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AI and digital tools in workplace management and evaluation

An assessment of the EU's legal framework

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AI and digital tools in workplace management and evaluation

An assessment of the EU's legal framework

This study focuses on options for regulating the use of AI enabled and algorithmic management systems in the world of work under EU law. The first part describes how these technologies are already being deployed, particularly in recruitment, staff appraisal, task distribution and disciplinary procedures. It discusses some near-term potential development prospects and presents an impact assessment, highlighting some of these technologies' most significant implications.

The second part addresses the regulatory field. It examines the different EU regulations and directives that are already relevant to regulating the use of AI in employment. Subsequently, it analyses the potential labour and employment implications of the European Commission's proposal for a regulation laying down harmonised rules on artificial intelligence (AI act). Finally, it summarises the other ongoing EU policy debates relevant to the regulation of AI at work.

The third and final part of this study reflects in detail upon the AI act and its potential impact on the existing EU social *acquis*. On this basis, it advances potential policy options across different EU legislative files, including but not limited to the AI act, to ensure that regulation keeps pace with technological development. It also argues that the AI act should 'serve' and complement – rather than over-ride – other regulatory standards that can already govern the introduction and use of AI-enabled and algorithmic-management systems at work.

AUTHORS

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Executive summary

Artificial intelligence (AI) is spreading into workplaces in many ways. Workers and employers will increasingly be confronted with AI applications and AI-induced software that encroach on labour relations. These AI systems could be introduced with an explicit aim to improve working conditions; however, this cannot be expected in general, and evidence suggests that this will instead be the exception. Rather, for policy-makers and legislators, it will be a question of ensuring that the introduction and operation of AI in the workplace are carried out in a manner that is mindful of AI's impact on working conditions. Furthermore regulation will have to force businesses to minimise AI's negative impact on labour protections.

To this end, this study presents policy options intent on preserving an adequate level of labour and social protections in light of the introduction of AI systems at work. These policy options are limited to reforms that the European Union's institutions can introduce. They are developed throughout this study by, first, exploring and assessing the impacts of how new robots, 'smart' work equipment, software, wearables and other technological tools will increasingly collect workers' data used by various forms of AI to pursue their human-defined organisational goals. The study then examines the extent to which current European laws govern the use of AI at work and analyses the interaction between existing laws and the European Commission's proposal laying down harmonised rules on AI (AI act) and the latter's relevance concerning working conditions, providing the building blocks for the policy options.

The key findings of this study include the following.

AI will become prominent in the workplace – Over time, many forms of software, both industry-specific and generalist, will acquire AI functionalities that will impact working conditions. AI, as a general technology, is likely to become a prominent feature in many people's jobs in the next few years. At the same time, a more limited group of AI technologies with particularly far-reaching effects on workers will initially become prominent in some industries more than others. At least shortly, not all industries will be characterised by equally intrusive AI systems. Certain businesses, for instance, engaged in logistics and stock management, seem to already extensively rely on AI-enabled tools and applications to drive their economic activities. However, in other sectors, developments are so far more limited, even if this could change in time. This will be made possible, among other things, by the elaboration of generic AI products, which will be marketed as being adaptable across industries. Likewise, consultancy companies will become more experienced in proposing AI solutions to business challenges. Moreover, generic software packages, such as those for human resources management (HRM), will also increasingly include some standard AI features. Hence, AI will become more commonplace in managing people at work throughout the economies of industrialised countries.

Introducing and operating AI at work poses challenges for businesses – Although it might seem as if AI will eventually take the work floor by storm, some of our findings suggest the opposite. Firstly, employers will have to carefully reflect on whether and how AI could best serve their needs by considering existing employment and labour protections and rights, including fundamental ones. Leaving aside AI applications of minor importance, companies will have to think long and hard about how they can incorporate AI into their business structure to obtain the best results. Many of the best tools will likely come with a hefty price tag, require additional investment in material and personnel, or demand adjustments to companies' work organisation. Therefore, before committing to far-reaching AI-based systems, employers will have to examine the business case for it. This also presents an opportunity for law and policy to intervene. As already happens in many EU countries, the law can demand companies to fully consider workers' concerns, interests and rights before implementing new technologies, something which would be entirely justified by several reasons discussed in the study.

The functionality and utility of many forms of AI at work remain in doubt – For example, many of the AI tools currently deployed in recruitment remain untested. As the literature points out, there are many valid reasons to adopt a cautious and critical attitude towards AI-powered recruitment applications. Similarly, in the future, AI will likely lead to more continuous staff appraisal. Instead of evaluating workers' performance only a couple of times a year, AI systems are projected to provide more continuous feedback. Yet, despite the theoretical promise of AI in this area, it seems rather complicated to effectively incorporate AI in staff appraisal in practice. For instance, how could there be any certainty that AI is obtaining and using all necessary data to reach a certain conclusion? Current systems effectively collect and compile data, but interpreting such data is much trickier, especially if humans are not allowed to correct a system's inferences.

Furthermore, some companies already rely on algorithms and AI to distribute tasks, monitor workers and evaluate their performance and attitudes. Reliance on such sweeping 'surveillance loops' is still somehow limited, but, in time, these may spread. Many more businesses will rely on AI to evaluate workers, after which the AI's findings will directly influence the decisions of managers. A critical issue in this respect is that businesses risk trusting AI disproportionately and unwarrantedly. One crucial way to better assess whether these systems function adequately will be by informing, consulting and negotiating with workers and their representatives.

AI is promising for the world of work, but it is not a silver bullet. It requires a lot of effort to be implemented successfully without producing excessive adverse effects that, among other things, are also highly detrimental to workers.

Businesses that lead in developing AI technologies will set the lines that other employers follow; therefore, action is urgently needed – Many employers still lack the hardware, data, staff, etc., required to rely on AI purposefully. However, some businesses at the forefront of this technology are already pacing ahead, setting out the lines that many other employers will soon follow. Therefore, we must urgently pay attention to the businesses and the sectors most affected by these developments and have broader discussions about what goals AI should serve. The time to set and enforce clear boundaries to dissuade investment in illegal, unethical and undesirable AI applications is now. This is a challenge that European institutions could face immediately.

AI has evident drawbacks in terms of its impact on working conditions – AI will, among other things, bolster the datafication of work, making data protection and privacy rights all the more important as a counterweight. AI is likewise poised to make work more precarious, boost businesses' surveillance capabilities, and, in some instances, even frustrate union activities. Furthermore, despite some proclaimed promises of AI in occupational safety and health (OSH) and non-discrimination, these technologies also present clear threats in these areas. Overall, there are genuine risks to the incorporation of AI at work.

Drawbacks that can be counteracted through regulation – Despite the severe potential erosion of working conditions, our review of the EU's regulatory context indicates that, with the necessary adjustments, much of the existing regulation can continue to function. Indeed, it can steer the implementation of future AI at work in a desirable direction. For this to occur, we outline here some of the most relevant options – a much more extensive list can be found in Chapter 5.

Based on the European Union's primary law, the European response to AI at work needs to, among other things, primarily focus on fundamental and human rights. 'AI ethics' is important; however, the protection of established rights should not be watered down by generic discourses about ethics. The European Union's Charter of Fundamental Rights enshrines a crucial range of personal, civil, political, economic and social rights. Any rethinking of the EU's secondary law in response to AI should also pay due regard to the tension between certain AI applications and those rights. The potential benefits of AI do not justify infringing these rights. It is up to the European institutions and the Member States to keep AI from endangering decent and just working conditions.

For example, the principles enshrined in the General Data Protection Regulation (GDPR) provide an essential framework to mitigate the negative consequences of AI at work, especially but not solely from a privacy perspective. Any AI's goals and functioning inevitably depend on the data available. Data protection laws can thus effectively establish boundaries. Assuming these rules are adequately enforced, which is the real challenge, the GDPR's principles of lawfulness, fairness, transparency, purpose limitation, data minimisation and accuracy can significantly mitigate the risk that harmful AI systems are elaborated and implemented in the EU. At the same time, nothing in the GDPR prevents AI developers and employers from carefully introducing AI at work as long as the fundamental rights and interests of all the data subjects, particularly the workers, are considered.

Besides the GDPR, which is fundamentally important for the protection of workers against undesirable AI, EU law also provides workers' representatives and social partners with a much-needed legal basis to claim consultation rights when AI is introduced to the workplace. Most notably, EU Directive 2002/14/EC enshrines a right to information and consultation that can operate, for instance, when an AI or an algorithmic tool can lead to substantial changes in work organisation. In this respect, however, Member States' national laws need to be reviewed to ensure the directive is adequately implemented. EU law provides some basis to subject AI to 'systematic' social dialogue. Yet, at present, Member States often protect and promote information and consultation rights stemming from EU law somewhat unsatisfactorily. Concerning AI, this could be addressed by better clarifying the extent and scope of these rights.

Similarly, under current rules, employers should already perform risk assessments to identify and address OSH risks when introducing AI into the workplace. Some analyses, however, have warned that to the extent it merely concerns software, employers may underestimate the potential OSH risks, including psychosocial risks, brought forth by AI. For this reason, future guidance on how to assess AI from an OSH perspective, be it in the form of a soft law or a hard law instrument, could be highly valuable. The duty of employers to assess and react to the OSH risks associated with certain forms of AI must, indeed, be stressed. It is a very reasonable objective for policy-makers to pursue by building on the existing OSH framework.

EU non-discrimination laws are likewise already somehow being used to vet AI systems in the workplace. However, these laws' effectiveness largely depends on the ease with which the burden of proof in court is placed on the user of the AI system instead of on the workers. In principle, claimants must bring *prima facie* evidence of discrimination before the burden of proof shifts to the defendant. Legislatures and courts will play a vital part in determining at which point the entity in charge of the AI is obliged to disprove allegations of discrimination. Alternative procedures available outside court to scrutinise AI systems, such as certification or specialised auditing, will also be crucial in combating discriminatory applications of AI and algorithmic-management systems. The most effective of such procedures could eventually find their place in the regulations. The burden of proof for claimants in court should, for example, be lowered in case an AI system is not certified. Various such interactions are conceivable.

