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UNI EUROPA ICTS
POSITION ON ARTIFICIAL INTELLIGENCE

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INTRODUCTION

UNI Europa ICTS recognizes the innovative and beneficial potential of Artificial Intelligence (AI) and other new technologies that are transforming our global economy. Ideally, we believe that scientific and technological progress should improve people's lives and—at this critical moment in human history—combat climate change. UNI Europa is committed to joining the dialogue about AI and working towards a just transition that serves the needs of workers in all jobs and sectors.

We know that all new technologies create opportunities and challenges. In the case of AI, the challenges related to the quality and quantity of work, skills and training, ethics, equality, and health and safety are of great concern. We want to assist our members as they enter the new world of work in the coming years, and we want to raise awareness about the opportunities and the risks that AI represents.

Artificial Intelligence is evolving rapidly, with little opportunity to slow its progress, but we can intervene to regulate and shape its impact. With this goal in mind, we are formulating recommendations that are grounded in a clear, common set of values. Without explicit communication of those values, our efforts to formulate sensible, humane regulation will fail.

OUR ROLE IN THE DEBATE

With this report, UNI Europa is entering an ongoing global conversation about AI, and we appreciate the work already well underway, especially regarding the development of ethical and trustworthy Artificial Intelligence. The Ethics Guidelines for Trustworthy AI and the Policy and Investment Recommendations for Trustworthy AI, from the European Commission's High-Level Expert Group on Artificial Intelligence as well as the work of the OECD Council on Artificial Intelligence, are particularly valuable contributions[1].

Overall, we favour a humans-in-command approach to AI, meaning that humans remain in control of all technology. We also firmly support respect for human rights as a cornerstone value in the use of all AI technology. AI and other emerging technologies should improve individual well-being and help build a sustainable and inclusive society. As workers' representatives, our responsibility is to help determine how AI systems are designed, developed, and regulated, and to raise awareness about ethical concerns among AI users.

We acknowledge that the public debate about AI has thus far included some discussion of employment, training, and upskilling, but a fuller range of issues related to AI in the workplace and the practical concerns of the European workforce deserve a more prominent place. AI and robotics significantly impact the labour market, particularly as older jobs and tasks transform or disappear, and new ones emerge. We need a deeper understanding of the scope of all these changes and the timeframe within which they will occur.

PARTNERSHIP AND DIALOGUE

Without social dialogue, we cannot build the best strategy for AI. European trade unions and employer organisations as social partners have an essential role to play in resolving complex questions regarding employment, training, the nature of work, inequality, and social protection systems. Decision-makers at the national and EU levels must listen to and cooperate with both unions and employers. And we must all recognise and use the expertise of those who are immediately involved in, or affected by, the design and use of AI systems. On a practical level, both trade unions and employers should take part in establishing appropriate norms and implementation mechanisms, developing and monitoring training, and governing accountability.

We believe that our responsibility transcends the mere duty of providing information to our members about new technologies deployed in the workplace. As employee representatives, we should participate early on in the process of deployment in order to safeguard their own interests and ensure that effective policies and standards are in place[2].

ISSUES COVERED IN THIS REPORT

In this report, UNI Europa highlights several ways that trade unions must engage in the AI debate to protect workers' rights, human rights, and decent working standards. We are pleased that many of our member organisations have already developed their own strategies on AI, providing a foundation for current and future bargaining, and we discuss some of those strategies below.

We believe that the essential instruments for active employee participation in the future are raising awareness through open communication[3] and collective bargaining. Therefore, with the goal of greater awareness and with input from our members, we have identified three topics of concern, which we will explore fully in the pages that follow:

• Data Collection and Management
• Skills and Training
• Fair and Just Transition

In each of these areas, we discuss our critical concerns and demands as they relate to collective bargaining on AI and related issues. We understand that the results of negotiations will differ depending on the context of each nation, sector, or company.

1-High-Level Expert Group on Artificial Intelligence, European Commission (April 2019) Ethics Guidelines for Trustworthy AI. Brussels: European Commission. https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines and AI HLEG, EU (June 2019) Policy and Investment Recommendations for Trustworthy Artificial Intelligence. Brussels: European Commission. https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence. (Accessed 30 October 2019.)
For an introduction to the principles see: Council on Artificial Intelligence, Organisation for Economic Co-operation and Development (2019) Recommendation of the Council on Artificial Intelligence. Paris: OECD https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449. (Accessed 30 October 2019.)

2- UNI Europa welcomes that the Commission's High-Level Expert Group on Artificial Intelligence (AI HLEG) has recognized the importance of workers' information, consultation, and participation during the development and deployment of AI. See Policy and Investment Recommendations for Trustworthy AI (footnote 1 above).

3- In this respect, it is interesting that the AI HLEG has identified increasing knowledge and awareness of AI as an essential requirement to "build a society supported by AI that we would like to live in" and has recognized the key role of trade unions as stakeholders defining training priorities. Ibid, p. 10.

Trade unions must engage in the AI debate to protect workers' rights, human rights, and decent working standards.

The promise of increasing workplace productivity as a result of new AI systems is appealing. Benefits would include greater prosperity and equality, inclusive growth, and a smaller environmental footprint. None of these results is guaranteed, and all will depend on improving the redistribution of machine-produced wealth. But if introduced in the right way—with worker and trade union involvement—the wealth generated from higher productivity can lead to higher wages, shorter working hours, improved working conditions, investment in skills and training, job creation, and a fair transition to green jobs for a sustainable planet.

There are many different AI systems, and their impact on working conditions varies. For example, AI systems can provide new work tools, replace some tasks currently performed by humans, or provide the framework for new methods of analysing work.

Regardless of the purpose of AI systems and how they are implemented, most will require the input of data. In the following section, we discuss challenges related to data in three categories: data collection, data management, and data analysis bias. We also discuss trade union responses and recommendations.

DATA COLLECTION:
PROTECTING WORKERS' PRIVACY AND PRODUCTIVITY

Every AI system needs data to complete the tasks it is designed to address, and that data must be of high quality. Low-quality data inevitably leads to poor outputs. Therefore, precise and thorough data collection methods are a prerequisite for successful implementation of AI. For example, if an AI system is analysing work quality or output, data on worker activity and performance should be collected more systematically and on a larger scale than in more traditional analyses.

