to all citizens still pose huge challenges in terms of access and delivery as, be they privately or publically provided, they are poorly managed and underfunded in many countries.

Most interviewed union representatives emphasized how challenging it was to extend services or (re)build infrastructure and to fund daily operations and maintenance when public resources are limited or restricted by austerity policies. In such situations, national and local government administrations often turn to public-private partnerships or contract services out to private businesses, even if these are not sustainable solutions in the long term⁴².

These trends are not new, but digitalisation is increasingly affecting the way in which public utilities are provided and refurbished. The introduction of digital technologies into the utilities sector is comparatively different from the past. Indeed, it is more comprehensive and far-reaching, being characterised by the integration of the Internet and wireless communication devices into all levels of generation and provision, including smart grids and smart metering for energy and water distribution⁴³.

Technological innovations such as the use of chatbots as interfaces for service users e.g. on the webpage or mobile phone app of the service provider are strongly driven by private digital tech companies such as Google, Apple, Amazon or Samsung.

Chatbots in public utilities: Dubai Electricity & Water Authority

RAMMAS is the Artificial Intelligence chatbot application launched by the Dubai Electricity & Water Authority (DEWA) on 17th, January 2017. It can communicate in English as well as Arabic. This is the first ever government chatbot application launched on the Google AI platform⁴⁴. The chatbot application is available on the DEWA website, IOS, Android, Amazon Alexa, Facebook, and as a physical robot. Since its launch, RAMMAS has processed close to 698,000 requests across various channels. This bot application comes with capabilities to take people's requests (inquire and pay bills) 24/7, process the data and make decisions with greater accuracy. This is one of the best chatbot applications that makes use of AI to the fullest.

Source: <https://www.dewa.gov.ae/en/customer/innovation/smart-initiatives/rammas>

The impact of digitalisation and new technologies on the water sector has been discussed by public sector trade union **ver.di** in **Germany**, which developed a discussion paper on this topic adopted by its federal specialist board for the sector in September



2018⁴⁵. According to the union, the last investment cycle carried out by public authorities in the German water utilities sector at the beginning of the 1990s had already widely introduced various forms of automation, remote-control technology and digital office communication. Since the new investment cycle is currently underway, it is likely that new technologies such as the predictive maintenance of water pumps will soon be introduced, even if cost-benefit calculations might not necessarily support such decisions. According to ver.di, this also seems to be the result of Germany's dominant thinking about digitalisation and technology, exemplified by the motto: "Everything that can be digitalised will be digitalised". The union holds that this approach is dangerous because the water sector is a public interest infrastructure of critical importance. These concerns are exacerbated by the fact that decisions regarding the introduction of specific technologies and digital change processes have often been made by actors outside the realm of the local and municipal government authorities responsible for water services. Decisions about the digitalisation of water services have not only been taken at a level higher than the relevant authority responsible for the service delivery, but also often include input from private companies, which raises questions of data ownership, processing and control (e.g. when gathering the data of private users in relation to predictive maintenance and remote control, or the leasing of water pumps from private providers instead of buying them).

Similar concerns were highlighted by other interviewed unions principally from Europe, such as energy trade union **FNME/CGT** of **France**, which was critical about how smart meters and related services were being introduced without providing users with enough prior information and advice on how private providers would use their personal and consumption data.

One key shortcoming that emerged from the consultation of unions in the water sector is the strong and often exclusive focus given to technology over the human factor and the fact that workers' participation and training needs in these processes are neglected. According to the unions, any investment in new technologies will fail unless it involves adequate staff development plans and training that guarantee that water utility workers are qualified to use the new

technology. In addition, public authorities must be prepared and ensure an analogue/manual backup option for emergency situations: cyberattacks on industrial sites have shown that critical infrastructures such as water and energy require a specific security approach and dedicated procedures involving highly qualified personnel. In the case of a disaster or emergency, such as a terrorist attack or an earthquake, the utility data system must be cut off from the Internet or from its automatic software and be able to operate in a closed, protected loop and with a manual backup option in order to avoid further, more serious damage. In such situations all systems based on the IoT and remote process control would stop functioning and it would fall to highly qualified employees to 'physically' do the job at the local waterworks to ensure service safety and continuity.

Ver.di believes that such challenges require double track procedures in critical digitalised public utilities to ensure human backup in case of digital system failure. If increasingly digitalised and highly automated vital public utilities are to operate safely, workers not only need new digital skills and qualifications, but must also be able to run the system without digital tools to maintain and keep the service running under emergency situations. However, the union is highly concerned that politicians and service providers in the water sector are barely aware of this critical requirement.

Utilities: Who owns big data?

New technologies are increasingly linked to the Internet, the gathering and analysis of data via remote-controlled devices, and other cloud-based services. Such technologies and services are, according to German union **ver.di**, principally provided by private tech companies. As a result, sector-related decision makers are often unaware of the far-ranging impacts of their technology-related choices. For example, the decision not to buy a new water pump and lease pump runtime service from a private provider instead may seem a perfectly logical decision under a purely cost-efficient perspective. However, by making such decisions, public utilities, institutions, and authorities relinquish their control over their own infrastructure.

‘Smart pumps’ also raise a bundle of new questions that, according to ver.di, often remain unaddressed: “Who does this pump notify when it has to be serviced, for example? Is it the (public) control room or the (private) provider/leaser? And who then decides whether the notification must be followed up or disregarded – the manufacturer or the control room colleagues? And what is stored in the algorithm that generates the notification: a sustainability or a wear and tear logic? Who defines this and who knows what is stored? Who owns the data collected by this pump: the manufacturer, the (waste) water operator or the municipality? Who may use these data and under what conditions? What does this mean for the protection of critical infrastructure?”

Source: Interview with a representative of ver.di’s water section and ver.di 2018: Digitalisation in Water Sector.

Digital sovereignty as the control over hardware technology and data is a crucial aspect of the governance of any digitalisation process, especially when it relates to critical infrastructure. The public water, energy and waste sectors are already converging into integrated utility services, be it in terms of renewable energies, virtual power stations or sewage sludge recycling. Consequently, digitalisation will foster the networking of systems, shared installations, software and data across different utilities. For-profit operators could use these loopholes to their advantage by finding a way to become gatekeepers between

public utilities, their departments and their users. Smart water meters and pumps run by third parties could damage public services by forcing responsible public authorities to purchase data that would normally belong to them already and are a requirement to run the utility effectively (e.g. changes in user behaviour, peak hours, breakdown frequency and locations, etc.) at a high price.

The private sector’s tendency to take over parts of critical infrastructure was also stressed by representatives from the **U.S.** public sector trade union, **AFT**, who referred to the infrastructural problems caused by old and rotten pipes in water provision, a sector in which the private sector is already playing an important role that is certainly due to increase with the introduction of new digital technologies. According to **AFT**, this trend is “very scary” because it will result in public services depending more strongly on private, for-profit business and will entail a loss of control over public water infrastructure.

Significant differences in the level of digitalisation in public utilities remain between and within countries and world regions. The **Confederation of Municipal Workers (CTM), in Argentina**, describes large disparities in utility digitalisation across the country as well as in logistics and transportation. In some regions, private companies are dealing with urban waste, while in others public agencies prevail. Furthermore, significant inequality exists in the access to the infrastructure and skills necessary to use modern technologies. Argentina’s administration has invested in the development of cryptocurrencies and blockchain technologies⁴⁶, including for use in public services: The city of Mendoza uses smart meters for electricity services, and passengers can pay for public transportation in bitcoins. However, this high-tech reality coexists with horses still being used for local transport.



1.5 Health and Social Services

Digitalisation within health and social services is very heterogeneous and encompasses a wide array of dimensions, ranging from the introduction of electronic health records to new forms of employment relations that have emerged in both public and private services through internet platforms (tele-health), the use of mobile technologies in, for example, diagnosing and tracking diseases (mHealth), and even the use of collaborative robotics for surgeries or drones for medicine and blood deliveries.

According to trade union comments received in the context of this study, the digitalisation of hospital medical services is primarily characterised by the introduction of surgery robotics, electronic patient files and digitised laboratory services. Hospital care activities such as blood sugar metering have also become increasingly automated⁴⁷.

A representative of the health section of **UNITE (UK)** reported additional aspects of healthcare service digitalisation, such as communication between patients and healthcare providers via apps and websites, automation of history taking and medical diagnosis, or outsourcing medical and health data processing (for further details see chapter 3.1).

New technologies and digital tools have certainly improved various areas of health and care services. For example, in most countries, rural areas do not receive adequate or comparable levels of healthcare service as urban areas. In these cases, digital communication tools and tele-medicine are providing added value and benefiting citizens and patients (see textbox below).

Canada: Establishing a single health platform

The SFPQ trade union from Quebec, Canada reported that one of Quebec's major current digitalisation projects was the introduction of the *Carnet Santé Québec*, an online service that provides citizens with a single health platform comprised of different information and services. It allows citizens and medical staff to consult the drugs received in pharmacies, medical sampling results or medical imaging examination reports, book or cancel appointments with a family doctor, and view their appointment history⁴⁸.

Denmark: Added value of tele-medicine and its impact on health work

The tele-medical ulcer assessment programme operational in all Danish regions and municipalities has changed the way in which nurses communicate with the hospital when seeing ulcer patients in their homes. The nurses communicate with the hospital via a web journal accessible from a cell phone or tablet. They upload photos of the ulcers to the journal. The hospital can then assess the ulcer without seeing the patient. Municipal nurses felt positive about the introduction of this new service and felt that digitalisation would lead to job enrichment and employee satisfaction.

Source: Lethbridge, J.2015: *Digitalisation of local authority services in Europe. A briefing paper commissioned by EPSU/CEMR*

Trade unions have also recognised the positive impacts of digitalisation in countries that have so far been unable to provide adequate healthcare coverage to their population.

According to the trade union representatives of **Burkina Faso's Doctors Trade Union** (Syndicat des Médecins du Burkina, **SYMEB**), the national healthcare system is now able to provide better services considering they are more accessible from everywhere. In Burkina Faso, documents—including medical files—are now accessible through the Internet, and digitalisation has become a general trend to which a specific ministry is being dedicated. Important investments were made and hospitals are now providing a wider range of services compared to the past. Public services are now also better organised and controlled. The interviewee added that digitalisation was also a way to fight corruption and prevent medicine theft, a common occurrence in hospital pharmacy stocks. Nonetheless, the risk of medical data misuse remains present and doctor/patient confidentiality may not be fully guaranteed once medical data go digital. The union reported several such cases, including a situation where a midwife knew of a malformed child and circulated that information via email without consent.

Conversely, digital-first approaches in health and social services can also result in new constraints and worse working conditions for workers when - as occurred in **Nepal** or **India**—rural health workers with a small income have no other option but to go through smartphone apps for recording medical data.

The health sector has emerged as a profitable market for profit-oriented digital tech multinationals. Union representatives from both European and Asian countries reported that telemedicine, surgery robotics, predictive diagnostics, wearable sensors and a host of new health apps were transforming healthcare significantly. Healthcare is also a core sector for machine learning and artificial intelligence testing.

Even in tech-savvy countries, the current wave of digital change and innovation has caused some anxiety. This stems from the obvious fact that large multinational tech companies are driving the proliferation of untested, unregulated digital health tools, their main motivation being the gathering data to explore new, profitable avenues of medicine, health services and business models.

Surgery robotics: not so rosy

The example of surgery robotics shows that new technologies linked to very costly investments do not always result in the promised benefits and added value. The Da Vinci surgical system, commercialised by the US-based company Intuitive Surgical, is one of the best known and most widespread technologies used for urology surgeries such as prostatectomies or hysterectomies. The system enables a human surgeon to watch via a 3D video and control a robot's arms inside the patient's body.

According to information released by the company, more than 2,500 Da Vinci robots are currently active in U.S. hospitals, with over 600 more in Europe, including 85 in Germany. The robots are used in private as well as public hospitals⁴⁹. The company also reported that more than 650,000 surgeries were carried out using the system in 2017. Most prostate surgeries in the US today are carried out by robots and the Da Vinci System is monopolising this market. However, according to various studies⁵⁰, surgeries using the Da Vinci system are not only significantly more expensive and longer lasting, but are also failing to deliver the promised health advantages over conventional practice (e.g. reduced risks, better/quicker healing process, etc.).

When it comes to artificial intelligence in medicine and health diagnostics, links to the business interests of digital corporate giants are more than obvious. In 2015 in the **UK**, consultants working at the *Royal Free* hospital trust in London approached *DeepMind*, a Google-owned AI firm that had no previous experience in healthcare, asking to develop AI software based on the trust's patient data. In 2017 the press revealed that the health records of 1.6 million identifiable patients were transferred without their knowledge to servers contracted by Google to process the data on behalf of *DeepMind*⁵¹.

In July 2018, US medical centres reported that the world's most prominent AI tool, IBM's Watson super-computer, gave unsafe recommendations for treating cancer patients. Many incidents have illustrated that the system, once touted as the future of cancer research, has frequently issued bad advice. In one case it suggested a cancer patient with severe bleeding be given a drug that could cause the bleeding to worsen.

According to the **Korean Health and Medical Workers Union (KMHU)**, digital technologies and the growing dependency on private corporations have drastically changed health and medical care in South Korea, and several aspects related to the Korean medical and health sector's digitalisation appear deeply problematic. For example, hospital management tends to purchase costly high-tech medical systems that are not always necessary. As a result, for these systems to be cost-efficient, they need to run on a 24-hour basis, which may cause patients to take unnecessary tests. This leads to excessive examinations and diagnoses, all paid for by the public health insurance system.

According to KMHU, remote diagnosis systems are not a necessity in Korea, as the country is relatively small and doctors and nurses do not need to travel long distances to visit patients. It is therefore rather likely that small-sized hospitals would disappear, should remote diagnosis and treatment become more widespread and easily permitted. This might have a negative impact on the Korean healthcare system.

The case of South Korea: Digitalisation, robotics and AI in medical and health care

The Korean government's digital and healthcare development strategies are actively promoting disruptive technologies, big data and AI in health and medical care. The current healthcare strategy has a time horizon of 2022 and includes such programmes and initiatives as using AI in innovative and more cost-efficient drug development, establishing a smart clinical trial system, encouraging the convergence of smart technologies in medical devices, reforming the healthcare ecosystem, and developing a pilot system to produce and manage big data in the healthcare sector that should become standard by 2021.

As of 2016, nearly 60 Da Vinci surgical systems were in use in 45 hospitals across the country. The IBM Watson system had already been introduced to Korea in 2016 and five hospitals currently use the system despite its accuracy being controversial.

The following forms of digitalisation in health and medical care were additionally highlighted:

- * Video technologies have dramatically and constantly progressed, from X-ray to CT (computer tomography), PET-GET (positron emission tomography) and MRI (magnetic resonance imaging). The recently invented small-sized and mobile Vscan ultrasound device is also going to replace the conventional stethoscope.
- * Medical records and their management are fully digitised. Today around 90% of Korean hospitals use Electronic Record Systems (ERM).
- * Hospitals have started developing 'smart' patient and hospital management systems, which are based on big data and include guidance for patients via smartphone apps, amongst other things.
- * A hospital has signed a memorandum of understanding with GE Healthcare Korea in order to develop a 'Smart Hospital System' for a new branch hospital. It will contain a 'clinical integrative situation room' designed by GE Healthcare. The system should provide the physician with the patient's biological data in real time in order to reduce the time needed for decision-making and accurate treatment, particularly in emergency situations. The system also promises to reduce medical and personnel costs.

Korea has also developed remote medical diagnosis techniques for both doctors and nurses that reach further than in most other countries in the world. The government, hospital management as well as digital tech companies would also like to develop new ways to treat patients remotely by using tools such as smartphones.

Source: Korean Health and Medical Workers Union (KMHU)



The governance of private data use is seen by KMHU as a critical issue. The planned integration of data gathered by various public institutions (health insurance, national health institute, cancer centres, etc.) into one big, single health and medical data platform has raised concerns that the data might be shared with private medical institutions to make profit.

According to KMHU, the risk that medical and South Korean healthcare public services may be privatised is therefore quite real. Indeed, the ambitious targets of the Korean government's digital healthcare strategy are closely linked to the business interests of the Samsung conglomerate, including branches such as Samsung Life Insurance, Samsung Hospital, Samsung SDS (IT services) as well as Samsung Biologics and Samsung Bioepis. For Samsung, the medical and healthcare sector is an engine of future growth that has gained massive investments. Public policy initiatives and private business interests are also closely linked in areas such as supporting the establishment of private hospitals for medical tourism, fostering big data and remote medical services based on 5G technology and new drug development.

Finally, in the absence of an effective and comprehensive governance system, eHealth can cause serious, possibly life-threatening risks to patients' medical data security and to the ability of health institutions to deliver public services, as the 2017 major cyber-attacks on the UK's NHS demonstrate. The attacks affected 16 British hospitals bringing health care and doctors' surgeries across Britain to a halt, forcing them to turn patients away and cancel appointments after the country's computer systems were crippled⁵².

As regards social services, such as social care and work, homecare or residential care, new digital technologies are increasingly used in order to increase

efficiency and productivity through the automation of more and more processes, administrative work and care and counselling work. This is mainly done by introducing assistant systems or even by completely substituting machines for humans in certain tasks. Key fields of application for such changes are:

- Electronic documentation, i.e. the gathering of patient and client data in e-files that are often linked to the social or care services delivered but may also consist of further data;
- Technical assistant systems such as 'smart' floors in residential care facilities (or at home) that notice if someone falls, or stoves that automatically turn off;
- Technical assistant systems such as GPS detection or video recording are also being applied in the field of social work in order to guide and protect social workers, e.g. in dangerous or difficult work environments;
- Telecare, telecounselling, telemonitoring or teleconsultation that make it possible to organise diagnosis or treatment of patients or clients over long distances, namely in rural areas;
- Care robotics are technical systems that partially or fully support or replace care activities and services. This could be, for example, robots transporting medicine or laundry, robotic suits that help to move patients, robots similar to pets or cuddly toys who are able to react to a patient's moods and emotions and try to influence them positively.

Artificial intelligence is also becoming more widespread in social services. Decisions regarding the need for home visits or the assessment of applications for social assistance, retraining or welfare benefits are increasingly supported or even automatically made by AI applications. A recent report on the use of AI has highlighted the example of the Swedish city of Trelleborg where parts of social benefits management have been automated. New applications are automatically checked and crosschecked with other related databases. A decision is then automatically issued by the system on the basis of these results⁵³.



1.6 Education and culture services

The world of education, learning and teaching is currently experiencing significant change resulting from the application of new technologies, learning and teaching methods, and digitalisation that is increasingly shaped by AI and machine learning. AI in U.S. education is expected to grow by 47.5% between 2018 and 2022 according to a report on the Artificial Intelligence Market in the U.S. Education Sector⁵⁴. Even though most experts believe that teacher presence is irreplaceable, many changes will be made to the parameters of a teacher's job and to educational best practices.

Digital technologies and applications are increasingly used to enhance student learning through interactive programmes, including virtual tutoring that considers the individual learning process. Further examples are individualised learning plans for students that are based on individual strengths and weaknesses and composed by data processing service centres belonging to private companies, or academic study courses individually chosen for each student, reflecting cognitive strengths and professional career assumptions. Digital technologies also play an increasing role in the way companies select job applicants, for example by using gaming programmes that forecast the economic success of candidates.

Digitalisation in education is occurring quickly because large multinational tech companies have discovered public education to be a lucrative business opportunity. As highlighted by the **U.S.** education trade union, **AFT**, “with advances of digital technology, artificial intelligence, e-tablets and robotics becoming the focus of a global edu-business, we stand on the cusp of public education becoming a technology product that parents and their communities are forced to buy from for-profit corporations.”⁵⁵

According to AFT, the digitalisation of education, teaching and learning is currently very much driven by the private business and profit-related interests of vendors such as Cogni, IBM, Microsoft, Google, Apple or Pearson. Too often, investments in digital technologies are bypassing teachers, brick-and-mortar schools and government departments of education.