Regulatory changes will be required in various fields of law – By and large, across multiple areas of labour and employment legislation, one could conclude that governing AI at work is not unfeasible, provided that the rules are adequately adapted to the challenges AI poses.

However, this somewhat positive overall assessment of current EU law does not mean we can be unconcerned about any of these matters. In fact, without the necessary regulatory changes and investments into effective enforcement mechanisms in various areas, AI may well spiral out of control at work and elsewhere. Moreover, even with solid governance structures, things may still become unpredictable. For instance, as noted in the study, in the long run, how AI systems will impact working time and workers' contractual relations is still largely unknown. In this sense, even though some actions, such as limiting the use of successive short-term employment contracts, can also already be taken, policy-makers should arguably adopt a realistic approach to the regulation of

AI. Concrete measures should arguably be taken soon. This study argues that amendments are possible and desirable to various labour laws; added together, they would result in a legal environment that, taken as a whole, becomes much more capable of governing the use of AI at work.

The AI act should bolster the effectiveness of other laws in governing AI – With this in mind, looking at the current situation from an employment perspective, we believe that the European Commission's proposed AI act could strengthen existing regulatory mechanisms to protect working conditions. However, quite to the contrary, the current draft AI act arguably imposes a regulatory 'ceiling', implicitly weakening the capacity of various existing regulatory mechanisms. Indeed, the current draft would issue an all-encompassing framework meant to determine what AI is trustworthy, after which such 'trustworthy' AI receives almost free reign to enter the workplace. Many existing work protection systems will be 'gutted' rather than enhanced by this approach. For all the reasons discussed in Chapter 4, this study argues that it is vital to put the AI act at the service rather than above the other laws that could govern the introduction and use of AI and algorithmic management systems in the work environment. This will require material amendments to the current draft, something which warrants serious scrutiny of this proposed instrument.

Additionally, the AI act intersects with many other EU policy initiatives that will frame the future of AI systems in European workplaces. Therefore, it is important to coordinate these various initiatives. In this regard, for example, the recent draft directive on platform work contains a chapter on algorithmic management that offers valuable and yet improvable protections for platform workers. However, unless the AI act includes similar measures, all workers beyond platform workers will remain much more vulnerable to the risks posed by AI and algorithmic management at work. One can also question whether the draft regulation is entirely in line with the GDPR.

The AI act should be a participant instead of an arbiter in the field of labour protection – The AI act might succeed in regulating AI as such. Still if the aim is to regulate 'AI at work' adequately, we argue that EU policy-makers should keep the many existing laws in mind and opt for a coherent set of measures across different fields of law. Salvation will not come from the AI act alone. The governance of AI at work could draw on many more areas of law. Therefore, Section 5.2 concludes this study by drawing a material list of policy options in the context of different legislative files, including but not limited to the AI act, that – it is the opinion of the authors – might allow the benefits of AI at work to be reaped by adequately countering its relevant risks.

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List of abbreviations

AGI	Artificial general intelligence
AI	Artificial intelligence
AIaaS	AI as a service
AI act	Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence act) And amending certain union legislative acts
AIDA	Special Committee on Artificial Intelligence in a Digital Age
BCI	Brain-computer interface
CDEI	Centre for Data Ethics and Innovation
Charter	EU Charter of Fundamental Rights
CIPD	Chartered Institute of Personnel and Development
CJEU	Court of Justice of the European Union
CNIL	Commission Nationale de l'Informatique et des Libertés
DPA	Data protection authority
DPIA	Data Protection Impact Assessment
DPO	Data protection officer
ECHR	European Convention on Human Rights
ECtHR	European Court of Human Rights
EDPB	European Data Protection Body
EDPS	European Data Protection Supervisor
EESC	European Economic and Social Committee
ETUC	European Trade Union Confederation
EU-OSHA	European Occupational Safety and Health at Work Authority
FLI	Future of Life Institute
GDPR	General Data Protection Regulation
HBS	Harvard Business School
HRM	Human resource management
ICO	Information Commissioner's Office
ILO	International Labour Organization
IP	Internet protocol

ML	Machine learning
NFC	Near-field communication
OECD	Organisation for Economic Co-operation and Development
OSH	Occupational safety and health
PwC	PricewaterhouseCoopers
SMS	Social media screening
TUC	Trades Union Congress
WEF	World Economic Forum

1. Introduction: Setting the scene

In 2016 Daniel Kahneman and colleagues published an article in the *Harvard Business Review* detailing how unreliable humans are as decision-makers. As the authors contended, '*[r]esearch has confirmed that in many tasks, experts' decisions are highly variable: valuing stocks, appraising real estate, sentencing criminals, evaluating job performance, auditing financial statements, and more*' (Kahneman et al., 2016, 40). These inherent errors in human judgements, leading to variability between experts, are an example of what they refer to as 'noise'. In a subsequent book, these authors argued that algorithms[1] and artificial intelligence (AI) may constitute a valuable improvement in this respect because these tools hardly suffer from 'noise' (Kahneman, Sibony and Sunstein, 2021). In principle, an AI will reach the same outcomes based on the same inputs. Precisely this is one of the reasons why AI may become of crucial importance in businesses around the world. It promises consistency, objectivity and, in some instances, explicability. In this regard, one could think of AI as a brilliant calculator: '*they are both machines designed to convert input into output in ways that humans–who have minds–choose to interpret as meaningful*' (Heaven, 2021, 70). However, this fact also comes with its own set of risks.

A well-known example is COMPAS, which stands for 'Correctional Offender Management Profiling for Alternative Sanctions'. Law enforcement used this computer program to predict defendants' likelihood of committing a future crime. This AI tool was used even though '*[t]he algorithm underlying COMPAS is held as a trade secret by its manufacturer, Northpointe (now Equivant), which means that we don't know how COMPAS generates its predictions, nor do we have access to the data the algorithm is trained on—so we cannot even inquire into its rationale*' (Babic et al., 2020, 65). As it turns out, a ProPublica investigation discovered the algorithms were biased against African Americans (Angwin et al., 2016); in other words, this 'intelligent' calculator was broken.

In a similar vein, as the upcoming chapters will illustrate, a wide range of AI applications are being used in the world of work that could – in theory – improve human judgement and are purported to do so. If the tools worked, they could significantly improve working life. Along those lines, persons could also be managed through AI-based systems. This would allegedly imply fewer biases and cronyism; staff appraisals would be entirely transparent and objective; management could also be warned by an AI when someone shows early signs of burnout; staff scheduling could even take an individual's work-life balance into account. However, one of the biggest problems is that, in reality, most of these tools do not work. Some tools might show too many false positives or negatives. For example, it may falsely identify someone who is at risk of burnout while, at the same time, neglecting a person who truly needs help but does not receive it since the AI is not picking up on the right signals. In other instances, AI-based tools may perform their task adequately but generate undesirable effects. The risks connected to the use of AI as a managing tool may, in many cases, outweigh its opportunities.

As things stand, EU law will likely play a significant role in shaping the future usage of AI at work. European institutions have invested considerable resources in a common digital agenda and digital single market. Recently, there have been various policy proposals in this field, covering, among other things, AI, digital intermediation services, platform work and a right to disconnect. Many of these legislative files interlock with each other. This is important because technological progress is not being driven by just one single technology, such as AI. Instead, it is the interplay between several mutually reinforcing technologies that drives innovation (Schwab, 2016). Still, despite the need to consider a range of technologies rather than just a single one, in order to provide this study with a clear sense of direction, it will predominantly focus on AI. Other related developments, such as big

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[1] *An algorithm is a 'set of rules defining how to perform a task or solve a problem. In the context of AI, this usually refers to computer code defining how to process data' (Boucher, 2020, VI).*

data, wearables and people analytics, are also mentioned, but the research nonetheless remains primarily focused on AI.

For the purpose of this study, AI is considered as '*a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation*' (Kaplan and Haenlein, 2019, 17). In that sense, AI is understood to be a somewhat precise operation performed by an 'intelligent' system that influences its environment (OECD, 2019, 22); not all software should be understood to constitute an AI (Casilli, 2019). The system needs to have access to external data (e.g., through sensors or various datasets), draw on that data to improve its operations, and achieve its human-defined objectives by executing tasks in an ever-improving manner. This 'learning curve', which the system goes through, largely distinguishes it from 'standard' automation, as practised for over a century.[2] 'Learning', in this context, can occur in various ways. The more thought-provoking methods have to do with machine learning[3], or also deep learning, in which case the system does not require human inputs to improve after it has been put to work.[4] Crucially, though, many forms of AI still rely on human inputs to enhance the functioning of algorithms. What is more, the people engaged in these endeavours are not always 'experts'. As the World Economic Forum reminds us, '*[o]ne of the challenges concerns the millions of people who are contracted to collect and label the data used in machine-learning models. This global workforce, sometimes referred to as the "invisible workers of AI," is left largely in the shadows. Ensuring their ethical treatment requires more attention*' (WEF, 2021, 24).

Importantly, AI's 'intelligent' features enable the system to operate in a more or less autonomous manner. It also makes it possible to replace forms of intellectual work. The consequences of this for the labour market have already been described in the literature (Frontier Economics, 2018; Martens and Tolan, 2018; Lane and Saint-Martin, 2021; Gavaghan, Knott and Maclaurin, 2021). Much of what has been written focuses on the dangers of AI in terms of un- and underemployment. In this regard, it seems entirely plausible for unemployment issues to arise in the longer run (Susskind, 2020); hence, it is essential to start thinking about how to deal with those issues through policy and law (Estlund, 2021). At the same time, it has been argued that for the time being, the impact of AI on the economy and employment seems small or even negligible (Littman et al., 2021, 59; Acemoglu et al., 2021). Therefore, what is arguably of more significant concern in the immediate future is not the quantitative but the qualitative dimension of AI at work, and how to regulate AI systems' impact on working conditions here and now (De Stefano, 2019).