To collect more data more systematically in the future, employers will need to increase the number of separate points at which workers and their work tools are measured. This plan presents

two problems: 1) Increased data collection can constitute an infringement of workers' privacy rights and a breach of trust between employer and worker. 2) Workers would be incentivised to circumvent the intent of the system and deliver only work that best fits specific evaluation criteria—and that incentive could lead to bias in the data. For example, social components of work and initiatives that are not part of one's job description—activities that contribute to individual well-being and growth in addition to productivity—might become "worthless" if they are not included in a work evaluation matrix. Carrying out such activities would risk a poor evaluation for a worker because less time would be put into measured work.

Both of the problems described above risk implementation of an AI system that, contrary to its intended purpose, decreases worker productivity and morale. Implementation of such an AI system also might risk discrepancies between the intended purpose of the system and the information in the collected data. This is a challenge faced by every statistical model, but one that is quite important to address when analysing a phenomenon as complex as work.

We must not forget that work occurs in groups of individuals, each of whom has unique traits, ambitions, flaws, and values. Workers' interactions—both face-to-face and digital—contribute to and influence the work of each member of the group. This is why analysing work with statistical models is such a daunting task.

DATA MANAGEMENT:
ENSURING SECURITY AND REDISTRIBUTING BENEFITS

After data is gathered, we face new challenges when it comes to managing that data. First, we must confront the issue of data security. Personal data about individual and identifiable human beings requires safe storage and handling to avoid serious, harmful data breaches. Storage and handling must be organised to comply

with national and EU legislation and regulations governing data protection. The same applies to data off-boarding and deletion. Other issues are the question of who has access to datasets that include personal data and whether a company has systems in place regarding good data governance.

Second, but just as important as data security, is the issue of access to and control of data. One might reasonably assume that employers should have control over their workers' data, but in fact, the question is more complicated than it first appears. For example, if employers do not build data collection mechanisms or their AI systems themselves, but rather license them from a third party, the employers might not be the sole legal entities with a claim or access to the data. Worker-generated data might be shared with other systems and used in more extensive analyses, giving individual workers little or no influence over where their information goes.

We can now see that data management includes a variety of ethical dimensions. Even if an employer is legally and technically able to collect and share worker data, is this morally defensible without meeting certain conditions of consent, the right to privacy, and redistribution of benefits?

To help address these ethical questions, the collection and management of worker data should be guided by *collectively negotiated principles and regulations*.[4]

As our society's use of computer systems becomes more widespread, the value of data will only increase. As employers collect more data on worker activities, the workers themselves are in effect generating more value. We believe this increase in value based on surveillance and worker-generated data should be reflected in a general redistribution of benefits to the whole workforce, a point we will discuss in our recommendations below.

DATA ANALYSIS:
RESPONDING TO THE MYTH OF NEUTRALITY

One of the lures of information technology in general, and AI specifically, is the perception of the technology as "neutral." Many people want to believe that a machine mimicking functions of the human brain can be free of human limitations, including particular economic, social, cultural, and political biases. However, the assumption that AI systems are neutral is quite dangerous. In 1968 computer scientist Melvin Conway coined what we know today as "Conway's law," saying that "organizations which design systems … are constrained to produce designs which are copies of the communication structures of these organizations."[5] In other words, the ethics and values of the humans constructing AI systems and of the organisations employing them will influence the systems' ethics and values.

In assessing the bias of AI systems and work, we should take seriously the implications of Conway's law. Few employers that use AI systems to analyse employees' data will have designed those systems. The designers are more likely to be experts in AI, not work management. That lack of knowledge creates another layer of bias, depending on the designers' perceptions and opinions about the work itself. We, therefore, conclude that datasets should be checked for bias and discrimination regularly and systematically and that appropriate countermeasures should be put in place to ensure fairness. [6]

4- See also UNI Global Union (2018) Top 10 Principles for Workers' Data Privacy and Protection. http://www.thefutureworldofwork.org/docs/10-principles-for-workers-data-rights-and-privacy/ (Accessed 30 October 2019.)

5- Melvin A. Conway (April 1968) "How Do Committees Invent?" Datamation 14:4, pp. 28-31.

6- For instance, Amazon had to take down their AI-driven hiring system because it clearly discriminated against women. See Jeffrey Dastin (October 9, 2018) "Amazon Scraps Secret AI Recruiting Tool that Showed Bias Against Women" Reuters.com. https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G (Accessed 30 October 2019.)

DATA COLLECTION AND MANAGEMENT
RECOMMENDATIONS

In our current public debate about AI and the future of work, data collection, data management, and data analysis are often discussed as questions of *ethics and integrity*. Ethics and integrity are certainly at the heart of the debate, and those questions, in turn, relate to the popular concept of trustworthy AI. In May 2019, the OECD emphasized *trustworthy* AI in their recommendations on the subject.[7] The European Commission High-Level Expert Group on AI also includes "trustworthy AI" in their key starting points[8]. Many academic, journalistic, and activist papers and publications embrace trustworthy AI.

We understand why the dream of trustworthy AI and an interest in the ethics of AI implementation are so compelling. However, we believe that a stronger focus on the challenges and dangers of data within the world of work is crucial if we want to move forward. From the trade union point of view, we seek robust, efficient approaches to the challenges discussed in this section. The recommendations below all arise from social partner negotiations addressing current issues in the labour market. Note that none of the approaches should be seen as firm directions to be implemented without additional discussion. Country-specific and sectoral contexts always matter.

DATA COLLECTION AND SOCIAL PARTNER NEGOTIATIONS

As described above, the challenges regarding data collection have ethical, practical, and legal dimensions.[9] The design and implementation of AI systems should respect the privacy rights of all concerned persons, especially the employees involved in the development and use of the systems. Unions should advocate for social partner negotiations regarding data collection. Among other issues, such negotiations could include:

- **Justification, suitability, and the principle of minimum invasion.** The legitimate purpose of the data collection should be established and links between the specific model for data collection and the desired outcomes should be clarified.

- **Precision**. The methods for data collection should be sophisticated enough to collect only the data related to the intended workplace. All parties involved should be sure that the collected data is the correct data, and only the correct data, respecting the principle of data minimisation.

- **Ethics.** Negotiations should stipulate what types of data collection would constitute a breach of personal and ethical boundaries, and therefore should never be collected.

- **Accountability and transparency.** Executive management should be accountable to the collective group of workers regarding the lifecycle of data, including data gathering, use, storage, moving, and "offboarding" or selling of personal data. This direct accountability to the collective is a huge gap in the General Data Protection Regulation (GDPR) that must be addressed.

- **Governance.** A data and AI governance council should be established or the duties and responsibilities of such a council should be added to existing dialogue structures, such as works councils.[10] With unions, companies should create mechanisms through which data collection can be monitored, evaluated, and ameliorated.