In **Canada**, according to a survey carried out in 2017 by the trade union federation **CSQ**⁵⁶ amongst 130,000 employees with some 9,000 responses in the education sector, employees consider new digital technologies to be a positive element in classrooms. The survey's main findings show that they promote cooperation and motivation in education for both staff and students. However, the survey also raised concerns regarding unequal access to such technologies and the fact that the border between working and private life is becoming increasingly blurred, which leads to increases in work intensity.

The key findings of the CSQ survey are as follows:

- 97% of all education personnel are in favour of the use of digital tools.
- The use of personal technological equipment to carry out professional tasks is a daily reality, as was confirmed by 74% of all surveyed members.
- Tasks accomplished on one's own time, outside regular work hours (reading emails, making/answering phone calls, other professional tasks related to digital technology), have increased and significantly increased for 76.5% of all respondents.
- Respondents noted an increase or significant increase in various aspects of their work, namely the diversity of their duties (76%), the control over the execution of their tasks (management of time and process, creating material whether educational or administrative or other - 74%) and the number of tasks needed to be carried out within a specific time period (65%).
- Nearly 51% of individuals surveyed considered their skills to be extensive and excellent. However, there seems to be a strong need to provide educational personnel with more and better techno-pedagogical skills. These skills are crucial in supporting both pupils and students with the use of digital tools so as to allow them to improve their skills and produce new knowledge.
- A total of 76.5% of respondents reported that digital tools have improved or significantly improved work sharing and collaboration among education personnel on the one hand and communication, namely with colleagues, parents, pupils and students on the other.
- Close to 70% of respondents stated having noticed an improvement or a significant improvement in both the motivation and learning of pupils and students due to the use of digital technology.



- Among responding members, 77% identified insufficient time to take ownership of and master various digital tools as being the main obstacle to their use.
- Close to 70% of respondents had undergone training on the use of digital tools, but they were short training courses focussing on the basics of digital tools. In fact, over 75% stated having completed only eight hours or less of training in the past twelve months.

Considering these challenges, CSQ regards both training and upskilling education personnel and the regulatory frameworks that should be defined in collective agreements as vitally important in guaranteeing a transition into a form of digitalised education that does not harm working conditions and protects individual workers.

1.7 Security, border and emergency services

New digital technologies such as bodycams, GPS tracking or drones, and increasing use of AI are having a significant impact on services such as police, security and prison work, border control, firefighting and emergency services. Increasingly, workers in these services are getting packed with high tech devices and tools.



Are digital technologies making us safer?

In 2017, the Chicago Police Department created six high-tech police hubs located throughout the city's more crime-ridden neighbourhoods. Dubbed Strategic Decision Support Centres, the hubs are a blend of human expertise and high-end technology, including surveillance cameras, gunshot detection platforms, predictive mapping and data analytics.

Gunshot detection systems represent a different technology trend that has benefited the police. By combining sensors—an array of microphones—with spatial mapping, police have a new way of responding rapidly to violent incidents. With the rise of gun violence and an increase in illegal guns, city police have often been one step behind when a spate of gunshots rings out in a neighbourhood. Gunshot detection technology, the most notable offering from ShotSpotter, offers a faster and more accurate response than to 911 calls, say experts. As of September 2018, 95 cities in the U.S. and South Africa were using ShotSpotter's technology, according to the company.

Sensors that can pinpoint gunfire are just one kind of surveillance the police can now use. Video surveillance has been around for a while but advances in technology have magnified its capabilities. Chicago has built the largest municipal camera integration platform in the country, with more than 35,000 government and private-sector video cameras on tap to watch and record what is happening on the streets. Another technology—license plate readers—uses character recognition to read the numbers and letters on license plates and quickly compare the plate information with hotlists of stolen cars, or drivers whose licenses have been suspended or revoked.

Less comprehensive, but just as leading edge, is the use of chatbots to automate some of the work done by police dispatchers. The San Diego County Sheriff's Department has launched a bot that helps deputies receive information while in their cruiser. Normally, deputies call their dispatchers to check on license plate numbers or run a profile check on a suspect. The department has been working with Microsoft to allow deputies to access the same information via a voice-activated assistant, which can pull the information from back-end databases and "tell" the officers what they need to know in real time.

Less mature, but certainly more transformative, is the growing field of crime analytics, including predictive policing and artificial intelligence. As the amount of data available to law enforcement increases, the need to turn it into information and ultimately intelligence has opened the door to analytics tools, including some AI techniques that can automate certain human tasks. "AI is the next logical evolution in policing," said CPD's Jonathan Lewin. "We have all this data, a lot of sensors, and incoming information from other open sources, including crime tips from citizens. So, plugging all of this into some kind of engine to gain insights and make connections that wouldn't be obvious to a human is the next logical step."

Source: <http://www.govtech.com/public-safety/Drones-AI-Bodycams-Is-Technology-Making-Us-Safer.html>



The **U.S.** example also demonstrates the strong linkage that can be established between public authorities and private companies: the Chicago Police Department (CPD) is working with technology from Microsoft and Genetec, a Canadian firm, and has built a high-end, integrated decision-support system that is giving CPD's support centres the insight needed to reduce crime. New York City has built a similar platform, known as the Domain Awareness System, which turns big data from sensors, cameras, license plate readers and other devices into actionable information for police officers.

An **AFT** representative emphasised that new technologies such as automated alarms or emergency buttons have positive impacts for the security of workers. New technologies such as drones, satellite monitoring and sensors also improve both performance and security in fields such as firefighting, emergency services in natural disasters and other incidents that are often extremely dangerous.

A recent report on AI and automated decision making shows that many European projects and initiatives are

developing in this field. The study demonstrates that EU institutions and member states are actively deploying automated decision making and automation technologies in police, border control and prison services (see textbox below).

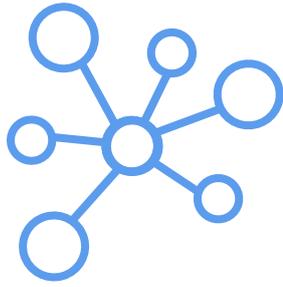
The U.S. and European examples are just a snapshot of the developments occurring in security-related services that are being driven by digital technologies, machine learning and artificial intelligence. New technologies such as drones deployed for border control or policy operations, iris scanners or biometric applications are also being acquired by the police, prison, and court or border control services of several Asian and African countries⁵⁷. **China** has emerged as a new and ambitious actor of the development and provision of high-tech security services, increasingly competing for new markets, for example in Africa⁵⁸.

The fast pace of digital change in police, security and emergency services and the growing dependence on private, for-profit actors already has worrying implications for civic, political, and privacy rights issues that need to be urgently addressed. □

Automated decision making in police, border control, prison and security services in the European Union

- * eu-LISA, the “European Agency for the Operational Management of large-scale IT Systems in the Area of Freedom, Security and Justice”, is now managing the “strengthened” databases and applications VIS, SISII and EURODAC together. This is leading to the creation of a “biometric core data system”.
- * iBorderCtrl is a system tested in Hungary, Greece and Latvia to screen non-EU nationals at EU borders, using automated interviews with a virtual border guard, based on “deception detection technology”.
- * DANTE (“Detecting and analysing terrorist-related online contents and financing activities”) is an experimental project, funded by the European Commission within the Horizon2020 programme, and aimed at using automated decision-making against terrorism. Eighteen EU countries are involved. DANTE is described as a “framework” that supplies “innovative knowledge mining, information fusion, and automated reasoning techniques and services” for the discovery and analysis of terrorist networks.
- * In **Belgium**, a local police department on the Belgian coast started implementing a predictive policing system in 2016. According to the police, the crimes that the system is most effective at predicting are burglaries and vehicle theft.
- * In **France**, automated processing of traffic offences became a massive revenue stream—and the government agency responsible, ANTAI, ignores legal requirements to disclose their algorithms.
- * In **Germany**, the city of Mannheim launched an “intelligent video surveillance” project based on motion pattern recognition. The video system can automatically detect brawls and trigger alarms.
- * In **Italy**, the “e-Security” project is based on the idea that “in any urban environment, crime and deviance concentrate in some areas (streets, squares, etc.), and that past victimization predicts future victimization”. It is supposed to provide complex automated assistance to law enforcement agencies.
- * In the **Netherlands**, some Dutch municipalities use the SyRI “Risk Indication System”. Based on certain risk indicators, the software allegedly detects an “increased risk of irregularities”.
- * A system used by the **Slovenian** Police at borders automatically matches travellers to “other police data” such as criminal files. The Human Rights Ombudsman and the Information Commissioner stated that such a system is not constitutional and filed a formal complaint in 2017.
- * In **Spain**, the VeriPol tool is used to indicate the probability that a complaint made to the police is false by automatically analysing calls using natural language processing and machine learning techniques.
- * RisCanvi is a statistical risk assessment system used in Catalan prisons, similar to LSI-R (**Canada**), Compass (**US**) and OaSys (**UK**). Although actual decisions are still made by professional humans, the AI tool makes predictions on which the decisions are based.

Source: Selection and summaries based on information in: Algorithm Watch 2019: Automating Society - Taking Stock of Automated Decision-Making in the EU.



2.

IMPACT OF DIGITALIZATION ON PUBLIC SERVICES QUALITY, EFFICIENCY AND ACCESS

2.1 Disentangling myth, ideology and reality

The general conclusion emerging from the consultation carried out with public service trade unions involved in this study would seem to be that new technologies, automation and digitalisation, “if implemented in a way that strengthens the ethos of delivering public services for the common good, could have the potential to promote more citizen and worker participation in the design and delivery of public services.”⁵⁹ They are tools that can reduce the strain and repetitiveness of work and have a positive impact on working conditions, work autonomy and occupational health and safety. If used in an appropriate way and within an appropriate framework they can also enhance public service quality and efficiency. These benefits were mentioned by the **U.S.** union **AFT** in the case of health care and medical advice and support made available in remote areas such as Alaska, or road and railway track security controlled by drones in sparsely populated areas.

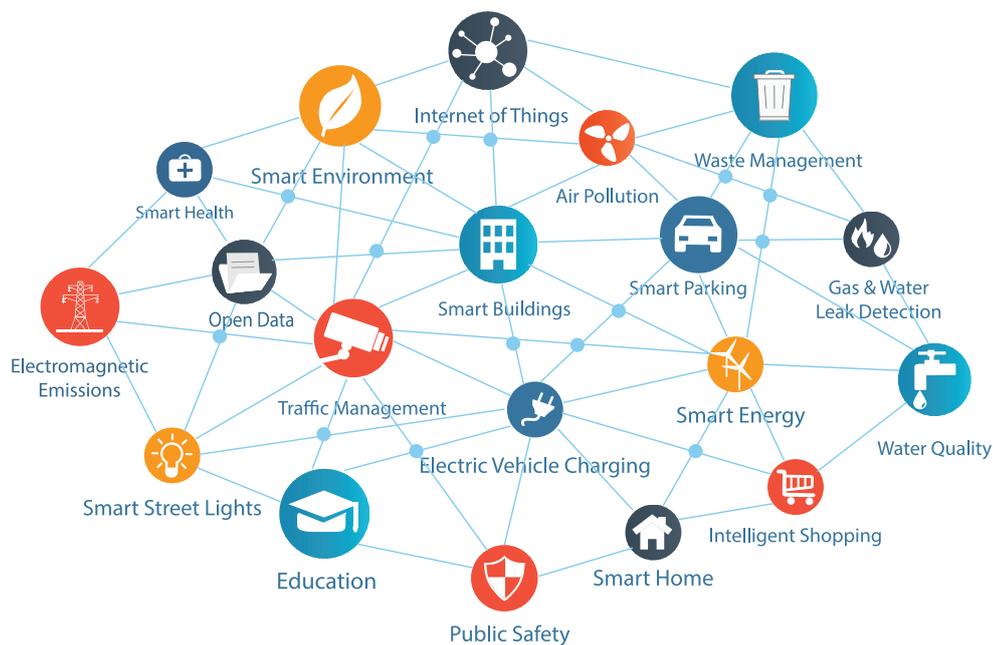
However, interviewees also pointed out that these improvements were far from automatic. They depend

on the presence of specific objectives for the use and introduction of technologies, specific regulators and social framework conditions, and adequate governance frameworks that oversee their impacts and developments. Nordic unions particularly highlighted the need to clearly define the objectives of any digital change project: is it cost reduction or improvements to the quality of public services to serve the public interest?

Some union representative expressed serious concern that digitalisation and automation might be used “as a cover to erode the public-service ethos and orientate the public sector towards a model of providing services that more closely resembles the private sector.” This is the main message currently pushed by international business consultancies, advising governments and public institutions.

A brochure by a private business consultancy firm in **South Africa** reads:

SMART CITY



“Automation in the public sector is expected to be the new normal owing to its huge potential to improve service delivery, revenue realization and cost savings. South Africa, although progressing well on this front, still has a long way to go. There is evidence from industries such as banking, finance and insurance, transportation and healthcare that have started adopting automation for better results. Automation is also growing in the public sector as governments are focused on efficient and improved service delivery.⁶⁰”

Similar promotional messages are echoed by powerful liberal think tanks and lobby institutions. The Brookings Institute frequently highlights the crucial role of digitalisation and new digital technologies for the achievement of development goals in Global South. Digitalisation is portrayed as the magic wand for economic and financial development as well as “leapfrogging”⁶¹ social and educational development⁶².

However, the introduction of digitalisation and new technologies in public services in Africa and other regions continues to rise critical questions: What are the motivations behind technology export and digitalisation programmes? How are technologies used, who is excluded from their use and why? Bearing in mind that technologies are not neutral but have certain values inscribed in them, how are digital technologies designed, and what impact does this have on individual opportunities for action as well as societal futures? Does the export of technologies by tech companies and development aid agencies and programmes that promote digitalisation of government and public services creates new dependencies?

The following chapter gathers evidence and examples on some of these questions and the impact of digitalisation on public service quality, efficiency and access, as well as related issues such as data privacy and security.

2.2 Impact on public service access and on the relationship between public services, citizens and users

Access and the interaction between citizens and public service providers are increasingly channelled via the Internet and digital devices. This transformation is being further accelerated by national ‘digital first’ agendas or ‘digital only’ principles in public administrations and governance.

Digital media are in some cases becoming the only channel of communication between users, public administrations, and services, which raises questions about equal access for all to public services. Older people, people with disabilities and people in low income groups are most likely to experience problems in accessing the Internet due to lack of access to hardware, unreliable or inaccessible power access and/or lack of digital skills.

In the **UK**, an estimated nine million citizens are digitally excluded from digitalised services.¹⁴ The **AFT** union also reported that the **U.S.** are characterised by a significant digital divide that has failed to improve over the last decade. Even in New York, around 30% of the population has no access to broadband communication infrastructure.

There is another important aspect to the accessibility issue: union representatives emphasised the risk of widening the gap between countries and regions with good, digital infrastructures and those that do not. Such gaps often coincide with affluent versus disadvantaged regions and/or urban versus rural areas.

Public service unions have also accumulated evidence that digitalised public services should not replace the personal relationship between public services and their users. While some simple, repetitive administrative processes can be digitalised, it would be highly problematic to apply the same logic to complex processes based on the judgements and/or decisions made by public service workers, like mediating social benefits applications, family support services, taking medical decisions or issue judicial rulings, just to mention a few. Here citizens continue to expect and need direct and personalised communication and human decision making⁶³.

In this context, it was also emphasized by trade union interviewees that public authorities need to be aware of the risks presented by leaving certain user groups behind, whether they be the elderly, those with no knowledge or experience of the Internet and electronic services, or migrants with little or no competence in the national language.

In **Germany**, the eGovernment Monitor 2018 shows that there is a clear link between acceptance of

digitalised services and educational attainment (and possibly income levels): citizens with a higher educational background tend to be far more in favour of digitalised services than those from with lower qualifications.

Commenting on the fact that **Denmark** has already implemented an obligatory ‘digital only’ principle for many public services, a representative of the **HK Kommunal** trade union noted that 90% of Danish citizens would still prefer direct and personal contact and communication with public administrations and services. Furthermore, only 20% of Danes think that public services should be as cheap as possible⁶⁴. Therefore, for Danish citizens quality matters more than cost-effectiveness.

Interviews with trade union representatives largely indicated that the impact of digitalised public services on service quality, efficiency as well as citizens’ trust in public service integrity is mixed. While in regions with poor access to digital services, interviewees noted that digitalisation can contribute to enhance trust in public services (for instance by increasing objectivity in decision-making and reducing corruption), others from countries with relatively well-developed social protection systems stressed the opposite—citizens’ trust in public services might erode if decisions taken by public administrations were based on automated processes or made by machines.

Furthermore, increasingly digitalised work processes and organisation can have a strong negative effect on workers’ motivation: in **Sweden**, the Union of Professionals (**Akademikerförbundet SSR**) reported that there was evidence of social workers leaving their jobs because they felt that decisions about social care were being completely automated, leaving no place for the exercise of professional judgement. The **HK union** in **Denmark** mentioned how digitalisation limits the roles of case workers and reduces face-to-face contact, both of which can be extremely important when dealing with sensitive issues such as child welfare, when decisions have to be made concerning the appropriate measures to ensure the child’s safety and well-being⁶⁵.

The issue of public service access and the importance of having adequate numbers of direct points

of contact between public service providers and citizens/users that do not rely on digital tools but provide access to workers in flesh and bones is as even more relevant in other world regions. According to a representative of the **National Confederation of Social Security Workers in Brazil, CNTSS/CUT**, while new digital offers and services have brought benefits to public service efficiency and quality (see section 1.2 above), substantial parts of the country where Internet infrastructure is poor or lacking and people lack the digital/IT skills and related tools there is no real access to such services. This digitalized public service access gap has been strongly highlighted by union representatives from Argentina, India as well as from Burkina Faso.

Digitalisation can therefore not be regarded as a panacea for the problems related to public service provision. In 2019, the President of **Uganda**, Yoweri Museveni argued that before investing into digital technologies and AI African countries must address the urgent lack of vital infrastructures and public services such as roads, railways, electricity or water and education. *“People who are enthusiastic about artificial intelligence are those who already have infrastructure and human resources developed”*, he said⁶⁶.

2.3 Impact on privacy and security issues

From our global review it emerges that the risks linked to the privatisation of personal data gathered by government functions and digitalised public services are considerable⁶⁷: even if governments collect data in line with existing data protection legislation, there is a risk that personal data will be shared with private companies as legal frameworks have not yet effectively been updated or developed to keep up with the new risks brought about by the meddling of digital technologies in people’s private lives. The ‘digital first’ approach jointly with the outsourcing of digital system development, and the privatisation of some government functions pose a threat to the

protection of personal data of citizens/public service users and workers alike.

Unions mentioned the ‘*once-only principle*⁶⁷’ as a major concern for personal data security.

The health sector has been at the centre of many scandals and incidents regarding patients’ data security and privacy. **Denmark** was traditionally regarded as a leader in terms of responsible patients’ data use and processing as regards confidentiality of personal data and overall data security. However, in 2014, authorities shut down the Danish General Practices Database (DAMD) due to security concerns: the media reported that the system was going as far as to collecting and storing illegally patient information about sexually transmitted diseases, panic attacks and other personal issues⁶⁸.

