Collective Bargaining and Digitalization: A Global Survey of Union Use of Collective Bargaining to Increase Worker Control over Digitalization

Eckhard Voss
wmp consult

Daniel Bertossa
Public Services International Global Union Federation

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Abstract

This article outlines and collates exemplary clauses from collective bargaining agreements and similar sources, such as guidelines for union negotiators on digitalization in public and private services. Based on the evaluation of agreements and single clauses and their mapping along seven key dimensions of workers' rights and protection as regards digital technology in the workplace, the research shows that collective bargaining provides clear added value in the absence of legal provisions and by complementing and tailoring existing regulation to sectoral and workplace specificities, new emerging risks, and other challenges. The research that will feed into an online database on the issue by Public Services International shows that unions are increasingly aware of the need to negotiate new rights for the digital work environment, while certain gaps exist as regards new emerging challenges and topics, for example, in fields such as workers' rights over digital tools and algorithms or equal opportunities.

Eckhard Voss is a senior adviser and management partner at wmp consult in Hamburg, Germany. Daniel Bertossa is Assistant General Secretary of PSI, the global union federation that represents 670 public service unions in 160 countries covering more than 30 million workers in both the private and the public sector.

Digitalization is rapidly changing the global economy and all aspects of the world of work.[1] New and "disruptive" technologies, such as cloud computing, big data gathering, analytics, the Internet of things, machine learning, and artificial intelligence (AI), affect all sectors, from employment trends to how we go about our jobs. 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."[2]

Workers and their unions will need to anticipate and mitigate these changes if they are to defend labor rights and maintain acceptable working conditions for their members. A recent baseline study by the global union federation Public Services International (PSI) on the impact of digitalization on various public services demonstrates the need for an equitable balance of power in decision making to ensure positive outcomes for workers. Thus, it is imperative that decision making is not left solely in the hands of corporate actors and that it be regulated in the public interest and include close consultation with implicated social partners.[3]

Collective bargaining is a key tool for workers if they are to gain influence and control in decision-making processes.[4] To ensure that this tool is available to workers, unions need access to collective bargaining clauses and agreements they can adapt and add to their own agendas. Initial evidence from this study suggests that only some unions have made tentative steps in this area.

To achieve these goals collective bargaining with regard to digitalization would need to reflect the significant impact of new technologies on the workplace and beyond from the perspective of workers. Digitalization often accompanies more comprehensive processes of change and transformation. Collective bargaining would need to provide provisions for single topics and areas of work and act as a comprehensive safeguard for principles, rules, and rights that guide workers and protect their interests.

Mitigating the effects of workplace digitalization, however, is better done by means other than collective bargaining. Privacy legislation, workers health and safety protocols, antimonopoly policy, and public procurement directives are just some of the many areas where strong legislative frameworks are needed to protect workers. In the absence of these frameworks, however, workers will use collective bargaining as one of the most effective tools for worker protection.

In addition to protecting the covered workers, collective bargaining can also help unions and workers push their agendas and fill in legislative gaps until other frameworks are up to the task. Collective bargaining has often been used to spread and enforce good practice as part of efforts to normalize standards, with the hope that they eventually become legislation.

Unions must simultaneously protect workers' interests through collective bargaining and demand legislative and regulatory reform. In the process, they must ensure that governments do not sign away powers to regulate digital technology under trade agreements—especially those that legally bind future services.

Methodology and Analytical Approach

Methodology and Dataset

The research was carried out between summer 2020 and fall 2021 as part of a project commissioned by PSI. This project aimed at establishing an online database (forthcoming) for the use of its affiliates that collects existing bargaining clauses and agreements that deal with digitalization.

The research was carried out by a mixed methodological approach: most of the collective agreements as well as other relevant documents were gathered with the help of national PSI

affiliates and Global Union Federation networks from all continents during the second half of 2020.[5] Further sources were gathered by screening relevant databases and resource centers, reviewing secondary sources, and engaging in direct exchanges with trade unions.

Because of the involvement of PSI-affiliated trade unions at the national level, the study focuses on public services. Thus, most of the documents and sources were gathered from sectors such as public administration and government and from utilities such as energy and water, telecommunication, postal services, passenger transport and logistics, social services, and health or education. But the sample also consists of collective agreements and other sources that have a cross-sectoral approach (e.g., European Framework Agreements signed by the peak-level social partner organizations) or have a multisector approach (e.g., negotiation guides with model clauses).

In all, sixty documents containing more than 140 relevant clauses were gathered for the purpose of this research from eleven countries and two larger regions (global scope and European Union) as shown in Table 1.

Table 1. Number of Research Sources per Country or Region

Country or region	Number of sources
Austria, Denmark, Global (ILO), Korea, Norway, Sweden	1
Spain, Ireland	2
Canada	3
European Union, Italy	4
United Kingdom	16
Germany	23
Total	60

The sample of documents cannot be regarded as representative of sectoral or geographical coverage. Nor was this the purpose of the analytical research approach, which instead aimed at providing typical examples of collective bargaining contract language on relevant topics related to digitalization.

Table 2 describes the type of sources, nearly 75 percent of which are collective agreements or compilations of relevant clauses at national, regional, and local levels and were delivered by PSI affiliates or desk research.[6] In contrast to these (legally binding) collective agreements, a few transnational framework agreements signed by European trade union federations and employer organizations were also included in the sample. Such agreements are nonbinding but encourage national affiliates to engage in collective bargaining within their countries. Finally, approximately 25 percent of the examined documents are trade-union model agreements, clauses, or guidelines to support union negotiators. The selection criteria for such documents were, first, a clear link to the issue of digitalization and, second, the existence of concrete model clauses addressing relevant aspects.

Table 2. Type and Number of Sources Gathered and Evaluated

Type of source	Number of sources
Collective agreements at national, regional, or company level, including agreements at company level that have been negotiated by staff representatives and the company management for the whole workforce	42
European framework agreements	3
Model clauses for trade union negotiators	15
Total	60

A further feature of the dataset relates to the dynamics of collective bargaining outcomes on digitalization over time. Though the search for relevant sources has not been restricted to a certain period when an agreement was signed or a model clause was published,[7] a striking result of the research was that most of the collective agreements and sources gathered are fairly recent, with nearly 60 percent of all documents signed or published in the three-year period 2019–2021 (see Table 3). This finding may indicate that interest is increasing but also it may simply reflect the tendency to renegotiate agreements that supersede previous agreements.

Table 3. Number of Sources per Year of Signature or Publication

Years	Number of sources
2005–2014	9
2015–2018	15
2019–2021	35
Total	59

Note: One source has no date because this is a compilation of relevant clauses from a variety of collective agreements with different dates of signature.

Analytical Approach: Taxonomy of Key Thematic Areas and Aspects

Digitalization covers a wide range of interconnected topics. To help workers, unions, and their representatives understand the areas in which they must collectively bargain to protect and support workers, and to order that information for ease of access and analysis, we developed a taxonomy that consists of main thematic areas (each broken down into subthemes or aspects) that should be regarded as key domains for the shaping of digitalization and the introduction of digital technologies in a way that respects workers' rights and improves working conditions by addressing current or future risks.[8] We are unaware of any other taxonomy that serves this purpose.

The taxonomy of themes and subthemes was based on an extensive review of existing research on the impact of digitalization on employment and working conditions and, where relevant, their interaction with public services. Seven broad themes and thirty-two subthemes or thematic aspects were developed into an analytical grid used for sorting and classifying the identified sources (see Table 4). All material found that deals with digitalization was placed within the taxonomy. As with any taxonomy, some distinctions are not crisp and there is some crossover between themes and subthemes. Where these crossovers are significant, we have

tried to cross reference within the text. This issue is most apparent where the topics move further away from traditional industrial relations topics and are influenced more by factors related to digital innovation. Perhaps the most striking example is the interrelationship between the content of Section 5: Worker's data rights and protection, and Section 6: Workers' rights over digital tools, artificial intelligence, and algorithmic management.

A key outcome of the qualitative and quantitative evaluation is a portrait of collective bargaining provisions on workers' rights in the context of digitalization. Apart from issues that are relatively well addressed, the research also has identified several themes that so far have not been addressed at all or where significant gaps exist. These results contributed to a better understanding of where the union movement needs to be working if it is to develop practical tools to support trade unions in negotiating over digitalization, including the promotion of bargaining on issues that so far have been scantly addressed.

Table 4. Taxonomy of Digitalization: Main Thematic Areas and Subthemes

1	**Workers' rights in the context of public service reforms involving new technology** 1.1 Anticipation of change and information and consultation rights 1.2 Involvement in decision making and investment planning 1.3 Public service reform impact on services and quality 1.4 Periodic reassessment of new technologies (impact and risk assessments)
2	**Equal opportunities and diversity** 2.1 Gender equality, diversity, and equal opportunities 2.2 The digital divide, discrimination, and bias 2.3 Digital inclusion 2.4 Equal opportunities assessment
3	**Employment, jobs, skills, and lifelong learning** 3.1 Job security and job protection 3.2 Employability and career security 3.4 Further training, upskilling, reskilling, and lifelong learning 3.5 Job profiles and job descriptions 3.6 Right to learn and learning time 3.7 E-learning, self-learning, and blended learning
4	**Work-life balance, telework, and platform workers' rights** 4.1 Teleworking, ICT mobile work, remote working, working from home, "smart" working, "blended working" 4.2 Working time 4.3 Work-life balance, availability, reachability, right to disconnect 4.4 New work, platform work, crowd working

5	**Workers' data rights and control over algorithmic inferences and profiles**
	5.1 Compliance with national and international regulation
	5.2 Data security and protection
	5.3 Data ownership and control, data storage, and interferences
	5.4 Data ethics and ethical codes
6	**Workers' rights over digital tools, artificial intelligence, and algorithmic management**
	6.1 Right to know about, edit, and adjust digital surveillance and control tools
	6.2 Artificial intelligence ethics and technology-restriction clauses
	6.3 Workers' rights in artificial intelligence and algorithmic management
	6.4 Technology-restriction clauses
7	**Health and safety protection**
	7.1 Digital work environment
	7.2 IT-related emerging risks assessment
	7.3 Psychological and psychosocial stress, risks
	7.4 Ergonomics, usability
	7.5 Screen time

In the following sections, we discuss the issues at stake and the key results of the qualitative and quantitative analysis in more detail. We also present an overview of the key research results and a selection of individual clauses that we believe are useful to help unions protect workers from the harmful and often hidden effects of digitalization and identify trends.[9]

Workers' Rights in the Context of Public Service Reforms Involving New Technology

As highlighted in a previous research report on public services, the digitalization of public services and the introduction of new technologies has a lasting effect on the provision and quality of public services and on employment and working conditions.[10] The introduction of new technologies is often related to profound changes in work organization, processes, service delivery, procurement, and outsourcing. Also, digitalization in public services is linked to claims by the digital tech industry that more can be achieved at less expense and that the new technology makes public services more efficient. These promises are often unfulfilled and there is evidence that the quality and delivery of public service can deteriorate while investment costs and hidden financial burdens (e.g., IT maintenance costs) have increased sharply.[11]

Further problems occur when staff are not involved in the process of change. A survey for the European Federation of Public Service Unions (EPSU) affiliate Prospect UK found that, when new technology was being implemented, 73 percent of workers were not very confident or not confident at all that their employer would involve them in making decisions.[12] Similar findings were reported from the local and regional government trade unions Kommunal in Sweden and Fagforbundet in Norway.[13] Both countries have a strong trade union presence at sectoral and workplace levels. But in the context of digitalization and automation, employees and trade union members have reported a significant lack of involvement before decisions are taken by public service authorities and providers.