Companies subject to the European GDPR are supposed to respect some of the requirements discussed above and to document them. However, trade unions do not necessarily have the right to access this documentation or to negotiate the purpose and method of using AI and other data-driven systems. This is a significant challenge for future negotiations.

WORKERS' ROLES IN DATA MANAGEMENT

As with data collection, the challenges related to data management should be addressed in negotiations between social partners. Data management must comply with existing legislation and regulation, including the GDPR. Management should be held accountable and be auditable with regard to any data management that includes personal data. Although accountability is a GDPR requirement, companies are currently not obliged to be audited regarding their management of workers' data. We believe that workers have a right to know and to influence how and where their data is stored. They should also know and influence when and where data is moved and who has access to their data. Imperatives for social partner negotiations include:

- **Justification and prior consultation**. Any method for management of worker-generated data should be warranted by the purpose of the data collection, including establishing which humans and which computer systems can access the data and the length of time the data will be stored. Workers' representatives should be consulted about these processes.

- **Control and access**. Before a data management system is activated, workers should be notified as to which legal entities have control of and/or the right to access their data. Unions should have access to the data of their members, subject to the members' consent.

- **Digital legacy**. When workers end their employment, they should have the right to decide what happens to the data collected by their employer about their work, according to the provisions of the GDPR.

- **Redistribution of benefits.** If an employer benefits economically or otherwise from using, licensing the use of, or selling worker-generated data to a third party, those profits should be redistributed to the workers.

- **Transparency.** If AI systems use personal data, that data should be used in a way that is legal and comprehensible to anyone concerned. All parties should be required to mark AI systems, so users and consumers are informed appropriately about AI methods.

- **Traceability.** AI systems should be designed and documented in a way that allows the decisions to be traced and understood. This should be the case especially for applications that are sensitive in terms of fundamental rights or that present health, social, or financial risks. The demands concerning documentation, transparency, and traceability may differ depending on each system's function, application scope, and risks.

- **Risk assessment.** If an AI system is likely to have a great impact on personal rights, working conditions, or other social consequences, a risk assessment is in order. Assessments should include risks related to human decision-making, social discrimination, and impact on working conditions. In order to carry out a risk assessment, all parties—especially worker representatives—should be involved in defining the guidelines.

- **Evaluation.** AI systems should be evaluated in light of their social impact unless a prior risk assessment has shown that there is no relevant impact. Evaluations should be based on pre-defined success criteria, but also allow for the analysis of new and unexpected outcomes and experiences. An evaluation should be carried out in the pilot phase so that faults and problems can be discovered early and with the participation of employees. This will help employee representatives play a role in safeguarding human design of AI systems.

PRINCIPLES TO AVOID DATA ANALYSIS BIAS

Work relations have never been neutral, and unions have always recognized the importance of negotiations to establish norms and regulations for the workplace. Politics and personal and social values play important roles in the world of work—a fact recognized as key to union strategy for decades.

We believe that decisions made by algorithms can lead to less democratic workplaces if they are not followed up with adequate supervision. For example, participants must be able to document exactly how each conclusion is reached. Neutrality, in terms of age, gender, ethnicity, and political standing must be ensured. In work settings, negotiations should centre on essential principles for avoiding bias, including, but not limited to:

• **Transparency.** In any AI system carrying out analysis of worker-generated data, there should be transparency at all stages of the system's design, and a layperson should be able to understand the system.

• **Equality.** To reveal and counteract discrimination that might be inherent in an AI system, companies should integrate into the analysis mechanisms to identify bias and procedures to address it.

• **Safeguards**. Permanent consultation, modification, and revocation are some of the safeguards and checks that can be implemented to mitigate bias. Other safeguards include an appeal process in which AI decisions can be appealed and repealed by humans and a tracing process in which AI decisions can be monitored and automatically compared over time to detect if decisions change when cases are similar.

7- Council on Artificial Intelligence, OECD (2019).

8- AI HLEG, EU (June 2019).

9- See the discussion of these issues in EU General Data Protection Regulation (GDPR): Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the projection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ 2016 L 119/1. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679&rid=1#d1e40-1-1 (Accessed 30 October 2019.)

10- Such a council should consist of workers and management; it should hold management accountable for AI and data practices and regulatory compliance. The council can be tasked to monitor, check, and audit algorithms and data governance strategies. It should also respond to employees' inquiries and facilitate whistleblowing. The council can oversee the respect of workers' data rights and the implementation of ethical AI practices.

SKILLS AND TRAINING

The Future of Jobs, published by the World Economic Forum (WEF) in 2018, included a survey of major employers across the world.[11] The report's data set contains 313 unique responses by global companies from a wide range of sectors, collectively representing more than 15 million employees. While this is only a small minority of the world's global workforce of three billion people, the workplace decisions of these firms have the potential to transform local labour markets through indirect effects. These companies also set the pace for the adoption of new technologies as well as evolving skills and occupational requirements.

Below, we present key highlights of the WEF survey relating to worker skills and training that may be affected by AI and other technological disruptions and our responses and recommendations.

HIGHLIGHTS OF THE SURVEY

• **Skills shifting.** During the period 2018-2022 global average skills stability—the proportion of core skills required to perform a job that will remain the same—is expected to be about 58 per cent. Therefore, the average shift in required workforce core skills competences will be about 42 per cent.

• **Reskilling and upskilling.** Employers indicated that they would prioritize reskilling and upskilling efforts for employees currently performing high-value roles as a way of strengthening strategic capacity, with 54 per cent and 53 per cent of companies, respectively, stating they intend to target employees in key roles and in frontline roles using relevant new technologies. In addition, 41 per cent of respondents are going to focus their reskilling on high-performing employees, while only 33 per cent said they would prioritize at-risk employees in roles likely to be most affected by technological disruption.

• **Additional training needs.** By 2022 the WEF report predicts that 54 per cent of the surveyed employers' workers will require substantial reskilling and upskilling. About 35 per cent of those workers will need additional training of up to six months, 9 per cent will need 6 to 12 months additional training, and 10 per cent will need more than 12 months.

• **Limits of current training.** The findings of the survey corroborate a range of recent research indicating that only about 30 per cent of employees in job roles with the highest probability of technological disruption has received any kind of professional training over the past 12 months. Those workers are on average more than three times less likely than employees in less exposed roles to have participated in any on-the-job training or distance learning and about twice less likely to have participated in any formal education. Other recent research finds that reskilling and upskilling efforts are largely focused on already highly skilled and highly valued employees.