The **Norwegian Union of Municipal and General Employees, Fagforbundet** mentioned the case of the decision to outsource patients’ data processing and ICT systems of the Norwegian South-Eastern Regional Health Authority to external private providers to cut costs. Workers and their union repeatedly warned the health authority, yet the project went ahead. As a result, privately contracted workers in Asia and Eastern Europe were wrongfully granted access to sensitive information of almost 3 million Norwegians whose confidentiality rights were compromised, and the outsourcing agreement had to be, which was consequently cancelled at a high cost for the health authority⁷⁰.

Despite many similar scandals worldwide, the commodification of personal data through the outsourcing of public service functions continues to occur on a systematic and global scale because it serves the interests of the private businesses engaging in digitalisation projects and remains quite unchallenged by national and international legislation. A 2017 UK scientific paper openly criticised the deal between Google and the Royal Free Hospital in London, which allowed the use of 1.6 million patients’ NHS data to

create an app that would alert clinicians in case of acute kidney injury. The paper argues that the collaboration “*has suffered from a lack of clarity and openness, with issues of privacy and power.*”⁷¹”

This points to the fact that besides the issues of and citizens/patients/users’ privacy and data protection, there is a more substantial underlying issue about power, influence and conflict between the public service general interest and the private corporate interests.

2.4 Impact on efficiency and quality

Union interviewees across all world regions noted that the use of new technologies such had neither a positive nor a negative impact on the public service efficiency and quality and rather referred the important role of introducing them under good framework conditions, careful, participative planning and tight monitoring of implementation and impact.

The medical staff and doctors trade union **SYMEB** in **Burkina Faso** highlighted the positive impacts of digitalisation on medical services and on public services in general, noting that they became better organised, controlled and more accessible to all. According to the union representative, digitalisation could be used to fight and prevent corruption and crime— such as the theft of medical supplies and medicines from hospitals. However, it also posed risks regarding the misuse of private medical data and information.

Interviewees mentioned based on experiences that when digitalisation projects that are primarily driven by cost-reduction objectives, as they will likely fail or cause unexpected negative effects such as frustration amongst public service workers, reduced user trust in public services, etc. Union representatives also stressed that public service digitalisation

Digitalisation and centralisation of the tax collection system in Denmark

Officially, the goal of this reform was to create an open, holistic administration with citizens and businesses at its centre and enhance legal certainty and uniformity. However, unofficially, and maybe more importantly, it aimed to achieve (massive) savings thanks to synergies, economies of scale, reduced duplication, regulatory simplification and the modernization of IT systems.

The reform's key measures included the establishment of a single authority (SKAT) that would serve as the main point of contact for both citizens and businesses and lead to the drastic reduction of local offices. The reform involved extensive digitalisation measures, such as the reduction of telephone contact centres and concentration on digital information channels.

On the positive side, trade union experts highlighted that the digitalisation process as such, i.e. as regards its technological dimension, was quite successful. Today, the system overseeing the taxation of employees in Denmark is one of the most automated and digitalised in the world. Tax is automatically deducted before payment of salary by the employer and reported digitally to the tax administration. The high degree of digitalisation, automation, digital communication and effective digital reporting systems have made things easier for most employees and for employers. Furthermore, the system is quite reliable and very difficult to hack.

However, it also has its problems, most of which are related to the massive reduction in staff as well as local contact points. Due to this, tax authorities have noticed that the volume of unpaid taxes has increased quite significantly, tax compliance amongst businesses has fallen, several important cases of tax fraud have occurred and, generally, the public's trust in the Danish tax administration has weakened. Consequently, independent auditors, business consultancies and academic researchers have demanded more personnel resources in order to rebuild trust and efficiency.

According to the HK trade union, a certain number of lessons can be drawn from the SKAT case and may well be relevant for digitalisation projects in other public services:

- * Digitalisation, standardisation and centralization were closely linked and driven by the motivation to achieve significant cost reductions.
- * In the SKAT case, savings were made in advance and employees were made redundant before the IT systems fully came into play. Even when massive IT problems occurred after the system's implementation, decision makers and the treasury continued to reduce personnel.
- * The project was designed and implemented without any serious employee involvement in spite of union requests.
- * All in all, the digitalisation project was based on excessive and unrealistic technological optimism.

Source: Interview with HK Kommunal⁷².

initiatives that were only designed at central level and implemented in a top-down fashion without worker involvement and participation on the ground also tended to fail because they did not consider the concrete realities and conditions of public service delivery.

Another example is that of the failed introduction of a new IT system to the NHS in the **UK**⁷³. Launched in 2002, and involving private IT and consulting companies such as Accenture, CSC, Fujitsu and British Telecom, the project aimed to set up the NHS Care Records Service in such a way that health professionals could access relevant parts of patient records as well as X-rays, prescriptions and electronic booking. Deemed the world's largest civil IT programme with an initial budget of £6.2 billion, it became also a disaster case. By 2006, several milestones had not been met and the cost of the project had nearly doubled. In 2008, the UK Public Accounts Committee found that the new system did not include any clinical functions, meaning that the needs of the clinical staff had not been met. In fact, there was a wide lack of commitment on the part of NHS staff because the project was introduced in a centralised and strictly top-down decision-making process without enough participation of workers and user engagement. In October 2011, the Department of Health abandoned the project, causing losses of several billion.

Therefore, it appears necessary to combine top-down and bottom-up processes and ensure meaningful public service worker and user participations in the conception, development and implementation of digitalisation programmes.

2.5 Impact on public finances

Digitalisation has a strong impact on public finances and public service budgets. The introduction of new technologies, the digitalisation of public service functions represents a significant investment in infrastructure and tech consultants. To be successful, it also requires increased spending in workers' training, upskilling and new qualifications.

Direct and indirect impacts of digitalisation on public finances often entail direct consequences on service quality and working conditions. Investments in digitalisation projects often focus entirely on the technology. However, it is just as necessary to invest in skills development and training programs for workers whose jobs will be digitalised and for those who will have to work with such digital technologies. According to many interviewees, this aspect is largely neglected or just put aside when in digitalisation investment budgets.

When digitalisation projects are financed with of private investment and PPPs, cost calculations often are unrealistic due to regular underestimation of indirect and recurring costs⁷⁴.

Digitalisation and automation are often linked to staff reduction. While this may result in reduced labour costs, it is a bad calculation overall. The digitalisation of some public service functions often results into higher workload that causes pressure and strain amongst remaining employees, leading to stress, burnouts, increased sick leave, adjoining costs, and poor staff retention among others, which in turn can negatively impact the service quality and effectiveness.

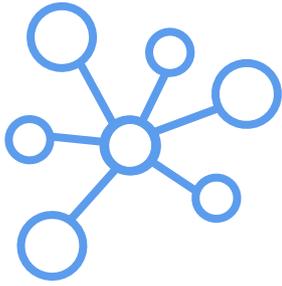
Previous sections of this report have already described several examples in which digitalisation projects had negative impacts on public finances. The **SFPQ** in French-speaking **Canada** also referred to the public authorities' very poor record in terms of developing, calculating and implementing budget-wise IT and digitalisation projects. Budgets are regularly overdrawn, calculations fail to consider indirect costs and cost anticipation mistakes have significant negative impacts on the public budget. Furthermore, Quebec's public sector's dependency on private IT and digital tech companies has increased and entailed a failure to develop in-house expertise and knowledge. Many reports by Quebec's Auditor General proved, time and time again since the beginning of the 2000's, that government is paying 50% more for an equal IT staff in the private sector than for its own equivalent staff⁷⁵, that the billing is over the contracted price per hour, and that the ratio of internal versus external staff is way over the ratio observed in other public administration⁷⁶.

Many other trade unions shared this experience. **Younion of Austria** represents around 150,000 public service employees in a large variety of services in town councils and local government. In an official position paper by the union's national board it is said: "digitalisation must not become synonymous with outsourcing, privatisation and public-private partnerships (PPPs), which threaten the functioning of our public services. There is no evidence that digitalisation or automation of public services leads to more cost-effective public services or to a reduction in the administrative burden per se. If new information and communication technologies (ICT) are introduced without adequate financial or human resources, it will result not only in poorer services, but also higher costs in the long run.⁷⁷"

This last assessment proved to be highly relevant in conjunction to the data protection and cyber-security issues that some forms of public service digitalisation raises. In the case of the 2017 cyber-attack on the NHS (see section 2.3), NHS managers as well as the **UNISON** trade union claimed that underfunding had prevented the health authority from spending enough money on the protection of their IT systems⁷⁸.

A **Younion** representative also underlined that digitalisation tends to go hand in hand with the rise of new low-cost forms of employment, which are rarely based on employment contracts subject to income tax and social security contributions, but rely instead on self-employment, freelancing or other highly vulnerable forms of employment. Digitalisation is also having an impact on workers' training and skills, with top-down digitalisation and automation not only resulting in the loss of low-skilled jobs, but also in a reduction of medium and even high-qualified employment. This in turn negatively impacts income tax and social security contribution revenues, undermining public finance and pensions.

This is compounded by large multinational tech companies' tax avoidance practices and the emergence of the 'sharing economy'. Jointly these trends are negatively affecting public finances. 



3.

IMPACT OF DIGITALIZATION ON PUBLIC SERVICE EMPLOYMENT AND WORKING CONDITIONS

3.1 Impacts on employment

The impact that digitalisation is having on employment and the labour market can be broadly described as fourfold⁷⁹:

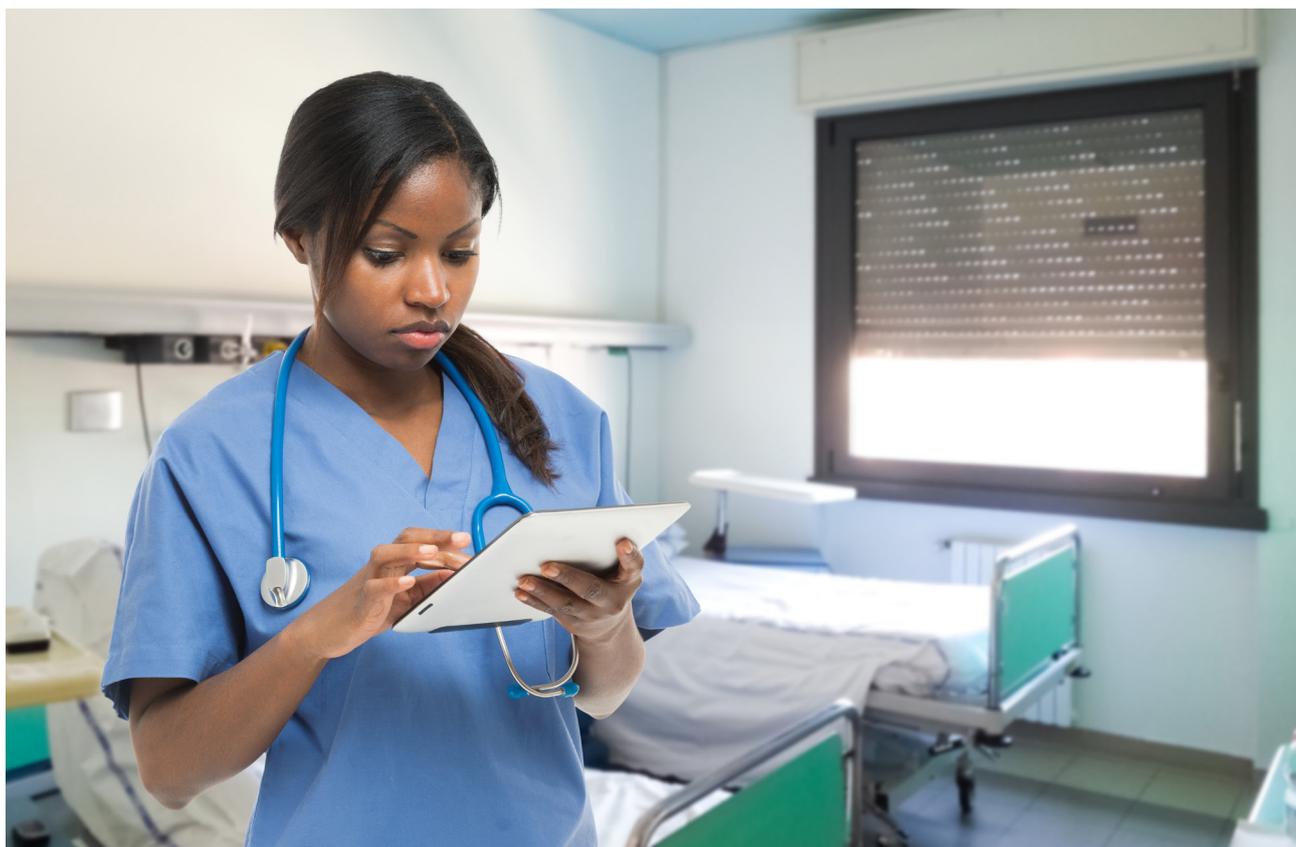
- **Employment creation:** in new sectors or related to new products and new services linked to new technologies. Big data analysts, app designers or cybersecurity specialists, etc.
- **Employment destruction:** due to the automation or robotisation of certain tasks and jobs especially in administrative work such as invoice handling and processing, etc.
- **Change in employment content and relations with citizens/users:** digitalisation of human/intelligent machine interfaces, and new forms of management. In general, employment content is becoming more demanding in terms of skills requirements, while employment relations become more blurred (for example by combining mobile work, homework and office work; more flexible working hours or increasingly project-based work).

- **Shift in employment systems and relation between employee and employer:** as a result of the increase in digitally mediated service works and platform work.

Both the literature review and the interviews indicate that the core of digitalisation-related employment creation will be concentrated in IT and tech professions in the private sector, not in public services. Existing evidence as well as (radical) future scenarios (see textbox below) indicate significant job and employment change as well as job destruction.

Although existing quantitative estimations should be interpreted with extreme caution, a large body of research predicts significant job losses. UK's national studies estimate that 25% to 40% of jobs could be lost to automation and digitalisation in the overall economy. A study carried out by the right-of-centre liberal think tank 'Reform' estimates that 250,000 jobs might be lost across different public service branches by 2030⁸⁰.

The threat of job destruction is stressed by various trade unions:



- The **UNSA** civil service union in **France** estimated that between 3% and 8% of staff (40,000 to 110,000 workers) will be affected in the near future, particularly in administrative and technical jobs.
- The **British** multi-sector union **UNITE** believed that over 230,000 of its 1.4 million members could lose their jobs to automation by 2035, with many workers in health services and local government being at risk.
- The **FNV** trade union in the **Netherlands** reported that 1,500 mostly lower-skilled jobs out of a total 15,000 were cut as a result of the digitalisation of legal services.

Interviewees from the UK, France or the U.S. reported that digitalisation programmes in public services often went hand in hand with austerity, budget cuts and workforce reductions. In **France** in 2018, the Macron government announced a plan to cut 120,000 civil service jobs by 2022⁸¹. Meanwhile, in the **UK**, deep and sustained austerity measures have seen hundreds of thousands of jobs cut in central and especially local government.

However, interviewed union representatives admitted that it was hard to identify individual tasks or whole jobs that would be lost to digitalisation. The extent to which this task reduction might cause job cuts is also unclear, since new, different tasks related to the use of digital technologies could be added instead.

In relation to the social care sector in the **UK**, **UNITE** noted that, although robots have not yet replaced human work in social care because of cost calculations, workers have become very cheap to employ. With automation and digitalisation, some social care workers are increasingly working via apps (e.g. clocking in when they arrive at houses), which contributes to making them even cheaper through zero-hour contracts or the failure of employers to pay care workers for travel time or for sleeping in.

A 2019 report was commissioned by the NHS to analyse the impact of automation on the delivery of health and social care in the **UK**⁸². The report predicts significant amounts of productivity and time gains: yet **UNITE** highlights the risk that the automation of repetitive and administrative tasks will not lead to freeing up workers to spend more time on direct care to patients and other value added activities, but would rather result in staff reductions⁸³.

It seems that growing employment insecurity due to new digital technologies and processes are associated with persistent labour shortage issues, particularly in the sector of healthcare and social services. This is illustrated by the following example.

The ambivalence of digitalisation in hospital care

At an event on the impact of digitalisation on public services in **Germany** organised by **ver.di**, a representative of the statutory employee representation body ('works council') of the large private hospital group Rhön Kliniken painted an ambivalent picture of digitalisation. The employees had certain reservations about digital change in healthcare and emphasised that "human care, the warm hand, is irreplaceable." Despite all the opportunities offered by digitalisation, technology should not replace nursing jobs. Therefore, it would be important to jointly define the limits of technification and test the acceptance of robot-assisted care in pilot projects. However, the main problem in hospitals, and in the health sector, is the lack of personnel. To resolve this situation, it is necessary to create good working conditions, "which go far beyond mechanisation".

Source: Based on documentation of the **ver.di** Digitalisation Congress 2018. Available at: <https://www.verdi.de/themen/digitalisierungskongresse/kongress-2018>

As cutting staff due to an over-optimistic reliance on digital systems might become dangerous in cases of IT problems and shutdowns, the digitalisation of public services should not involve the reduction of staff that is needed to allow services to function under all circumstances. The importance of maintaining staff and ensuring that the public service workforce has both digital and 'analogue'/manual skills and competences was similarly stressed by a **ver.di** representative.

A further important issue linked to digitalisation is the rise in digitally intermediated service work that is not based on a contract with an employer but formally carried out as self-employment in a vacuum of workers' rights and social protection. Often referred to as platform work and 'Uberisation'⁸⁴, these forms of work tend to be associated with precarious self-employment and to a new dimension of exploitation and 'Taylorism', that can go as far as the determination of workload and pay by algorithms; the absence of any minimum wage; or the need for workers to invest in their own work devices (e.g. smartphones, apps).

3.2 Impact on working conditions: The overall picture

Almost all union interviewees highlighted the fact that certain digital technologies or devices (drones, robots, sensors, GPS, etc.) have the potential to support workers in hazardous, dangerous, strenuous or tedious working conditions.

A representative of the local and municipal workers trade union, **HK Kommunal**, pointed out that, in the municipality he is working with, automation and 'robotisation' have successfully reduced monotonous tasks and jobs, such as paying invoices or handling simple cases. This representative, who is also the main *employee process automation officer*, said that working time had been reduced by around 30% as a result of delegating simple tasks to eight machines/robots. According to him, this is allowing employees to spend more time on more complicated cases and develop into new roles and functions.

According to **HK Kommunal**, the creation of the function of "employee process automation officer" and the direct involvement of this officer in the project group implementing automation projects in the municipality was a crucial factor in taking workers interests into account, reducing concerns amongst employees about the future of their jobs and creating trust and confidence in the process.

This example indicates that public service employees appreciate the positive impacts of digitalisation on working conditions and working environments. As shown by large surveys carried out amongst public service workers in **Norway** or **Germany** (see textboxes beside), an overwhelming majority of trade union members in these countries have a positive outlook on digitalisation and new technologies: as many as 90% believe that new technologies will help them deliver better public services.

However, the results of these same surveys are rather worrying regarding the concrete implementation of digitalisation projects and their impact on working conditions. According to surveys carried out by trade unions in Norway as well as Germany amongst public services unions and workers, the implementation of digital change projects is quite poorly managed by the responsible authorities, with insufficient attention paid to working conditions or active employee and representative involvement.

Norway: Public service trade union experience of digitalisation⁸⁵

In 2017, the Norwegian Municipal and General Employees trade union federation **Fagforbundet** carried out a survey among its members. The survey, which was part of a report from the think tank Agenda "The robots are coming - what is the public sector's response?" was sent out to 170,000 members of Fagforbundet. It received more than 30,000 answers from members across different occupational groups.

The survey showed that employees were positive about new technology and wanted to use it: almost 90 percent of Fagforbundet members believed that new technology would help them deliver better public services. The survey also showed that 80 percent of the respondents were willing to acquire new skills to enable them to carry out their work in new ways encompassing digital technologies. However, only 35 percent answered that their workplaces had adequate training systems. Only 38 percent answered they had received sufficient information prior to the introduction of digital technologies at their workplaces.