This study explores this question. It is, first and foremost, a legal study, as set out in Chapter 2's description of the methodology. However, labour law is meant to be responsive to what happens on the ground. As such, it is vital to understand how AI already operates in the world of work. To this end, Chapter 3 describes the various ways in which AI technologies and tools are already employed at work. It focuses, among other things, on the use of AI in recruitment, staff appraisal, task distribution and disciplinary processes. Having described how AI is already impacting the world of work, Chapter 3 furthermore provides a tentative picture of what can be expected to happen in the next five years. The chapter also offers an impact assessment, highlighting some of the most significant impacts of these developments and of the use of AI as a managing tool. Chapter 4 then turns to the regulatory field with this assessment in mind. Its first section sets out what the European

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[2] '*What may distinguish AI from other automation technologies, such as industrial robots and other automated machinery, is its greater potential to expand the range of tasks that can be automated. This may be particularly the case with a technology such as machine learning, which is specifically designed to self-improve*' (Lane and Saint-Martin, 2021, 20-21).

[3] '*Machine learning refers to second generation AI techniques whereby the algorithm is designed to find its own solution to problems, rather than following rules defined by human experts*' (Boucher, 2020, VII).

[4] *For an extensive explanation of how AI works, see (Lehr and Ohm, 2017; Boucher, 2020; Devillé, Sergeyssels and Middag, 2021).*

Parliament has achieved so far before its second and most extensive section discusses the various EU regulations and directives that are already relevant to regulate the use of AI in employment. Its third section analyses the Commission's proposal for a regulation laying down harmonised rules on artificial intelligence (AI act) and Section 4 summarises the other relevant policy debates ongoing at the EU level. The fifth and final chapter advances some policy options across the various legislative files that could be pursued to improve the current state of the law.

2. Methodology

The backbone of this study is a desk-based legal analysis of AI-enabled and algorithmic-management systems at work. Nonetheless, key insights were also provided by sources different from legislation, case law and legal scholarship. Chapter 3 of the study especially draws on management, HR, economics, and sociological research. The aim of these chapters is not to provide an exhaustive interdisciplinary literature review on AI at work, which would go far beyond the scope of this study. It is, instead, to give a fair representation of what researchers in these fields have argued about the potential impacts of AI at work through academic publications or 'grey' literature. These accounts of how AI-enabled and algorithmic management systems are being implemented in the world of work informs the legal analysis conducted in chapter 4 of this study.

This legal analysis primarily concentrates on EU law. Therefore, it does not refer to the domestic legislation of Member States unless to give some specific examples, even if the authors believe that domestic labour laws and industrial relations practices will be essential for the future regulation of AI. Even without directly addressing domestic legislation, it emerges that the areas of EU law relevant to the regulation of AI in the work environment are already quite diverse. Some of these areas of law have arguably received more scholarly attention than others. This is also reflected in the size of the relevant sub-sections of this study. The legal analysis in chapter 4 aimed specifically at identifying the opportunities and pitfalls in existing legislation by always paying heed to the findings of the abovementioned literature on AI.

Subsequently, section 4.3. and, in particular, chapter 5 offer a general view on the potential impact of the AI Act in light of the existing social *acquis*, based on the analysis carried out in the previous parts. At the end, various policy options are presented and evaluated in terms of their potential to counter the identified risks and enable beneficial application of AI to different elements of work. Some of these policy options are based on arguments advanced in the preceding text of this study, while others can be found in different sources in literature, duly cited in the text.

3. Review of AI for HR management

3.1. The technologies and tools

> *Before delving into the regulatory environment, section 3.1. of this chapter mentions various AI-induced technologies and tools that are already having an impact at work. Section 3.2. subsequently focuses on certain specific angles of AI's integration into the work environment, such as its use in recruitment and staff monitoring. Section 3.3. discusses near term development prospects. Lastly, section 3.4. contains an impact assessment, emphasising some of the major impacts of the AI tools addressed in chapter 3.*

Mapping all the existing AI applications on the work floor is arguably impossible. Some sources have identified AI '*as the next 'general purpose technology', the fourth since the beginning of the industrial revolution after the steam engine, electricity and semiconductors*' (WEF, 2020, 7). Therefore, it is reasonable to expect that this technology will influence the world of work in many different ways.

One notable example is autonomous robots. These will be used in both industry and services, and are designed to function with little human interaction. In this regard, it is best not to picture the stereotypical image of a human-like robot. Although these robots receive much media and literary attention, most robots will have a more application-oriented look, taking into account *i.a.* the environment and cost reduction strategies.

Many businesses already rely on semi-autonomous carts or drones to transport goods at the workplace. Another clear example is the robots used in fruit cultivation to pick the fruits. Moreover, robots must not necessarily be mobile to be autonomous. At the German technology company Bosch, if a certain welding station in one country works better than another, the other locations are informed about how to make the necessary adjustments (Kreutzer and Sirrenberg, 2020, 97). Much in the same way a modern car's automatic driving features might learn how to avoid a car crash on the basis of data concerning an earlier accident elsewhere on the globe, the same may happen in production processes. These industrial tools may change their operations based on the experience gathered by similar tools elsewhere.

Compared to static tools, such as a classic robot arm that continuously performs the same task on the assembly line, many of these AI-enhanced robots are projected to operate more autonomously through space. Instead of having a fixed position at the assembly line, for example, a robot arm could be mounted on the ceiling of an industrial kitchen so that the device can manoeuvre through the room. Businesses that rely on autonomous robots are confronted with new risks due to close human-robot collaboration (Moore, 2019a, 5-7; Lane and Saint-Martin, 2021, 45-46). Historically, factories have increasingly adopted measures to shield workers from industrial robots to preserve safety at work. AI's ability to have robots perform (semi-)autonomous actions might make interactions with workers far less predictable, raising concerns from the point of view of labour law (Taes, 2021).[5] One of those concerns is that these devices may increasingly set the pace of work and continuously monitor the work productivity of humans in their vicinity.

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[5] *Research has shown, for instance, that the more autonomous a robot is, the more people blame the robot for errors instead of the co-worker operating the robot (Furlough, Stokes and Gillan, 2019). With this in mind, one has to wonder to what extent contemporary rules that attribute liabilities among employers and employees, for instance, in case of a work accident, can continue to operate. If people are generally inclined to blame autonomous robots for their 'errors', and implicitly the external company that designed the robot, should rules be redesigned to also attribute liabilities beyond the actors at the workplace itself?*

In addition to robots that operate (semi-)autonomously, there are also AI-driven co-bots and wearables. The latter can be specifically designed to improve humans' ability to perform work. Exoskeletons and 'smart clothing' that support the human body are examples; besides supporting muscles, they may likewise make workers aware of unhealthy body postures, informing them about this through an app. Various other smaller 'wearables' might likewise be introduced into the workplace. Think of smartwatches that some employers use to incentivise healthy living habits (for a critical assessment, see Ajunwa et al., 2017) or 3D smart glasses providing workers with relevant information while on the job (PwC, 2016). Scholars mention at least six reasons for the adoption of such technologies: (i) monitoring employees' psychological and physiological state (which also poses severe hazards – Moore, 2020, 21-26); (ii) enhancing operational efficiency; (iii) enhancing collaboration; (iv) promoting a safe and secure work environment; (v) enabling new industrial practices; and (vi) improving workers' overall health (Khakurel, Melkas and Porras, 2018, 802-803). As these objectives indicate, wearables may have positive implications for workers; however, besides the grave risks that we will analyse below in the chapter, their implementation can also lead to a '*[f]eeling that one is being treated as a means to an end*' (Maltseva, 2020) [6].

In addition to wearables, there is also a whole range of other work tools that are not worn by workers but could have an AI component in the future. The Internet of Things, which allows 'smart products' to stay connected and transfer data, will make it possible for daily work tools, such as an office chair, to sense our use of that product. Furthermore, in the case of office work, the computer, which is often the primary working tool, is already digital. However, also workers engaged in industries such as construction, that so far have required little digital tools compared to other sectors, might increasingly see their activities tracked digitally (Calvetti et al., 2020). Although the use of sensors in that environment may be well-intentioned, most notably to improve health and safety at work, their implications for workers may be problematic. Recent research in three high-tech Italian automotive factories indicates, for instance, that the companies were more focused on digitalisation and interconnection than automation. Overall, according to the authors, the case study indicates that '*Industry 4.0* automation systems reduce '*room for employees' autonomy and increases forms of management control*' (Cirillo et al., 2021).

Having provided examples of how physical items such as robots, wearables and other objects can collect or feed data to AI systems, we must also reflect on the implications of AI for human resource management (HRM). HRM has been described as '*the management of work and people towards desired ends*' (Boxall, Purcell and Wright, 2008, 1). In that sense, and based on the practices already visible in our economies, it is reasonable to assume that AI will increasingly feature in many enterprises' HR policies. Inevitably, businesses will have to reflect on how (semi-)autonomous robots and other smart devices can be implemented to reach their desired ends. Arguably, even from a purely managerial perspective, workers and their representatives should not be left out of this equation. As economist Laura Nurski and others have noted, '*[t]o make the most of AI, both employers and workers need to be able to see its potential*'. The speed with which new technologies can be successfully implemented at the workplace also depends on workers' cooperation. To achieve this, technologies should arguably be seen as working for workers, not against them (Hoffman and Nurski, 2021; see also Tambe, Cappelli and Yakubovich, 2019, 34-35), a concern that is hardly adequately addressed in many current managerial practices.

To that extent, for example, it has been suggested that management at a hospital may want to frame AI applications as tools to enhance doctors' medical expertise. Instead of highlighting the comparably better performance of AI in analysing medical images compared to human doctors, it is preferable to stress how collaboration between AI and doctors leads to optimal results. In that way, doctors feel supported by AI in pursuing their causes; such a narrative does not undermine

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[6] *The author references (Twenge, Catanese, and Baumeister, 2003) and (Bastian and Haslam, 2011).*

their professional expertise, allowing them to remain engaged in 'meaningful' work (Smids, Nyholm and Berkers, 2020, 511). More broadly, beyond this one example, some argue that companies should focus '*on creative new ways to configure groups of people and computers to accomplish valuable tasks*'. Such '*arrangements will enable computers to use their specialized intelligence to do what they do best while people use their general intelligence and other skills to do what they do best*' (Malone, Rus and Laubacher, 2020, 21-22)[7]. Some researchers claim this type of approach will lead to better results than simply trying to replace workers with AI (Wilson and Daugherty, 2018; Babic et al., 2020).