• **Productivity drives reskilling and upskilling.** Some 90 per cent of respondents said that their key metric for reskilling and upskilling initiatives is increased workforce productivity, followed by retention of high-skilled workers, enabling workers in frontline roles to make the best use of new technologies, and increased employee satisfaction. Fewer companies see reskilling as a means of lowering recruitment costs, redeploying employees in disrupted job roles, or increasing the skills base of their medium- and lower-skilled workforce.

• **Strategies to shrink the skills gap.** Current employer strategies for dealing with the critical skills gap fall into three categories: 1) hiring external applicants with skills relevant to evolving technologies, 2) automating work tasks, and 3) retraining existing employees. Many employers have not yet identified a clear strategy, but external contractors, temporary labour, and freelancers are likely to be options.

• **Partnership with unions.** Partnering with unions regarding skills and training was only supported by 23 per cent of employers across all industries, including manufacturing and services.

• **Workers at risk.** When employers are willing to prioritise reskilling and upskilling of existing workers, a minority consider ongoing programmes for workers at risk of substitution—meaning workers with the greatest need are the least likely to benefit from employer-initiated schemes.

It is important to bear in mind that this is a survey of employers with sizeable resources. Employees in smaller companies and workers in the gig economy are likely to face a greater challenge in achieving reskilling and upskilling. Small companies lack financial resources for improving employees' skills and often acknowledge no responsibility for workforce development. At the same time, gig workers frequently are not even recognised as employees.

CAUSES OF CONCERN

The results of this survey concern us because a culture of lifelong learning is increasingly imperative for workers across the globe that are affected by technological change. In particular, the survey shines a light on the fact that many companies do not acknowledge the bottom-line impact of and business case for reskilling and upskilling investments. Time requirements, costs, success cases, and appropriate delivery models for reskilling and upskilling are likely to look different for different categories of job roles and workers.

Recently, the statement of European employers on "Reducing labour shortages by improving skills matching,"[12] addressed concerns about growing skills mismatches and the need for a reform of the training and education system. Many of the concerns raised in the employers' statement are correct, but they do not address their own role in investing in training. They focus too much on the promotion of STEM skills, without acknowledging the importance of soft skills, including creativity, empathy, and complex reasoning. This is partly because many AI-driven skills analyses aim at identifying skills gaps using open data sets, such as LinkedIn profiles, which do not necessarily refer to soft skills. The question we must raise is how to use AI systems to compare existing skills with changing demand in order to close the skills gap before it increases.

OUR TRAINING AGENDA

What then are the digital skills that a majority of employers will expect workers and job applicants to have in the future? For almost all employees, the essential digital skills needed to survive in the workplace of the future are:

• Digital foundation skills: The most basic skills for functioning in a digital work environment, from turning on devices to connecting to the Internet to changing passwords.

• Communication skills: Collaborating and sharing information online.

• Safety skills: Finding, managing, and storing digital information securely.

• Transaction skills: Registering and applying for services, buying and selling goods and services, and administering and managing transactions online.

• Problem-solving skills: Finding solutions to problems using digital tools and online services.

• Legal skills: Understanding risks and threats in carrying out activities online, keeping data secure and software up to date, including using privacy-enhancing technologies for communicating via social media platforms.

In 2017, only 43 per cent of European citizens had adequate digital skills as described above.[13] But we expect that workers will not only need these skills in the immediate future, they will also have to retrain and improve them throughout their working lives. In addition to these digital skills and other technical knowledge, workers will need to hone their creativity, persuasiveness, emotional intelligence, and initiative as suggested by the EU Commission in its interim 2018 report, *Skills for Smart Industrial Specialisation and Digital Transformation*.[14]

11- Centre for the New Economy and Society (2018) The Future of Jobs Report. Geneva: World Economic Forum. http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf (Accessed 30 October 2019.)

12- Business Europe (September 2019) "Reducing labour shortages by improving skills matching." Brussels: Business Europe. https://www.businesseurope.eu/sites/buseur/files/media/position_papers/social/2019-09-12_joint_statement_labour_shortages_and_skills_mismatches.pdf (Accessed 30 October 2019.)

13- In the survey, 17 per cent of the total EU population reported having no digital skills at all. For more details, see the results of the Digital Economy and Society Index (DESI) (2019) https://ec.europa.eu/digital-single-market/desi (Accessed 30 October 2019.)

14- "As a response to these labour market changes and challenges, the combination of technical (i.e. STEM-based) and non-technical skills (i.e. quality, risk, and safety assurance; management and entrepreneurship; communication; innovation related and emotional intelligence)—so-called T-shaped skills are expected to be in high demand," in Executive Agency for Small and Medium-Sized Enterprises, EU (November 2018) Skills for Smart Industrial Specialisation and Digital Transformation, Interim Report. Luxembourg: Publications Office of the European Union. https://op.europa.eu/en/publication-detail/-/publication/1939a3ea-e955-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-101268965 (Accessed 30 October 2019.), p. 55.

15- "Thus, individuals have to engage in life-long learning not only to remain employable but also to achieve fulfilling and rewarding careers. Likewise, employers should not solely rely on new workers with the right ready-made skills but invest in workforce up/re-skilling as a beneficial investment even in the absence of skills-shortages." Ibid., p 56.

SKILLS AND TRAINING
RECOMMENDATIONS

We believe that social partners must be involved in establishing the skills and training required to transition to a fair workplace of the future. Trade unions have a wealth of unparalleled experience in identifying training and workforce needs. Technological changes, new interactions of humans and machines, and evolving skill sets will not produce increased productivity or generate job satisfaction if only employers are involved.

Unions must include our own objectives for fair training and workforce transitions in all our agreements at the national and transnational level. We must use our collective bargaining machinery and consultation bodies to convince employers to prioritise investment in existing human labour as much as they prioritise automation and hiring external applicants.

Trade unions know how to identify obstacles to employees' advancement. We recognise the importance of training at the workplace and during working hours, so it is important for us to raise awareness about existing training opportunities. Training should improve the individual worker's employability, and employers should finance the training and the time needed.

The magnitude of the changes affecting our global economy means that unions also must campaign, negotiate in the context of collective bargaining, and lobby governments to introduce beneficial changes such as:

• Ensuring that education institutions and companies provide training in valuable digital technology skills.

• Making it clear that employability must be promoted through upskilling and reskilling schemes, and that corporate investment in formal, informal, and life-long learning is essential. [15]

• Developing action plans at the EU, national, and local levels with education providers and social partners in order to modernize education and vocational training.

• Demanding that AI provide an opportunity for workers to apply their skills and competencies to the fullest while at the same time remaining in control of the production process.