The survey busted the myth that municipal employees are sceptical about new technology and showed the importance of enabling workers to take an active role in workplace digitalisation processes.

When employees are interested in new technology and wish to have access to and learn how to use new digital tools at work, it sends an important signal to the employers. They should ask their employees which areas they believe could be digitalized first – and how.

Source: Summary of the survey results by Fagforbundet in the context of this survey

Whereas the **Fagforbundet** survey data suggests that more should be done to inform employees about digital change projects at an early stage and to provide adequate upskilling and further training measures, the German survey results regarding the key impacts of digitalisation and new technologies on working conditions are quite worrying. Indeed, a majority of workers (working across all public services) reported increases in their workloads due to digitalisation; almost 60% reported that digitalisation had increased stress and pressure linked to working time; and almost 50% reported that digitalisation had caused surveillance and control of their work to increase.

Germany: Survey evidence on the impact of digitalisation on working conditions in public services

Based on responses from 6,600 public service employees, a survey commissioned by the public service trade union ver.di provides comprehensive evidence on the impact of digitalisation on working conditions in public services. Quite surprisingly, survey results show that digitalisation in Germany is impacting working conditions in public services more than in the private economy as a whole: 88% of public service employees claim to be affected by digitalisation, 69% of them to a large extent. Generally, the effects of digitalisation are felt more strongly by employees who carry out highly complex and managerial tasks. As regards specific services, the effects of digitalisation in public administration are more pronounced than in sectors such as education or health and social work, likely indicating that digitisation processes in administration are more advanced already.

As regards working conditions, however, the survey yielded worrying results: nearly half of all respondents reported an increase in work intensity due to digitalisation while only 8% reported a decrease. This increase is mostly linked to the volume of work that employees must deliver: 56% reported an increase in their total volume of work while only 4% felt that this volume has decreased. As a result, digitalisation has also caused stress and time pressure to increase by 59%. Furthermore, according to 47% of public sector employees, surveillance and control of their work has increased due to digitalisation—only 3% report the opposite.

The number of employees reporting positive effects is much lower. Only one in four workers reported positive effects on decision-making and only 20% of public service employees reported that digitalisation had had a positive effect on the compatibility between their family life and their career.

Source: DGB Bezirk NRW: Digitalisierung im öffentlichen Dienst – Auswirkungen aus Sicht der Beschäftigten. Sonderauswertung des DGB-Index Gute Arbeit, Düsseldorf, October 2018. Available at: <https://nrw.dgb.de/archiv/++co++5fb3a472-cd37-11e8-a27c-52540088cada>

Certain other potential negative impacts are more complex and therefore more difficult to address through specific action and regulation, as was illustrated by research into the introduction of new IT systems in Swedish municipalities. The study looked at the way both managers and workers perceived the process and found significant differences in their perspectives. While managers viewed ICT as a neutral activity and talked about the move from administrative to service work, including switching from telephone to computer work in a positive way, workers perceived the changes in work as a loss of the personal contact that had been maintained via phone.

The increased importance of computer work made the workers feel undervalued and unable to use their professional skills. Furthermore, ICT creates a greater volume of more monotonous work. This study showed that when work was changed by ICT/ digitalisation, the new systems were designed in such a way that invisible/ social skills and the knowledge built up by workers were rendered useless. Resistance to these new systems is a reaction to the de-skilling of work and the devaluation of the relationship between users and providers. Workers perceived themselves as active agents before the introduction of digitalisation, but as victims after its introduction. These results suggest that, when implementing digitalisation measures, it is necessary to consider how to do so “*without making the employees feel powerless, insignificant or socially isolated in order to get employees on board*”⁶⁶. This would require a more participatory approach for workers and their unions at all stage of digitalisation-related organisational changes.

3.3 Skills and competence requirements

Digitalisation also affects the nature and contents of jobs in terms of skills and tasks. The reference to tasks is important since jobs should be regarded as bundles of different tasks and skills. As the report shows, digitalisation impacts directly on tasks and skills, but only indirectly on jobs: while, according to research, routine physical tasks are increasingly being replaced by machines, the need and demand for intellectual and social tasks as well as IT use are growing overall. Other studies also show that digitalisation and new technologies strongly affect tasks and skills requirements⁶⁷.

One of the strong messages that emerged from the survey amongst public service unions was that the introduction of digital technologies, tools and processes is restructuring both the workplace and work contents. This in turn is resulting in new work and job requirements and in the need for a workforce that matches new and multiple demands. On the one hand, there is a need for workers to be more highly qualified in order to keep pace with technological developments. On the other hand, there is an increased demand not only for subject-specific knowledge and skills, but also for more social and general skills such as problem-solving abilities, creativity, communication skills or the ability to think in a comprehensive and networked manner.

One union interviewee pointed out that “*digitalisation creates losers (workers engaged in jobs/tasks that can be replaced by machines/robots) and winners ('agile' workers, professionals, IT/software specialists)*”. Thus, significant investments need to be made in vocational training and upskilling to avoid leaving a large proportion of the workforce behind during digital transformation processes. Furthermore, measures regarding company-specific training and HR planning activities are also necessary. Interviewees particularly emphasised the following recommendations to guarantee a process of just digital transition that leaves nobody behind and avoids new forms of inequalities:

- adapting initial and further training programmes at company level as well as within occupational profiles (national, sector-level);
- providing all workers with basic digital skills, including workers less affected by digitalisation and older workers;
- re- and up-skilling workers whose jobs are automated in order to protect them against redundancy;
- integrating new occupational profiles into company specific training, skills development and qualification programmes;
- integrating digital tools and methods into initial and further training courses and programmes;
- (re-) classifying pay groups according to new digital tasks and job profiles;
- creating roles for trade unions and workers to identify and anticipate skill needs and training requirements as well as co-design relevant programmes and curricula.

As reported by the public service trade union **ver.di**, the German water sector was put forward as a practical illustration of these requirements. According to ver.di, many changes in work organisation, working processes and skills requirements were associated with past investment and modernisation cycles in the water sector. Current research carried out by the German Federal Institute of Vocational Education on professional profiles has identified several needed adjustments and new requirements emerging from the digitalisation of jobs and services in water services (see textbox below).

Germany: Digitalisation and new skills requirement – Adjusting the occupational profile of a Water Supply Engineering Technician

The Federal Institute for Vocational Education and Training (BIBB) is currently using the example of sewage technology specialists to investigate the effects that digitalisation is currently having on their occupational profiles and what other effects are still to be expected. Two trends can already be identified: On the one hand, in the future, workers will need even more contextual understanding of the process so that manual intervention at the installation remains a reasonable possibility in case of failure. On the other hand, “learning to learn” will become increasingly important as ever more rapid innovation cycles continue to shorten the shelf-life of IT knowledge. These trends can be applied to numerous occupational fields and employers must find solutions to them. Attitudes such as “the ‘digital natives’ already know” or “people can learn that after work” will not suffice. Indeed, the retirement of the Baby Boom generation, who are taking a lot of process-related knowledge with them, is coinciding with declining numbers of school leavers and increased qualification requirements. Ultimately there is a looming risk of losing the development and transmission of trade-specific manual know-how to workers, which is an absolute necessity in case of a digitalized water service system breakdown.

Source: ver.di

It still is unclear whether, and if so where, individual tasks or entire jobs in the water sector might vanish because of digitalisation as this will depend on concrete investment decisions in water infrastructures. Whether this also means job cuts is equally unclear, as new tasks will also be added to the competence roster. It is important, for example, that the staff

savings promised in glossy brochures by pro-digital business consultancy firms as a result of fully automated installations actually occur in reality before new tasks are assigned to colleagues.

Trade union representatives also highlighted that the principle according to which every employee has a right to training must be upheld if digitalisation is to be a win-win proposition. Furthermore, such training should be offered on a continuous, lifelong basis for all employees, not only made available to senior workers or be limited to short periods.

Relatively few examples of good practice were reported by trade unions in the field of skills and competence development as a response to the new requirements prompted by digitalisation and the introduction of new technologies. One good practice was that of the “change agents” that have been established in Norwegian municipalities in order to accompany digital transformation processes, link management and the workforce, and support employees. This initiative was developed by the **Norwegian trade unions** in local government. It is further described in section 4.4.

HK Kommunal mentioned the introduction of ‘*robotized process automation*’ (RPA) in a Danish local authority as another example of good practice. RPA aims to relieve employees whose manual, repetitive and rule-based tasks take up a lot of their time. Thanks to the automation of case handling and search tasks, employees should be able to save on time—which could then be used for other tasks—and concentrate on control functions. The municipality of Haderslev RPA learned from previous negative experiences in digitalisation projects, especially the dangers posed by top-down implementation that failed to take specific framework conditions into account. Therefore, the RPA was, from its planning stage, integrated into a comprehensive project and steering group structure, including not only senior managers and external service providers, but also employee representatives (the ‘employee process automation officer’) and vocational training experts.

The huge gaps and skill divides within the population and workforces in other world regions also relate to skills and competence requirements. According to interviewed trade union representatives in Latin America, this is the case, for example, of healthcare workers who not only lack digital skills but are illiterate and are now obliged to use mobile apps and devices to record notes on patients and their health.



3.4 Occupational health and safety

The impact of digitalisation on public service workers' occupational health and safety is ambiguous. A 2018 report by the European Agency for Safety and Health at Work of the European Union (EU-OSHA) shows that digitalisation does present a certain number of challenges for workers' physical and mental health, such as growing ergonomic risks due to the increase in online work and the use of mobile devices in non-office environments, ergonomic and cognitive risks associated with new human-machine interfaces or an increasing numbers of workers treated (rightly or wrongly) as self-employed, who could fall outside existing OSH regulation⁸⁸. However, the report also found that certain dimensions, such as telework, could contribute to well-being at work and to a good work-life balance. Since workers are no longer obliged to work in the same place at the same time, the risks of travel accidents are lower. The use of ICT could also help remove people from hazardous environments or better protect them by automating dangerous, monotonous and/or repetitive tasks.

That said, important emerging psychosocial risks have been identified in relation to flexible working patterns and to a 24/7 economy. Such a pace of work leads to increased workloads and task complexity, excessive working hours or feelings of isolation due to personal relations being replaced by virtual or remote contacts. Additional risks include the danger

of suffering from eyesight issues due to excessive screen time, sleep disruption problems, stress, ergonomic problems including postural issues and carpal tunnel syndrome, depression and 'burn-out' due to an "always on" work culture, hyper-connectivity and constant digital availability.

Furthermore, certain physical health risks related to computer and ICT work are already well-known: physical inactivity is associated with health risks such as coronary heart disease, being overweight or obese, certain types of cancer and psychological disorders such as depression and anxiety. There is also a risk of additional musculoskeletal disorders [MSDs] resulting from the use of mobile devices such as mobile phones and tablets that are less ergonomic than desk-top devices.

Research⁸⁹ has highlighted how workers in public employment services reported that digitalisation was leading to a degradation of their working conditions because of work intensification, monitoring of work and workers, performance-oriented management, loss or standardisation of social relationships and negative mental health outcomes.

In **Sweden**, public service union **Vision**, along with other trade unions in local government, carried out an in-depth analysis of the impact of new technologies and digitalisation on workplaces in public services. They highlighted the importance of workers' influence over the introduction and development

3.5 Working time and work-life balance

of digital technologies and computer systems. Their research found that in workplaces where there had been no employee involvement, the share of workers who thought that their IT system had reduced stress and disruption in their job was around 20% lower than in workplaces where employees reportedly had an influence. Similar results were published in research carried out on behalf of **Swedish Municipal Workers' Union Kommunal**⁹⁰.

The **SFPQ of Quebec, Canada** reported that digitalisation might also have indirect effects on occupational health and safety through the deterioration of working conditions. This was evidenced by a survey researching working conditions in the internal call centres that were created in public administration and government bodies as early as the 1990s (see textbox below).

Canada: Worsening working conditions lead to health and psychosocial issues

In 2016, the public service trade union SFPQ published a report on “Changes in work and service delivery in the era of new public management” that also addressed the issue of digitalisation in public services⁹¹. The research behind the report analysed a trend found in new public management to shift specific services within public administration to specific entities such as call centres, with a particular focus on working conditions. Based on a sample of almost 500 responses from different ministries, the findings indicated a strong trend of standardization of tasks and functions, as well as the application of quantitative performance indicators and an increase in tight monitoring and control by managers. As a result, overall working conditions had worsened while health and psychosocial issues had emerged. In response to this, the SFPQ organized a platform for employees to address critical issues related to working conditions in call centres and promote improvements as well as higher quality services.

Source:
Interview with SFPQ in the context of this study.

One of the major threats presented by digital change is the pressure to stay online at all times. This issue has been discussed broadly but remains inconsistently addressed in practice in most countries. **France** and **Italy** have introduced reforms that foresee a legal right to disconnect (see textbox below). Similar regulations have increasingly been negotiated in sector and company-level collective agreements by trade unions, including in public services (see chapter 4).

France and Italy: Legal Right to disconnect

The boundaries between work and private life are becoming increasingly blurred due to mobile work and in particular the tendency to read and respond to email correspondence outside of normal working hours and be connected to work-related information flows at all times. In order to address this problem trade unions have demanded regulation. In addition to company or sector level agreements, demands have also been made to develop national legislation in certain countries.

France was a pioneer country in this context. Indeed, the government reacted to public debates and strong trade union demands in 2017 by introducing the legal right to disconnect through the so-called El Khomri law, which posits that every employment contract must include a negotiation of the employee's obligations regarding the extent to which they are expected to remain connected outside of office hours.

In **Italy**, trade unions were also strong proponents of legislative regulation. The right to disconnect is explicitly recognized in Law No. 81/2017, article 19. The provision specifies that the written agreement between worker and employer must also regulate the employee's time off and indicate the technical and organizational measures taken by the involved parties to ensure that the employee has the right to disconnect from company devices.

For further information see: Avogaro, M. 2018: Right to disconnect: French and Italian Proposals for a global issue.

Interviewed unions reported that the increase in home-based or mobile telework was a strong digitalisation-related trend. Influenced by private sector development, modern 'open' office concepts⁹² are often planned to host fewer employees than the total employed by a company. This causes competition among workers to get the best desks in the morning, while bringing savings to the employer who is able to calculate average office occupancy and shift office desktop costs (electricity, rent, insurance or even hardware costs) to the worker.

AFT highlighted the strong trend towards telework in the **United States**. It referred to the example of federal state central administration in Tennessee where employees were actively encouraged to work from home. However, the main incentive behind this impulse was not to offer employees a better work-life balance, but rather to reduce office rental costs. This example seems to reflect a general trend in public administration in the U.S. as the following textbox illustrates.

Who Needs a Desk? Tennessee Takes Telework to the Max

The latest estimates from the U.S. Census Bureau published in November 2018 show that in 2017 approximately eight million workers primarily work from home. That makes telework now second behind only driving as the most common means of getting to work, exceeding public transportation for the first time⁹³.

The number of Americans telecommuting at least occasionally is much larger than what's depicted in the federal data. That's because the Census survey asks respondents to report how they "usually" go to work, meaning those working from home only a day or two each week aren't counted. A 2016 Gallup survey found that 43 percent of employees spent at least some time working remotely⁹⁴.

Among Tennessee state workers, in some departments up to 72 percent of the workforce telework most of the time. They're all participating in the state's ambitious initiative, called Alternative Workplace Solutions (AWS), to transform its workplace. It goes far beyond traditional approaches to telecommuting, in which employees occasionally work from home but still spend most of the time in a central location.

In exchange for giving up their desk or office, participating employees can work remotely (either at home or in the field) full- or part-time. When they do come into the office, they can select from a variety of seating options—standing desks, lounge areas, conference rooms. They have lockers for personal possessions. The best schedule for each person is evaluated individually. Some employees come into the central office twice a week.

Since mid-2016, when the program launched, 16 departments have given employees the option of telework. 6,000 of them took it. About 27,000 of the Tennessee executive branch's 38,000 employees could eventually be eligible.

In the first two years of implementation, AWS has racked up an impressive record of benefits. According to internal Tennessee surveys, 60 percent of managers say employees have improved productivity and 80 percent of employees say they have a better work-life balance. Participating agencies have recorded a 37 percent reduction in sick leave use, and the state estimates that the average employee is saving \$1,800 a year on gas. By the end of this fiscal year, Tennessee says it will have likely cut its real-estate rental costs by \$6.5 million. Next year, it plans to sell one of its downtown Nashville office buildings, which is no longer needed. That could give the state an extra \$40 to \$60 million (no figures available on the share of savings borne by employees).

The results have other states intrigued, including North Carolina and Utah.

Sources: based on information provided by the AFT trade union and an article on www.government.com. Available at: <http://www.governing.com/topics/workforce/gov-tennessee-government-telework.html>

3.6 Work monitoring and surveillance

The use of digital tools to monitor workers' movements, breaks and performance has long been of concern to trade unionists. However, such tools may also bring advantages since surveillance tools and robotics can support workers in handling and controlling dangerous and toxic substances, as union interviewees from the water and waste sector mentioned.

AFT representatives highlighted that, depending on the context, GPS tracking and other surveillance and monitoring tools can increase security and even save lives: this is the case when police officers or social workers operating in dangerous situations come under attack. However, they also stressed the need for clear regulatory rules, such as ensuring that only specific and agreed-on places are subject to surveillance and regulating the use of cameras in vehicles and that of the data collected from workers' digital wristbands.

Most interviewees mentioned problematic aspects of digital tools that allow for monitoring and surveillance. A study carried out in internal call centres equipped with digital technologies in public administration in French-speaking **Canada** demonstrated that employees were initially enthusiastic to work with state-of-the-art communication technologies and digital equipment. However, it became clear quite rapidly that these technologies were also used to permanently and abstractly (i.e. not considering a case's concrete aspects) control employee performance, for instance to oversee how much working time is spent on specific tasks, number and duration of breaks, toilet visits or constant surveillance by the system with rebuke from the team leader or manager. Work scheduling was also done automatically by the system, which caused many issues regarding the workers' ability to take days off or maintain their reduced schedule during the holiday season and summer vacation. The lack of flexibility for workers to plan their time was the main complaint expressed to the union. Recently, one public agency tried to improve those elements and, to do so, they were forced to go back to manually making work schedules for 700 people⁹⁵.

All in all, digitalisation provides new, cheap and powerful data processing possibilities that allow a worker's performance to be tracked and algorithms to increasingly dictate workload, schedule, and work intensity. When used to monitor performance, such technologies can also have an impact on pay. Performance monitoring and surveillance also increases the risk of psychosocial strain, stress related to meeting arbitrary targets set by a machine and diminished flexibility in terms of work schedules and workloads.

In many public service sectors, apps on smartphones, specially designed portable devices or components in vehicles, all feeding into data analytics systems, are becoming a part of the day-to-day working life of many workers. This is often coupled with location monitoring technologies, which are becoming more widespread and are no longer necessarily attached to the vehicle but may be integrated into mobile devices such as the smartphone or tablet.

As was highlighted by **ver.di** in **Germany**, each step further into digitalisation potentially extends the technical possibilities of performance and behaviour control. These possibilities must not be used in a way detrimental to human rights and dignity. Worker data protection systems must be considered in any IT procurement decisions. "Privacy by design" and "privacy by default"⁹⁶ software, which limits the analysis of worker-related data or does not allow it at all, are means of choice here. Therefore, companies and institutions must become aware and be held accountable for their responsibility over worker data protection. They must ensure that sensitive information is collected and handled in a way that is consistent with human and labour rights.

Given the increasing relevance of worker data sensitivity and privacy issues, some trade unions have developed model collective agreements and other tools to negotiate and secure workers' protection. Several examples are presented in chapter 4.