This issue was fundamental to a 2017 collective agreement in the Norwegian local government sector, signed by Fagforbundet, the Norwegian Ministry of Local Government and Modernization and the Norwegian Association of Local and Regional Authorities.[14] Their aim was to foster an inclusive strategy for the digitalization of public services, and the agreement committed all parties to engage in social dialogue and active worker participation in achieving these transformations. The agreement stressed the need to involve worker representatives and employees in the process, especially by joint committees on digitalization or employees becoming digital agents.

Workers deserve to be heard and included in all stages of public service reform and restructuring. Trade unions, representatives, and interest groups need to be involved from the preliminary stages of planned digitalization to the introduction of new technology, keeping a clear channel of communication between all affected parties. Analysis of reforms on services and their quality, such as periodical risk assessments, are key to maintaining transparency, keeping workers in the loop on changes to their professional tasks and roles and incorporating their demands and needs into reforms.

Collective Bargaining Practices and Gaps
Of the sixty collective agreement or model agreement texts that were analyzed, nineteen refer to the introduction of new technologies and rights of workers and trade unions. Most of the identified texts are collective agreements at various levels, covering either a whole sector or a company.

Most of the clauses we found (eighteen out of nineteen) refer to basic information and consultation rights in the context of restructuring, which in many countries are already guaranteed by legal provisions (see Figure 1). Outside of those texts, only a few clauses include commitments for anticipating change that involve consultation or even participation of workers' representatives or trade unions. Such clauses exist only within company-level agreements and few clauses address the impact of reforms on the quality of public services.
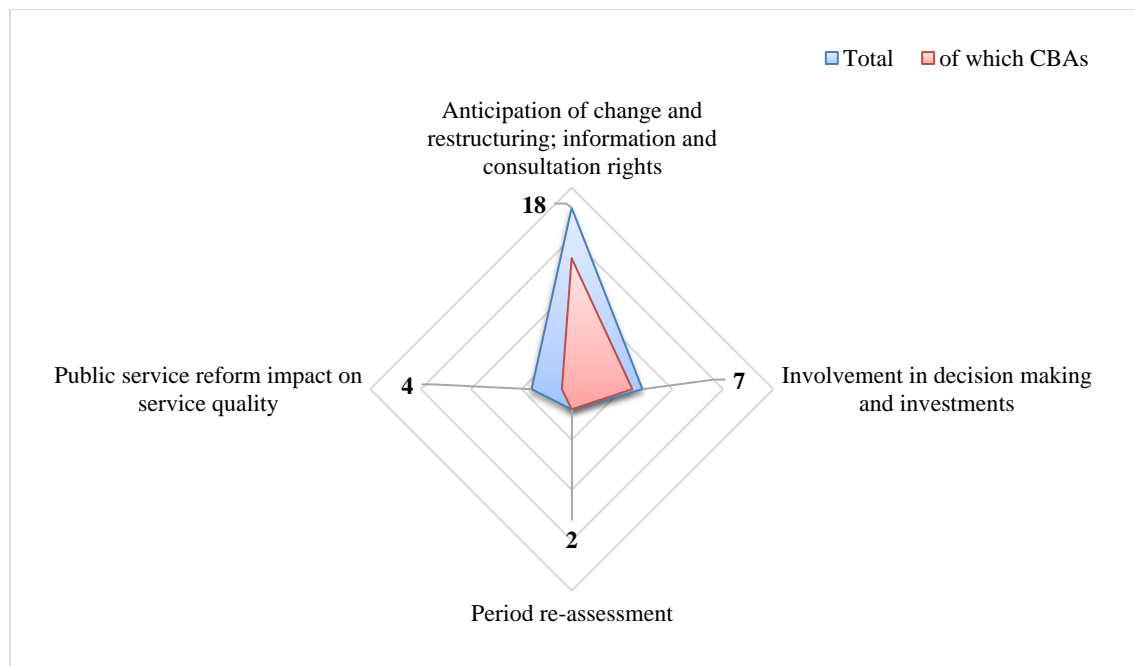

Figure 1. Collective bargaining clauses addressing workers' rights in the context of public services reforms involving new technology (N=19 collective bargaining agreements [CBAs]/model agreements)

Few texts and collective bargaining clauses were found on organizing periodic or other reassessments, that is, a joint analysis on whether a restructuring project or a newly introduced technology has achieved expected results or not. An absence of worker participation in decision making is also apparent. Very few clauses contain provisions that enable active involvement of workers in decisions about public service reforms and new technologies.

The introduction of new technology can be worrying and stressful for workers, adding to a sense of precariousness in a rapidly changing world.[15] To shape digital restructuring and reorganization that takes into consideration the needs, demands, and health of all workers, trade unions need to be informed about plans as early as possible.

Anticipation of Change and Information and Consultation Rights

The collective bargaining unit of the Public Service Alliance of Canada (PSAC) has proposed language to help prepare workers to anticipate change, deliver information, and engage in consultation. This language includes a definition of technological change, a suitable time frame to provide advanced notice, and proposed language for the workplace when identifying potential risks. The trade union defines "technological change" as

> the introduction by the employer of equipment, material, systems or software of a different nature than that previously utilised; and a change in the employer's operation directly related to the introduction of that equipment, material, systems or software.[16]

Trade unions in Europe have negotiated broader framework agreements that address certain procedures and processes that digitally restructure and reorganize workplaces.

Involvement in Decision Making and Investment Planning

As mentioned earlier, there seem to be only a few agreements or model texts that regulate workers' involvement in decision making on technological change projects and digitalization. Not surprisingly, the agreements we found are from countries that have a strong tradition and also legal regulation of workplace co-determination and participation rights.

In 2016, the German railway trade union EVG entered into a landmark collective agreement on digitalization and working conditions with the main German railway company, Deutsche Bahn, covering more than 150,000 workers. The agreement encompasses a broad range of decision-making issues and sets out a detailed participation process for workers' involvement when new digital tools are introduced.

The agreement stipulates a concrete procedure of workers' involvement that consists, among others, of the following provisions:

> The respective worker representatives are involved in the planning, development or introduction of digital innovations at an early stage. The possible effects of the new/extended digital processes or applications are, as far as possible, pointed out by the employer and discussed with these representatives and, if applicable, the collective bargaining partner. Common criteria . . . for the assessment of new/extended digital processes or applications are discussed; open questions are scheduled. The parties involved agree on concrete processes of support with worker representatives and jointly determine test steps and the form of participation. . . . In order to conclude the participation process with the worker representatives, an assessment of the effects of the digital innovation in terms of personnel, economic and structural aspects and with regards to the protection of employees shall be submitted. On this basis, a decision must be made as to whether and to what extent regulations for dealing with the consequences of the digital innovation process are to be agreed.[17]

Public Service Reform Impact on Services and Quality

References to improved productivity, efficiency, working conditions, and health and safety are just some of the promises made by advocates of digital restructuring and reorganization. When changes are made, however, digitalization often has a negative impact on service access, quality, and working conditions. Trade unions and representatives must demand transparency, ensure that critical reviews are thoroughly conducted, and report potential and identified negative impacts as early as possible. The earlier a problem is identified, the earlier it can be rectified. That only four clauses were identified indicates that this is an area where further union work is needed.

Periodic Reassessment of New Technologies

The need for periodic reassessment of the impact of new technology was hardly addressed by collective agreements. But in the collective agreement between the railway trade union EVG and the railway company Deutsche Bahn it is agreed that the employer has an obligation to carry out evaluations and impact assessments, which are then submitted to the workers' representatives when piloting digital innovation projects.[18]

Equal Opportunities and Diversity

According to a recent paper published by the global service trade union UNI Global, more than 200 million women around the world lack access to the Internet because of social and cultural barriers.[19] For example, more than 1.7 billion women do not own a mobile phone, even though mobile phone ownership sits at 80 percent in most low-income countries. Gender discrimination in the labor market is widespread. Hiring practices that exacerbate entrenched patriarchal norms have left women overrepresented in jobs with a high potential for automation. Other groups, such as migrant workers, face similarly restrictive professional barriers and are underrepresented in sectors that reap the material benefits of digitization, such as ICT and e-commerce. Problematically, the data fed into algorithms that support many of the technologies used in public services is often biased, creating a digital landscape that both reinforces and perpetuates discrimination.[20]

The impact of the digitalization of public services on gender and diversity should be fully anticipated and monitored continuously. Thus, the potential influence of bias and discrimination should be included in any new technology impact and risk assessment. Ideally, equal opportunity legislation should be updated to ensure that it adequately deals with digital challenges.

Collective Bargaining Practices and Gaps

Overall, collective bargaining has inadequately addressed issues of equal opportunity and diversity in anticipating digitalization. As shown in Figure 2, nineteen texts were identified out of the sixty documents evaluated but only nine of the texts are from collective bargaining agreements, while all others were found in guidance documents or other texts supporting trade union negotiations.

Most clauses provide a general commitment to digital inclusion or commitments to gender equality and equal opportunities or both but do not include binding rules and procedures. Thus, enabling and fostering working environments that champion equality and diversity should be regarded as a pressing task for collective bargaining efforts.
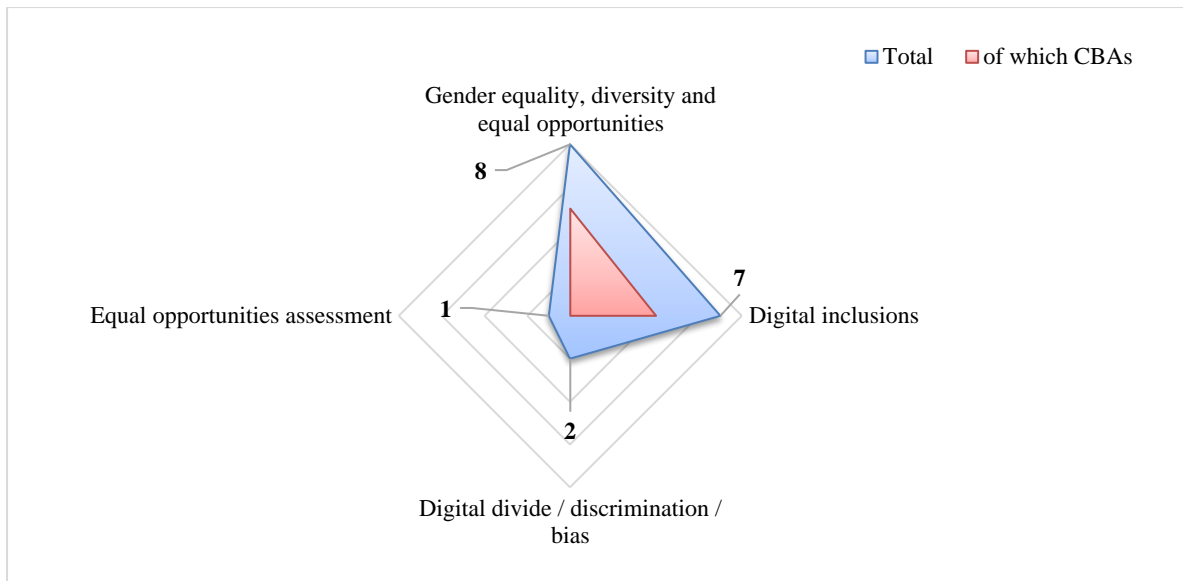
Figure 2. Collective bargaining clauses addressing equal opportunities and diversity (N=14 collective bargaining agreements/model agreements)

The need to negotiate clauses on countering the digital divide, discrimination, and bias while establishing protocols for equal opportunity assessments is ongoing.