• Ensuring that those involved in the development and marketing of AI (researchers, engineers, designers, and others) act in accordance with ethical and social responsibility criteria. This should be addressed by changing educational priorities for technical subjects and by providing lifelong learning opportunities, such as incorporating ethics and the humanities into training courses in engineering.

• Demanding that employers are transparent about new developments so employees can evaluate whether they prefer to train or leave.

• Insisting that companies prepare a "people plan" and not only invest in technology. Such plans should be conducted throughout the value chain of each company and might include:
  - Mapping current workers' skill profiles.
  - Cooperatively determining reskilling and upskilling requirements.
  - Offering courses during working time.
  - Assisting displaced workers in developing career development plans.
  - Working with employment agencies and other companies to help workers move on successfully.

• Requiring that employers have a long-term strategic plan on how upskilling and reskilling strategies are implemented and that unions be involved through social dialogue.

• Demanding that employers finance the training and the time needed for employee training, thus establishing a right to training.

• Making it clear to employees, in trade union education and other worker-centred forums, and in collective bargaining, that they should proactively seek training, but that it is not their sole responsibility to keep up with rapid technological developments.

Other areas in which we believe unions can influence the agenda and make genuine positive change:

Training levies. Levying sums from employers that they can claim back if they use the money for retraining their workers can be useful. When monies are not spent, they can be used by the state to assist small companies that cannot afford training budgets.

Retraining payments and subsidies. In cases of obsolete and highly vulnerable companies and industries with thousands of redundancies, unions must support retraining payments and subsidies as part of redundancy compensation to facilitate workers' re-entry into the labour market. The public sector and education systems should also be engaged.

Education reform. We support changes in education that de-emphasize memorising information, and help students turn information into knowledge by teaching creative, analytical, and social skills.

Job Guarantees. In the near future, public policymakers must explore job guarantee schemes that would complement the normal labour market. Guaranteeing paid activity for those who lose their jobs will maintain confidence and use workers' existing skills. If governments become the employer of "last resort" this would be of use to workers otherwise facing significant time out of the labour market. Such a plan could actively promote upskilling if learning new skills were a core element of the guaranteed activity.

Union-financed training. Finally, either separately or in concert with employers, unions can offer training courses for members at competitive costs, using their formidable purchasing power.

A FRAMEWORK FOR A FAIR AND JUST TRANSITION

Artificial intelligence, automation, and robotics are becoming more significant in individual jobs, the larger labour market, and society as a whole, resulting in both new opportunities and new risks. In some job categories, more than 90 per cent of jobs now require specific types of digital skills.[16] Older tasks and jobs are disappearing as new ones are created, and all these changes are happening faster than ever before.

With these changes come new and larger social and economic divides, even as geographical divides are shrinking. We see clear gender inequality in the tech world, and across many industries wages are not increasing at the same pace as productivity is increasing. Profits tend to concentrate in a few large corporations and in countries with the greatest data access and control of markets.

To manage the transition to a global digitalized labour market in a fair and human-centric manner, social partners and other stakeholders must cooperate on all levels and create a framework for policies and investment strategies on social security, training and relocation, research, education, and infrastructure. Access to AI should be for all, and the benefits should be spread uniformly and equally.

We believe that it is essential to bring professionals and users from all levels into the process of crafting policies for inclusive and non-discriminatory development and application of AI. Decision-makers and social partners must work proactively to advocate for AI to be used ethically, democratically, and safely. And we all need to work to create an environment and regulations for AI systems that sustain humans and our planet.

Involvement of social partners is a key to ensuring a fair and just transition. Social partners need to be involved when deciding on and managing a fair transition to the digitalized world of work. This includes policies, standards, and investment strategies regarding 1) what the labour market should look like, 2) how sectors and jobs will be affected by AI, and 3) the quality and quantity of jobs.

Any fair transition will include planning for how to relocate workers and manage training, as well as ways to share profits from automation productivity gains and to reinvest those profits for upskilling, reskilling, and securing social welfare systems. Companies and stakeholders at all levels should cooperate towards a set of shared goals, including:

Using public discussions to decide where AI should be used for the long-term benefit of society. Social partners, academia, policymakers, and civil society should all be a part of this dialogue. They should map developments and determine which sectors will be affected and how, and they should set goals and follow up on the developments in the labour market and the effect of AI on workers.

Creating a public, independent mechanism to control and audit algorithms. A European group of observers focusing on ethics in AI systems could play the role of an independent watchdog. In the ongoing process, it is vital that all involved parties, including unions, are active participants in supporting ethical AI.

Prioritizing women's education, research, and job opportunities so that they are equal to those of men.[17] The problem of gender inequality must be addressed as early as possible, from the primary education level on, and we must challenge gender stereotypes that disadvantage women in tech and science. Increasing the representation of women in science and technology is not only a question of equality and democracy, but would also improve the "relevance and quality of research and innovation outputs for society as a whole."[18] All relevant stakeholders should strive to provide targeted education pathways and funding for girls and young women in technology.

Measuring and controlling for bias in decisions taken by algorithms to avoid anti-democratic results. We must establish transparency and neutrality about which data is used for decisions and where that data comes from. Individuals and businesses must be able to appeal to a public authority if they believe that they are acting unlawfully as a result of behaviour/decisions taken by AI systems. Toward this end, it will be necessary to update regulations and laws related to AI in order to define and regulate responsibilities formally.

Raising ethical awareness. All concerned parties, from AI developers to national governments, must contribute to raising awareness of moral, ethical, and legal issues related to AI by giving it a prominent place on the political agenda. One way is to establish

an arena where decision- makers, business leaders, research communities, civil society, and professionals can meet and have an active dialogue. Simply put, we need an open, inclusive, and collaborative process based on a shared set of values.[19]

Striving for a labour market with a variety of low-, middle- and high-qualified positions. Social partners should be able to influence what businesses, roles, and professions AI and robotics are to replace or complement and how it is done. The quality of work, variation of tasks, and work environments can improve with the use of advanced technology. AI, automation, and robots can be used for monotonous, dangerous, and difficult tasks as well as tasks beyond human capacity. AI and new technology can let us focus more on analytical or creative tasks and on social interaction with clients or patients. But we should not think of the new technology as something beyond our control. We can cushion the adverse effects of certain sectors through collective bargaining and training programs.

Encouraging employee participation early in the development and deployment of new technologies. It is essential and important to inform and consult workers representatives in the workplace or at the branch level.