Therefore, many businesses will have to engage in a thorough reflection about if and how to use AI at work, and all the more so if they will increasingly rely on AI-driven software to perform HRM. As researchers from the International Labour Organization (ILO) have highlighted, in fact, '*AI is replacing mental tasks rather than physical ones, which were the target of previous waves of mechanization*' (Ekkehard, Merola and Samaan, 2018, 2; see also Prassl, 2019). Many white-collar tasks could, therefore, potentially become (partially) performed by AI-based software. A distinction can be made in this respect between industry-specific and general software; for instance, regarding the former, AI-enabled tools aid lawyers in retrieving and classifying court cases or assist architects in making design choices. Other AI-driven software may, on the other hand, be more general, becoming utilised across many industries. An example would be incorporating AI in packages such as widely used office suites or other computer programs employed for administrative purposes.

Regarding industry-specific tools, AI seems to make significant strides in some areas. Economists David Autor, David Mindell and Elisabeth Reynolds discuss a case in the field of auditing legal fees. A big insurance company, for instance, has to hire legions of lawyers each year. Their legal bills must be regularly audited. One such insurance company had AI developed to perform this auditing. According to their study, '*[s]oon the system was yielding millions of dollars in annual savings, freeing the auditors to move on to more complex work*' (Autor, Mindell and Reynolds, 2020, 36; see also the example of JP Morgan in Stancombe et al., 2018, 6).

In contrast to this somehow limited task in the insurance sector, other businesses rely on much more comprehensive information technologies. 'Warehouse management systems' are already exerting far-reaching influence over HRM in logistics. In research prepared for the MIT Task Force on Work of the Future, '*an operations manager at a distribution center said: 'What I would really like is software that keeps track of every person and every robot on the floor and tells each of them what it should do next'*'. This kind of all-encompassing system has already become a reality in some companies. As the authors of the report stress, '*[i]n fact, such software exists in a few large plants, but adapting it more widely will require greater numbers of persons with technical skills*' (Mehta and Levy, 2020, 22). The same is arguably true in other parts of the supply chain, such as trucking, where 'fleet management systems' perform intrusive work performance monitoring (Levy, 2015). Hence, in some sectors, AI-induced software already exerts significant influence over HRM and, consequently, over working conditions.

Besides these industry-oriented software applications, some tools are specifically designed to be used across sectors by as many companies as possible. Most notably, scholars highlight the future importance of 'Artificial Intelligence as a Service (AIaaS)'. In this case, large cloud providers, such as Amazon, IBM and Microsoft, provide their clients with access to either (i) '*technical environments and resources to facilitate* [them] *in undertaking their own ML (sometimes called 'Machine Learning as a Service'); or (ii) providing access to prebuilt models that* [they] *can essentially 'plug' into their applications*' (Cobbe and Singh, 2021, 4). Tech companies, in other words, can facilitate other businesses in creating their own AI-based systems or have them rely on prebuilt models that can be

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[7] *Reference is made to (Guszcza and Schwartz, 2020).*

fitted into their business environment. In the latter case, client businesses would decide how to operationalise this prebuilt model within the boundaries prescribed by the vendor.

Along similar lines, tech companies will also sell HRM software with AI functionalities. For some time now, companies have been digitalising their HR practices. Paychecks are sent digitally instead of by post. Employees have to apply for holidays online. Expenses can also be submitted online. More recently, however, increasingly complicated HR-related activities, such as recruitment, training and performance appraisal, have likewise become digitalised. The use of AI is reported to be promising in this respect, especially for somewhat repetitive tasks (Hmoud and Laszlo, 2019, 26). Management scholars point to the potential value of AI, for example, in: (i) deciding to whom jobs are offered; (ii) recruiting suitable candidates; (iii) ensuring recruits are up to speed faster; (iv) managing performance; (v) conceiving effective training methods; (vi) determining who is eligible for promotions; (vii) managing retention and turnover; (viii) and optimising employee benefits (Tambe, Cappelli and Yakubovich, 2019, 19-21).

While this impressive list seems to suggest AI will effectively dominate HR departments, those very same authors also point out the limitations of these developments. More specifically, some HRM needs might limit AI's potential. For one, it is observed that technology cannot answer the question of who is a 'good job applicant' or a 'good employee'? Humans have to come up with the answer; only then can technology be put to work. Likewise, on what data points should the algorithm base its evaluation to detect good employees? Can all the relevant factors even be captured in data (Tambe, Cappelli and Yakubovich, 2019, 21-23)? Research by Leighton Evans and Rob Kitchin, for instance, has noted that the problem is not just that several work tasks, such as customer service, can hardly be captured using employee performance metrics. That itself is already problematic. It might mean workers decide to neglect customer service because it does not adequately count in their performance statistics, or workers may start feeling like they are being punished for doing what is right (taking good care of customers). Another significant issue is that systems and equipment meant to gather data encounters frequent failures. '*These situations arise because although the environment is highly data dependent, it relies in some cases on old digital technology that has limited capability and lacks interoperability with other systems*' (Evans and Kitchin, 2018, 51). In other words, even if a business had unlimited resources, building a 'smart' business would be far from straightforward. Researchers Prasanna Tambe, Peter Cappelli and Valery Yakubovich have similarly observed how companies buy software from vendor X to track employee performance and software from vendor Y to govern compensation and payroll. When sold by different vendors, software are rarely compatible. Additionally, the authors note how '*surprising*' it was '*to hear from our respondents about the internal political battles over control over data. The payroll department, for example, does not want to give its data to the talent acquisition department to let them see what predicts which applicants are likely to take the most time off*' (Tambe, Cappelli and Yakubovich, 2019, 23; see also Vial et al., 2021).

Bearing these experiences in mind, in contrast to its functioning under 'lab conditions', adequate functioning of AI in HRM in the real world is another matter entirely to achieve. Leaving aside very narrow AI applications, such as AI-powered features in office suites, the effective use of AI technology would require meticulous planning, maintenance and implementation. This is true even just by focusing on the operational problems for businesses; Thorben Albrecht and Christian Kellermann highlight that the actual adoption of AI at the company level depends on: (i) what it can do, for example, given the amount of data available; (ii) what it is allowed to do in view of regulations and ethics; and (iii) what actual benefits it brings to the business considering its price tag. Since many of these applications require a significant investment, the return on investment must be correspondingly high (Albrecht and Kellermann, 2020, 5). As such, one would expect companies that want to take full advantage of AI to thoroughly reflect on how to integrate it. This also offers an opportunity for law and policy. If, from a management perspective, businesses should, in any case, carefully consider how AI serves their HRM, then why should the law not require businesses to make

certain considerations, for example, related to data protection, non-discrimination or occupational safety and health.

| **To summarise:** |

- AI will be incorporated into businesses in various ways, both through hardware and software applications.
- At least at first, far-reaching AI technology may become more prominent in some industries, such as logistics, than others.
- Some businesses, such as tech companies, will develop AI features that other businesses will be able to incorporate in their organisations (e.g. 'AIaaS').
- Businesses that wish to rely on AI will have to carefully reflect on how AI could best serve their HRM needs without infringing workers' fundamental rights. This presents an opportunity for law and policy.

3.2. The application of AI in various contexts

3.2.1. Recruitment

As a general rule, AI must have sufficient data to make a meaningful contribution (Servoz, 2019, 22). One area of the labour market where such data is reportedly available is recruitment. Already in 2010, Kristie Ball reports that '[i]n the US there are 20 million CVs stored in databases, and the US Internet recruitment industry has attained the dubious accolade of being the second-largest source of income for providers after pornography' (Ball, 2010, 91). Also, because of this copiousness of data, AI-based recruitment tools have become increasingly common in our societies.

As one report remarks: 'General 'job websites' such as Indeed, ZipRecruiter, and LinkedIn have become large clearing-houses for job seekers and job advertisers' (Gavaghan, Knott and Maclaurin, 2021, 13). Websites like these allow employers to advertise their job postings to specific types of job applicants. Employers are provided with targeting options. Crucially, however, this means that some jobseekers are excluded from even seeing particular job opportunities. In this respect, which jobseeker – or group of jobseekers – is allowed to 'see' a specific job opportunity is determined, on the one hand, by the employer's choice to target certain categories and, on the other, by the website's algorithmic mechanisms underneath.[8]

Due to this process, even this initial step – advertising jobs to particular sets of individuals – may already lead to the unwarranted exclusion of jobseekers and entire groups thereof (Bogen and Rieke, 2018, 17-19; Kim and Scott, 2019). Algorithms might, for example, disproportionally push job advertisements with a higher average income towards men (Simons, 2020, 13-16). This might not even have only to do with the employer's targeting choices. Some computer scientists observe that 'during the ad delivery phase, advertising platforms can play an independent, central role in creating skewed, and potentially discriminatory, outcomes' (Ali et al., 2019, 23; see also Imana, Korolova and Heidemann, 2021).

Besides using AI in advertising job opportunities, AI systems are also used to perform other tasks at the early stages of recruitment. For example, Johnson & Johnson and L'Oréal have reportedly relied on such systems to adjust their language in job openings, significantly increasing interest in their positions among women (Black and van Esch, 2020, 219). Platforms, such as LinkedIn, Ziprecruiter and CareerBuilder, might eventually incorporate these features into their systems.

Besides the initial composition of the candidates' pool, employers may use AI-enabled tools to narrow it down, particularly when they receive hundreds or even thousands of applications for

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[8] 'For example, on ZipRecruiter, employers can opt to give incoming applicants a 'thumbs up.' As ZipRecruiter collects these positive signals, it uses a machine learning algorithm to identify other jobseekers in its system with similar characteristics to those who have already been given a "thumbs up"—who have not yet applied for that role—and automatically prompts them to apply' (Bogen and Rieke, 2018, 20).

specific job profiles (Adler, Boyce and Caputo, 2017).[9] Tools such as Recruitment Management Systems and Applicant Tracking Systems can be deployed to select job applications, allowing recruiters to only pay attention to the most qualified candidates (Fuller et al., 2021, 8). They allow reducing significantly the time it takes for businesses to hire someone, in some cases shortening it from an average of 24 to 9 days (Black and van Esch, 2020, 220). However, as research conducted by the Harvard Business School and Accenture highlights, these systems also have significant weaknesses.[10] Too often, businesses continue to add requirements that are needed to pass the initial filtering. '*Over time, these requirements come to resemble the rings on a tree trunk; new requirements are added to those accumulated over time. As the list of requirements and preferences gets longer, the number of applicants likely to qualify shrinks inevitably*' (Fuller et al., 2021, 22; see also Cappelli, 2019, 52).