Gender Equality, Diversity, and Equal Opportunities

More binding rules tackling digital inclusion are drastically needed because digitalization has a strong impact on gender equality, diversity, and equal opportunities. The ever-growing automation of the service sectors especially affects women, who are traditionally overrepresented in many of these fields. In public services this includes health, social care, and sectors characterized by a high share of administrative work. Further, women are often overrepresented in low-skilled jobs, working under flexible contract arrangements, such as part-time or temporary positions, that add to their professional precarity. The rapidly increasing demand for IT jobs and related managerial functions continues to favor men, leaving women strongly underrepresented in these positions.[21] Women face further difficulties because of the expectation that they will fulfill traditional caretaker roles within the familial sphere, leaving them at greater risk of high levels of stress as the boundaries between work and private life continue to blur.

In the (non-binding) European Framework Agreement of the National and European Administration Delegation of Trade Unions (TUNED) and the European Public Administration Employers (EUPAE), the social partners also recommended the development of a gender action plan with specific targets and yearly goals to close the gender and possibly the grade gap in employees benefiting from the opportunities of digitalization. Furthermore, employers are encouraged to offer possibilities for flexible working patterns by men and women and involve equality officers in the design and implementation of digitalization processes.

Gender equality is also an important issue in the context of working from home, an issue that emerged across the globe during the COVID pandemic. Trade unions will need to negotiate agreements that include provisions to adequately support and protect workers, especially those (predominantly women) with care responsibilities. A guide for trade union negotiators issued by the Austrian public services trade union Younion makes this point:

> Mobile working must never lead to women having to look after children or relatives in need of care "on the side." There must be sufficient supply of affordable, year-round,

high-quality educational facilities that enable full-time work for both parents. The same applies to the care of relatives in need of care.[22]

It is important that any new technology is introduced in a fair, legal, and equal manner and that action will be taken to promote equality and to prevent and eliminate discrimination on the grounds of sex, marital status, pregnancy, race, ethnicity, nationality, disability, sexual orientation, age, gender identity, religion, or belief.

The Digital Divide, Discrimination, and Bias

The digital sphere is affected by the entrenched societal biases that influence perspectives and decision-making processes in all walks of life. Thus, it is important to fight the digital divide, discrimination, and bias. Bias is embedded in algorithmic systems (discussed in later sections on AI and algorithmic management), and its presence poses further threats to equality and diversity in the workplace. For example, algorithms in HR software may influence hiring, firing, and promotion decisions in a way that reflects the values of the software companies that designed them, or the datasets they have been built on, rather than those of the user.[23] To combat this tendency, collective agreements should include clauses aiming to identify and govern the embedded bias in algorithmic systems and their influence on managerial decisions.

Though it is a rapidly emerging issue, our research has identified guidance on such bias only in material for trade union negotiations. One example is a clause in a model agreement on new technology published by the British trade union UNITE:

> It is agreed that the Employer will ensure that New Technology does not discriminate in any area of employment and accepts its responsibilities to comply with the Equality Act 2010 and all other relevant legislation. It is recognised that specific issues, including new ways of working and working time, job design, job evaluation, access to training, retraining and progression, can all have equality implications.[24]

Digital Inclusion

Digital inclusion is another important issue that needs to be addressed in collective bargaining. The adverse and disproportionate impact of digitalization on existing inequalities is affecting not only women in the labor market but also other disadvantaged groups. Nonwhite and ethnic minority workers and workers with disabilities continue to be disproportionality affected by technological unemployment. Discriminative work environments and institutionalized sexism, racism, and ableism have seeped into all aspects of training, appraisal, promotion, and professional progression, keeping these workers in lower-skilled job profiles.

The following passage is from a company-level agreement that addresses the protection needs of part-time and temporary workers:

> We want [part-time workers] to have the same excellent income support and the same support if they're ill (or somebody in their household is or they need to shield etc.) that permanent XY company's employees enjoy. Resolving this issue might also allow more temporary staff to be allocated with laptops so they can work from home.[25]

The need for digital inclusion was also highlighted by the European Framework Agreement of the National and European Administration Delegation of Trade Unions (TUNED) and the European Public Administration Employers (EUPAE):

> Digitalization should be framed as an opportunity to enhance the work-life balance of both women and men, whose needs will differ throughout their life depending on

several factors, such as their care responsibilities, economic situation, career or educational changes. Therefore, both digitalization and work-life balance measures must be gender-sensitive and equality proofed, allowing for positive actions so that employers are aware of the options digitalization can offer to advance gender equality at the workplace, both in terms of pay and new job opportunities. As with other HR issues, the earlier the gender equality aspects of a digitalization process are considered, the better and more effective the responses can be.[26]

Equal Opportunities Assessment

Because of the strong impact of technology and AI on equal opportunities and the risks to the job security of different groups of disadvantaged and marginalized workers, any digitalization project must be accompanied by a robust equal opportunity assessment. Our research, however, was unable to identify any collective agreement clauses that proposed such assessments. The only source identified was a clause from a model agreement published by the UK public service trade union UNISON, which states that parties to the respective agreement must recognize that automation tends to have a disproportionate impact on sections of the workforce and therefore an equality impact assessment is needed. With reference to the national legislative framework, the model clause stipulates:

> The equality impact assessment will assess the impact of the proposal on groups that display the protected characteristics defined by the 2010 Equality Act, with a view to amending the proposal if the assessment reveals discriminatory impact and improving the proposal to promote equality.[27]

Employment, Jobs, Skills, and Lifelong Learning

As in previous cycles of technological change and disruption, digitalization has a twofold impact on the labor market. While some jobs and tasks have been taken over by machines, robots, or automated processes, new jobs have been created in other areas, such as software programming, ICT, data processing, digital maintenance, app development, and websites, creating winners and losers. Those who lose their jobs, however, are not necessarily those who are recruited for new emerging positions.[28]

In this context, trade unions need to negotiate agreements and frameworks on job security and employability at different levels, from the workplace (job profiles, job descriptions, and related wage groups) to the sectoral level. There is also the need to define new rights and principles regarding continuous vocational education, training, qualification, upskilling, reskilling, and professional mobility—not least to ensure that workers, regardless of care responsibilities, can participate fully. New agreements on training should include the "right to learn" and clear definitions of employer and employee responsibilities, avoiding situations where individual workers assume responsibility for adopting skills and continuous learning.

Collective Bargaining Practices and Gaps

Nearly half of the sixty analyzed collective agreements and model agreement documents addressed issues related to job and employment security, security of professional careers and various aspects related to skills, and training and further training. It should be noted that out of the twenty-seven relevant texts identified, most (twenty-one) were collective agreements. Thus, these issues can be regarded as well-developed and already established in collective agreements at various levels.

Because of how company practices change and develop at a rapid pace, however, gaps remain that are quite striking and require more attention. These gaps relate to e-learning, self-learning, blended learning, and learning platforms or virtual learning.
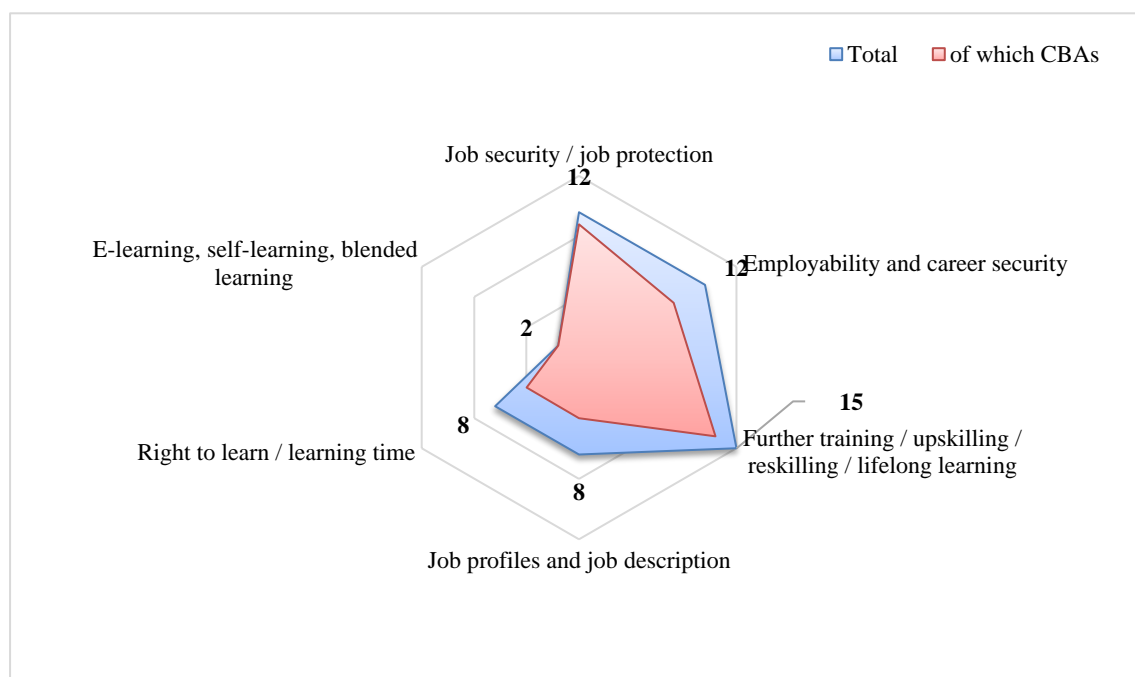

Figure 3. Collective bargaining clauses addressing employment, jobs, skills, and lifelong learning (N=27 collective bargaining agreements/model agreements)

Many studies and research reports estimate that for the labor market as a whole, digitalization and automation will not result in absolute job losses, especially for IT and tech jobs.[29] But research also indicates significant job and employment changes, in addition to job destruction. Within public services, estimates from trade unions in France, the United Kingdom, and the Netherlands have predicted significant job losses due to digitalization and automation.[30]

Job Security and Job Protection

Because of those losses, and in the absence of legal rights, job security and job protection must be a key issue of collective bargaining. When it comes to the protection of workers against technologically induced redundancies, the German public and private service trade union ver.di has developed comprehensive negotiation practices: collective agreements on employment protection in the context of automation.