3.7 Impact on existing and new inequalities in the labour market and workforce

Current literature on the topic has particularly emphasised the fact that digitalisation has polarised, and will continue to polarise, existing inequalities in the labour market on the basis of skills, gender and other worker characteristics. For example, digital technologies are replacing routine cognitive and manual tasks commonly performed by workers in the middle of the wage spectrum. However, non-routine manual tasks are often performed in jobs that require low skill and education levels. As a result, jobs are being further separated into tasks traditionally performed by the lowest and highest skilled workers⁹⁷.

Research has found that wages have also become more polarised. Wage levels and job quality are increasingly linked to the command of digital skills, which will continue to gain importance in labour markets in the coming years, along with “analytical, interactive, and problem-solving skills”⁹⁸. Researchers agree that inequality will rise as the demand for low-skilled workers decreases and the economic opportunities for low-qualified people in the labour market become more constrained and precarious⁹⁹. Research has also stressed that the main challenge is to make sure that low-skilled workers are given opportunities to train and retrain¹⁰⁰.

The research mentioned above is mainly based on OECD countries and there exists a major lack of research on the impact in developing countries. The trend causing low skilled labour to decrease due to digitalisation and automation might not apply in countries where labour costs are much cheaper.

Union representatives highlighted the strong need to invest more in training and retraining and for them to be involved in the identification of specific needs and programmes. Furthermore, they indicated that digitalisation could pose a threat to equality along gender lines. **UNISON** pointed out that in the **UK** many of the jobs and task profiles facing a high probability of automation were carried out by women. At the same time, the rapidly increasing demand for both IT jobs and managerial functions are favouring men since

women are strongly underrepresented in these areas. Therefore, it is necessary to take action on training for women in order to address these imbalances.

A representative of the **Spanish Federation of Services to Citizens, FSC/CC.OO**, also highlighted that the digitalisation of public services was characterised by a strong gender divide resulting from structural gender imbalances in the fields of ICT and technology. Digitalisation may therefore well exacerbate existing horizontal and vertical gender-based employment segregation.

Digitalisation is not gender neutral

More than 200 million women around the world lack access to the Internet because of social and cultural stereotypes; more than 1.7 billion do not own a mobile phone, even when 80% of the population in developing countries have one; only 13% of ICT workers are women and out of that percentage, only 10% occupy managerial positions within the sector. There is nothing gender neutral about the impact of digitalization in the Future World of Work. From flexible working hours, to life-long learning and digital-skill training, to the technology gap and labour segregation; digitalization will have a significant, and most times, overlooked, impact on women.

Source: **UNI Global 2017: Digitalization from a Gender Perspective**

Trade unions in the fields of health and social care but also in other sectors characterised by a high share of administrative work highlighted that digitalisation and the automation of service activities were affecting women to a far greater extent than men. This is not only due to the workforce in health and social care being overwhelmingly female, but because of the overrepresentation of women in jobs that require lower skills and entry qualifications. Many such jobs are also based on flexible arrangements such as part-time or temporary contracts.

The adverse and disproportionate impact of digitalisation on existing inequalities is not only affecting women in the labour market but also other disadvantaged groups. This is the case of black and ethnic minority workers, as is shown in the following textbox that summarizes evidence and experiences in the **UK**.

Adverse and disproportionate impacts of digitalisation on black & minority ethnic workers

At a conference on digitalisation and public services organised in 2018, a representative of the Public and Commercial Services trade union (PCS) and member of the TUC Race Relations Committee provided an assessment of the impact of digitalisation on black and minority ethnic (BME) workers:

In Britain, significantly lower percentages of ethnic minorities work as managers, directors and senior officials, compared with white people. The largest sector employing BME people is the public sector, largely because the levels of discrimination in the private sector are higher and because the public sector is seen as having better equality policies and being more accessible to BME workers. However, this is the area that has faced the deepest cuts to jobs, adversely impacting BME people as they are more likely to work in front-line and administrative roles, those bearing the brunt of cuts. Referring to the UK government's austerity programme, the union member noted that these include cutting front-line services. Nearly 25,000 administrative roles are seen as 'redundant' in public service delivery, many have been cut already. The four largest areas within the sector are the National Health Service, Education, Central and local government and Police forces. Within the Civil Service, 154,000 administrative jobs are impacted, while in Education that number stands at 89,700. According to research, the government's aim is to fully automate these administrative roles and replace them with technology. This process has been happening systematically over the past 10 years. The focus is on admin roles that are repetitive, front-line or cognitive and that involve interacting with users. These are roles traditionally filled by BME workers and roles they have been held back in because of discrimination at work and institutional racism in all aspects of training, appraisal, promotion and progression. Being held back in such roles mean that there is little opportunity to partake in development opportunities in order to upskill and compete for jobs at higher grades. According to the trade union representative, "BME workers not only face a glass ceiling in public sector employment but find that ceiling barricaded."

Source: <https://www.epsu.org/sites/default/files/article/files/Impact%20of%20digitalisation%20on%20BME%20workers%20EPSU%20June%2018%20-%20Zita%20Holbourne.pdf>

3.8 ‘Digital Taylorism’: Emergence of precarious forms of employment

The emergence of new types of digitally intermediated employment involving digital labour platforms that do not regard themselves as employers—with related responsibilities and duties—but only as intermediaries has been well documented in private service delivery¹⁰¹. However, interviewees highlighted that these types of employment and 'Uberisation' are occurring with equal frequency in public services. This is especially visible in labour intensive services and is often related to formal employment relationships being substituted for dependent, sometimes “bogus” self-employment, bringing about the demise of labour protection regulation and the rise of precariousness.

Union representatives from the **UK** and **Austria**, as well as **South Korea and Singapore**, made strong references to new forms of precarious employment that have already emerged in the private sectors but are becoming increasingly common in public services, such as health and social care, public space management, gardening or urban public transport).

In the **UK**, a study carried out by the market-liberal institute ‘Reform’ in 2017 argued that public services could be “the next Uber”. The report describes a future scenario where public services are largely automated and where human labour is provided via online-platforms for on-demand teachers or doctors (see textbox beside).

According to **UK’s UNITE** and **UNISON**, this radical vision of public services organised on the basis of work-on-demand is not totally unlikely. This can be explained by the combination of fiscal austerity policies and a digitalisation strategy that mainly aims to cut costs by layoffs and staff reduction in public services.

Referring to platforms in the field of social care and the increased use of app-based work schedules and work-on-demand models in the sector, UNITE noted that the ‘Uberisation’ of care work has already started. The prime motivation of digitalisation in this field is cost reduction and the promise of productivity increase. According to UNITE, such developments indicate a general ‘digital Taylorisation’ affecting the health and social services sector in the UK. Accordingly, staff is seen as the largest cost factor and becomes a target for outsourcing and, where possible, standardisation and process automation and AI solutions such as robots for social care.

From the perspective of workers, app-based work via platforms is often linked to extremely flexible working time (and thus a highly unsteady income situation) and a lack of social security or labour law protection against economic and social risks because they are formally self-employed. □

Public Services as the next 'Uber'?

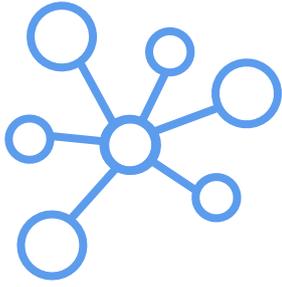
UK-based liberal think-tank Reform says websites and artificial intelligence “chat bots” could replace up to 90% of Whitehall’s administrators, as well as tens of thousands in the NHS and GP surgeries by 2030. Even nurses and doctors could fall victim to the march of the machines, which the report says can outperform humans at some diagnoses and routine surgical procedures and are more efficient at collecting information. The report also argues that public services should become more flexible by embracing a gig economy where workers support themselves through a variety of flexible jobs acquired through online platforms. A Reform press release says: “Public services can become the next Uber, using the gig economy to employ locum doctors and supply teachers.”

Few complex roles, it suggests, will be able to resist the move towards automation, with the aim that public services will eventually become “diamond-shaped”, as both frontline and strategic roles are replaced by computers. “Twenty percent of public-sector workers hold strategic, ‘cognitive’ roles,” it says. “They will use data analytics to identify patterns—improving decision-making and allocating workers most efficiently.” The NHS, for example, can focus on the highest risk patients, reducing unnecessary hospital admissions. UK police and other emergency services are already using data to predict areas of greatest risk from burglary and fire.”

Such “contingent labour” platforms, it says, could suit hospitals and schools as an alternative to traditional agency models, as well as organisations that experience seasonal peaks in demand such as HMRC at the end of the tax year.

The report also highlights the scope for increased automation in policing through crowd-monitoring drones and facial recognition technology, although it acknowledges the concerns involved in holding people’s images.

Source: The Guardian: "Robots could replace 250000 public sector workers". 6 February 2017. Available at: <https://www.theguardian.com/technology/2017/feb/06/robots-could-replace-250000-uk-public-sector-workers>.



4.

TRADE UNIONS AND PUBLIC SERVICE DIGITALIZATION

As argued in the previous sections of this report, digital change is resulting in new and fundamental challenges. Specific issues and challenges identified by public sector unions include:

- contents, quality and mode of delivery of public services in the future, including the relationship between public and private operators;
- the increasing use of AI and algorithms in supporting and even taking over decision-making in public services—a development that raises serious ethical questions;
- the role of trade unions, employee interest representation and collective action in shaping and influence the digital transition process in public services;
- significant restructuring and change of public service employment profiles and contents as well as the workforce structure in public services (job destruction and creation, job change and shifts);
- deepening of existing and emergence of new inequalities in public service access and among public service workers (skills, pay, working conditions);
- the impact of machine work, new digital tools and new forms of performance and behavior monitoring on working conditions experienced by public workers;
- increasingly blurred boundaries and dependency between public and private actors engaged in the provision of public services and private companies providing software, big data analytics or cloud solutions;
- data security and personal data privacy issues for public service users and workers;
- the emergence of new forms of vulnerable, precarious employment in public services (health-care work platforms, outsourcing and telework, for example) and its massive impact not only on the affected workers' social security (often formally self-employed) but also on public income due to tax losses;



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Trade unions around the world are actively engaged in addressing these challenges. As organisations advocating for quality public services and user access and representing the interests of public service workers, they are well aware of the fact that digitalisation implies much more than mere technological change. Indeed, they regard it as a comprehensive phase of restructuring, requiring concomitant measures at different points in time (anticipation, implementation and evaluation of change processes) and at different levels (from workplace, to national and global level).

The following sections describe examples of trade union initiatives and good practice, both in terms of tools used and of the levels of action at which they have sought to shape framework conditions and regulate the processes underpinning the digitalisation of public services.

The analysis addresses three guiding questions:

- How can workers and their trade unions participate and take an active role in shaping the forms and use of new technologies in public services?

- How can workers take control of new technologies in a way that benefits their working conditions and wellbeing (e.g. telework, flexible work to adapt to workers' needs) as well as the services they deliver?
- How can trade unions negotiate (e.g. via collective agreements) a fair digital transition for public service workers?

4.1 Involvement in digitalisation-related public policies

In all world regions, trade unions have been actively involved in debates and the development of public policies regarding digital transformation processes and their impact on employment and work. They were often the first organisations to highlight not only positive aspects but also the critical impacts digitalisation had on working conditions. Although their level of influence differs, trade unions have been successful in shaping public policies and legal reforms in certain countries, notably as regards the “right to disconnect” or workers’ data protection.

AFT in the **U.S.** published a report on the impact of digital government and technological change on public employees and the quality of public services as early as 2002. The report was elaborated by a trade union task force on digital government that was set up by AFT¹⁰² and addressed issues that are more relevant today than ever before: health and safety, training and skills development, telework and other work options made available by new technologies, and employee privacy and security.

The **German** union **ver.di** reported that public sector employers at federal, state and municipal levels have adopted digitalisation programmes, laws and master plans aiming to digitalise public services and processes. Many of these activities are exclusively technology-oriented and mostly fail to address the question of how digital technologies can improve the provision of public interest services or the role of workers. ver.di has repeatedly criticised the government’s approach in public statements, positions papers, public conferences and on dedicated websites¹⁰³. The union is investing a significant amount of resources and efforts in informing and contributing to public opinion and debates on the subject of digitalisation. This includes the preparation of expert opinions on proposed legislation and active lobbying of legislative and policy making bodies. In addition, ver.di is involved in discussions held in Federal Government commissions on the subject of digitalisation. ver.di also actively contributes to design

EPSU demands for fair EU eHealth policies

In a position paper responding to a public consultation on the digitalisation of the health and care sector, the European Trade Union Federation EPSU noted: “Collection of big health data should not in any case be treated as commodities: Therefore, big data should be used only to improve patient’s treatments and the organization and interoperability among different medical institutions. EU standards should avoid patient and health data transfer for commercial purposes. Another priority should be the fight of big health data black market. It means as stated before that patients and workers need also to be aware in which way the hospitals are going to use confidential data on treatments and in the case oppose any use for commercial purpose of their health data.”¹⁰⁴

As regards implementing eHealth policies in the European Union, EPSU requests the following:

- * That the promotion of private-public partnerships be challenged and that an increase of public investment in the digital transformation of our health systems (infrastructure, workforce, support of patients) be fostered instead.
- * That the European Commission address the uneven access to new technologies faced by workforces across different countries and regions in Europe, particularly in the countries hit hardest by austerity measures, and implement measures to overcome it.
- * That the European Commission further involve social partners in the reflection surrounding the transition towards new care provision models: sectorial social dialogue is an important tool for investigating the new care model’s impact on the workforce, creating opportunities to establish trust, confidence and good collaboration and involving the workforce in designing transition strategies.

Sources: EPSU contribution to public EU Consultation on “Transformation Health and Care in the Digital Single Market” (10 Oct 2017) and EPSU reaction to the European Commission’s Communication on “enabling the digital transformation of health and care in the Digital Single Market; empowering citizens and building a healthier society” <https://www.epsu.org/article/place-workers-digital-transformation-health-europe>

proposals for political discussions that are relevant for public services, such as the ethics commission or the "White Paper Working 4.0" discussion process about the future of work that was initiated by the German government in 2015.

In **Argentina**, the **Confederation of Municipal Workers (Confederación de Trabajadores Municipales, CTM)** prepared a position paper on the "The Future of Work in Municipal Services (*El Futuro del Trabajo en el Sector Servicios Municipales*¹⁰⁵), which was presented at a PSI meeting on municipal services, the CONTRAM ISP Americas in 2018. The CTM highlights that trade unions are not opposed to new technologies. In fact, they acknowledge the positive impact that these technologies can have on public service employees' working conditions and general quality of life. However, the CTM also demands that employees have a voice and that trade unions be allowed to participate in the development of technological modernization and digital innovation programmes in public services. The trade union placed emphasis on the fact that no public service worker should be left behind and that all should have a right to training and skills adaptation.

The CTM stressed that collective bargaining was the best possible mechanism to ensure worker participation and involvement and guarantee positive outcomes, as it empowers them to demand information about future investments in new technologies from employers. This subsequently allows them to analyse the impact that these investments may have on employment and to propose and adopt measures in the workers' defence.

In addition, in 2018, the **Argentinian Association of Legal Workers (Asociación del Personal Legislativo, or APL)** launched an observatory on the future of work—the *Observatorio del Futuro del Trabajo*¹⁰⁶. The digital transformation of our societies and economy is one of this observatory's areas of interest. Indeed, it considers digitalisation to be one of the most significant challenges facing the world today, on par with the resurgence of authoritarian regimes and the increasing dominance of East Asian economic power. In June 2019, the Observatory published a collective paper on these topics. Considering the lack of worker involvement and the many promises

made in the context of new 'intelligent' technologies and automation, APL also firmly requests an "institutionalization of employee participation" through collective bargaining and the tight monitoring of the implementation of digitalisation projects and programmes in public services¹⁰⁷.

As regards education policies, trade unions in various contexts are engaged in the public debate surrounding the future of education in the digital age and the priorities set by public education policies.

For example, **U.S.** union **AFT** acknowledges the added value of new technologies as support tools in the teaching profession. The union has developed its own web-based learning platform ('Share My Lesson'), which is very popular, thereby demonstrating that technology, when properly used by qualified teachers, can enhance the learning process. However, educators and their unions—not for-profit corporations—should always be the ones to lead the policy, design and training measures relating to technological innovation in the field of education. As was previously highlighted (see section on education and cultural services in chapter 1), AFT has observed that digitalisation and the heightened interest of large multinational and software companies in the education sector have emerged as a threat to public education. The trade union was not only critical of the dominant approach to educational digitalisation, which consists in bypassing the main actors in the education system by establishing direct links to those users who can afford to pay, but also raised strong concerns regarding the practices of large tech companies, who seek to replace educators with technology despite data showing that an over-reliance on artificial intelligence promotes inequality, minimizes teacher-student connections, disregards socio-emotional learning and lowers test scores. According to AFT, even the most sophisticated artificial intelligence cannot replace the many important one-on-one relationships that students need to advance in school and life, or teach the valuable life lessons that help them grow and succeed.

In view of this, the union resolved that it would work with the Education International global union and the Organization for Economic Cooperation and Development to map the development of technology

in education and bring together data-driven practitioners and researchers in order to understand and promote the best, most effective practices.

In 2017, the public service trade union **SFPQ in Canada** started its own research project to evaluate the implementation and promotion of artificial intelligence in the State of Quebec (see textbox below). The project is still ongoing and has two main objectives: Firstly, setting up a conceptual framework that looks at AI in public services and its possible impacts. Secondly, analysing impacts with specific groups of workers in the IT field (by function, sector of activity, employment category) in order to better understand the AI revolution and the digitalisation of public services. On this basis, SFPQ aims to develop an adequate strategic position on the introduction of these new technologies into government.

Canada – Trade union research on artificial intelligence in public government

"For public services, the issue of AI is intimately linked to automation, a source of both concern and hope. On the one hand, the automation of processes and the digitization of services can be part of an industrial management logic resulting from Taylorism. They would then promote staff reduction, task standardization, devaluation of front-line jobs, de-skilling of staff and outsourcing of services. In addition, they would have the potential to contribute to the geographical remoteness of services to the population and their dehumanization.

On the other hand, the deployment of these advanced technologies would allow economies of scale to be achieved without affecting the payroll of public organizations. Some forms of automation would encourage the replacement of thankless tasks related to administration, monitoring and inspection, cleaning and handling with more rewarding and better paid jobs. By imposing delivery standards and rules, automation would improve the quality and personalization of services to the public."

Source: SFPQ: L'AVENIR DE L'INFORMATIQUE AU GOUVERNEMENT DU QUÉBEC - Travaux prospectifs sur l'intelligence artificielle. Cadre conceptuel, September 2018. Translation by authors of this report.

These are some examples of how trade unions are working to make sure that issues surrounding employment, working conditions, future of work and employee interests are kept at the heart of public service digitalisation processes. However, trade union and worker participation and involvement in public policy formulation and implementation with regards digitalisation remains insufficient overall. This is visible even though both national framework conditions regarding workers participation and the actual role and influence of collective bargaining at the level of individual public service providers as well as throughout the sector differ significantly,

Trade union representatives in **Africa, Northern and Southern America**, as well as **India and South Korea** reported that the collective voice of the workers is hardly heard when governments elaborate or roll out public policy over digitalisation in public services. Even in EU countries, where social dialogue between employers and trade unions is institutionalised and enshrined in EU treaties, trade union representatives reported that the public narratives surrounding public service digitalisation were dominated by technological devoutness and determinism, while employee interests and concerns were neither sufficiently heard nor listened to.