In other words, if businesses rely on technology to automate these activities, the list of suitable candidates risks being artificially constrained (as perfectly eligible candidates never make it to the shortlist). According to the same source, '*[t]he net result: Millions of potential workers are effectively ostracized from the workforce*' (Fuller et al., 2021, 36). Other scholars have also noted that although most stages of the recruitment process still seem to involve human intervention, at this particular stage of the process, candidates that do not meet certain requirements may well be rejected on a fully automated basis (Gavaghan, Knott and Maclaurin, 2021, 50).

Another issue at this stage relates to the reliance on systems based on machine learning (ML)[11] to shortlist candidates. The goal is to predict what persons will excel in a specific function. However, as a theoretical case study from the Institute for the Future of Work indicates, these systems tend to reproduce the patterns found in the data on which they are trained. Consequently, ML may disadvantage certain job applicants depending on the data used. Consider a call centre. Suppose customer satisfaction ratings are used as a data source. In that case, the data might show that customers prefer workers that use language associated with the (upper) middle class and, on average, grant higher ratings to male workers. As those workers receive high ratings, the recruitment system might disproportionally shortlist workers who use that type of language associated with a certain social background or have a male-sounding voice (Simons, 2020, 6-11). In short, '*[t]he process of 'cloning your best people' can result in encoding human bias*', which, in turn, could constitute a discriminatory practice (Ajunwa and Schlund, 2020). In this sense, based on the idea of 'AI as a Service', some companies will develop recruitment software that any employer, willing to pay, can use. Much in the same way various employers might rely on the same recruitment agency, these days, many employers obtain similar software aimed at selecting job applicants from businesses such as Equifax or Kronos – now called UKG (Ajunwa and Greene, 2019, 62). As multiple employers use this technology, tackling the potential pitfalls mentioned above is increasingly crucial.

Moreover, vendors of recruitment software may also advertise systems with 'extravagant' AI-enabled tools whose functionality is highly questionable. Some businesses claim to identify human traits and skills shared by the highest-performing people in different roles through AI-powered chatbots and phone calls, video games, and AI-driven job interviews (Heilweil, 2019; Volini et al.,

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[9] *This is actually not that uncommon. The internet and all kinds of online labour market intermediaries have resulted in an 'avalanche in applications per position' (Black and van Esch, 2020, 218).*

[10] *For example, '[a]lthough employing machine learning and semantics-based techniques have proved to assist employers in screening out irrelevant resumes, they still suffer from limitations, namely, semantic knowledge incompleteness and limited domain coverage stemming from the resources (training data, ontologies and knowledge bases). This system is evaluated in a real-world recruitment scenario by comparing manually calculated scores between resumes and job posts with those produced by the system. The results have shown acceptable accuracy except for job offers that require special skills' (Maree, Kmail and Belkhatir, 2019, 717).*

[11] *'Machine learning refers to second generation AI techniques whereby the algorithm is designed to find its own solution to problems, rather than following rules defined by human experts' (Boucher, 2020, VII).*

2019). During the selection process of a major food company, for instance, applicants have to play online games first, giving an AI the chance to identify traits like risk aversion. Subsequently, applicants hand in a video answering questions relevant to the job position. That video is analysed by an AI, which is supposed to focus on wording, body language, and tone of voice. The 'best' candidates are then invited for in-person interviews (Wilson and Daugherty, 2018, 122). Other employers rely on AI software to 'cybervet' job applicants through social media screening (SMS). In this respect, without even considering privacy issues, *'researchers have cautioned against using SMS in practice, citing a lack of a consistent research demonstrating SMS validity and utility'* (Hartwell and Eggli, 2020, 221; see also Vaughn, Petersen and Gibson, 2019, 253-254).

Many of the other assessment tools used in recruitment may also be flawed.[12] Video games used to select job candidates might be effective in measuring certain specific aspects. However, their general validity is questionable.[13] Moreover, some remark that the 'digital divide' between citizens, with some having better internet connections and ICT devices or being more tech-savvy, may lead to unfairness (Weidner and Short, 2019, 163-164), entailing suboptimal selection. Furthermore, these tests may foster cheating. In the past, all job applicants might have been invited on one single day to come and conduct one single test resembling an exam. As these tests and assessments become digitalised and conducted every day of the week, it becomes more difficult to prevent cheating and guarantee the integrity of the test's results (Drasgow and Olson-Buchanan, 2017, 259; see also Schellmann and Strong, 2021b). A relevant question is whether AI integration can honestly prevent this? If not, 'intelligent' features would be built on top of very shaky foundations.

Other AI features in recruitment may likewise suffer from shortcomings. For instance, AI-driven job interviews may attempt to assess an applicant's personality based on inflexion and timber in their voice. Yet, this can lead to highly dubious results (Wall and Schellmann, 2021; see also Schellmann and Strong, 2021a)[14]. Facial recognition software is also sold to analyse job applicants' facial expressions; there are many questions regarding the validity of any such findings as well (Raghavan et al., 2020, 475). Facial recognition software has, for instance, been shown to perform poorly on darker skin tones (Buolomwini, 2018).

Another significant issue might be the impact of automated selection processes on certain groups of workers, such as people with disabilities. Some recruitment tools could potentially disadvantage

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[12] *'With all this bounty come corresponding cautions and challenges, including the vastly increased access to a huge number of psychometrically unsound or wholly untested tools now so easily available on the Internet and the greater likelihood of assessments being misused by untrained managers and HR staff'* (Adler, Boyce and Caputo, 2017, 5).

[13] *'One of the games measured risk-taking. Candidates had 3 minutes to collect as much money as they could by clicking 'pump' to inflate a digital balloon with air and money. Each click added 5 cents. At any point, the candidate could choose to collect money to add the amount to his or her total and start with a new balloon. However, if the candidate waited too long and the balloon popped, the candidate collected no money from that balloon. Candidates could collect money about as fast by clicking early and frequently or waiting–as long as they didn't wait too long. The point of the game was not really about the amount of money collected but identifying the individual's risk propensity'* (Black and van Esch, 2020, 220). The problem with this kind of game, though, is that it measures someone's propensity to take risks in a game. It might actually say very little about that person's inclination in real life. If a person is not very motivated to obtain the job position, for example, that person may well take a lot of risk then and there. In contrast, if someone believes that making a balloon pop is a horrendous mistake, then that person might be very cautious even if it really does not matter all that much whether the balloons pop. Moreover, if that cautious person would have known someone at HR that told him or her the employer was really looking for people who took risks regardless of how many balloons pop, it might likewise change that person's risk taking in the game. In short, does such a test actually have value?

[14] In one instance a person obtained a reasonable English proficiency score by reading a German Wikipedia page to the AI. Subsequently, the researchers decided to do the same exercise, this time speaking Mandarin. The hypothesis was that German sounds more similar to English than Mandarin. Yet, the second person did not score any worse than the first.

disabled jobseekers; in this respect, it is unclear how adequate accommodations can be made (Kantrowitz and Gutierrez, 2017, 211; see also Schellmann and Strong, 2021a)[15].

Taken as a whole, despite the purported benefits of using all these AI tools (Vrontis et al., 2021), management scholars such as Peter Cappelli warn businesses not to get caught up in the prevailing narrative surrounding AI and recruitment. First of all, in a broader perspective, these recruitment tools prompt businesses to find talent in the labour market instead of developing it in-house. That might not be the right choice. Crucially, he also remarks:

> '*In the end, the drawback to using algorithms is that we're trying to use them on the cheap: building them by looking only at best performers rather than all performers, using only measures that are easy to gather, and relying on vendors' claims that the algorithms work elsewhere rather than observing the results with our own employees. Not only is there no free lunch here, but you might be better off skipping the cheap meal altogether*' (Cappelli, 2019, 57).

Indeed, multiple authors call for more thorough evaluations of these tools' overall effectiveness, utility and fairness (Dattner et al., 2019; Morelli and Illingworth, 2019, 86).[16] Employers with massive resources to invest in them might, perhaps, find a way to make them work somehow satisfactorily in their particular setting. Yet, that does not mean their effectiveness is guaranteed across the board.

3.2.2. Performance management: Staff appraisal and professional development

Assessing work performance has long posed a challenge in many contexts (see Buckingham and Goodall, 2015). It is, therefore, unsurprising that also in this area, tech solutionism is becoming prevalent (Kane, 2015). In this respect, the use of wearables devices and other work tools that continuously collect workers' data is spreading. It raises legitimate concerns about the potential for invasive surveillance (Tomczak and Behrend, 2019; Ajunwa and Schlund, 2020). Besides wearables, communication tools widely used at work, such as Slack and Microsoft Teams, can also function as plentiful data sources. So do social media platforms. Combining all these sources makes it possible to obtain what is commonly referred to as 'big data', which combines multiple data sources and large volumes of data with the capacity to generate and process such data at high velocity (McAfee and Brynjolfsson, 2012). The creation and use of big data for the purpose of HRM is an increasingly common business practice (Garcia-Arroyo and Osca, 2019).

Another relevant practice is 'data analytics', whose goal is to draw observations and lessons from the (wealth of) data available, and possibly predict what might happen or prescribe what ought to happen (see Rasmussen and Ulrich, 2015; Minbaeva, 2018). Not all forms of data analytics necessarily require big data. At the same time, the increasing relevance of data analytics arguably does trail the recent growth in data. Moreover, to the extent AI is involved in this regard, one can expect the data analysis to be oriented towards big data analytics rather than a limited setup.