> The parties to the collective agreement are aware that increasing automation and digitisation may lead to job cuts. The common goal is to preserve jobs and the ability to work and be deployed in the digital future.[31]

The following example is from a guide for trade union negotiators, published by UNISON. It suggests the following clauses to avoid redundancies:

> Redundancy will always represent a last resort in the process of organisational change. All options for avoiding redundancy will be explored, including: Limiting the refilling of posts when staff leave the organisation; restrictions on recruitment, opportunities for

secondments across the organisation; seeking volunteers for job-share or part-time work, retraining existing staff to cover any skills gaps; fixed term work to cover fluctuations in staff resource requirements; redeployment of staff, within their contract of employment, to suitable alternative employment; seeking volunteers for voluntary redundancy or early retirement; other cost saving measures that preclude the need for redundancy.[32]

Our research has identified many clauses that address the issue of job security—and to a much lesser extent job protection[33]—in collective agreements and as guidance documents and model agreements for trade union negotiators.

Employability and Career Security

Digitalization and remote working have created further challenges for career development. The following clause is taken from an agreement negotiated by Italian trade unions representing public administration:

> The administration ensures that employees who make use of [teleworking opportunities] are not penalised in terms of recognition of professionalism and career advancement.[34]

Further Training, Upskilling, Reskilling, and Lifelong Learning

Digitalization affects jobs in terms of tasks and skills. While routine physical tasks are increasingly being replaced by machines, the demand for intellectual and social skills along with IT use is growing. Various studies mirror these findings and highlight how strongly digitalization affects task and skill requirements.[35] Because further training, reskilling, and upskilling are key aspects of job security, training access has consistently been a prominent item on trade unions' collective bargaining agendas.

In June 2020, the Autonomous Framework Agreement on digitalization of European cross-sectoral social partners, including the European Trade Union Confederation (ETUC), provided strong commitments and suggestions to recognize concrete skill development and training measures as key to employability.[36] Measures as suggested by the European cross-sectoral trade unions and employer organizations include, for example:

- The commitment of both parties to upskill or reskill to meet the digital challenges of the enterprise.
- Access to and arrangements of training, in line with diverse national industrial relations and training practices and taking into account the diversity of the workforce, such as in the forms of training funds/sectoral funds, learning accounts, competence development plans, and vouchers. Training provisions should spell out clearly the conditions of participation, including in terms of duration, financial aspects, and worker commitment.
- The operation of schemes, such as short-term work, that combines a reduction of working hours with training, in well-defined circumstances.

Recent agreements between social partners at the European level have addressed training and skills as part of European social dialogue, in addition to further negotiations to provide workers the necessary tools to maintain healthy work-life balances. In November 2019, the EPSU and employers representing central government administrations approved a checklist and series of recommendations on digitalization and work-life balance.[37] The purpose of this checklist is to ensure that the deepening digitalization of services and ways of working in governments improves the work-life balance of employees throughout their careers.

The European social partners in electricity (EPSU, IndustriAll and Eurelectric) also addressed digitalization in a framework of actions agreed to in 2020.[38] The framework covers training and lifelong learning, the development of strategies to prevent psychosocial risks, particularly by recognizing the importance of the right to disconnect, and a commitment to safeguard working-time arrangements and well-being at work.

Job Profiles and Job Descriptions

Agreements should clearly define the anticipated consequences of automation, which will always involve some restructuring of job roles and profiles. UNISON has elaborated guidance on general principles: Where automation is expected to lead to a change in job roles, a more detailed consultation paper should be set out, including information on current and proposed staffing structures, skills required, and training opportunities, as well as job descriptions and grading of posts.[39]

Right to Learn and Learning Time

Digitalization requires new rights of workers to training and learning, including clear provisions regarding the remuneration of learning time. Further training and continuous learning and skills development are a key component of employability and job security in the light of digital change. Accordingly, trade unions should negotiate fair and equitable access to training and learning and define employers' obligations and responsibilities in this context.

On this issue, trade unions have successfully negotiated agreements and clauses on workers' rights to training and qualification to accompany technological change processes. Key components of a "qualification claim," according to an agreement negotiated by ver.di, are the following:

> (1) Employees who take on new or changed tasks have a right to be prepared by suitable qualification measures. The qualification is closely linked to the assignment at the new workplace. If the xy company is unable to offer the relevant qualification in good time, it will be provided outside the xy company at the employer's expense. The planning of the qualification measure is demand oriented. Demand oriented in these cases means activities required for measures or requirements and changes at the present time, but also activities required in the future (e.g., through digitalization).

> (2) The need for qualification is recorded in a joint discussion between the employees who will be working in a new job in the future and the receiving manager and the leaving manager via a meeting and forwarded to the personnel and cultural development department. The Staff Council must be involved accordingly.[40]

E-learning, Self-Learning, and Blended Learning

Digitalization, new digital technologies, and better Internet connections have accelerated the development of e-learning, virtual learning, and other learning formats, such as video tutorials and gamification. Also, net digital tools, such as virtual reality and augmented reality, increasingly have been integrated into learning environments. E-learning is closely linked to the demand of employers that employees engage in stronger practices of "self-learning" and "blended learning," that is, learning not only in traditional training environments but also at the workplace, at home, or when commuting.

Despite the increasing relevance of e-learning and self-learning, our research has been able to identify only two collective agreements/clauses that address the issue. The following is a

general clause on the topics and the introduction of e-learning platforms in Italian public administration that should be regarded as a minimum requirement:

> The Administration, within the limits of the financial resources available under current legislation, including through its e-learning platform, organises information and training initiatives for the benefit of all staff, both managerial and non-managerial, by identifying specific pathways geared to mobile work.[41]

Work-Life Balance, Telework, and Platform Workers' Rights

The COVID-19 pandemic has shown the potential for dramatic digital changes in work and its organization, especially in terms of workers' "logging on" and working outside traditional sites of work.[42] While working from home may have positive side effects on work autonomy, such as reducing travel time and the offering the possibility to better balance work and life needs, there is also plenty of evidence that exactly the opposite is happening. "Smart working" or working from home increases pressure to combine professional responsibilities with duties at home.[43] It can also lead to unacceptable working conditions, such as inadequate infrastructure and ergonomic conditions, and growing social distance from colleagues and workers' interest representatives.

As various research shows, existing legal regulations on telework and new and more flexible forms of mobile working only provide a general and minimalistic framework that ideally should be complemented and tailored to specific company and sectoral needs and challenges by collective bargaining.[44]

The COVID-19 pandemic and the resultant rise in mobile work is reflected in new clauses in collective agreements.[45] For example, national agreements negotiated in 2020 by trade unions in France and Spain include teleworking provisions. In other countries, trade unions have made progress on availability, reachability, and the right to disconnect. An important digitalization "blind spot," however, is found in efforts to reduce working hours. Reducing working hours in line with technology-induced productivity growth would be an important method for ensuring that technology translates into better lives for workers, rather than higher unemployment.

Collective Bargaining Practices and Gaps

The coverage of important issues at stake in relation to telework, working-time, work-life balance, and platform work is uneven. Overall, there have been twenty-seven texts identified by the research that address various aspects, of which eighteen are collective agreements. But, as shown in Figure 4, most clauses deal with workers' rights in the context of telework, ICT mobile work, remote working, and working from home.

By contrast, new emerging issues such as reachability, the right to disconnect, and work-life balance have been addressed by model clauses but have not yet sufficiently arrived at the collective bargaining table (with few exemptions).

Also greatly underdeveloped in terms of workers' protection and workers' rights is the coverage of digital platforms.[46]
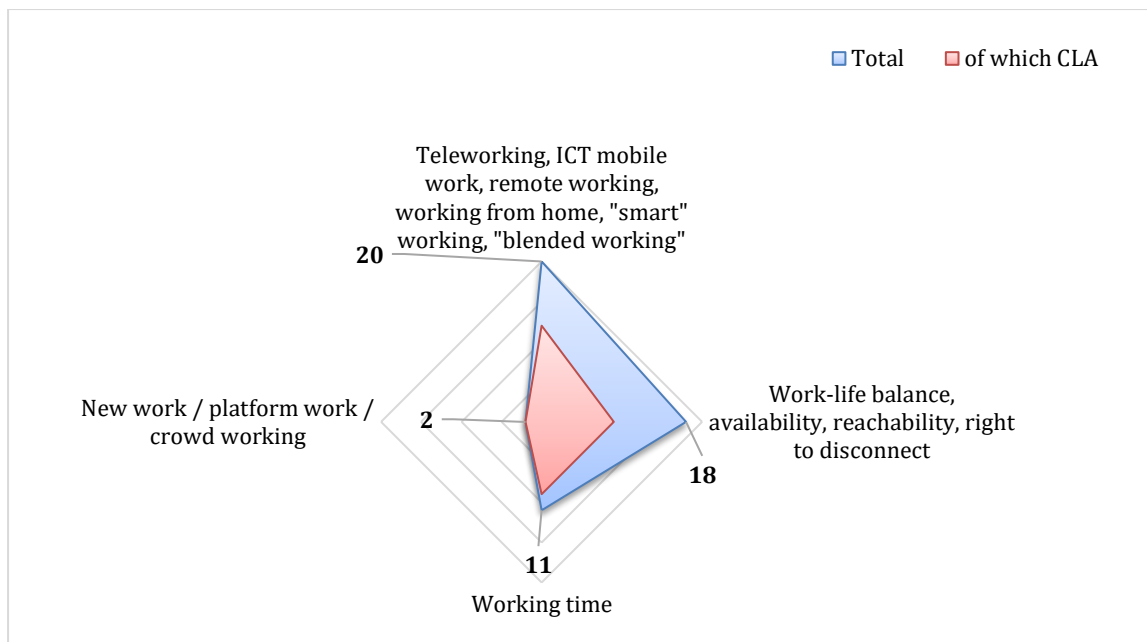
Figure 4. Collective bargaining clauses addressing telework, working time, work-life balance and platform workers' rights (N=27 collective bargaining agreements/model agreements)

Teleworking, ICT Mobile Work, Remote Working, Working from Home, "Smart" Working, "Blended" Working

As regards teleworking and new emerging forms of ICT based mobile work, trade unions with organizational strength and influence—and supportive national industrial relations systems—are able to negotiate binding agreements on teleworking and new forms of ICT-based mobile working.