UK unions forcefully pointed out that digitalisation could be considered a continuation of austerity policies and of creeping public service privatisation under a slightly different guise. Even in **Nordic European countries**, where trade unions are powerful and collective bargaining agreements take on a quasi-legislative role, interviewees highlighted numerous cases of bad practice in the formulation and implementation of digitalisation policies.

Such examples of good and bad practice should inspire not only trade unions, but also policy and decision makers in the public service sector, to reflect on the current shortcomings and deficiencies of trade union involvement in digitalisation and change policies and practices. It is our hope, therefore, that the positive examples documented in the following sections might not only inspire public sector trade unions, but also support reflection and learning amongst policy makers.

4.2 Anticipation and managing of digital change and restructuring

Several union interviewees mentioned that informing workers and their representatives in a timely manner is a crucial condition for the proper anticipation of digital change and its impact on employment and work. Trade unions consider the introduction of new technologies—automation technologies in particular—to be a significant restructuring event that should be addressed by information and consultation procedures and ensure collective negotiations and worker participation as early as possible to avoid negative impacts.

Vision in Sweden stressed the importance of employees having influence on the introduction and development of IT systems. Studies and surveys conducted by the union have shown¹⁰⁸ that early employee involvement leads to staff and management experiencing greater usability in the form of improved cooperation, independence, quality, efficiency and security within the system. Early involvement also leads to a better standard of occupational health and safety and a better work environment in the form of reduced IT-disruption-related stress levels.

In **Quebec, Canada**, the public service collective agreement (*Convention collective des fonctionnaires*, 2015-2020) includes several stipulations addressing digitalisation through the promotion of cooperation and dialogue between employers and staff representatives. Digitalisation and ‘technological change’ are defined as a change in operations caused by the introduction or additional use of machinery, equipment or tools that results in significant job changes or even the substitution of specific tasks for employees in one or more departments. In such a case and within thirty days of the entry into force of the collective agreement, the parties agreed to establish a joint ministerial industrial relations committee in the affected department to discuss problems resulting from the introduction of technological changes and consult on possible measures and solutions. However, this poses challenges for union representatives because these discussions assume that they know the IT field; that they are able to evaluate

the possible impacts of such technologies and identify the training needed by its members, etc. The imbalance in knowledge can quickly become one of power.

4.3 Collective agreements setting frameworks for socially just digitalisation

The primary way for trade unions to get the best out of digitalisation and protect their members is negotiating collective agreements that can help regulate many of the issues arising from digital change, whether these impact on pay, working time, work-life balance or aspects linked to health and safety, such as psycho-social risks.

In September 2017, **Fagforbundet**, as one of the main trade unions in the municipal sector in **Norway**, signed a national tripartite cooperation agreement¹⁰⁹ with the Ministry of Local Government and Modernisation and the Norwegian Association of Local and Regional Authorities—the municipality’s employer association. The agreement¹¹⁰ engages three municipality-level parties (heads of municipal administration, local politicians and trade unions) in a tripartite dialogue on digitalisation and digital competence. The project is financed by the Ministry and runs until end of 2019. More than 70 municipalities, representing the whole country, are taking part in the programme. The participating municipalities are involved through national conferences and smaller regional workshops, which representatives from all three municipality-level parties must attend. The objective is to support the transformation that new technologies and digitalisation bring to the municipal sector, create better understanding, support organizational development and provide a digital platform (a website¹¹¹) where relevant reports and documents can be found and examples of good practice as well as the challenges facing the participating municipalities can be shared¹¹².

Norway: Involvement of Workers' 'Digital Agents' in the digitalisation of municipal health and social care services

In addition to the national tripartite agreement, positive developments are occurring in other municipalities in Norway. One such example is Drammen, a municipality of around 63,000 inhabitants. The municipality has involved employees in digitalisation processes affecting its healthcare services by setting up a steering committee upon which the local trade union representative has a permanent position. Furthermore, employees on the ground, for example health workers in elderly care, are appointed as “digital agents” with a special responsibility to test and decide on new digital devices and how best to train co-workers.

There are 55 appointed digital agents in the municipality’s Health and Social Services division. Although at this stage it is still too early to precisely describe the role played by digital agents, their tasks involve:

- * Supervising other employees, supporting their managers in the use of digital tools.
- * Attending meetings relating to their role.
- * Selecting the digital devices (digital medicine dispensers, logging in their mobile device for reporting home-nursing visits, digital archiving or chatbots) or other tools that they use during their work.
- * Sharing their knowledge across departments to ensure a more solid foundation for the technical solutions the municipality procures.
- * Sharing ideas and coming up with new projects that they feel are needed in their departments.

Worker involvement makes the process of digitalisation more effective and less costly. Digital agents can provide feedback on practical aspects, such as the low battery capacity of certain devices used by social care workers, and privacy-related concerns. Fagforbundet and our shop stewards are concerned with the protection of our members’ privacy when using digital devices at work. These regard tracking employees during working hours, for example. Home care nurses who use mobile devices to register when and what they are doing when visiting patients are at the risk of being tracked while working. Employers could then misuse the information they collect on their employees during working hours.

Source: Information provided by Fagforbundet

The German union **ver.di** has demanded a different approach in addressing the challenges resulting from digitalisation. This includes the adjustment and supplementation of labour law regulations in response to new requirements. ver.di has called on the German government to adapt the Works Constitution Act (Betriebsverfassungsgesetz) and the Federal Staff Representation Act (Bundespersönalvertretungsgesetz) in order to guarantee stronger legal co-determination rights¹¹³ and address new challenges related to digitalisation. Co-determination rights and rights of initiative, for example for upskilling and data protection, must be introduced or extended. A possible solution to this issue is the process-oriented co-determination established under the North Rhine-Westphalia Act on the Representation of Staff Employees (Personalvertretungsgesetz).

The representative of the Confederation of Municipal Workers (CTM), in Argentina pointed out in an interview for this study the critical linkage between the right to collective bargaining in local and regional government being respected and public service quality. In Argentina, this fundamental human and labour right was secured in national law in 2015, but is only partially upheld in about half of Buenos Aires’ municipalities. This means that, in the majority of the country’s municipal governments, workers do not have collective bargaining rights and lack the working conditions they need to properly deliver quality local public services and participate in the digital transformation of said services¹¹⁴.

4.4 Trade union guides and model collective bargaining agreements

Trade unions in several countries have developed and published practical guides for their shop stewards to support them in the negotiation of agreements on the introduction of new technologies.

For instance, in 2017, the **UK** trade union **UNITE** published a "Draft New Technology Agreement"¹¹⁶ that defines certain principles and equips shop stewards in public service providers with practical tools for addressing the introduction of new technologies in their area of work. The agreement was promoted by the union as part of a broader campaign aiming to assess the impact of digitalisation across all the sectors in which it organises. The draft agreement covers a broad range of issues including training, health and safety, working time, monitoring and surveillance and suggests adapting the bargaining structure to address issues around digital change.

According to UNITE, the overarching principles that determine the introduction of new technologies should be the following:

- New technologies should promote jobs and create new jobs
- New technologies in public services should be used to reduce working time but not pay
- The introduction of new technologies should be managed in an inclusive way—no divide and rule
- Training should be an integrated component
- The acquisition of new skills should be compensated
- Risk assessments regarding potential monitoring & surveillance and the use of personal data should be an intrinsic part of the introduction of new technologies
- The health and safety impacts of new technologies have to be addressed



- Fairness and Equality should be overarching and guiding principles

UNITE also proposes several concrete tools that should be suggested and used by trade union negotiators when consulting and negotiating with employers on the introduction of new technologies. This "new technology bargaining apparatus" should rely on the following elements:

- A request to set up a New Technology Sub-committee in order to gain timely access to information, guarantee the quality of the information provided, involve trade union experts and prepare a solid ground for union response and negotiations.
- New Technology Representative posts should be established by the trade union and/or employee representation body at the level of public service providers.
- A demand that a New Technology Fund be established. Such a fund should be used to provide sufficient resources for the New Technology Sub-Committee and the New Technology Representatives.

Based on these demands, UNITE has made available on its website a model agreement providing concrete ideas on possible wording and content that could be used by trade unions and employee representatives¹¹⁷.

The **French** trade union federation **CGT** has been addressing digitalisation as a concern, claiming new rights. In this sense, it produced a guideline for bargaining in 2017 to allow an adequate follow up regarding the impact of digitalisation on work life quality¹¹⁸.

In **Germany**, **ver.di** has developed and published similar initiatives, including model agreements on e-government and IT Framework Agreements for works councils. **ver.di** has also defined key principles that should be respected when introducing new technologies and implementing digitalisation projects in public services. Digitalisation should be regarded as a tool to be used for:

- promoting innovation in employment
- speeding up qualification
- facilitating healthy work
- safeguarding personal rights
- unlocking free spaces for a better quality of work and life

In the **ver.di** section of local government and municipalities, staff representatives face the challenge of accompanying and shaping the multi-faceted processes of "digital administration". According to **ver.di**, it is important to understand digitalisation as a social development that requires active shaping in order to achieve good outcomes and impacts. Therefore, the union developed a series of handouts in partnership with company-level colleagues. **ver.di** developed a "*Model Framework Agreement on E-Government*"¹¹⁹ as early as 2013, and, more recently, has made available tools for company agreements on the use of mobile devices such as smartphones and tablet PCs¹²⁰.

AFT in the **U.S.** is also supporting local branches and staff representatives in negotiating agreements, especially the inclusion of sections that address issues related to new technologies, such as mobile tools, GPS data or telework.

Addressing the urgent and growing issue of monitoring and surveillance of employees in the workplace, the **UK** service trade union **UNISON** has elaborated a detailed guide for trade unions that provides general

information on technologies and digital tools in this context and suggestions for addressing the issue through collective agreements. The guide also includes a model agreement with employers¹²¹.

4.5 Regulating the impact of digitalisation on occupational health and safety

One of **ver.di**'s main aims in promoting collective bargaining and supporting company-level employee representation is to tackle psychosocial and health and safety related impacts of new technologies and digital work. In order to achieve this, **ver.di** has, over the last few years, carried out its own action-oriented research and cooperation activities such as the *Prentimo* project¹²² and is actively promoting the negotiation of IT health and safety risk analyses for public service providers.

Addressing the impacts of digitalised work in the field of health and safety has also been an important topic for trade unions in other countries.

In **Sweden** for example, joint bodies dealing with health and safety issues were established in local and municipal government. Building on survey results regarding the potential health and safety risks presented by the introduction of new technologies and digitalisation projects, the Swedish public service trade union **Vision**—along with other unions in the local government sector—and the municipal employer organisation **SALAR** set up a strategy for a "healthy work life" organisation (*Sunt Arbetsliv*). Its goal is to promote a good working environment and to ensure that health and safety questions are properly addressed.

Vision also published guidelines for IT safety inspections and risk assessment. However, these are part of a broader corpus of action principles and suggestions addressing digital change processes. Here, **Vision** defined seven action points regarded as crucial for the planning and implementation of IT projects (see textbox beside).

Sweden: Vision's Seven Actions Points for IT projects and initiatives

1. **Allow staff to influence the planning, development or replacement of IT systems from start to finish.** Digital solutions must have a given place on the agenda and be a natural part of day-to-day, ongoing collaboration and systematic work environment management. Digitalisation makes it possible to create accessible digital tools to meet various functional requirements.
2. **Ensure that managers can influence the development and procurement of IT affecting the organisation from start to finish.** Capture the ideas of managers and their staff regarding how usability can be improved to the benefit of the organisation. The preconditions for exerting influence must be equally good irrespective of whether the organisation is male or female dominated.
3. **Ensure digital competence.** Digital competence and knowledge of the organisation are two prerequisites for obtaining an IT system that works in everyday working life. A high level of digital competence at every level of the company reduces vulnerability. Individual training and introductions to the digital environments in which the organisation works must be prioritised.
4. **Increase digital competence among senior management.** If there is a lack of competence at strategic management level regarding the prerequisites for digitalisation, and its effects on the digital work environment, there is a risk that the organisation will implement short-term decisions, the consequences of which will be detrimental to both the development of the organisation and the health of employees.
5. **Update work environment knowledge to include the digital work environment.** HR departments, management and safety representatives should have the requisite knowledge to create a healthy digital work environment.
6. **Implement IT safety inspections.** IT safety inspections are a method for identifying where the system is wasting time. Procedures and agreements should be in place to quickly rectify flaws in the system. IT safety inspections offer good support in identifying required improvements and collecting proposals on how to do so from users. Procedures to collate improvement proposals, and the resources to take the necessary measures, should be in place.
7. **Start today and it will be more fun to go to work tomorrow!** The most important thing is to begin paying attention to the digital work environment, and the potential it offers for improvement within the organisation. Going to work will be more enjoyable when the system supports instead of disrupts. And there is always satisfaction in feeling that it is actually possible to influence one's situation.

Source: VISION 2018: Digitalisation in the service of the organisation.

Similarly, in **Italy**, the **FP-CGIL** public sector federation negotiated a collective agreement covering the central government. This agreement includes a provision to set up a joint body on innovation ("Organismo paritetico per l'Innovazione") that will address questions related to smart working and work-life balance, well-being and occupational health and safety, and the prevention of psycho-social risks, work-related stress and burnout¹²³.

In order to make sure that digital tools such as GPS are used in a way that protects the safety and health of public service employees, the **AFT** trade union in the **US** has negotiated agreements with local service providers, such as childcare services, for instance.

United States: Regulation of GPS data in social services

“AFT and management agree that all employees should be treated respectfully and equitably, and that the agency should be a responsible steward of taxpayer dollars. Should GPS systems ever be provided by the agency to employees to take into the field, GPS data will only be requested on particular employees in the event that there are significant concerns for the employee’s safety or specific information that the employee has not been honest about his or her whereabouts during work time, GPS data is required in response to a warrant, subpoena, public records request or in any case where an employee has been named an alleged perpetrator of child abuse or neglect.

Significant concerns for an employee’s safety require the following:

- * The employee has not answered their cell phone
- * The employee has not returned to the office at their scheduled time, and
- * The Executive Council level administrator over the employee’s department agrees prior to the request begin processed that there is an ongoing and imminent concern for the employee’s safety.

Specific information that the employee has not been honest about his or her whereabouts exists when any source that cannot be readily discredited reports that the employee was not where they reported they were. In the event that GPS data is pulled under any of the circumstances discussed in this section, that information may be used as evidence in a pre-disciplinary hearing and in that case, all other procedural protections set out in Article 8, including the opportunity to present rebuttal evidence, will apply as usual.”

Source: Information on contract language of a collective agreement negotiated by the Federation of Children’s Service Employees, AFT Local 3143. Provided by AFT in the context of this study.

4.6 Local level bargaining and direct workers involvement

Many cases of good practice reported by interviewed union representatives with respect to the introduction of digitalisation are related to activities in local and municipal government. As the following examples show, these relate to a broad spectrum of public services.

The case of the municipality of Eidsberg in **Norway** showcases good practice regarding workers involvement in digitalisation projects¹²⁴. In May 2018,

this municipality of around 11,500 inhabitants introduced a ‘*Change Agents*’ system to ensure employee involvement in digitalisation processes. One of the union stewards of **Fagforbundet**, Reinfjell, was appointed as a Change Agent. Reinfjell holds this role together with six other employees. None of the Change Agents come from management, which according to the shop steward is viewed as an advantage. They act as a link between management and the workers on the ground and come from various occupational groups. The role of the Change Agents is still being shaped. Some of their responsibilities involve motivating and supporting fellow employees regarding new forms of work. Their purpose is not just to establish new digital systems, but to increase the digital know-how among employees. By working

side by side with employees impacted by digitalisation, the Change Agents will observe how the workers are affected and call for changes in the process if necessary. Another important part of being a Change Agent is ensuring that all employees receive necessary training.

Eidsberg participates in the national tripartite cooperation project as part of a group consisting of five neighbouring municipalities. In 2020, these five municipalities will be merged into one as part of Norway's ongoing structural reforms. The new municipality will have close to 50,000 inhabitants. The system of Change Agents has also been introduced in the other four municipalities and will remain a tool for employee involvement in the new municipality starting in 2020.

The local and municipal section of the **HK Kommunal** in **Denmark** has defined six guiding principles that should be applied to digitalisation projects in public services:

- increase influence and involvement in digitalisation measures in municipalities and regions;
- develop internal knowledge regarding digitalisation in order to better understand change processes and their impact;
- having gained knowledge of good data protection solutions and data ethics, share that knowledge in order to develop good data security solutions in public administration;
- provide active guidance and information to citizens, which is essential in order to maintain confidence and trust in digitalised public services;
- allow trade union members to be key players in digitalisation initiatives and their implementation;
- inform public service managers as to how they should involve employees in digitalisation projects.

According to representatives of the **ver.di** trade union in **Germany**, works councils or staff representatives, as well as youth and trainee representatives, have a key role to play in shaping digitalisation at the undertaking level. They must examine whether existing company or service agreements are still sufficient in the light of the current legal framework and technical innovations, or whether they have to be supplemented or completely renegotiated. ver.di also calls on public service employers to provide the bodies and representatives with comprehensive information in good time, to cooperate with them intensively, to interpret the co-determination rights broadly and to recognise the need for upskilling.

4.7 Shaping and regulating working time, telework and work-life balance

Digitalisation has put many issues related to working time (back) on the agenda of workers participation. These issues range from the impact of automatization and rationalisation gains on working time (reduction), to working time conditions, regulation of ICT-related work at home or outside normal working time, availability, monitoring and documentation of working time, maximum hours, remuneration as well as a bundle of aspects related to the increasingly blurred boundaries between working and private life.

Issues pertaining to working time, such as telework and work-life-balance, are certainly critical for collective bargaining on the topic of the impact of digitalisation on public service workers. In the case of home-based or mobile telework, many comments pointed to a number of rules and criteria for telework defined in collective agreements or company framework agreements that were regarded as important for 'fair telework'. The following were especially emphasised:

- Digital or online work has to be regarded as working time and there should be appropriate remuneration or compensatory time-off rules;
- There must be clear rules defining how working time at home or away from the workplace is counted;
- Rules and regulations in company agreements, regulation and collective agreements should take into account the fact that many employees increasingly complete most of their work outside of the normal workplace;
- Home-work should be based on the principle of voluntariness and reversal of evidence: both the worker and employer should agree, and in case of non-agreement, the employer should provide clear evidence as to why home-based telework is not possible;
- Clear rules are needed as regards the working conditions and health and safety requirement of telework locations;

Interviewees from public service trade unions in the current study highlighted that model-agreements on ICT-based mobile work or telework have proved very helpful for negotiations with management. Against a backdrop of high telework attractiveness in the U.S. public administration (see section 3.5), **U.S.** union, **AFT**, mentioned good practices in regulating telework, such as a local agreement that has been negotiated by the **Federation of Indian Service Employees**¹²⁵.

The right to disconnect is one of the issues related to digitalisation that has been most prominent in public debate in certain countries (Germany, France and Italy, for example). Some well-known sectoral examples have been observed in the automotive, banking, insurance or IT sectors where agreements between unions/works councils were concluded regarding the workers' right to disconnect during specific times, such as the evening, at weekends or during holidays.

The right to disconnect has also been negotiated in the French telecommunications and postal and logistics sectors, as well as in the Finnish financial service sector, for example.

As highlighted above (section 3.5), the legal right to disconnect was achieved in **France** thanks to the strong public pressure organised by major trade union federations. However, the scope of the law was initially limited to the private sector before being extended to the public sector¹²⁶. In France, five major trade unions were involved in drafting a report on labour and digital transformation, commissioned by the then Minister of Labour. The 'right to disconnect' was included in the report as part of a series of recommendations and finally was turned into law in 2017. French trade union representatives in the public sector highlighted the regulation's key aspects as follows:

- Outside of certain working hours, employees have the right not to respond to emails;
- The employer is obliged to guarantee this right (by establishing internal rules on working time) or be in breach of working time regulations as dictated by the labour law;
- Regarding working time, it is not longer relevant to distinguish between 'classical' work and work at home;
- Trade unions will become involved in the development of evaluation criteria as regards the application of the right to disconnect.