Engaging in a dialogue about which competencies we need in the future and how to manage training for the new high-tech labour market. To relocate or upskill the workforce is expensive, given training and unemployment costs, so we must plan effectively. For example, we might follow the model of training outplacement programs through collective bargaining agreements. Foundations are negotiated in national, sectoral collective bargaining agreements (CBAs) by social partners and mutually funded by unions and employee organisations. On a local level, some larger companies apply internal training programs for employees instead of redundancy when competence shifts are needed.

Increasing funding for research and education on AI in Europe. North America and Asia are leading in AI currently, so we must close the gap. We also need government-funded and EU-funded research on the effects of AI and automation on workers, social security, and the labour market with the involvement of social partners. At the European level, the outcomes of the Digital Skills and Jobs Coalition should feed European and national action plans on digital skills.

Redistributing AI-generated wealth through CBAs. An important element of the larger debate on AI is the question of how profits should be reinvested for the common good to create employment in health care, health services, education, mobility, and other realms. Employees should participate in the redistribution of machine-produced profits through wage increases, investment in skills, and reduction of working time. In many cases, this redistribution can be managed through CBAs. Working hours and systems vary, so they should be adapted on a national, sectoral, and company level to suit each business or profession.

The objective of this redistribution is to help integrate social progress and high-quality jobs with an ethical approach to AI in order to create a balance to maintain a sustainable transition to AI systems for humans and the planet.

Strengthening social security systems. We advocate for addressing future job losses and the likelihood that employment relations may become more precarious due to AI and automation by reinvesting profits from AI in public employment services. These services can be used to provide training along with extended study loans or grants to prepare career transitions before and during unemployment.

Addressing the platform and gig economies with new solutions. Data has become the new oil, driving the economy as it drives AI, so it should be considered an asset and generate income for the people whose data is creating profits. A fair, proportionate system to distribute the profits through a fee or rental system should be established to make the data economy equitable and sustainable.

Using CBAs to complement social security systems. Most CBAs cover insurance for sickness, parental leave, pensions, and occupational injuries. Many trade unions also offer income insurance if members become unemployed. The coverage of CBAs should expand to new forms of work and platforms—for example, with new agreements on holidays, fees, and maximum working hours.

Focusing attention on climate change and the environment. The use of AI is important for the transition to a sustainable economy. Comprehensive social reorganization will require innovation around business models, services, and digitization—all areas in which AI will play an important role. To adapt to a sustainable economy, we must think about the life cycle of products and reusing entire products or their components. Careful use of data can accomplish this more effectively and efficiently, and AI can enable market and life cycle services to keep, electronic products such as washing machines, for example, in use longer.

A FRAMEWORK FOR A FAIR AND JUST TRANSITION
RECOMMENDATIONS

As yet we have encountered few examples of collective bargaining approaches specifically designed for a fair and just transition to a new world of work, but many unions have begun to develop their own ideas about what such a transition should look like. Some of those ideas are detailed below.

SOCIAL PARTNERS' INVOLVEMENT

In order to ensure a fair transition, trade unions must be included in public debates about new technologies, and policymakers and industry leaders must recognize workers as key stakeholders. That recognition should lead to worker and union participation in all aspects of the transition:

> • Trade unions and employee representatives should be involved in the design, development, and deployment of AI systems in organisations before final decisions are made. The timely involvement of concerned employees will help ensure that personal rights are protected, that human sovereignty over AI systems is maintained, and that the tasks of employees and interoperability of AI systems are developed in a humane manner.

> • Social partners should cooperate to identify training needs, design new education pathways, and find funding opportunities.

> • Social partners must promote awareness about the challenges and opportunities of new technologies. They should help ensure that the "new world of work" does not create more inequalities, but rather improves the lives of all people.

> • Worker and union participation should happen at the regional, national, and transnational level. Employees should also participate in any ethics advisory committees set up by companies.

> • No one should be subject to automated decisions that result in a legal or otherwise burdensome impact on the individual.

LABOUR MARKET BALANCE

Collective bargaining agreements on the sectoral level should include AI, robotics, and digitalization concerns so that worker participation and protections can be adapted to each sector and business. Transnational company agreements and company agreements on the issues of digital job quality are already in place in many companies.

Given the probable polarization of jobs, separating those that can be replaced easily by AI (often referred to as low-skilled) and those still requiring significant human input and creativity (often called higher-skilled), it will be important to find a balance between sectors that will lose jobs and those where employment will be created. And to foster balance in society overall, the benefits of technology should be reinvested in education, health care, and other aspects of the common good.

WORKING TIME, WORK-LIFE BALANCE, AND TRAINING

The objective of a fair and just transition is also closely linked to debates around new models for working time, such as a reduced full-time week of four days of work and one day of training. The question these models seek to answer is how we can distribute the remaining work after automation and AI take over most repetitive and lower-skilled tasks. The aim is to distribute work equally and allow for improved work-life balance for everyone.

Some organizations already have taken practical steps towards reaching these fair transition goals. The Spanish *Unión General de Trabajadores* (UGT) has demanded a new social contract for the digital world that is based on putting people's needs first. The Association of Swedish Engineers (SI) and a group of stakeholders have presented a model for mid-career training called "Study Friday." Under Study Friday, professionals can upskill at work to

meet the demands of new technology. The program is managed cooperatively by trade unions' universities and companies. The content and practice of upskilling are negotiated by social partners in CBAs on a sectoral or company level. One lesson to take away from this initiative is that training—including the level, scope, content, and availability—can be adapted more quickly when certain roles, groups, or businesses are affected.[20]

OUTPLACEMENT PROGRAMS AND EXTERNAL RELOCATION

Collective agreement-ruled outplacement programs provide examples of how transitions to digital skills can work well on a national or sectoral level. These programs last from three months to two years and include training and job search assistance. The foundations that manage the outplacements[21] are funded by trade unions and employer organisations and negotiated in national, sectoral CBAs by social partners. Anyone at risk of redundancy can participate in these programs, which work a bit like insurance.

LOCAL COMPETENCE SHIFTS

Ericsson has a local competence shift program to avoid redundancy. The employees reskill or upskill at work to avoid redundancy and stay in the company. The agreements on what competencies are needed and who should participate are negotiated in local agreements by unions and employers.

SOCIAL SECURITY AND PROFIT-SHARING

Collective bargaining agreements distribute company profits to workers through wage increases and better conditions, but they also can be used to reinvest profits in training as discussed above. In some cases, outplacement programs can be funded cooperatively by employers' organisations and trade unions to provide greater worker security.[22]

CONCLUSION

Artificial Intelligence is more than the latest fashionable buzz word; it is already an integral aspect of the working lives of many of our union members. With this position paper, we hope to contribute a more employee-centred viewpoint to the general debate.