In Spain and France, cross-industry trade unions have been able to secure legal changes that have produced binding frameworks on mobile working and cover all employees.[47] Based on cross-industry agreements, public sector trade unions in these countries also negotiated specific agreements for employees in public administration and services. In Spain, the FSC-CCOO and FeSP-UGT public service federations signed an agreement covering 2.5 million public sector employees.[48] The agreement includes basic principles that telework arrangements should be voluntary, reversible, and subject to key provisions relating to health and safety, equality, transparency, and objectivity. The agreement protects employee rights and guarantees services for citizens. Other important elements include a right to disconnect, data protection checks, and the right to privacy. The unions have called for subsequent negotiations at various levels of government to ensure implementation of the new agreement. Similarly, French public service trade unions signed a collective agreement on telework in July 2021 that covers all employees within the domestic public sector.[49]

In Italy, the public service union FPCGIL has highlighted in a response to this study that the COVID-19 pandemic has rapidly increased the number of public administration workers forced to work from home, often under working conditions that are far from suitable. While more wealthy administrations can provide workers with proper technical equipment and infrastructure, other workers are left by themselves when it comes to accessing and installing Wi-Fi connection and hardware and digital devices. With this in mind, trade unions highlighted the urgent need to negotiate a national collective agreement in order to provide minimum standards for mobile work, including the provision that "agile" or "smart" working should not be regarded a new form of work (with fewer protection rights):

When following legal and contractual regulations, smart working does not constitute as a new form of work, but a different way of carrying out the work, which is designed to allow administration personnel to make use of the new space, time and performance of the employment relationship, guaranteeing equal opportunities and non-discrimination for the purposes of recognition of professionalism and career progression.[50]

Working Time

In Germany, ver.di in 2021 negotiated a collective framework agreement with the interior ministry which, for the first time, sets out general principles and framework conditions on mobile working for employees in federal state administration. The framework agreement stipulates that all forms of mobile working must be regulated by local agreements between staff members and management, including at least the following subjects:

- personal scope of application;
- regulations on working time (including beginning and end);
- a requirement that the employer bear the costs of work equipment and devices provided by the employer, as well as their maintenance and repair;
- in principle, no use of personal data to monitor performance and conduct; and
- the prohibition of discrimination against employees when using or not using mobile forms of work.[51]

Younion has elaborated several guiding principles about working time in the context of mobile working, including the respect of the national working hours legislation, employers' duty for working time recordings as a proof of fulfilling legal obligations, the treatment of travel time as working time, and the right of nonreachability.[52]

Work-Life Balance, Availability, Reachability, Right to Disconnect

In relation to work-life balance, many workers now have more flexible hours and are increasingly able to carry out tasks remotely. For all the positives this brings, the sense of "always being connected" has led to employee availability outside of working hours becoming more and more common. To avoid risks to health, to protect staff time, and to create a sense of well-being and job satisfaction, many unions have sought workplace e-mail and mobile phone policies, ideally as part of a collective agreement.

Agreements like the telework agreement negotiated by Spanish trade unions in July 2020 and then implemented by the Spanish government have been negotiated in various sectors. The Spanish agreement, which focuses on the Spanish banking sector, includes a direct reference to an obligatory disconnection period.[53] The agreement also includes the right to disconnect once the working day is over, a first for a nationwide sectoral agreement. It also limits meetings outside the daily schedule, which in all instances will be voluntary and will not extend beyond 7:00 p.m. Furthermore, there is an obligatory disconnection period between 7:00 p.m. and 8:00 a.m. the following working day.[54] In other countries (e.g., Sweden)[55] trade unions have elaborated detailed guidelines for shop stewards and company-level union representatives to support negotiations on telework, including on reachability.

New Work, Platform Work, Crowd Working

The rapid spread of new forms of employment in the platform economy, often based on flexible and precarious contractual arrangements, challenge collective labor rights, such as the freedom of association, industrial dispute resolution, and collective bargaining rights.

Trade unions in different global regions have addressed the issue of precarious platform work. For example, AUPE of Singapore noted that the emergence of the gig economy and corresponding precarious forms of work are regarded as the most important labor market challenges Singapore faces today. AUPE also reported that issues related to precarious self-employment, social security protection, and decent wage standards are addressed by a tripartite working group within the Singapore Tripartism Forum.

In Europe, trade unions have also successfully negotiated codes of conduct with platform providers or have started to provide legal advice to crowd and platform workers.[56] The first-ever European collective agreement between a digital platform and a trade union was negotiated in 2018 in Denmark between the cleaning platform Hilfr and the 3F trade union. The agreement established certain collective social and labor rights for freelance workers on the platform, including minimum payment and sick and holiday pay.[57] Nonetheless, employment in the platform economy remains an area where we find little evidence that unions have secured protections through the use of collective bargaining—though it is difficult to determine whether this gap is due to the speed of developments, the lack of union technical capacity, the lack of union power because these platforms are undermining organizing ability, or some other cause.

Worker's Data Rights and Control over Algorithmic Inferences and Profiles

Digitalization implies the extraction and creation of large amounts of data.[58] Recent research shows that workers' data rights and the ethical behavior of employers when managing workers' data are increasingly salient issues.[59] Yet they are largely neglected in national and regional laws and regulations. Too often, workers are unaware or intentionally excluded from decisions about what data is gathered and for what purposes and how it is analyzed and used, even in regions with established data collection regulations, such as the European Union, where legislative frameworks for data privacy and protection are provided and the transparency obligations of the data processor are defined. In all of the areas discussed in this section, a robust legislative approach would strengthen worker protection, in addition to the effectiveness of collective bargaining.

The collection, use, and analysis of workplace data are critical areas for union action.[60] An increasingly important task for workplace union representatives and negotiators will be to negotiate workers' rights to be informed about and to edit, block, and have influence over data extraction and use, as well as over the inferences/profiles that are created on the basis of this data. This right is equally important for workers who work on-site, in the field, or remotely.

In addition, legislation, where it exists, needs to be complemented and fine-tuned by collective bargaining over improved data rights that address compliance with national and international regulation, data security and protection, data ownership and control, data storage and data offboarding, and data analysis, including algorithmic inferences and profiles.[61] There is also an increasing need to negotiate data restriction clauses and agree on data-related ethical principles and codes.

Collective Bargaining Practices and Gaps

The important and rapidly emerging issues of data protection and data rights for workers have so far been addressed only partially by collective bargaining. Out of the sixty texts gathered, only twenty touch on this issue; about half of those are binding collective agreements, most of which are company-level agreements. But as Figure 5 shows, data ethics and ethical codes, data restriction clauses, and data interference/profiling have not yet been addressed by collective bargaining and agreement.
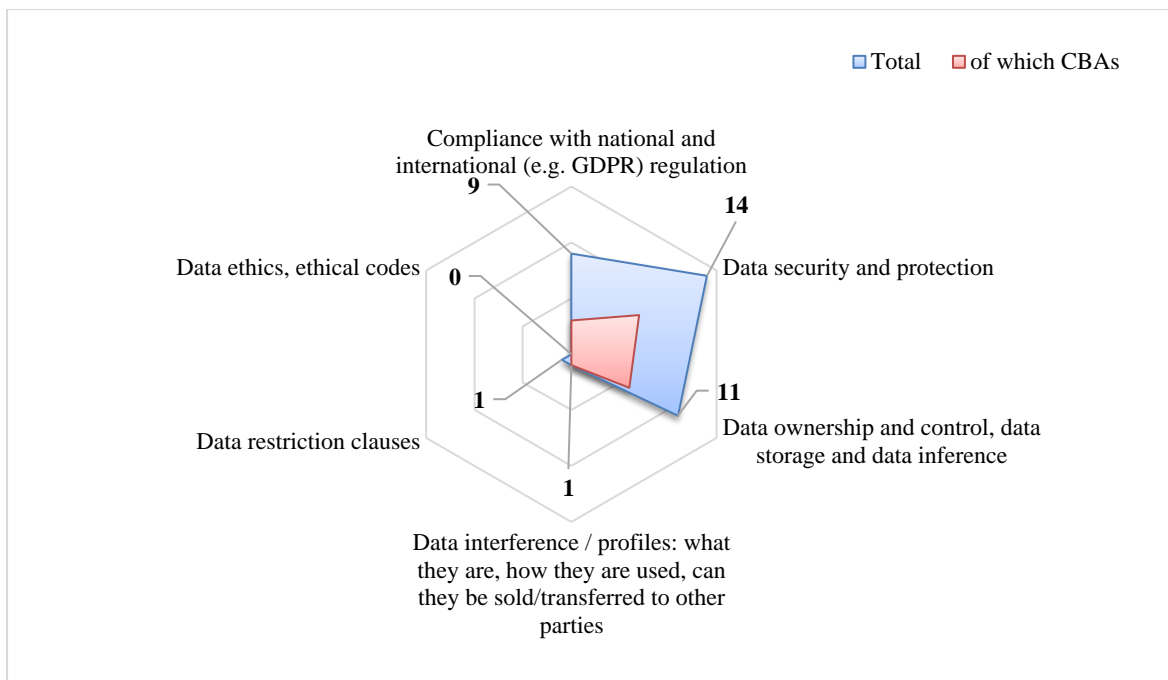
Figure 5. Collective bargaining clauses addressing workers' data rights and control over algorithmic inferences and profiles (N=20 collective bargaining agreements/model agreements)

Compliance with National and International Regulation

With every interaction employees make with digital technology, data is gathered by their businesses and organizations. The trend of monitoring and data gathering by employers has accelerated over the past years and will only continue to do so in the future. Trade unions will increasingly need to ensure that appropriate national and international legislation on personal data protection and privacy is respected by practice at company and workplace levels. This basic requirement is reflected in the following clause from a company agreement negotiated by the German service trade union ver.di:

> In accordance with legal requirements, when using IT procedures, only the personal data of employees are processed that are necessary for the operation of the procedure or for working with the procedure. These data may not be processed by the department for other purposes. Personal employee data may only be used for behaviour and/or performance reviews if they were collected for this purpose and the employees concerned already knew or could have known this at the time of their work with the procedure.[62]

In many countries, employers are also obliged to carry out a data protection impact assessment (DPIA) and inform workers and their unions about what data is collected and for what purposes.[63] The trade union Prospect UK has provided guidance for employees and union representatives on important questions to ask and aspects to consider with DPIAs, including information about the proposed processing of the data and the reasons the processing is taking place, the legal basis for the processing, and an assessment of how necessary the processing of the data is in relation to the reasons for the processing, on the assumption that employers should be collecting only the minimum amount of data needed. Furthermore, there should be provisions on the consultation with trade union or workforce representatives about risks to the personal data of individuals and the identification of appropriate measures to address such risks, including safeguards, security measures, and mechanisms to ensure the protection of personal data and to demonstrate compliance with the regulations.[64]

Data Security and Protection

An important issue that, according to our research, has not yet been addressed in collective bargaining agreements is data ownership and control and data offboarding. Employers extract data from workers, such as location, movement, efficiency, hours worked, sick days, and vacations. This data provides essential information about each worker and should, ideally, belong to the workers. So far we have found no union that has successfully negotiated for joint access and control over this kind of workplace-generated data.

As a recent ruling from the Austrian Data Protection Authority shows, where data is stored is also significant to workers' rights and privacy.[65] If data is moved to jurisdictions with weak data-protection regimes, workers' privacy is at risk. Consequently, workers should know whether data or datasets that include workers' personal or identifiable information is moved to other jurisdictions, and they should have a right to block this movement.