4.8 The right to training and qualification

According to union representatives interviewed in the context of this study, employee training and qualification are key to avoid large proportions of the workforce being left behind by digital transformation processes. The following needs were especially highlighted by interviewees:

- adapting initial and further training programmes at company level as well as in occupational profiles (national, sector-level);
- (re-) classifying pay groups according to new digital tasks and job profiles;

- providing all workers with basic digital skills, including workers less affected by digitalisation and older workers;
- re- und upskilling workers whose jobs are automatized in order to protect them against redundancy;
- integrating new occupational profiles into company specific training, skills development and qualification programmes;
- integrating digital tools and methods into initial and further training courses and programmes;
- guaranteeing a right to training for every worker.

An example of good practice was reported by the **AUPE** union in **Singapore** where the government’s “smart nation” project is being implemented in close cooperation with trade unions in the public sector. In this context, not only did several thousand public employees receive training measures such as data analytics, coding and a “Skills Future Digital Workplace (SFDW)” course, that were implemented with AUPE’s active involvement, but new training rights were also agreed. Every public employee now has the right to four hours of digital training every month as part of an annual 100 hours of training during working time. These are paid for by the employer. Furthermore, a mobile app called “Learn” has been launched to provide a mobile platform for public officers to learn any-time and anywhere. These achievements were highlighted as quite unique by the AUPE representatives.

As regards the protection of workers against redundancies due to new technologies, the German public service trade union ver.di highlighted good negotiation practices, namely collective agreements on employment protection against automatization (‘Rationalisierungsschutz’) that were settled as far back as the introduction of new technologies in the 1980s. Today, ver.di is demanding that the old agreements be adjusted and updated (see textbox below).

Germany: Collective Agreements on Employment Security in the context of Automation

The 1980s saw a wave of automation in public services. As such, the collective agreement on automation protection covering public administration at national, federal and municipal level dates back to this period. This agreement has been in force since 1987 with the aim of emphasising the interests of employees in change processes and avoiding social hardship. It regulates job security, qualification claims, income guarantees and improved protection against redundancy. However, the collective bargaining agreement needs to be adapted to the new conditions emerging in the age of digitisation and the new challenges and needs that have arisen as a result of increased technical possibilities.

Therefore, ver.di calls for a new collective agreement that safeguards co-determination processes and employee participation. Furthermore, the right to qualification and time sovereignty is to be guaranteed. In short, employees should participate in digitalisation gains and be protected from risks.

Source: ver.di. See for example the information leaflet “ Digitalisierung im öffentlichen Dienst durch Tarifvertrag gestalten!”, February 2019. Available at: <https://bund-laender-nrw.verdi.de/service/thema-digitalisierung/++co++2833ec54-314c-11e9-a162-525400f67940>

4.9 Impact of digitalisation on workers and trade union rights

Digitalisation is having a strong impact on workers' rights and has resulted in a number of challenges to existing legal regulation. This is exemplified in topics such as the protection of personnel data, the use of data for performance and behaviour monitoring in the workplace, the extensive surveillance of workers' activities both in the workplace and in outside work. Digitalisation also challenges existing regulation regarding working time, break and rest periods, holiday rights, access to training or the workers' right to work in healthy and safe workplaces.

The rapid spread of new forms of employment that often are based on flexible and precarious employment contractual arrangements in the digital economy are also challenging collective labour rights such as the freedom of association, industrial disputes and collective bargaining rights.

The interviews with public service trade union representatives have also shown an increasing concern regarding the impact had on basic rights linked to the status of employment, i.e. access to social and labour protection or coverage by social security systems. This results from the fact that there are typically no standard contractual arrangements involved in platform work or digitally mediated service work (e.g. via platforms such as UBER)¹²⁷.

In addition to their negative effect on employment and workers' social security, new digital-based forms of employment have a broader effect on those social security systems that are based on wage-related contributions. This was strongly emphasised by certain of our interviewees, such as the representative of the public service trade union in Austria. According to the interviewee, both new forms of employment such as platform work and new digital



business models based on the ‘sharing economy’ are undermining the established systems of social security and welfare because they are based on taxing employment rather than value-added activities. Furthermore, activities in the sharing economy have negative effects on local and municipal tax revenues as they are based on the idea of avoiding tax payments. To counteract this, a resolution made by the union management board in 2016 requested that the definition of employment status be rethought and eventually remodelled to provide labour protection for new forms of digital work and make adjustments in the field of social security legislation¹²⁸.

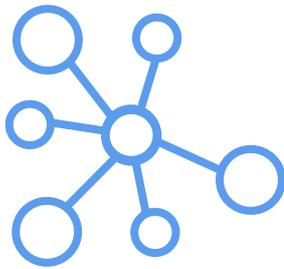
Similar demands have been made by other trade unions in different world regions. For example, **AUPE of Singapore** noted that the emergence of the gig-economy and corresponding precarious forms of work is regarded as one of the most important labour market challenges faced by Singapore today. It also reported that issues related to precarious self-employment, social security protection and decent wage standards

were currently being addressed by a tripartite working group within the Singapore Tripartism Forum¹²⁹. The Forum was launched in 2007 by the Prime Minister and consists of the Ministry of Manpower, the National Trades Union Congress and the Singapore National Employers Federation. The Forum is a platform for the tripartite partners to voice concerns and work together more effectively to overcome the more complex challenges as regards economic, social and labour market issues.

The trend of blurring boundaries between fully contracted workers and the self-employed, as well as the emergence of new forms of often extremely flexible mobile work raise a number of questions as regards individual and collective workers’ rights. However, the need to adjust and extend existing regulation in the light of new emerging challenges (employment status, data protection, surveillance, health and safety, working time, etc.) has not yet entered the broader public debate surrounding the brave new world of working in a digital(ised) economy. 

5.

CONCLUSIONS AND RECOMMENDATIONS



Though the scope of this study and of the national cases it presents is limited and should not be regarded as wholly representative of the global picture, it allows some clear messages and common themes to emerge both in terms of the literature review and the consultations carried out with trade union representatives.

Public service digitalisation is a global trend and is affecting citizens, users and workers everywhere.

This trend and its impacts are likely to increase due to technological developments such as AI and to structural mechanisms such as austerity, privatization and tax avoidance practices that weaken the financial capacity of public institutions to invest in and build their own in-house ability to develop pro-public digitalisation processes.

Digitalisation and new technologies have the potential to improve public service quality, accessibility and offer, provided workers and users have an opportunity to shape public policies, governance frameworks and the workplace or user conditions underpinning digitalisation. They can also improve work-life balance, work autonomy and working conditions. However, such positive spillovers do not materialise automatically. They require specific framework conditions. If digitalisation is implemented only for the sake of cost and headcount reductions, the impacts on service quality and employment will be negative.

Digitalisation is not a panacea when it comes to enhancing public service quality and access for all.

In fact, when introduced in already polarised contexts with wide digital or educational gaps, it has the potential to deepen these inequalities further. Therefore, the idea that digitalisation will automatically make public services more accessible and affordable to all is a myth promoted by private businesses, especially large digital tech corporations and global business consultancies, which have a vested interest in accessing the public service sector as it presents lucrative markets and business opportunities. Compelling evidence from different public service sectors show that the cost-effectiveness argument is often simply false, as digitalisation requires large investments that are often underestimated, create dependency on private technology providers, and are ultimately unsustainable for public authorities, finally benefitting contracted private service providers or financed via the private sector, privatisation and/or private-public partnerships.

Current trends in financing the digitalisation of public services indicate **that private businesses are playing a strong role in the provision, delivery and maintenance of digital hardware and software. They are also retaining strategic knowledge essential to quality digitalized public services,** which places them in the perfect position to provide expertise and knowledge that is no longer available within public service providers.

Digitalisation often goes hand in hand with the strengthened presence of the private, for-profit interests of big tech companies. Questions relating to the way investments in public service infrastructure are financed (role of public budgets, private investors) and available public resources (tax incomes) must urgently be addressed. All relevant public services analysed in this report point to the fact that, if not checked and framed in the interest of the public good, digitalisation tends to drive the further privatisation of public services.

As shown by the examples studied in this report, investments in the digitalisation of public services and in automation and new technologies often absorb huge amounts of money and fail to produce the expected results and efficiency gains. This is because **unintended effects and hidden costs** were not considered.

The human impact of digitalisation in public policies and initiatives is far too often neglected. Due to structural imbalances and inequalities related to gender, educational attainment and other criteria, such as access to professions, training, working time and stable types of employment contracts, **digitalisation tends to increase existing inequality in the labour market, in particular as regards gender and qualification status.** In order to counter this trend, significant investments and efforts should be made to support weaker and disadvantaged groups. However, the study found little evidence for such pro-active labour market approaches.

Contrary to the common image of a brave new digital world, research and surveys carried out among public service employees show that **digitalised work often has negative impacts on working conditions and health and safety at work.** Furthermore, digital work is still work that needs to be regulated and framed by new types of digital health and safety standards.

We know there is no stopping the rapid digitalisation of work in the future. However, **all workers must have a voice and a mechanism to shape this impending change of the future of work,** to ensure equity and inclusiveness, and to protect democracy and the freedom it provides.

Trade unions in public service sectors have, so far, been the only relevant actors demanding that workers and employees not be left behind in digital transformation processes. Good practice examples illustrate the important role of trade unions, social dialogue and collective bargaining in developing framework conditions and regulations that work in favour of public service quality, improved working conditions and employment security.

Trade unions across continents have developed a similar canon of principles and demands as regards public service digitalisation. The key aspects for shaping good digitalised public services are:

- Digitalisation should be regarded as a tool rather than an end in itself. Therefore, the introduction of new technologies and digitalised services should be based on a clear vision of the future of quality public services for all.
- Public service employees should be involved in digital transformation processes as early as possible through information, consultation and participation.
- Digitalisation should not result in any redundancies. Employment security and a right to training and skills development for every employee in public services, irrespective of their professional background and status, should be a general principle.
- Digital technologies and new digital services have led to new forms of working conditions, working time and employment status (e.g. telework, mobile ICT work, online platforms, availability). There is a need to establish supplementary regulation as well as legal and other framework conditions.
- The issues pertaining to big data and algorithms, data security and data privacy are creating a need to develop clear and reliable framework conditions that protect workers and define certain rights.
- In the field of health and safety, the worrying results of existing research and surveys put to

public service employees make it necessary to carry out risk assessments regarding digitalised work and working conditions.

The **framework conditions defining trade union involvement and participation in public service digitalisation across the world differ significantly** and range from co-determination rights and/or a strong role for collective bargaining agreements at national, sectoral and local level in some countries, to a total lack of influence in public policies and in local public service undertakings in others.

Digitalisation has a significant impact on individual and collective workers' rights, for example in fields such as health and safety, working time, personnel data protection, the right to training as well as the right to organise at the workplace, to engage in collective bargaining and industrial disputes. And here, the emergence of new forms of employment and precarious working conditions results in the need to adjust existing rights and develop new regulatory answers in order to represent workers and employees who are currently excluded from legal and social protection rights.

The digitalisation of public services raises fundamental questions about the future of the social and welfare state and the constitution of work. Currently many trends and symptoms indicate that we might already be at the beginning of an age of “surveillance capitalism” (Shoshana Zuboff), a new global architecture of assets and power relationships that threaten core values such as freedom, democracy and privacy.

As regards the role of the workers in such a scenario, the Argentinian public service trade union APL contributed a quote by the researcher and labour law expert, Luis Ramirez:

“And the workers? They seem to be the big losers, as do the trade unions. Not only because of the destruction of employment, but also because of the development of new forms of production, and of non-salaried work, which grows hand in hand with hyper connectivity applied in the world of work. Workers without offices or factories and, many times, without employers (at least, visible and

formal). With a computer we can work at home, in the bar, or in a co-working (shared office), and if we link ourselves to an electronic platform, we can fulfil the dream of not having an employer (but neither do we have rights)”.

The evidence of trade union practices documented in this report shows that public sector trade unions are aware of these risks surrounding the future of work, workers' rights and worker protection. Therefore, one main recommendation can be made in order to avoid such a negative scenario: strengthen the voice and influence of employees in public service digitalisation by guaranteeing consultation and negotiation rights, as well as strong collective agreements.

As regards good practices, the report has shown that the **greatest progress has been made in those cases where the collective voice and influence of employees in public service digitalisation has played a strong role**, i.e. by guaranteeing consultation and negotiation rights, as well as strong collective agreements. The report also shows that where this is the case, there has been most progress in advancing public services, protecting employee rights and contributing positively to the quality and availability of public services. By contrast, where such a social compact is lacking, the results and impacts are much poorer and might even worsen service provision and quality.

Thus, the report shows that trade unions are playing a crucial role in protecting the interests of their members and public service workers in the digitalisation process. The evidence presented in this report also demonstrates that trade unions are strong advocates for the delivery of higher quality public services and **the need for digitalisation and the use of new technology to serve and support public interest while avoiding a scenario in which public services fall under the control of private business interests.**

Future activities: Making sure that technological progress will result in social progress. A few final remarks should be made on the need for more in-depth research and activities: Firstly, the interviews and interaction with trade union organisations around the world has shown that public sector trade unions want to engage in the exchange of experience, information, and good and bad practices. While this

study was based on a perspective that embraced all public services, there is also a need to take a more in-depth, sectoral approach. Due to the limited resources available for this study, it would also be very helpful—with a view to develop more suitable practices in supporting public sector trade unions—to analyse different world regions in more detail and equip regional trade union centres with the necessary resources to do so. The focus should be placed in particular on cases and examples where trade unions have successfully turned technological progress into social progress in terms of worker wellbeing and working conditions as well as the quality and accessibility of public services for all.

Regional and sector-specific platforms gathering trade union experience and demands represent a much-needed activity that would make an important contribution to policy debates in international and regional institutions regarding digitalisation-related issues such as e-government, smart cities or free trade agreements and digitalisation (an issue that could not be addressed in this study).

Furthermore, the study has shown that **trade union representatives dealing with digitalisation and new technologies need to develop competencies and build know-how in order to contribute to the debate**. Representatives have voiced a strong wish to exchange knowledge and know-how pertaining to artificial intelligence, machine-based decision making or technologies such as blockchain. Webinars or online training sessions organised in cooperation with critical experts and/or institutions could facilitate such exchange.

And finally, such knowledge should be used to lobby policy and decision making and develop a stronger critical voice regarding the significant risks public services are facing as a result of powerful private corporate business interests that undermine the fundamental, normative orientations of general interest public services, such as equal access, serving the public good and the people. The study has shown that such risks are global in nature and high on the agenda of trade unions across countries and world regions. It would be important to address such issues through political campaigns highlighting the need to protect or even reinstate the ‘public good’ in public services.

Such activities should be accompanied by **further research and exchange**. The following topics require more attention, analysis and knowledge building as well as trade union cooperation:

- The impact and implications of public service digitalisation on the human rights of citizen/users of public services. In this context, in particular the rapid development of AI, algorithms and machines in decision-making should be addressed.
- The impact and implications of public service digitalisation on the trade union rights (freedom of association and collective bargaining) of public service workers. As shown in this review, digitalisation is challenging the very notion of work and workers/employees. Against this, there is a need to recalibrate labour law, to rethink collective bargaining and the regulation of working conditions, social protection and to review principles of collective representation and organisation. In this context, there is a need to further research on the impact of the platform economy on public services.
- The strategies used by private corporate champions of digitalisation in public services and the growing influence of private business on trade negotiation, lobbies of national governments and multilateral organisations and how workers’, unions and citizens/users can build alliances to in order to strengthen digital transformation processes that are driven by the idea of public good rather than by technological feasibility and business interests.
- Scenarios and recommendations for effective multi-level governance of digitalisation, including legislation, the role of social dialogue and collective bargaining. Against the global character of digital technologies and digital initiatives across all public sectors and the fact that such change is often driven worldwide by the same global companies, there needs to be a globally coordinated approach of trade unions to the regulation of digital technology use in public services. □

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ANNEX:

Trade unions participating in the study

Trade Union	Country	Sector
1. Confederacion de Trabajadores Municipales (CTM)	Argentina	LRG
2. Asociacion del Personal Legislativo (APL)	Argentina	Central Government
3. Younion	Austria	Public Services in general
4. Confederacion Nacional de Trabajadores de Seguridad Social CUT (CNTSS)	Brazil	Social Services / Health
5. SFPQ-Syndicat de la Fonction Publique et Parapublique du Québec	Québec (Canada)	Regional administration
6. HK Kommunal	Denmark	LRG (Haderslev council)
7. HK Kommunal	Denmark	LRG (National perspective)
8. CFDT - Health	France	Health care
9. CGT FMNE	France	Energy
10. Ver.di	Germany	LRG / public services in general
11. Ver.di	Germany	Water Section
12. Nagpur Municipal Corporation Employees Union (NMCEU)	India	LRG /Smart Cities
13. Fagforbundet – Norwegian Union of Municipal and General Employees	Norway	Municipal and Central Government
14. AUPE Amalgamated Union of Public Employees	Singapore	Public administration / Civil Servants
15. KHMU	South Korea	Public Administration / Health
16. FSC CC.OO	Spain	Central administration, water and sanitation, LRG
17. UNISON	UK	Public Services in general, focus health care, female employees
18. UNITE	UK	Public Services in general
19. AFT American Federation of Teachers	USA	Central, federal and local administration, health and social services, emergency services
20. Syndicat des Mediciens du Burkina Faso	Burkina Faso	Health Services

Endnotes

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3. OECD 2019: *Going Digital: Shaping Policies, Improving Lives*, p. 18.
4. For explanations see the glossary of terms.
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8. See: Drahoukoupil/Fabo 2016: *The platform economy and the disruption of the employment relationship*.
9. See Broughton et al. 2016: *Precarious Employment in Europe: Patterns, Trends and Policy Strategies*.
10. See for example: Eurofound and the International Labour Office (2017), *Working anytime, anywhere: The effects on the world of work*, Publications Office of the European Union, Luxembourg, and the International Labour Office, Geneva.
11. Broughton et. al. 2018: *The experiences of individuals in the gig economy*.
12. Voss 2018: *Digitalisation and Workers Participation – What Trade Unions, Company level Workers Representatives and Platform Workers think*.
13. EPSU Position Paper on Smart Public Services for a Digital Age. <https://www.epsu.org/article/epsu-position-paper-smart-public-services-digital-age>
14. AFT Public Employees 2002: *Digital Government and Technological Change*.
15. Public Services International brings together more than 20 million workers, represented by over 700 affiliated trade union organizations in 163 countries and territories. It is the global trade union federation dedicated to representing and promoting quality public services in every part of the world. PSI members, two-thirds of whom are women, work in social services, health care, municipal and community services, central government, and public utilities such as water and electricity. For more information visit <http://www.world-psi.org/en>
16. PSI Programme of Action, 2017 <http://congress.world-psi.org/wp-content/uploads/2017/12/EN-Vol-1-Draft-PoA-adopted-by-Congress-Nov-2017.pdf>
17. It is important to note here that private technological innovation such as the development of the smart phone, augmented reality glasses or 3D-printing has also been massively supported by public funding, namely in the U.S. and China. See Mazzucato, M. 2013: *The Entrepreneurial State*.
18. <http://congress.world-psi.org/wp-content/uploads/2017/12/EN-Vol-1-Draft-PoA-adopted-by-Congress-Nov-2017.pdf>.
19. OECD 2019: *Going Digital*, p. 41
20. Available at: https://publicadministration.un.org/egovkb/portals/egovkb/documents/un/2018-survey/e-government%20survey%202018_final%20for%20web.pdf.
21. The ranking is based on the UN E-Government Development Index (EGDI), a composite indicator of three important dimensions of e-government, namely: provision of online services, telecommunication connectivity and human capacity.
22. The World Bank. Global Dataset - Of the 1 billion people without an official proof of identity. Available at: <http://blogs.worldbank.org/ic4d/counting-unaccounted-11-billion-people-without-ids>.
23. See for example: *India Loves Data but Fails to Protect It*, New York Times 4.3.2018, accessible at: <https://mobile.nytimes.com/2018/04/03/opinion/india-data-privacy-biometric-aadhar.html>
24. See: Deloitte 2018: *Blockchain in Public Services*.
25. During 2012 and 2015 the Danish Government made it mandatory for Danish citizens to use digital self-service for a wide range of public service areas. Also, under the Danish Digital Post Act, it became mandatory from November 2014 to be able to receive Digital Post from public authorities from November 2014. For further details see the website of the Danish Governments' Agency of Digitisation: <https://en.digst.dk/policy-and-strategy/mandatory-digitisation/>.
26. According to the current legal framework of the European Union, it is forbidden that decisions be taken by machines.
27. 'TravelBot' is an AI-powered Facebook Messenger chatbot established by the Travel for London (TFL) government agency in June 2017. This Messenger bot is intended to help people with services like bus arrivals, route status, service updates (bus/rail), maps, and even contacting a human agent if a user would like to access further details. See: <https://tfl.gov.uk/info-for/media/press-releases/2017/june/tfl-launches-new-social-media-travelbot>
28. The Facebook Messenger chatbot is run by the Ministry of Communication and Information of Singapore. The chatbot extracts the information from the government dedicated portal that is already in place for public use., 'Gov.sg' - <https://www.facebook.com/gov.sg/>
29. See Royal Geographical Society: *Digital Divide in the UK*. Available online: <https://21stcenturychallenges.org/what-is-the-digital-divide/>
30. For the complete story of this example see: <https://www.journaldemontreal.com/enquetes/sagir>
31. See for example: Hayat, P (2016): *Smart Cities – A global Perspective*.