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[15] *One example is that of an AI recruitment test that might priorly ask whether a person is colour blind or has any trouble hearing. This may well be relevant to take a suitable test. However, asking someone about a disability before the test is problematic because it forces that person to admit he or she has this condition even though it might not actually be relevant for the job. Admitting you have this condition at this early stage might not be in your best interest as a jobseeker (and, in some countries, it may not even be lawful for the employers to become aware of it during recruitment). This way of working forces these individuals to either opt for an accommodation or to choose for the regular test out of fear that opting for the accommodation will actually inappropriately disqualify them.*

[16] *'The current state of affairs in the development of AI/ML talent management tools reflects a yawning gap between I-O psychologists [i.e. industrial and organizational psychologists]—who study the science and practice of personnel selection and have learned from decades of organizational, legal, and ethical lessons in the selection and workplace contexts—and computer scientists and applied statisticians—who implement AI/ML talent assessment technologies'* (Gonzalez et al., 2019, 42).

According to HR literature, however, compared to data analytics in supply chain management, logistics, finance etc., the HR profession has been quite hesitant to engage in this direction. HR personnel might, among other things, lack training in IT and statistics.[17] Furthermore, many businesses are likely to purchase or lease human resources information systems [HRIS] from external providers. Yet, this practice is not without its dangers. '*Rather than providing strategic and predictive analytics that allow organisations to ask and answer big questions about how value can be created, captured and leveraged, HRIS typically provide answers to a more limited set of questions focused on operational reporting*' (Angrave et al., 2016, 5). This might have some value, but these authors believe the chances of this form of analytics significantly improving performance are low.[18]

Complementarily, workforce analytics professor Mark Huselid argues that the more effective HR analytics systems are those uniquely tailored to a given business and its environment (Huselid, 2018, 682-683). However, it is extremely hard to reach the levels of expertise needed to develop these tools in-house. Research from McKinsey has identified five stages a people analytics team should go through: (i) poor data, (ii) good data, (iii) strong data, (iv) advanced analytics and (v) reliable predictions. The researchers stress how difficult it is to reach the final stages (Ledet et al., 2020). Yet, only in the later stages could HR analytics satisfactorily contribute to identifying and promoting key employee behaviours, as well as relational dynamics (Leonardi and Contractor, 2018), that would help the business achieve its strategic and operational goals. Generic metrics and analytics purchased from third-party vendors are unlikely to provide high levels of insight (Minbaeva, 2018, 701).

This general observation about HR analytics is, arguably, relevant when thinking about AI's potential impact on performance management. Indeed, if, according to specialised HR literature about people analytics, generic HR information systems are unlikely to yield significant results, it is not sensible to expect generic AI software from third-party suppliers to function properly across different firms in diverse settings. What is more, some evidence suggests that in order for AI to have a significant impact, it is important for developers to explain to users what the AI model is doing, and, to the extent possible, give those interacting with it in the field some control over what it does (Dietvorst, Simmons and Massey, 2018; Massey, 2019, 20-21). These findings also conflict with the idea that generic 'over the counter' HR-focused AI will be capable of perfecting performance management in any business. As the McKinsey study from 2020, mentioned above, noted:

> '*No people analytics team we interviewed has been able to take a full fifth step to reach the top level of the stairway: creating reliable, consistent, and valid predictive analytics. Reliable predictions will enable people analytics teams to analyze and explore practical options for management action. While some organizations have built fit-for-purpose predictive models—mostly for workforce planning—implementing predictive analytics in the context of employee selection, development, or engagement decisions requires a substantially scaled-up data-science operation, massive amounts of highly accurate data ('very big data'), cutting-edge algorithmic*

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[17] '*The HR function will also require reskilling. It will need more expertise in IT support—especially given all the performance data generated by the new apps—and deeper knowledge about teams and hands-on supervision*' (Cappelli and Tavis, 2018, 52). See in particular: Kryscynski et al., 2018.

[18] *There is also a counterargument to this. For example, people analytics revealed that a manager meeting new hires on their first day makes a significant difference in terms of these new hires' behaviour during the first couple of months. When such rather obvious insights are confirmed by metrics and analytics, it becomes much easier to make the case in the boardroom (Grant, 2019). Hence, also 'generic' analytical tools may actually succeed in improving individual and team performance because management at the top level might be more easily convinced using data. At the same time, it would also be true that people analytics sometimes requires a certain degree of contextualisation and granularity (Rebele, 2019).*

technology, and organizational comfort with how to address the impact on fairness and bias' (Ledet et al., 2020).

As the citation suggests, individual companies with the necessary resources to digitalise their operations, implement workforce analytics and comprehend what the AI is doing in this setup may obtain some results. In theory, the AI systems might predict what is likely to happen or can even suggest to decision-makers what action they might want to take. Some researchers observe that, in particular, these tailored predictive and prescriptive functions of AI can contribute to business (Peeters, Paauwe and Van De Voorde, 2020, 208);[19] yet, at the same time, these functions raise significant legal and ethical questions concerning their impact on workers. Some examples are already known. IBM, for example, claims that an AI called Watson consistently made correct predictions about employees likely to leave the company, reportedly saving it 300 million U.S. dollars. The company also uses an 'AI-powered learning platform' that serves internal and external courses, such as YouTube videos, Harvard Business Review and MIT Sloan Management Review articles, up for every single individual. The AI '*will say, 'Given what you've taken so far and your career goals, here are some recommendations, and here's what people like you have taken and how they've rated it'*' (Schrage et al., 2019, 3-5).

This kind of AI-supported continual assessment could materially transform the field of performance management. These systems are set to offer employees constant data-driven feedback, possibly replacing periodical performance reviews. A continual feedback process is created, meant to engage workers more. Some even picture these e-processes as AI systems becoming workers' coaches (Babic et al., 2020, 63-64).

Overall, drawing on this literature, technology seems destined to systematically collect and present data about individuals' and teams' performance. Even if doing this right is already challenging, the real hard part is obtaining the data, metrics, and procedures needed to identify the real issues through the data. In the long run, people analytics teams aim to comprehend what is going on and propose viable solutions. Along those lines, Microsoft's MyAnalytics tool, for instance, tracks workers' email traffic, response time and time devoted to meetings, attempting to optimise their work routines (Giermindl et al., 2021, 11-12). Likewise, Percolata claims to rely on sensor data and information about sales per employee in retail to identify which colleagues work together best. The goal of its software is to generate the 'ideal' constellation of workers for every fifteen minutes of the day to optimise sales. Businesses that rely on Percolata's software create a highly flexible workforce; the schedule for each employee is sent to their smartphone, with good performers allegedly receiving more hours (Giermindl et al., 2021, 15). These shift allocation tools, reliant on algorithms and, possibly, an AI, are increasingly common in the retail and hospitality sectors (ACAS, 2020, 9). Still, for now, despite the real possibility of automatically scheduling workers through some of these tools, Alex Wood remarks that managers prefer mostly to perform manual scheduling based on the information derived from these tools (Wood, 2021, 4). Importantly, a study conducted by various universities on retail workers shows that algorithms aimed at fostering business' efficiency can lead to suboptimal results. This is due to these algorithms being based on a very limited notion of efficiency and not taking into account the numerous hidden costs associated with schedule instability (Williams et al., 2018). Workers subject to algorithmic scheduling risk paying the brunt of these flaws by receiving irregular hours and seeing their work becoming even more precarious at the hands of a machine.

Again, echoing our findings in the previous section, the use of AI in the HRM framework presents plenty of challenges and risks that, in many cases, outweigh its opportunities both at the societal

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[19] '*After all, the ultimate purpose of using machine learning with employee data is to successfully predict behavioral outcomes: Who will succeed if we promote them? Who is going to quit? How much return will we get in performance if we implement this new training?*' (Rosett and Hagerty, 2021, 172).

and business level. Labour market actors and policymakers should not fall into the tech-solutionist fallacy whereby AI in itself is believed to solve performance and business organisations' shortcomings.

Lisa Marie Giermindl et al. highlight some key considerations in this respect. As they point out, decision-makers would do well to consider their choices carefully because:

> '*people analytics can promote a false sense of certainty regarding the data (Gal et al., 2017), which can lead to two major pitfalls. First, people analytics' illusion of objectivity can result in an overly strong, possibly even a blind belief in the algorithms' processes, results and capability to predict reliable outcomes correctly (Leicht-Deobald et al., 2019; Mayer et al., 2020). […] Second, people analytics might follow a reductionist logic which can mislead managers to postulating cause-and-effect relationships that in fact do not exist (Bhattacharya et al., 2010; Khan & Tang, 2017; Leicht-Deobald et al., 2019). […] By putting people into boxes, people analytics systems fail to consider the complex, decisive nature of knowledge work and human interaction (Faraj et al., 2018; Gal et al., 2017).*' (Giermindl et al., 2021, 11).

3.2.3. Task distribution, management and evaluation

One of the scenarios depicted by Michael Schrage et al. is for technology to be introduced with the aim of spurring workers' productivity (Schrage et al., 2019); this section addresses this scenario. Businesses in various sectors are already moving along these lines. For example, as mentioned in the prior section (e.g. Percolata), '*[m]ajor retail companies and restaurant chains have long been using these methods, having internalised and updated the everlasting lessons of human resources management: compartmentalise, measure, optimise, correct*' (Aloisi and De Stefano, forthcoming). In the transport industry, automated processes contribute to determining how vehicles are routed (Abduljabbar et al., 2019). Uber, Lyft and other transport platforms likewise rely on algorithms to govern their fleet (Rosenblat, 2019). The European Commission's second-phase consultation document on platform work, moreover, mentions that '*[w]hile the use of automated systems in the work context first gained prominence through its applications in the platform economy, algorithmic management tools are spreading beyond platforms to traditional workplaces*' (European Commission, 2021, 11; see also Spencer and Huws, 2021). Indeed, algorithmic management was probably already present in certain industries before it gained prominence in the platform economy (O'Neil, 2017). Nonetheless, the platform economy has been a mass pilot test for automated decision-making in the world of work before it widely spread to other sectors.