Intrinsically linked to the movement and storage of data/datasets is the question whether an employer has the right to sell or sell access to extracted worker data. In this regard, the Financial Services Union in Ireland has negotiated with management an amendment to the staff privacy policy. This policy includes an Anti-Commodification Clause:

> The Bank commits that it will not turn employee data into a commodity for sale or trade, and a clause on Respect and Human Rights: The Bank is committed to respecting workers' privacy and human rights as defined in law and in particular with regard to the UN's Universal Declaration of Human Rights and the ILO's 1997.[66]

As many digital tools deployed in workplaces are developed and owned by third parties, unions must have the right to know whether these parties have access to extracted data, and whether they have claimed rights to use or sell this data. Ideally, workers should have the right to prevent the use or sale of such data.

Data Ownership and Control, Data Storage, and Interferences

Workers who are covered by the European General Data Protection Regulation have a right to know what data-generated inferences and profiles are created using their personal data. But no worker under any data protection regulation in the world has the right to know what inferences they are subject to in case these inferences are not build on their personal data but on other data or information.[67] For example, if an algorithmic inference used in an automated hiring system renders workers of a particular age, from a particular postal code, and with a particular level of education as not trustworthy by customers, then a worker who matches that criterion is unlikely to be called for a job interview.

According to our analysis, out of more than 140 collective bargaining clauses, only one deals with data inferences and profiles. This clause is from a company agreement negotiated by ver.di trade union negotiators in Germany.

> The collection, processing, storage, evaluation and forwarding of data in the context of occupational health management shall be subject to the principles of economic data collection and confidentiality. The co-determination rights of the staff councils must be observed and safeguarded in this context. . . . Therefore, only the data necessary for analysis and evaluation within the framework of occupational health management shall be collected, stored, forwarded and evaluated. An evaluation is only carried out in anonymous form and in compliance with data protection regulations. data protection regulations. The transfer of personal data requires the written consent of the employees concerned.[68]

Data Ethics and Ethical Codes

Not all data extraction is negative for workers; in some instances it can benefit and safeguard workers' health and safety. For example, location tracking on workers' vehicles can be crucial in protecting workers' road safety. Unions could do far more, however, to define red lines in terms of what is acceptable use for this data by including data restriction clauses in collective agreements.

Teamsters in California have negotiated such data restriction clauses by including in one of their collective agreements that location tracking data cannot be used for employee performance evaluation.[69] The ver.di have released a guide with concrete principles for trade union and works council negotiators that also includes a clause on data restriction in relation to personal data:

> Evaluations of personal data are generally only permissible in anonymised form or—if a reference from the data to persons (re-identification) is required—in pseudonymised form. If procedures for pseudonymisation are to be used, measures (including the security of the pseudonymisation key) and the necessity, conditions and procedure for re-identification must be explained. Evaluations are only permissible with the consent of the staff representative. Person-related abuse controls may only be carried out in cases of justified suspicion and with the involvement of the staff representative and the data protection officer.[70]

A clear gap in trade union bargaining practices seems to exist on the issue of data ethics and ethical codes. No agreement or agreement clause has been identified by our research. The Financial Services Union in Denmark has created a model text to spark the dialogue on data ethics at national, sectoral, and company levels.[71]

Workers' Rights over Digital Tools, Artificial Intelligence, and Algorithmic Management

The monitoring of workers is nothing new. But, with the influx of digital technologies, monitoring and surveillance has become so far reaching that it has been labeled "surveillance capitalism."[72] Methods can combine several monitoring devices and provide real-time analysis, meaning they are interactive and unavoidable. The list of what these tools can track is almost endless. Examples include location tracking, recording of online activities, movement analysis, biometric and facial recognition, emotional tracking, keystroke monitoring, and speech analysis.

These digital tools and the information gathered are used by employers to manage and exercise control over workforces, organizing, allocating, optimizing, and evaluating work and workers. Algorithmic management practices have spread from digital platforms to traditional working environments and the public sector.[73]

The use of algorithmic and AI systems in the workplace will rapidly increase in the coming decades and has already accelerated because of the COVID-19 pandemic. One example is the rise of new forms of food delivery where workers are managed and controlled by algorithms.[74]

As highlighted in a recent report on "people's management" and AI technologies by the British Trade Union Confederation (TUC), the use of algorithmic management is already advanced in several areas, such as absence management, ratings, work allocation, staff scheduling, assessment of training needs, and resource allocation.[75]

Collective Bargaining Practices and Gaps

Our research has identified only ten sources that have addressed these issues, nine of which are binding agreements. As shown in Figure 6, however, all binding clauses are related to digital tools that control or monitor performance and behavior. All are restricted to the company level and no general rules or workers' rights have been defined at the sectoral or the cross-sectoral levels. Key gaps exist in the regulation and governing of workers' rights and AI technologies and in management by algorithms and ethical issues related to the use of algorithms. Our research found only one relevant (nonbinding) agreement. We were unable to identify any agreements or model clauses on the issue of technology-restriction clauses and we were able to identify only two texts that deal with workers' rights and transparency in algorithmic management. Against the rapid spread of AI-based practices there is an urgent need to address the issues of workers' rights in the context of AI deployment, decision making, and management practices in collective bargaining.
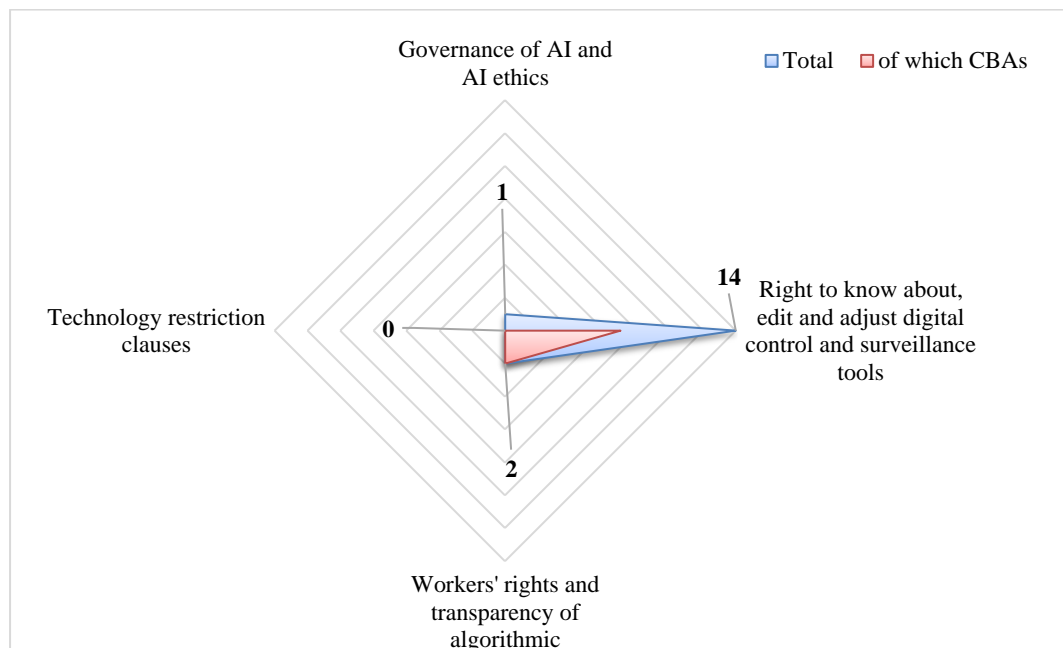

Figure 6. Collective bargaining clauses addressing workers' rights over digital tools and AI, their use and deployment (N=10 collective bargaining agreements/model agreements)

Right to Know About, Edit, and Adjust Digital Surveillance and Control Tools

Many policies can fall under the umbrella of monitoring and surveillance in the workplace. A 2017 UNISON guide, for example, highlights the following:

- Monitoring as a feature of ICT technology policy
- CCTV and video surveillance policies
- IT and e-mail policies
- Acceptable-use policy for telephone, e-mail, and Internet-use policies
- Social media policies
- Vehicle monitoring policies[76]

Collective agreements at sectoral and company levels are a crucial instrument to regulate and strictly limit the use of monitoring and surveillance technologies to jointly defined purposes.

The Canadian Union for Public Employees (CUPE) provides the following contract-language clauses on electronic monitoring:

There shall be no electronic monitoring of Employees by the Employer for any purpose without the written consent of the Employee.

An Employee may withdraw their consent under this Article at any time.

Electronic Monitoring or Surveillance Electronic monitoring or surveillance equipment may only be installed by the Employer to protect the Employer's premises and property, and to enhance the personal safety of employees and students. The Union shall be notified, and a notice shall be posted in all workplaces in which the Employer has installed electronic monitoring or surveillance equipment. Such equipment shall not be used to conduct general, on-going supervision of employees.[77]

Artificial Intelligence Ethics and Technology-Restriction Clauses

In 2020, the British TUC published preliminary results from their study on AI and technologies that manage people, which include key principles from the perspective of workers and trade unions. Among these are the principle of securing a strong involvement of workers in AI governance and ethics and others on fairness, equality, and transparency:

Fairness and equality: Secure ethical and socially responsible development of AI for the benefit of all, not only employers and commercial interests; ensure equality of outcome and access, including non-discriminatory outcomes from use of AI-powered technology and equal access for all.

Transparency: Increase availability of accessible and understandable information on how AI technology works, but also on how worker data is used to inform AI-powered tools, and across AI platforms; increase worker awareness of when AI is operating and ensure consent is obtained where appropriate.[78]

Workers' Rights in Artificial Intelligence and Algorithmic Management

In 2021, as part of the Our Digital Future project, PSI published a guide for trade unions on co-governance of algorithmic systems. It is a check-list of questions workers and their unions should be asking management in connection with the implementation of workplace digital systems.[79]

In the context of an initial screening of collective bargaining agreements and clauses on algorithmic management, however, only one—nonbinding—agreement was identified, the 2020 framework agreement between the ETUC and European employer organizations. In this agreement, the social partners recommend that national affiliates, when deploying AI systems, should respect the principles of "human in control," the prevention of harm, and the need for a risk assessment, transparency, and fairness, that is, avoiding unfair bias and discrimination. The agreement also states:

In situations where AI systems are used in human resource procedures, such as recruitment, evaluation, promotion, dismissal, and performance analysis, transparency needs to be safeguarded through the provision of information. In addition, an affected worker can make a request for human intervention and/or contest the decision along with testing of the AI outcomes."[80]

Apart from workers' rights to know about, edit, and adjust digital surveillance and monitoring tools that are used by managers to control their workforces, the issue of algorithmic management has become increasingly important. It is closely linked to the section on workers' rights to be informed on what data analysis is taking place and what algorithmic inferences and profiles are created. Algorithmic management is the use of computer algorithms and AI techniques to control employees; it is a form of "automated management." Clauses in this

section relate exclusively to the rights of workers to know about the systems and factors that are used in algorithmic management and their involvement and ability to influence this form of management.