32. See: <https://dmicdc.com/>.
33. United Nations: E-Government Survey 2018. Gearing E-Government to support transformation towards sustainable and resilient societies.
34. See for example Deloitte ('Smart Cities Africa', available at: <https://www2.deloitte.com/za/en/pages/public-sector/articles/smart-cities.html>); Telefonica ('A path to smart cities in Latin America', <https://www.gsma.com/iot/wp-content/uploads/2012/05/Luciano-Alakija-GSMA-Smart-City.pdf>), Siemens ('Smart Cities – Data driven Cities', <https://www.siemens.com/innovation/en/home/pictures-of-the-future/infrastructure-and-finance/smart-cities-trends.html>). On specific cases see: Bill Gates is building his own Smart City, <https://www.businessinsider.de/bill-gates-smart-city-pros-cons-arizona-urban-planners-2017-11?r=US&IR=T>; 'Google and Toronto: smart city, dump deal', <https://www.theguardian.com/commentisfree/2018/feb/05/the-guardian-view-on-google-and-toronto-smart-city-dumb-deal>
35. The following information is based on available literature on the topic as well as an interview with the president of the employee trade union of the Nagpur Municipality carried out in December 2018.
36. When it comes to source of financing, most of the Smart City plans envisage around 70 per cent of the total outlay to be funded by the Central and State Government, either through the Smart City Mission or through other Smart City schemes. The challenge lies in the balance 30 per cent which is supposed to be funded by the private sector either through public private partnership (PPP) projects or through issue of municipal bonds / similar instruments.
37. Housing and Land Rights Network: India's Smart City mission. Smart for whom? Cities for whom?
38. Launched in 2013 in the context of the Governments Vision 2030 to become Africa's leading hub for innovation and digital technologies, the results achieved so far are quite sobering. See for example the article in Daily Nation of December 2018: <https://www.nation.co.ke/business/Why-Kenya-Konza-technocity-is-dead-in-the-water/996-4890120-qxopp7z/index.html>.
39. See: 'The aim is to automate us: Welcome to the age of surveillance capitalism', Guardian, 20 Jan 2019.
40. See: <https://www.barcelona.cat/digitalstandards/en/free-soft/0.2/introduction>
41. See: <https://www.barcelona.cat/digitalstandards/manifeto/0.2/>
42. See for example: Hall, D 2015: Why public-private partnerships don't work. The many advantages of the public alternative. PSIRU London. Report commissioned by Public Services International (PSI). See also the "People over Profit" online library: <https://peopleoverprof.it/>.
43. This also includes technologies and services connected to smart meters and smart grids. The EU social partners in the electricity sector, EPSU and EURELECTRIC agreed on a joint position on smart meters in 2010: <https://www.epsu.org/article/joint-position-smart-meters>. This was based on a survey carried out by EPSU amongst national members across Europe in 2010 that revealed a mixed picture of trade union involvement and participation in decisions regarding the introduction of smart metering. Generally, trade union involvement was regarded as weak in the context of introducing new technologies. Furthermore, the survey found that cost-benefit analyses took no account of the consequences that the introduction of smart meters could have on employment. EPSU also published a position on smart grids in 2009. See: EPSU Opinion on ERGEG Public Consultation Paper on Smart Grids, available at: <https://www.epsu.org/hu/node/5564>. As noted by utility experts of PSI Global in a comment to this report, smart metering in developing countries is illustrating also other impacts and consequences in particular for poorer households: Smart or prepaid meters are used to collect fees and consequently cut off those citizens that are not able to top-up their meters/cards.
44. Google in recent years has invested heavily in machine learning and AI applications that are easy to handle and thus attractive for clients that lack specific knowledge in the field. The AI platform is linked with a number of related services that Google offers for example "document understanding AI services", which analyze scanned or digitally available documents and translate them into structured data.
45. ver.di: Digitalisation in water sector. State of affairs, questions, calls. Available at: <https://ver-und-entsorgung.verdi.de/themen/digitalisierung/++co++8cf093da-b286-11e8-964c-525400f67940>.
46. See for example: https://www.theepochtimes.com/argentina-launches-blockchain-for-public-services_2608919.html.
47. As documented in a report summarizing results of the ver.di conference on digitalisation and public welfare in April 2018, see: <https://www.verdi.de/themen/digitalisierungskongresse/kongress-2018>. Digital blood sugar metering works with a glucose sensor that substitutes the routine fingertip puncturing to measure blood glucose. The sensor on the upper arm measures the glucose content and a scan with a digital radar shows the value.
48. <https://www.quebec.ca/sante/vos-informations-de-sante/carnet-sante-quebec/>
49. In fact, due to the high investment costs, the Da Vinci surgery system in Germany has been introduced in particular in large public hospitals.
50. See for example: Studie im Fachjournal Lancet; report about a study in Australia: <https://www.srf.ch/news/schweiz/da-vinci-roboter-teure-hightech-operationen-mit-ungewissem-nutzen>; or in Germany: <https://www.zeit.de/2017/01/chirurgieroboter-davinci-operation-arzt>
51. <https://www.theguardian.com/commentisfree/2017/jul/09/giving-google-private-nhs-data-is-simply-illegal>
52. See: <https://www.theguardian.com/technology/2017/may/15/warning-of-nhs-cyber-attack-was-not-acted-on-cybersecurity>.
53. See: AlgorithmWatch 2019: Automating Society.
54. <https://www.researchandmarkets.com/research/pc2rfv/artificial?w=4>
55. AFT 2018: Resolution "Future of Teaching and Technology".
56. See: CSQ: Digital technology: meeting the challenge, providing the support. CSQ survey results. Available at: http://www.lacsq.org/fileadmin/user_upload/csq/documents/dossiers/numerique/1718-236_FeuilletSommetNum_EN_web.pdf
57. See for example on Uganda: <https://africandailyvoice.com/en/2019/02/11/uganda-police-force-undergoes-digitalisation/>.
58. See for example: <https://www.france24.com/en/20181026-armed-drones-iris-scanners-chinas-high-tech-security-gadgets>.
59. EPSU 2016: Position Paper on Smart Public Services for a Digital Age, p. 1.
60. Deloitte South Africa 2017: Automation in Public Sector.

- Automation reduces costs and transforms public service. Web-article, <https://www2.deloitte.com/za/en/pages/operations/articles/automation-in-the-public-sector.html> (accessed January 2019).
61. 'Leapfrogging' means making rapid and disruptive (in contrast to evolutionary and incremental) progress.
 62. Brookings Institute 2018: Harnessing Africa's Digital Potential. New Tools for a New Age.
 63. See: Krcmar et al. 2018: eGovernment Monitor 2018 – Nutzung und Akzeptanz digitaler Verwaltungsangebote – Deutschland, Österreich und Schweiz im Vergleich.
 64. These figures are based on survey results published in the report "IT in Practice" by Ramboll. See Ramboll 2018: IT I Praxis.
 65. Examples documented in EPSU 2018: How trade unions can use collective bargaining to uphold and improve working conditions in the context of digital transformation of public services.
 66. Quoted from: <https://africandailyvoice.com/en/2019/01/25/ugandan-president-calls-caution-ai-accelerating-african-development/>.
 67. EPSU 2016: Data protection, public services and workers' rights. Appendix to the EPSU Position Paper on Smart Public Services for a Digital Age, adopted by the EPSU Executive Committee on 19 April 2016.
 68. The principle that a citizen should provide their information to public authorities only once, allowing this information to then be saved and shared between all levels of government.
 69. See: <https://www.dr.dk/nyheder/regionale/fyn/fremtiden-ulovlig-database-om-patienter-afgoeres-i-dag>
 70. You can read more about this case in English here: <https://www.itgovernance.eu/blog/en/norwegian-health-authority-hacked>. <https://www.newsinenglish.no/2017/05/31/health-board-fired-after-it-scandal/>. On the cancelling of the agreement see: <http://norwaytoday.info/finance/bins-billion-agreement-outsourcing/>
 71. Powles / Hodson 2017: Google DeepMind and healthcare in an age of algorithms.
 72. See also: Thomas L. Madsen, HK Stat Denmark: Digitalisation and Centralisation of the Danish Tax Administration – the good, the bad and the real ugly effects seen from a public sector union perspective – and a picture of the future in other areas? Presentation held at the EPSU Seminar on Digitalisation, 13 June 2016, ÖGB, Vienna.
 73. See Lethbrigde 2016: Public Services, democracy and digitalisation See also Taghreed 2016: The UK's National Programme for IT: Why was it dismantled?
 74. See: Powell 2016: PPPs and the SDGs: Don't believe the hype. See also various documents and news articles in the online library People over Profits: <https://peopleoverprof.it/>
 75. See: Vérification de l'optimisation des ressources – Rapport du Vérificateur général du Québec à l'Assemblée nationale pour l'année 2012-2013, automne 2012, chapitre 5 : Contrats de services professionnels liés au traitement de l'information, Available at: https://vgq.qc.ca/fr/fr_publications/fr_rapport-annuel/fr_2012-2013-VOR-Automne/fr_Rapport2012-2013-VOR-Automne-Chap05.pdf.
 76. See: <https://www.lapresse.ca/actualites/politique/politique-quebecoise/201211/29/01-4599210-rapport-du-vg-des-contrats-informatiques-mal-geres.php>.
 77. Younion: Arbeiten 4.0: Den digitalen Wandel fair gestalten!
 78. Interview with UNISON in the context of this study. See also: <https://www.theguardian.com/technology/2017/may/15/warning-of-nhs-cyber-attack-was-not-acted-on-cybersecurity>.
 79. Based on Degryse 2016: Digitalisation of the economy and its impact on the labour markets.
 80. See: Guardian: Robots could replace 250,000 UK public sector workers, 6 February 2017. Available at: <https://www.theguardian.com/technology/2017/feb/06/robots-could-replace-250000-uk-public-sector-workers>.
 81. See: France 24: French public sector workers strike against Macron reforms, 22 May 2018. Available at: <https://www.france24.com/en/20180522-french-public-sector-workers-strike-against-macrons-reforms>.
 82. The so-called Lord Darzi Report. See: <https://www.ippr.org/news-and-media/press-releases/embrace-full-automation-to-release-time-to-care-in-the-nhs-and-social-care-says-top-surgeon-lord-darzi>.
 83. The Darzi Report identified communicating medical notes, booking appointments and processing prescriptions among the many activities that should be carried out through digital technology. Researchers have calculated the value of the time that may be released through automation of the current tasks in different roles, freeing up professionals to focus on caring. Potential time releases are quite significant, e.g. more than 50% in support to clinical staff; 35% in ambulance staff, 30% for nurses and health visitors; 30% in infrastructure support. As regards job roles, the report estimates that automation might reduce the amount of time needed for managerial work by 36%, in the case of registered nurses by 29% and by 24% for direct care work activities. For more details see source in the footnote above.
 84. See: Berg et al. 2018. Digital labour platforms and the future of work.
 85. Based on a summary of the survey received from a representative of Fagforbundet. A Norwegian version of the report can be found on Agenda's website: <https://tankesmienagenda.no/notater/digitalisering-av-offentlig-sektor/>.
 86. Nygren 2012 Narratives of ICT and Organisational change.
 87. See for example: ECORYS and Danish Technological Institute (2016) The impact of ICT on job quality: evidence from 12 job profiles. A study focussing on two public services (public employment services and homecare) that has been commissioned by EPSU is based on this approach. See: Peña-Casas et al. (2018): Impact of digitalisation on job quality in public services. Homecare and Public Employment Services.
 88. EU-OSHA 2018: Foresight on new and emerging occupational safety and health risks associated digitalisation by 2025 — Final report.
 89. Peña-Casas et al. 2018: Impact of digitalisation on job quality in public services. Home care and Public Employment Services.
 90. Kommunal 2019: Welfare technologies for health, safety and professional development.
 91. SFPQ 2016: LES CENTRES D'APPELS DANS LA FONCTION PUBLIQUE ET PARAPUBLIQUE DU QUÉBEC.
 92. See for example the NYT article: "Don't get too comfortable at your desk". Available at: <https://www.nytimes.com/2017/10/06/business/the-office-gets-remade-again.html>
 93. See: <http://www.governing.com/topics/transportation-infrastructure/gov-workers-telework-public-transportation-commute.html>
 94. See: <https://news.gallup.com/businessjournal/206033/>

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95. See: <https://grandsorganismes.gouv.qc.ca/a-consulter/actualites-et-evenements/detail/news/mise-en-ligne-de-la-presenta-tion-mobiliser-le-personnel-des-centres-dappels-en-optimisant-leurs-con/>
 96. See explanation in the glossary of terms.
 97. See Black/ Spitz-Oener A. 2007: Explaining Women's Success: Technological Change and the Skill Content of Women's Work.
 98. De Groen et al. 2017: Impact of digitalisation and the on-demand economy on labour markets and the consequences for employment and industrial relations.
 99. Berger/ Frey 2016: Structural Transformation in the OECD: Digitalisation, Deindustrialisation and the Future of Work.
 100. Arntz et al. 2016: The Risk of Automation for Jobs in OECD countries: A Comparative Analysis.
 101. See for example Berg et al. 2018: Digital labour platforms and the future of work.
 102. AFT Public Employees 2002: Digital Government and Technological Change. The Impact on Public Employees and Quality Public Services. The taskforce involved seven trade union members from six different federal states and from a variety of public services and job classifications.
 103. See for example: <https://www.verdi.de/themen/digitalisierung>.
 104. EPSU contribution to public EU Consultation on "Transformation Health and Care in the Digital Single Market" (10 Oct 2017), available at: https://www.epsu.org/sites/default/files/article/files/EPSU_CONTRIBUTION_E_HEALTH.pdf
 105. <http://www.world-psi.org/es/el-futuro-del-trabajo-en-la-administracion-publica-nacional-el-caso-argentino>
 106. See: <https://www.apldigital.org.ar/new/index.php/prensa/1315-observatorio-del-futuro-del-trabajo>
 107. Interview with a representative of APL in November 2018.
 108. For example, VISION: "IT i Valfårdens Tjänst (IT in the Service of Welfare)", 2014.
 109. In the Norwegian context, collective agreements usually consist of two parts: A basic agreement that governs the relationship between organisations and predominant rules. This national tripartite dialogue programme can be seen as an extension of the basic agreement. The other part of the collective agreement is a national agreement regulating wages and working conditions for a certain industry or a sector. The national tripartite cooperation agreement on digitalisation is not concerned with bargaining or negotiations. It is social dialogue at national and local level.
 110. The actual agreement (published on the Ministry's website, in Norwegian): https://www.regjeringen.no/contentassets/c80976429a464896bbd2de4d3598c89f/avtale_digital_kompetanse_kommunene.pdf. Article in English on the signing of the agreement: <http://www.world-psi.org/en/norwegian-municipal-union-signs-tripartite-agreement-worker-involvement-and-social-dialogue-public>
 111. The website created and edited by the three parties on national level: www.komdigi.no.
 112. See also: <http://www.world-psi.org/en/norwegian-municipal-union-signs-tripartite-agreement-worker-involvement-and-social-dialogue-public>.
 113. The co-determination laws guarantee employees participation in particular in the the regulation of working conditions as well as (to a lesser extend) in economic planning and decision making at company level.
 114. See also: <http://www.world-psi.org/en/node/10133>
 115. Regarding the situation of municipal workers rights in Argentina see also the report of a joint CTM and PSI meeting in the context of the International Labour Conference 2017: <http://www.world-psi.org/en/ctm-and-psi-take-municipal-workers-union-rights-fore-international-labour-conference-2017>.
 116. See: <https://unitetheunion.org/media/1236/draft-new-technology-agreement-october-2016.pdf>.
 117. A model form of such a "New Tech Agreement" can be downloaded on the UNITE website: <https://unitetheunion.org/work-voice-pay/work-voice-pay-guides/>
 118. Utilise la Transformation Numérique pour Changer le Travail – Un Guide UGICT-CGT. <http://www.ugict.cgt.fr/publications/guides/utiliser-le-numerique-pour-changer-le-travail--le-guide-qvt>
 119. See: https://www.boeckler.de/pdf/mbf_bvd_hintergrund_e-government.pdf
 120. For further information see: <https://www.verdi.de/themen/digitalisierung>
 121. UNISON 2018: Bargaining on monitoring and surveillance workplace policies, July 2018. Available at: <https://www.unison.org.uk/content/uploads/2018/08/Monitoring-and-surveillance-at-work-08-2018.pdf>
 122. Prentimo stands for "Preventive Shaping of Mobile Work". See: <https://innovation-gute-arbeit.verdi.de/ueber-uns/forschungsprojekte/prentimo>
 123. "Contratto Collettivo di Lavoro. Comparto Funzioni Centrali. Periodo 2016-2018". Available at: https://www.aranagenzia.it/attachments/article/8804/CCNL%20definitivo%20Funzioni%20centrali%20triennio%202016-2018_firmato_12-2-2018.pdf
 124. The information on this case was delivered by Fagforbundet in the context of this study.
 125. Contract language from the agreement negotiated by Federation of Indian Service Employees, AFT, Local 4524. Provided by AFT in the context of this study.
 126. For further information, see: <https://www.euro-found.europa.eu/fr/publications/article/2014/france-a-legal-right-to-switch-off-from-work>.
 127. See for example: Broughton et al. 2018: The experiences of individuals in the gig economy; Forde et al. 2017: The Social Protection of Workers in the Platform Economy; Prassl, J. 2018: Collective Voice in the Platform Economy.
 128. Yunion 2016: Arbeiten 4.0: Den digitalen Wandel fair gestalten.
 129. <https://www.tripartism.sg/home>.



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