As scholars note, businesses in other parts of the economy are increasingly using algorithms to direct and monitor the workforce (see Bernhardt, Kresge and Suleiman, 2021; Wood, 2021). 'Electronic Visit Verification' systems, for example, are now used to surveil home care workers (Mateescu, 2021). Likewise, remote teleworkers are being increasingly subjected to systems that direct, monitor and report on their activities (Aloisi and De Stefano, 2021a). Many other workers are starting to similarly have their work constantly overseen by an 'algorithmic boss' (Adams-Prassl, 2019; Aloisi and De Stefano, forthcoming). In a report commissioned by UNI Global, Alessandro Delfanti and colleagues describe how Amazon workers are guided and monitored, for example, through AI-powered cameras[20], barcode scanners[21] and computers at the workplace both to keep

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[20] '*As the first wave of the COVID-19 pandemic waned in 2020, Amazon unveiled Distance Assistant: an open source, AI-driven system designed to monitor and enforce social distancing at its warehouses in the United States, and around the world. The system also generates data that Amazon can use to modify its workplaces or, more accurately, surveil the movements of its workers*' (Delfanti, Radovac and Walker, 2021, 8).

[21] '*Tools like the scanner assign them tasks (go to aisle X and pick item Y), read the information encoded in the barcodes of the products Amazon sells, and are used to monitor workers' every move inside the warehouse*' (Delfanti, Radovac and Walker, 2021, 6).

up with production rates and to engage in '*political control*'[22]. For instance, a tool at Amazon, called 'Connections', requires Amazon workers to respond to at least one survey question each day using their computer, workstation device or hand scanner. '*The company states that Connections 'analyzes response data and provides insights to managers and leaders to review and take actions as they uncover issues or see opportunities to improve.' Many workers instead report feeling that what is tested is their compliance with Amazon's workplace culture, although the company frames Connections and similar programs as tools for worker empowerment*' (Delfanti, Radovac and Walker, 2021, 7).

As the company tests these technologies for internal purposes, it is unsurprising that Amazon also sells some of these tools to other businesses. One example is the Amazon Web Services Panorama Appliance. It is '*a hardware device that adds machine learning capabilities to standard internet protocol (IP) connected cameras. Panorama is used to analyze videos within a company's existing network, in real time, without the data ever leaving the premises*' (Delfanti, Radovac and Walker, 2021, 9). Other companies likewise sell tools to keep tabs on employees by bundling together information to produce 'productivity scores' (Heaven, 2020). Troublingly, digital worker surveillance seems to be becoming an industry in its own right (Steele, 2020). Certainly, it is hard to deny that digital surveillance tools appeal to more and more businesses.

To give some other examples, the Korean e-commerce giant Coupang is reported to heavily rely on AI to shorten delivery times. Notably, the company has recently come under media scrutiny as some of its workers allegedly suffered severe injury and death from overwork (Kim, 2021). The gruelling pace in logistics businesses, where the number of units processed per hour is tracked, can indeed lead to dangerous working conditions (EU-OSHA, forthcoming). These findings contrast sharply with the rather optimistic views of some. Surveillance AI has, for instance, been presented as an opportunity to keep workers safe and improve their health (Chamorro-Premuzic, 2020). While this is indeed a possibility, in theory, this may be far from reality for many workers. Along the lines of what is happening in e-commerce warehouses, AI can be introduced in an attempt to boost production and productivity. If that is the primary thrust behind the introduction of AI-enabled management systems, safeguarding occupational safety and health might become a secondary objective at best. One that may not be ranked any higher than the disturbing tracking of 'unionisation risk'[23] across the business.

If used sensibly, AI-enabled tools could, indeed, improve occupational health and safety conditions, for instance, by helping lighten workers' workload (CIPD and PA Consulting, 2019, 26)[24], and it can offer insights into measures that improve work-life balance (Deshpande et al., 2021, 20). Yet, another side of the coin is increasingly showing its face, most notably but not solely in platform work and e-commerce warehouses. Abigail Gilbert and her colleagues refer to this as '*the Amazonian Era*', which marks not '*the replacement of humans by machines but the treatment of humans as machines*' (Gilbert et al., 2021, 4).

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[22] *The authors use this term, illustrating this type of control by, for example, referring to job ads posted on the website of Amazon in 2020 looking 'for analysts with prior experience in the military or law enforcement to gather intelligence on 'labour organizing threats against the company.'' (Delfanti, Radovac and Walker, 2021, 5).*

[23] *'SPOC is designed to help Amazon monitor a wide range of potential threats to its operations, including severe weather events, local crime rates, opioid usage and, especially, labour organizing. According to Recode, about half of the data sets referenced in the February 2020 memo are related to unions: e.g., 'Whole Foods Market Activism/Unionization Efforts,' 'union grant money flow patterns,' and 'Presence of Local Union Chapters and Alt labour Groups.'' (Delfanti, Radovac and Walker, 2021, 12).*

[24] *A worker survey from CIPD and PA Consulting found that, as a result of automation and AI, '(24%) experienced a decrease in their workload, with the same proportion experiencing an increase (23%; others noted no change).' Additionally, '[r]egarding the pace of work, more respondents reported that AI and automation makes their work faster (45%) than that the pace of work has slowed down (16%)' (CIPD and PA Consulting, 2019, 26).*

Their case studies describe a supermarket worker whose till monitors the number of customers standing at the checkout by using heat sensors. Other sensors record the speed of this worker's scanning, leading to 'queue length reports' that are used to assess the worker's performance. In another example, an engineer is asked to record when she starts and completes a task in the 'Connected Worker app'. The system also relies on wearable headsets to monitor the engineer's eye movements, making it possible to detect when she is talking to colleagues. The data about various engineers is subsequently used to calculate how long it takes to complete a task, which, in turn, leads the system to schedule the work for all workers '*according to 95% work optimisation of all staff at all times*' (Gilbert et al., 2021, 12).

These algorithmic mechanisms, using sensors and other data sources to track the productivity of workers and profile them, are spreading throughout the economy. The level of sophistication varies. Sometimes, the systems may be rather simplistic, as is the above case of the cashier in the supermarket. It might even just be an algorithmic model without any real AI capabilities. Nevertheless, what seems evident is that adding AI to the mix does not lessen the extent of control in such a situation. One legitimate concern is that AI could be put to the task of predicting at which performance levels and paces workers deliver the best results without being pushed over the limit just yet.

Notwithstanding possible exceptions,[25] however, some scholars observe: '*[t]he application of AI technology to human resources (HR) analytics is still in its infancy, even if one considers a generous definition of what kind of technologies AI refers to. HR analytics software products rarely involve automated decisions or even recommendations based on data-driven predictions. Rather, they often develop and visualize an array of HR metrics leaving evaluations and decisions entirely to human decision-makers*' (Loi, 2020, 4). In most instances, human decision-makers would rely on the metrics presented to make specific calls, such as readjusting performance thresholds or not renewing someone's employment contract. Call centres, for example, are businesses generally renowned for their intrusive surveillance and managerial practices towards workers (Moore, 2020, 32). These businesses, *inter alia*, rely on voice-analysis software to detect both customers' and workers' moods, offering motivational suggestions to the workers about how to calm down the customer (Simonite, 2018). It is not hard to imagine such tools being used to monitor workers. These data would generally also be used to advise management decisions about who receives bonuses, who is put on personal development plans, or who is sanctioned (Bronowicka et al., 2020, 15). Fully automated decision-making by any form of AI does not seem to be prevalent for now.[26] However, even if some human inputs may still be required, it should not be neglected that humans may not be in the position, or not feel comfortable, to deviate from any option or choice suggested by machines – both because they would then likely be held to account for these decisions by their supervisors and because of 'automation biases'. The latter are discussed in the literature as biases that engender '*overconfidence in machine decisions, and an ensuing bias against challenges to those decisions*' (Kaminski and Urban, 2021, 1961).

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[25] *Logistics companies, for example, might be rather close to this kind of situation. 'Delivery drivers for some firms often spend their entire working days following algorithmically generated instructions on what route to take to their destination, in order to fulfil jobs that are themselves being allocated to them by an algorithm, by an algorithmically calculated target time that they are under huge pressure to beat, or see their performance downgraded by yet another algorithm. Regardless of the classification of their employment status, such workers have very little contact with human managers in the course of their jobs' (ACAS, 2020, 9).*

[26] *Colclough does describe a case in which the system might have done more than just present metrics to management. She writes 'bank employees in a customer service centre are subject to a system that measures the customers' and workers' tone of voice and mood. It then advises the workers on what to say, sale and do and monitors them for succeeding in doing the 'right' thing' (Colclough, 2018, 6).*

3.2.4. Retention, rewards and promotion

As the previous sections have described, some companies already follow a 'holistic' digital management approach aimed at governing all areas of people's work experience (often presented as a 'panopticon' in the literature (e.g. Hagen et al., 2018; Woodcock, 2020)). At the same time, rather than investing in all-encompassing algorithmic-driven information systems, other businesses may opt to use digital tools to achieve more limited goals – for instance, reducing worker turnover. Some argue that AI would be suited to make predictions about people inclined to leave the company, providing the business with an opportunity to retain them (Jeske and Calvard, 2020, 249). IBM's above-mentioned predictive attrition program is an oft used example in this regard (Kiron and Spindel, 2019, 5), one that could be of interest for industries with high turnover rates, such as the hospitality and tourism sector.

To that extent, one should immediately caution against being overly optimistic. It could be argued that predictive systems that only spot employees willing to leave may be of little help. Tools that try to obtain a better fit between job applicants and employers at the time of recruitment are likewise considered key to employee retention (Johnson, Stone and Lukaszewski, 2021). A tool that solely tries to prevent turnover by predicting employees' resignation risk may thus hardly make any real difference. This would be true even if AI could truly predict and map this risk reliably, something that seems already questionable (Albinus, 2021). One primary reason is that most businesses may simply not have the data required for AI to make accurate predictions in this sphere, let alone the existence of dependable technology able to make accurate predictions in this field if the data existed.

Furthermore, there are also other reasons why it might be rather unlikely for very specific AI applications to take hold in HRM. Technology management professor Paul Leonardi observes that telework during the COVID-19 pandemic might have boosted the development of AI HRM applications because remote work creates considerable 'digital exhaust'[27]:

> '*By themselves, individual particles of digital exhaust contain very little meaning. For example, if an employee starts work late one day (as recorded by VPN login times), spends an unusually short amount of time working with information in a portal (as recorded by server-side time-stamps), and is unusually quiet in a meeting (as recorded by total seconds of talk-time in a Zoom session), none of these pieces of digital exhaust by themselves tells us much. But when those pieces are combined, examined over time to qualify a pattern of behaviour, and compared to other employees' patterns, they can start to create inferences that an employee is, for example, disconnecting from the organization*' (Leonardi, 2021, 250).