Highly relevant in this context is a landmark agreement achieved in March 2021 by the Spanish trade unions UGT and CC.OO on the status and rights of workers on digital labor platforms, in particular, the rights of workers and trade unions regarding algorithmic formulas that determine their working conditions.[81]

According to the generally binding agreement, digital platforms will have to make available to trade unions an algorithm or any AI that may have an impact on workers' conditions. This right to information is granted to everyone working through a platform. Transparency requirements apply to all digital platforms equally with the right to

> be informed by the company of the parameters, rules and instructions on which algorithms or artificial intelligence systems are based that affect decision making that may have an impact on working conditions, access to and maintenance of employment, including profiling.[82]

Technology-Restriction Clauses

We looked for technology-restriction clauses in the context of digital tools and AI but were unable to identify any clauses concerning restrictions or redlines on the use and purposes of digital technologies.[83] This must be regarded as a clear gap in current collective bargaining, as digitalization increases managerial potential to use technology against workers and unions. The implications for its potential use during collective action and strikes or for identifying workers that are members of a trade union are alarming.[84]

Health and Safety Protection

The impact of digitalization on public service workers' occupational health and safety is mixed. While digitalization and the use of ICT could help remove people from hazardous environments and better protect them by automating dangerous, monotonous and repetitive tasks, for example, there is also increasing evidence about new emerging health risks, including from excessive screen time.[85] A 2018 report by the European Agency for Safety and Health at Work of the European Union (EU-OSHA) shows that digitalization does present a certain number of challenges and risks for workers' physical and mental health due to the increase in online work and the use of mobile devices in non-office environments, multitasking or work intensification and overload.[86]

At the same time, the psychosocial and physical risks of digital work environments, digital tools in the workplace or as related to new forms of working or mobile work have not been addressed sufficiently so far by legislation.[87] In this context workplace and company level frameworks of IT-related health and safety risks assessment and mechanisms of preventive and curative health and safety practices are required if workers are to be covered by such measures. In all of these areas collective bargaining and workplace agreements can play an important role to close legislative gaps and address new emerging risks.

Collective Bargaining Practices and Gaps

Nearly half of all analysed collective agreements and other relevant texts contain clauses related to health and safety issues and address new emerging risks regarding psychological and psychosocial risks or risks related to ergonomics. Also, a comparatively high share of the clauses are collective agreements when it comes to IT-related risks or ergonomics. By contrast,

substantial gaps are present within collective agreements and bargaining in relation to some specific health and safety requirements and measures, such as screen time.
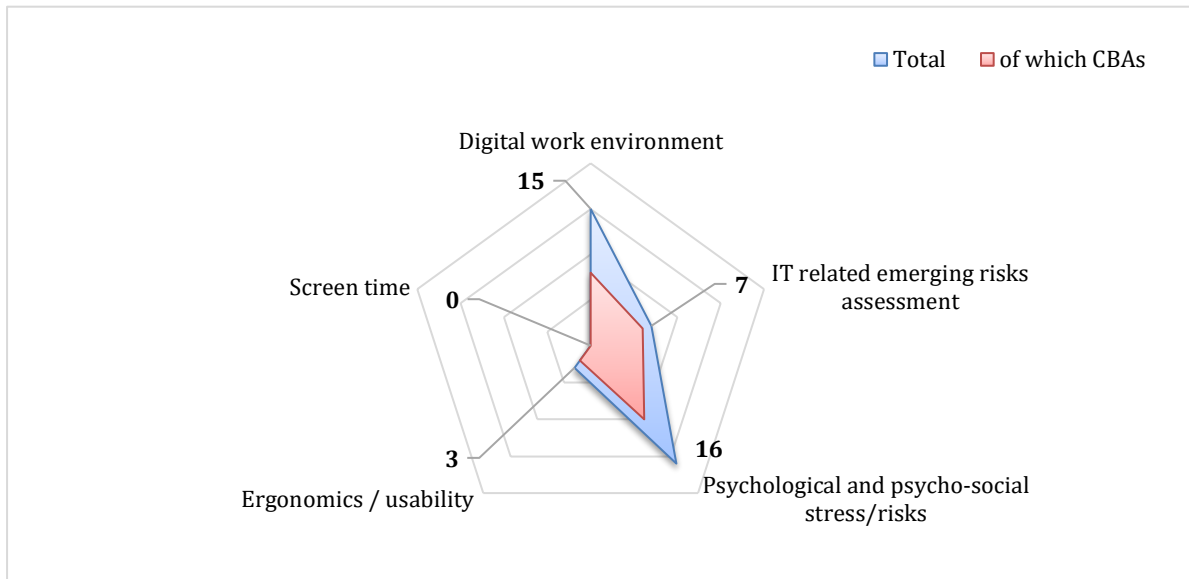

Figure 7. Collective bargaining clauses addressing workers' rights over digital tools and AI, their use and deployment (N=28 collective bargaining agreements/model agreements)

Digital Work Environment

In relation to digital work environments, the European trade unions (TUNED) and employers' organizations in central government (EUPAE) have elaborated joint recommendations on do's and don'ts of digital health and safety policies that provide also useful guidance for trade union negotiators.[88] Technologies carry with them several risks for the safety and mental and physical well-being of employees.

Table 5. Recommendations on Do's and Don'ts Regarding Health and Safety in the Digital Work Environment

Do's	Don'ts
Conduct regular psychosocial risk assessments or at least make sure that psychosocial risks are part of the obligation to carry out regular health risk assessments.	Underestimate the potential risks linked to digitalization and new ways of working on employees' well-being.
Make sure that verification mechanisms are in place so that the applicable health and safety provisions correctly comply with the EU social partners' agreement on teleworking.	Assume that workers will know and use the best IT equipment in their interest or that of the administration.

Do's	Don'ts
Implement on-going communication campaigns on work-related stress and the risks and signs of burnout as a preventive measure.	Wait to address issues such as burnout and chronic stress until they are already manifesting in the workforce. Underestimate the collective impact of individual burnouts.
Enhance cooperation between HR professionals, occupational health and safety experts and bipartite committees, employee representatives, and unions to manage workplace campaigns. Raise awareness about the potentially harmful effect of digital technologies and overwork. Support employees in recognizing early warning signs of stress that could lead to burnout.	Assume that the workplace is risk free.
Be particularly vigilant about the risk of isolation of flexible workers by maintaining intensive communication with and between on-site and off-site staff. Limit, if necessary, the number of telework days in the interest of employees.	Assume that well-equipped flexible workers have the same degree of communication with the workplace as teams on-site.

Source: Document 51_FA_EU 2020: TUNED and EUPAE, *Checklist of Do's and Don'ts on Digitalisation and Work-Life Balance*

IT-related Emerging Risks Assessment

As regards IT-related risks assessments, the British trade union UNITE in its health and safety and new technology model agreement guidance has included suggestions on how to perform these risk assessments.[89] The model agreement stipulates that the new technology risk assessments must be undertaken with the full involvement of all relevant union representatives, before any new technology is introduced in the workplace. The respective risk assessment must specifically include:

- Any potential impacts on the mental health of workers.
- Any potential impacts relating to workers with physical disabilities.
- Any potential toxicity or side effects from chemical or biological materials that may be used as part of new technology.

Psychological and Psychosocial Stress/Risks

Digital changes in the workplace involve a lot of new elements, which requires the ability to "multitask," that is, the ability to control many processes at the same time. Increasingly employees start their working day by switching on their smartphones and this has become a common method for workers to access their tasks for the day. The smartphone offers great opportunities, but it also carries considerable risks. Workers can no longer "switch off" in the

evenings and at weekends and may have to read and respond to emails outside of working hours. All of these factors make it difficult to clearly divide work and professional life and can lead to increased feelings of stress. Thus, it is essential to combat and avoid psychological or psychosocial stressors that emerge during digital change.

A good example is found in a collective agreement on the future of work at Germany Railways ("TV Work 4.0") negotiated by the railway trade union EVG. The agreement includes the establishment of a "social budget" (financed by the employer) that provides support and the financing of measures in different fields related to maintaining employability, including health promotion:

> In the TV Work 4.0, we have determined that the Works Councils can agree budgets from which additional measures for qualification and health promotion can be financed. These qualification measures will ensure that colleagues can continue to be employed in their jobs, or in changed or new jobs. The Works Councils negotiate the amount of the budget and the measures to be financed.[90]

Ergonomics, Usability

Whenever new technologies, digital tools and workplace changes are introduced, there are implications for work organization, space and other ergonomic issues. Technology, furniture and software must be well designed to cause as little disruption as possible when issued to workers. The place of work, movement areas, screen position, lighting conditions, and so on, must not diminish usual workplace standards prior to the introduced changes and also be appropriate for the new technology.

Here, trade unions such as the service trade union ver.di in Germany, have elaborated model clauses relating to technological change in the workplace, exemplified by the deployment of video display units. This clause also highlights the requirement of workers' representatives to be closely involved in review processes.

> In the case of fundamental changes, new construction and conversion plans involving VDU workstations, an ergonomically trained person (with regards to the relevant laws, standards and methods) must be consulted in good time so that changes in planning and execution are still possible. The same applies to the procurement of furnishings and technical equipment for VDU workstations.
> The competent staff representatives (employee representatives) shall be involved in the approval of VDU workplaces.[91]

Screen Time

Our research was not able to identify any concrete clauses on health and safety issues related to screen time. This clear gap is in need of attention since plenty of scientific evidence links increased screen time to headaches, neck pain, myopia, digital eye syndrome, and cardiovascular problems. E-learning, the use of social media for work purposes, requirements of working from home, and mobile working during the COVID-19 pandemic have only accelerated the increase in screen time.[92]

Conclusions and Recommendations

The aim of our research was to help union staff and workplace representatives design better collective bargaining clauses, briefs, and documents to safeguard workers' rights, create satisfactory working conditions, facilitate a healthy work-life balance, and safeguard the quality and democratic value of public services. We found empirical evidence of growing

awareness among trade unions on the issues at stake. Some trade unions have already taken steps to formulate clauses or produce briefings or guidance for collective bargaining to mitigate the negative effects of digitalization on working conditions and workers' rights. But considerable deficits in these areas remain.

Digitalization is still not automatically or comprehensively included in collective bargaining agendas.

The more than sixty documents and 140 individual clauses this study identified that refer to digitalization in collective bargaining represents a small fraction of the total number of existing collective bargaining agreements. This finding suggests that most agreements do not contain specific provisions dealing with digitalization issues, though some areas of digitalization will be covered by other generic protections, such as reorganization and change in the workplace or health and safety provisions.

Most provisions cover areas of traditional union work or areas where existing models can be adapted.

The data suggests that trade unions have concentrated most attention where they can easily adapt traditional union approaches to digital issues. The focus of unions has also been on the effect digitalization has on employment, work organization, and working conditions, with many agreements and clauses aiming at reskilling and upskilling workers to counter redundancy. Since working remotely is one of the most noticeable direct effects of digitalization, regulations on telework/homework are prevalent in contemporary collective bargaining. National, sectoral, and company-level negotiation outcomes illustrate the dramatic influence the COVID-19 pandemic has had on working from home and other forms of telework.