Social partners, and in particular trade unions, have a key role to play during the next few years as the labour market of the future takes shape. We want a fair and just transition towards a society in which AI systems benefit everyone, no one is left behind, and the skills and competencies of individual workers are respected and valued. Trade unions should proactively shape this vision, and we must begin by addressing AI issues in collective bargaining now.

16- DG Communications Networks, Content & Technology, EU (May 2017) ICT for Work: Digital Skills in the Workplace. Luxembourg: Publications Office of the European Union. https://ec.europa.eu/digital-single-market/en/news/ict-work-digital-skills-workplace (Accessed 30 October 2019.)

17- According to a recent UNESCO report, only 12 per cent of leading machine-learning researchers are female. Equal Skills Coalition, UNESCO (2019) I'd Blush If I Could: Closing Gender Divides in Digital Skills through Education. EQUALS. https://unesdoc.unesco.org/ark:/48223/pf0000367416?posInSet=1&queryId=2a80d5 6a-6c00-4e86-8c66-852d9031a66c (Accessed 30 October 2019.)

18- AI HLEG, EU (June 2019). Think of the occurrence of gender bias in AI algorithms that could also be reduced.

19- Several important contributions to this debate have been made. For example, Council on Artificial Intelligence, OECD (2019) and Association of Nordic Engineers (ANE) (2018) Nordic Engineers' Stand on Artificial Intelligence and Ethics: Policy Recommendations and Guidelines. http://nordicengineers.org/sites/default/files/ Recommendations%20AI%20and%20ethics.pdf) (Accessed 30 October 2019.)

20- An overview of the report can be found on the website of the Association of Swedish Engineers: https://www.sverigesingenjorer.se/aktuellt-och-press/nyheter/ study-friday-ny-modell-for-utveckling-av-ingenjorskompetensen/. (Accessed 4 November 2019.) And see the full report: Sveriges Ingenjörer, Teknikföretagen, Industriarbetsgivarna, IT&Telekomföretagen, Innovationsföretagen, IKEM, KTH, Chalmers, Uppsala universitet, Lunds universitet, Linköpings universitet, Luleå tekniska universitet och Umeå universitet. (05 June 2019) "Study Friday: Ett nytt förhållningssätt till livslångt lärande." https://www.sverigesingenjorer.se/globalassets/ dokument/rapporten-study-friday---ett-nytt-forhallningssatt-till-livslangt-larande.pdf (Accessed 4 November 2019.)

21- Non-profit foundation TRR is an example. See https://www.trr.se/en/

22- An example of profits used for social security would be data rent, or data as a commons. See Ekkehard Ernst (12 June 2019) "Big Data and Its Enclosure of the Commons," SocialEurope.eu. https://www.socialeurope.eu/big-data-and-the-commons (Accessed 30 October 2019.)

To illustrate how concerns about new technologies, including AI and robotics, can be addressed in collective bargaining, we share below some examples of union and social partner initiatives. This is not an exhaustive list, and the examples depend on the national, sectoral, and local context.

DATA COLLECTION AND MANAGEMENT

Initiatives addressing rights provided by the GDPR in the workplace

The UGT and the employer organization Ametic have signed an agreement stipulating that when a new technology is adopted, employers should specify its effects on GDPR. The agreement also anticipates the creation of an advisory committee on GDPR. And UGT has proposed several conditions to ensure that GDPR rights are met:

• Prove that the link between data and the labour dimension is relevant.

• Define the final purpose of data collection. For example, is the purpose to increase productivity or to sell data?

• Determine whether data collection is relevant. For example, is it necessary to collect biometric data from employees in order to allocate office space?

• Ensure that data is used in the best manner possible. Companies should use data not only for their own purposes, but also for the benefit of workers.

In a similar approach, the Austrian printing and journalism union, Gewerkschaft der Privatangestellten, Druck, Journalismus, Papier (GPA-djp), has prepared a checklist for works councils, raising issues related to the nature of data collection, including the type of data collected, how long it will be stored, and who has access to it. The union also provides works councils with information about digitization and data protection via an online tool. [23]

In Switzerland, communications union syndicom and telecommunications company Swisscom have agreed on a Smart Data policy that includes principles for processing of employees' personal data. [24]

Initiatives regarding ethical AI and avoiding bias at the workplace

The Association of Nordic Engineers (ANE) has issued recommendations for ethical AI:

• Establish training programs to deepen staff members' understanding of ethics and to develop skills for ethical reflection, debate, and recognition of biases.

• Establish an internal ethical review process that democratizes company decision-making by involving more people.

• Establish a set of internal standards and checklists about ethical issues in AI development, including the challenge of ensuring meaningful human control.

• Support and facilitate internal reporting of risks and violations, establishing rules for clear actions in response. [25]

SKILLS & TRAINING

In Spain, the agreement signed by UGT and the ICT sector employer organization anticipates that if jobs are destroyed or transformed as a result of new technologies, measures should be taken to identify new options for job creation.

The manifesto for digital talent signed by Spanish social partners in the ICT sector (UGT; *Comisiones Obreras*, or CCOO; and the business association Ametic) highlights the need to improve education and training to match the need for skills, to adapt to digitalization, and to increase gender balance in the sector.

UGT also has signed an agreement with Google ensuring that the company will train 200 trade union representatives on transversal digital skills. This training is free, and Google is not supposed to gather data. When their training is complete, these workers will become trainers themselves and train 5000 colleagues in various sectors. An online training platform will be set up to reach out to more people.

In the Finnish insurance sector, trade union *Vakuutusväen Liitto* (VVL) has established cooperation with the chief of robotics at IF insurance. This will help the union and the company jointly address how new technology is deployed and how workplaces will be

affected, especially in regard to customer care. The IF European Works Council (EWC) agreement also promotes transparency about data use. VVL has issued recommendations on workers' skills:

• Companies need a shared vision of skills requirements.
• Competency development requires different methods and adequate working hours.
• Telework and flexible work improve wellbeing and choice.
• Local agreements are possible if built on trust, competency, time, and courage.

VVL estimates that this approach reduces the number of redundancies because the company trains employees during working hours and pays for it. Employees also are responsible for educating themselves and asking proactively for training. The company is transparent about developments so that employees can evaluate whether they want to train or leave.

French unions Confédération Française Démocratique du Travail (CFDT), Confédération Général du Travail- Fédération des Activités Postales et de Télécommunications (CGT-FAPT), and Force Ouvrière-Communication (FO-COM) have an agreement on digitization with Orange that includes fundamental respect for the private life of employees and their right to disconnect outside of working hours. The agreement lays down provisions on how to ensure that this right is respected and that appropriate training and prevention measures are in place.