Some, but insufficient, coverage exists in areas where the effect of digitalization is obvious in the workplace and on workers' daily lives.

Data protection regulations vary widely by region. We found evidence of the adaption of clauses in the broader areas of gender equity and digital inclusion but very little specific text on equal opportunity assessments, digital discrimination, and bias. Public service trade unions must consider the disadvantageous effects digitalization has on minority and female workers and endorse the right to training, safeguard employment, and ensure healthy conditions for telework. We also found clear gaps in collective bargaining on the impacts in professional training and learning and the emergence of new psychosocial risks and strains linked to workplace digitalization—areas covered by agreements but not as comprehensively as might be expected despite the need for new approaches to risk assessment and mitigation. Updates and reviews in these areas should concentrate on whether bargaining covers all potential hurdles of new emerging technologies.

Large gaps exist in areas most related to novel and disruptive technologies, leaving workers exposed to these rapid changes.

Outside of these areas where unions have been able to adapt previous methods to digital problems we found surprisingly little progress. Many emerging issues that detrimentally impact conditions for workers are hardly covered by collective bargaining or are simply absent. Perhaps the most alarming finding is the almost nonexistent coverage of many of the most disruptive aspects of digitalization on workers, trade unions, workplace rights, and public services. These include the introduction of algorithmic systems and the generation of inferences

and their role in personal behavior profiling and bias in HR procedures. More broadly, the regulation and governance of AI and digital ethics frameworks and their implications in areas such as managerial decision-making, monitoring, and work planning need urgent attention. Furthermore, we found no evidence that public sector unions are using collective bargaining to deal with the effects of digitalization on the provision of high-quality public services. The current attempts by public service trade unions to mitigate the negative impacts of digitalization on public service provision are likely to be insufficient in tackling pressing and proliferating challenges.

Finally, we found little to suggest that unions have found effective ways to use collective bargaining to control or regulate platform working or crowd working. Sizeable gaps are apparent in the efforts of unions to ensure that the introduction of digital technology is accompanied by a fair share of worker benefits, generated either by increased efficiency or by capturing the value of the data they produce. Both will be essential if collective bargaining is to be used to address rising inequality.

Sectoral coverage seems to be linked to union power.

We found that trade unions representing public services in national, federal, and regional administrations produce considerable amounts of material on digitalization regulations. That national, federal, or regional public administration collective agreements have been negotiated speaks to the strength and organizational power of trade unions within these public services sectors. In other sectors, most of the collective agreements gathered have been at the company or provider level.

Further work is required.

The evidence shows that there are significant gaps of knowledge concerning digitalization and collective bargaining. This finding is surprising because collective bargaining agreements are one of the strongest tools that trade unions have to shape acceptable future working practices.

Our study shows that there is a need for trade unions to exchange information and to learn from appropriate practices already in place. PSI's online database from which the data for this study came should fill some of that need. The most pronounced gaps are in areas of novel technology. The sample pool bias toward public service unions may account in part for this finding, though given the size and diversity of public services we might reasonably expect more. It is also possible that a lack of union technical expertise in digitalization is a barrier to the development of such clauses. Attracting or pooling resources to invest in the creation of this expertise and the development of clauses may be necessary for progress in this area. PSI is currently developing model clauses in these areas for use with its online database, but more will be required. It would be useful for unions to establish common ground across countries and sectors on the many issues, and though frameworks establishing industrial relations differ from country to country and adjustments are needed in the light of national, sectoral, and workplace specificities, technology and its impacts on working conditions are increasingly a global challenge. This fact should be regarded as an opportunity for transnational action and capacity building among trade unions in the public and private service sectors and all other branches of the economy.

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Notes

[1] *Digitalization* is a multidimensional 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 societies, labor markets, and the economy. See, for example, OECD, *Going Digital: Shaping Policies, Improving Lives* (Paris: OECD, 2019), https://www.oecd-ilibrary.org/science-and-technology/going-digital-shaping-policies-improving-lives_9789264312012-en. This report defines digitalization 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. A report by the European Agency Eurofound also provides and overview: Eurofound, *The Digital Age: Implications of Automation, Digitalisation and Platforms for Work and Employment*, Challenges and Prospects in the EU (Luxembourg: Publications Office of the European Union, 2021).

[2] ILO, Issue brief no. 6, Cluster 3, *Technology for Social, Environmental, and Economic Development*, prepared for the 2nd Meeting of the Global Commission on the Future of Work, February 15–17, 2018.

[3] See Eckhard Voss and Raquel Rego, *Digitalization and Public Services: A Labour Perspective*, PSI International, 2019, https://publicservices.international/resources/publications/full-report---digitalization-and-public-services-a-labour-perspective?id=10382&lang=en. From the perspective of digitalization in social services, see also Eurofound, *Impact of Digitalization on Social Services* (Luxembourg: Publications Office of the European Union, 2020).

[4] See, for example, the recent overviews from the perspective of public services in Europe and the United States: Richard Pond and Jan Willem Goudriaan, *Ensuring Trade Unions Have a Say in the Transformation of Work,* Social Europe, 2020, https://socialeurope.eu/ensuring-trade-unions-have-a-say-in-the-transformation-of-work; Lisa Kresge, *Union Collective Bargaining Agreement: Strategies in Response to Technology,* UC Berkeley Labor Center, 2020. See also the information on the final event of a two-year project on digitalization and collective bargaining conducted by the European public service trade union federation EPSU: *Digitalisation and Collective Bargaining,* European Public Service Union, 2020, https://www.epsu.org/article/digitalisation-and-collective-bargaining.

[5] Public service trade unions from the following countries contributed actively to this compendium by sending collective agreements, single relevant clauses, or relevant material (such as negotiation guidelines that include model clauses): Austria, Belgium, Canada, the United States, Spain, Italy, Ireland, Germany, Norway, United Kingdom, and South Korea. Information was also received from Kenya, Ghana, and India. Furthermore, the ILO Workers Group ACTRAV has contributed general assessments as regards digitalization as an issue of collective bargaining from the global perspective.

[6] Depending on national regulation and practices of collective bargaining, collective agreements are not always publicly available, especially single-company agreements, including agreements that are negotiated by staff representatives and the company management. The PSI affiliates CUPE in Canada and the KPTU in Korea carried out their own screenings of collective agreements and delivered compilations of selected clauses. Such a systematic screening of own collective bargaining databases has also been carried out by the PSI affiliates in Germany and the United Kingdom, but in both cases, not only single relevant clauses but entire agreements were delivered to the researchers.

[7] It should be mentioned, however, that the review of literature and the screening of databases and relevant repositories covered the period from 2005 to the end of 2021.

[8] The authors would like to acknowledge the valuable comments and contributions of Christina Colclough (WhyNotLab) in the development of the taxonomy.

[9] Readers wanting access to the full dataset, or the text of specific clauses referred to in this article should access the online database that will be launched during the summer on the PSI website.

[10] Voss and Rego, *Digitalization and Public Services*.

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[17] Document 48_CBA_DE 2018: "Collective Bargaining Agreement Work 4.0," EVG trade union and Deutsche Bahn, https://www.evg-online.org/fileadmin/Tarif/Tarifvertraege/Tarifvertraege_DB_Konzern/TV_Arbeit_4.0_EVG_2018_internet.pdf.

[18] Ibid.

[19] Marta Ochoa, *The Path to Genderless Digitalisation,* UNI Global, 2017, http://www.thefutureworldofwork.org/media/35352/genderless-digitalisation.pdf.

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[23] Christina Colclough, *Workers' Rights: Negotiating and Co-Governing Digital Systems at Work*, Social Europe, September 3, 2020, https://www.socialeurope.eu/workers-rights-negotiating-and-co-governing-digital-systems-at-work.

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[26] Document 51_FA_EU 2020: TUNED and EUPAE, *Checklist of Do's and Don'ts on Digitalisation and Work-Life Balance*, https://www.epsu.org/sites/default/files/article/files/Guidelines%20checklist%20DOs%20and%20DON%E2%80%99Ts%20digitalisation_EN.pdf.

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[30] For examples from public service sectors, see Voss and Rego, *Digitalization and Public Services*.

[31] Document 06_CBA_DE 2020: "Company Agreement Future."

[32] Document 24_GUID_UK 2018: UNISON guide, *Bargaining over Automation,* https://www.unison.org.uk/content/uploads/2018/04/Bargaining-over-Automation.pdf.

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[35] See, for example, ECORYS and Danish Technological Institute, *The Impact of ICT on Job Quality: Evidence from 12 Job Profiles*, 2016, a study focusing on two public services (public employment services and homecare) that was commissioned by EPSU and is based on this approach. See also Peña-Casas et al., *Impact of Digitalisation on Job Quality in Public Services*.

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[46] See Hannah Johnston, Alina Caia, Michael "Six" Silberman, Monica Ceremigna, Diego Hernandez, and Valerica Dumitrescu, *Working on Digital Labour Platforms* (Brussels: ETUI, 2021).

[47] For Spain, see the royal decree, October 23, 2020, available at https://www.boe.es/eli/es/rdl/2020/09/22/28/con. For France, see the governmental decree, November 26, 2020, available at https://uimm.lafabriquedelavenir.fr/wp-content/uploads/2021/03/2020-11-26_ANI_Teletravail_14.pdf.

[48] EPSU, *Unions Sign Telework Agreement*, 2020, available at https://www.epsu.org/epsucob/2020-epsu-collective-bargaining-news-september-no18/unions-sign-telework-agreement.

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[51] Document 60_CBA_DE 2021: Collective Agreement on Mobile Forms of Working (unpublished).

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[56] See the joint initiative of trade unions in Germany, Austria, and Sweden to support crowd and platform workers: http://faircrowd.work/. The German service trade union ver.di is also offering support and legal advice services for crowd workers; see https://innovation-gute-arbeit.verdi.de/ueber-uns/forschungsprojekte/cloud-und-crowd, accessed June 20, 2022.

[57] Document 11_CBA_DK 2018: Agreement between the 3F trade union and the digital platform Hilfr (unpublished).

[58] See Annette Bernhardt, Lisa Kresge, and Reem Suleiman, *Data and Algorithms at Work: The Case for Worker Technology Rights,* UC Berkeley Labor Center, 2021.

[59] See for example, Colclough, "Workers' Rights."

[60] While data, AI, and digital technologies are closely linked, the clauses in this section relate to what data is extracted and by whom, how it is analysed and for what purposes and the rights workers have, or should have, over this data and its analysis. The clauses concerned with what rights workers have over the use and deployment of digital tools and AI are dealt with in the following section on workers' rights over digital tools and AI.

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[82] Document 55_CBA_ES 2021: Agreement between Spanish government and the social partners.

[83] In contrast to the guaranteeing of workers' rights in relation to monitoring and surveillance technologies in the workplace, technology-restriction clauses establish limitations on management's right to introduce new technology. For further details and also reference to US collective bargaining practices see the section on this issue in Kresge, *Union Collective Bargaining Agreement*, 7.

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