The Association of Nordic Engineers (ANE) recommends integrating ethics into engineers' training. Education about ethical considerations is often insufficient in the technical disciplines and in the working lives of engineers. ANE recommends that this deficit be addressed through changes in educational goals and priorities for technical subjects. [26]

ANE also emphasizes the importance of providing adequate information about training opportunities. In its report on continuous professional development, ANE recommends that:

• All employers should provide Continuing Professional Development plans and long-term strategies for professional development for all employees built on dialogues between the employer and the employee.

• The right to receive professional development should be an integral part of collective bargaining and included in employment contracts.

• Employers should provide spaces and time for employees to develop and improve their competencies. Each employee should have the right and obligation to seek opportunities for professional development proactively. [27]

UNITE the Union has reached an agreement with a number of employers on new degree apprenticeships being introduced into UK workplaces. The agreement includes the obligation that employers earmark 0.5 per cent of their total wage bill each year as a training levy.

UNITE has also reached an agreement in the finance sector for offering employees retraining and upskilling. Degree apprenticeships in ICT and cybersecurity have proven to be the most popular.

Swiss syndicom has reached an agreement with several companies on the right to training for employees.

The Communication Workers Union (CWU) in the UK is working with BT, the national telecom network provider, to secure training and redeployment for its members in new roles created by AI and digital technologies. On the engineering side, migration from a copper switch network to a digital fibre network is demanding new kinds of engineering and software programming skills. On the customer-facing side, routine tasks such as fault reporting and appointment scheduling are being automated, and online customer queries are increasingly being answered by internet chatbots. But calls about more complex queries drive an ongoing need for high-quality customer interaction and sales skills. The CWU is talking to BT about maximising the number of higher-level customer service roles and improving opportunities for career progression.

In financial services, the CWU has also been working with Santander to seek redeployment and training opportunities for members who are affected by high street bank closures and the changing nature of contact centre roles. The growth in online and mobile banking means that although basic financial information can be found online more easily, customer queries are becoming more complex and taking longer to resolve. The CWU wants to maximise the opportunities for membership growth from the many new digital and AI-related roles in financial services, particularly in software design and technical innovation. Areas of investment include intelligent contact centre queuing systems, fingerprint recognition, and voice biometrics.

JUST TRANSITION POLICIES

Addressing work-life balance and work organization

In the finance sector, employee and company representatives in UniCredit have signed a joint declaration of the EWC on work-life balance and respect for employees' private lives, including the right to disconnect. Key issues are respect for official working hours and rest times, proper use of corporate devices, and promotion of flexibility regarding time and work organisation to meet personal needs and interests such as sabbaticals and other forms of leave[28].

The Spanish unions UGT and CCOO have successfully campaigned for an agreement with Telefonica that recognizes the right to disconnect and the promotion of work-life balance. The agreement also recognizes the need to train managers to guarantee that workers are not connected too often and to ensure that employees are not forced to deal with electronic communications outside working hours. Spanish labour law establishes sanction mechanisms in the form of court cases, mediation, or disciplinary measures. Based on the national agreement with Telefonica, the right to disconnect has been integrated into the Global Framework Agreement between UNI and Telefonica so that these provisions apply to all global branches and subsidiaries.[29]

The German union ver.di has signed an agreement with Deutsche Telekom regarding ICT-based mobile work. The agreement covers the definition of mobile work and the rights of employees to concerns about mobile work, working time, and health and safety. Spanish CCOO has reached a similar agreement with insurance company AXA, which includes recognition of the right to turn off company phones or not answer work-related calls outside of working hours. The agreement implies that AXA employees are not required to answer work emails or messages outside of their normal working day and contains provisions on work-life balance, remuneration, and leave entitlements.

In Switzerland, syndicom has signed agreements with several companies regarding mobile work in employees' homes, including the right to disconnect.

In France, several unions, including CFDT, have signed an agreement with Capgemini on the right to disconnect. Provisions cover respect for time off work and the role of managers in respecting the right to disconnect. The agreement suggests guidelines and training for both employees and managers on the right to disconnect.

23- See DigiCheck: https://www.gpa-djp.at/cms/A03/A03_1.15.8/berufsleben/digitalisierung/digicheck. (Accessed 30 October 2019.)

24- See Swisscom Convention Collective de Travail (July 2018): https://syndicom.ch/fr/branches/telecom/swisscom/cct-swisscom-2018/ (Accessed 30 October 2019.)

25- Association of Nordic Engineers (ANE) (2018).

26- Ibid.

27- Ibid.

28- For more details, see UniCredit (2017) "Joint declaration on 'work-life balance.'" Milan: UniCredit European Works Council. https://www.unicreditgroup.eu/content/dam/unicreditgroup-eu/documents/en/sustainability/EuropeanWorksCouncil/JD_workLifeBalance_EN.pdf (Accessed 30 October 2017.)

29- For more details, see the press releases of CCOO http://www.fsc.ccoo.es/noticia:391804--Firmados_los_acuerdos_de_desconexion_digital_y_registro_horario_en_Telefonica and UGT https://comunicaciones.fesmcugt.org/2019/07/17/ugt-firma-el-acuerdo-de-desconexion-digital-y-registro-de-jornada-en-telefonica/ (Accessed 30 October 2019.)

APPENDIX II

GLOSSARY

This report is not an assessment of the technology discussed. We focus on principles and policy responses, which assert no opinions about the technology itself. For readers new to the topic, we provide brief definitions of some of the frequently used terms below.

Artificial Intelligence: "Artificial Intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions—with some degree of autonomy—to achieve specific goals." [30]

Big data: "Exceptionally large sets of data, which cannot be processed by traditional data analysis systems. Big data can be described by the following characteristics: volume, velocity, variety and veracity." [31]

Data: "Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized. Information; When data is processed, organized, structured or presented in a given context so as to make it useful, it is called information." [32]

Personal data: According to the EU's General Data Protection Regulation (GDPR), personal data is "any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person." [33]

30- Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, and the Committee of the Regions (2018) Artificial Intelligence for Europe) 237 Final, p. 1. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A237%3AFIN (Accessed 30 October 2019.)
31- For a complete definition see https://en.wikipedia.org/wiki/Big_data (Accessed 30 October 2019.)
32- For an interesting comparison of data and information see https://www.diffen.com/difference/Data_vs_Information (Accessed 30 October 2019.)
33- EU GDPR, article 4.1. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679&rid=1#d1e40-1-1(Accessed 30 October 2019.)