Tracking all this 'digital exhaust' could form part of an employee retention program. Troublingly, however, these data could also be used to ground other decisions, including disciplinary ones, once again with no real oversight on the reliability of these systems or their transparency, and again without providers and employers worrying about privacy protection in collecting and processing these data.

Earlier, we highlighted how some HR analytics applications aim to turn periodical staff appraisals into continuous feedback processes. Some observers suggest these processes should also be used to determine workers' compensation. They argue: '*Companies should examine whether the metrics they use to reward* [sales representatives] *are aligned with their strategic objectives. They should set individual targets based not on past performance but on the potential of each rep's customer*

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[27] *The meta-data we generate by using ICT technology is sometimes referred to as 'digital exhaust'. Usually, this term refers to (meta-)data that is considered worthless at first sight, but might, in fact, be useful when combined with other (meta-)data. For instance, '[l]ogs of employee behaviour are called digital exhaust because they are by-products of other activities, like setting up a meeting or running calculations. Although the term 'exhaust' may signal the inadvertent nature of such digital records and connote worthlessness, nothing could be further from the truth' (Leonardi, 2021).*

portfolio. And they can boost reps' motivation by setting and revising targets in line with customers' purchasing cycles while conducting experiments to arrive at the optimal frequency' (Chung et al., 2019). In another article, some of these same authors argue an AI can take into account a worker's behaviour as part of a 'behaviour-based compensation system' (Chung, Kim and Syan, 2020, 43-45). Uber's well-known 'surge pricing system'[28] may act as a blueprint in this respect.

Such developments – and their potentially detrimental implications in terms of wage instability and inequality – cannot be ruled out unless regulation intervenes to limit or ban them. We might expect to see these systems evolve in areas where laws and collective agreements do not entirely fix wages. Furthermore, in terms of rewarding workers, automated processes can also be used to achieve less extreme goals, such as determining what kind of end-of-year rewards work best for specific workers in particular situations (Schweyer, 2018).

Lastly, we will briefly mention the subject of job promotions. It would seem there are many different ways of applying AI in this context. Still, there are some reasons to believe that fully automated decision-making in this field is unlikely to be widely deployed, at least for the time being. For one, a promotion might come with new duties, such as managing a small team or being required to interact much more intensively with business clientele. Although it is conceivable for an AI to be programmed to predict how someone might perform in a new role, it seems unlikely that management relinquishes to play a role in the final decision about promotions. Moreover, there is also a human aspect that needs to be addressed. When promoting someone who, for instance, has far less experience at the company than a comparable worker, then, regardless of that person's merits, management might want to ensure this promotion is not perceived as unfair by colleagues. The need to take 'fairness' into account and manage interpersonal relationships when promoting someone might help explain why, relatively speaking, there seems to be little serious discussion about the role of an AI in automating job promotions (Köchling and Wehner, 2020, 836).

3.2.5. Disciplinary procedures

As mentioned before, technological advancements have significantly expanded companies' ability to engage in worker surveillance (Ajunwa, Crawford and Schultz, 2017). Platform workers, in particular, have been at the receiving end of automated or quasi-automated sanctions for many years. As Phoebe Moore discusses, digital labour platforms have also long relied on customer feedback ratings to evaluate workers' performance. Those ratings – for instance, a customer giving three stars out of five – are a crucial component of the 'surveillance loop'. Workers are constantly watched either through the platform's app, which relies, *i.a.,* on GPS signals, or by outsourcing supervision to the clients (Moore, 2020, 28). Worldwide research by the ILO has found in this regard that about 15 to 19 per cent of platform-based taxi and delivery workers have experienced deactivation (ILO, 2021, 182). Low ratings, in particular, can trigger deactivation. The impact of such ratings means that a cab driver may not ask a customer to stop smoking in the car out of fear of a low rating. A food delivery worker may likewise feel pressured to unwillingly enter into someone's apartment out of the same fear of a low rating, even if traditional delivery companies have long considered it reasonable for delivery personnel not to do this, also to avoid the risk of sexual or other forms of harassment (Todolí-Signes, 2021b).

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[28] '*Surge pricing is displayed to drivers through a type of heat map visualization, where the algorithmic assessment of supply and demand will temporarily raise fares for a particular geographic location (see Figure 1). Visible to both riders and drivers, the creation of such surge pricing zones is billed by Uber as a means to ensure positive customer experience by enticing new supply to an area of high demand (Kedmey, 2014; Uber Technologies, 2015b). Uber's surge pricing patent (Lin et al., 2014) and its vernacular explanations contend that surge pricing prompts more drivers to get on the road (Uber, 2014) when demand is high, but there is some evidence that surge primarily redistributes the existing supply of drivers rather than adding to it (Diakopoulos, 2015)*' (Rosenblat and Stark, 2016, 3765-3766).

Bearing platform workers' experiences in mind, it should be emphasised that ratings might become increasingly important in the service economy at large. Suppose a customer downloads the app of any service provider, such as an airline company. From a technological viewpoint, it is fairly easy to enable passengers to rate the crew members after the flight. Those ratings, quite similar to what happens in the platform economy, could automatically trigger certain proceedings. They provide a fertile source of data that could, for example, affect performance-linked remuneration or initiate a performance review (Darrah, 2021).

As evidenced in the literature, digital management tools may also provoke disciplinary measures for other reasons besides computing ratings. Some tools may be motivated by commendable goals. For example, the Oxford Internet Institute refers to an AI bot that aims to detect bullying and harassment by screening workplace emails (Neff, McGrath and Prakash, 2020), a practice that could conflict with workers' privacy. Algorithmic systems could also be theoretically developed to mitigate 'like-me' and 'affinity' biases at work (Executive Office of the President, 2016, 14).

The disciplinary use of algorithmic management, however, raises important concerns. Think of an AI system that automatically attributes penalties to workers. In the platform economy, for example, some businesses automatically charge fees and fines to workers for not meeting deadlines (Berg, 2019, 84-85).[29] To combat similar practices in warehouses, the State of California has recently passed an Assembly Bill to prohibit some employers from taking adverse action against workers for failure to meet a quota that has not been disclosed or for failure to meet a quota that does not allow workers to take a meal or rest breaks or otherwise comply with occupational health and safety laws.[30] Besides disciplinary sanctions, employers could also engage in automated or semi-automated dismissals. Amazon, for instance, is said to have automatically fired Flex delivery drivers. *Bloomberg* reports in this regard that: '*Amazon knew delegating work to machines would lead to mistakes and damaging headlines, these former managers said, but decided it was cheaper to trust the algorithms than pay people to investigate mistaken firings so long as the drivers could be replaced easily*' (Soper, 2021). Important to note, such automated and semi-automated disciplinary measures have, at least in one instance, been found in court to result in indirect discrimination.[31] The legality of semi-automated dismissals could also be highly questionable under some national unfair dismissal laws (Gaudio, forthcoming).

What is more, an AI does not necessarily have to engage in direct sanctioning to obtain a disciplining effect. As professors Katherine Kellogg, Melissa Valentine and Angèle Christin write, algorithms may also discipline workers by replacing and rewarding them. Firstly, they argue that organisations can recruit workers on a massive scale in some digitalised businesses, such as platforms, without this being time-consuming. In this sense, the reliance on an AI to issue dismissals or non-renewals

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[29] '*Imagine that the company you work for charged you a fee—$10, $20, or even $40—every time you showed up late for work, left an hour early, or called in sick. Professional cleaners working for Handy, a cleaning and handyman service, don't have to imagine this scenario: They are living it*' (Van Doorn, 2018).

[30] *Assembly Bill No. 701 to amend Section 138.7 of, and to add Part 8.6 (commencing with Section 2100) to Division 2 of, the Labor Code, relating to employment.*

[31] '*The case, promoted by the most representative Italian labour union, Cgil, brought to light that Deliveroo's riders were evaluated primarily on two aspects: reliability and participation (we use the past tense because the company claims to have «adjusted» the statistics used for its slots through its new contracts, which were signed in November and are anyway widely contested). The combination of these metrics gave workers an internal ranking; by virtue of that ranking they were more or less likely to be offered new jobs or to be downgraded instead. Workers with good ratings were among the first to be able to apply for the most coveted work shifts and could also turn down the most uncomfortable ones. However, any waiver in the 24 hours prior to the shift weighed against future calls. Upon returning from a period of absence for various reasons (health problems, commitments related to the care of family members, or collective action), workers could be automatically downgraded and forced to start all over again, by climbing the ranking from the scratch*' (Aloisi and De Stefano, 2021b). Because the system did not pay any attention to the reason why workers were absent, it negatively impacted workers who had a valid reason for their absence. The Court in Bologna considered this to give rise to indirect discrimination.

cannot be dissociated from what is happening in the business in terms of recruitment. Digitalisation and AI enable some firms to access '*a reserve army of workers ready to take the jobs of those who do not comply with managerial directives*' (Kellogg, Valentine and Christin, 2020, 380). From this perspective, it is not only automated firing that should be seen as a form of algorithmic disciplining. Especially in the context of rapid onboarding, the non-renewal of short-term contracts can also fall within that category.

Secondly, on a different note, the authors also point to 'algorithmic rewarding' as another mechanism used to discipline worker behaviour (*Ibid.*, 381). We have noted earlier how salespeople might be encouraged through performance pay to take certain actions. However, it is not only performance pay that might serve this purpose. Our previous discussions have also covered the example of an AI used to schedule work shifts, benefitting workers who perform well. Indeed, on-call work arrangements provide businesses with the opportunity to offer work to some workers at the expense of others. Platforms are again a clear example. Most platform workers in the taxi and delivery sectors believe that their ratings and acceptance rates impact the amount of work they receive (ILO, 2021, 152). As these workers are often (mis)classified as self-employed, this practice is materially facilitated. It would become more problematic to do so in many jurisdictions if these workers were legally considered employees. In that case, the employer – i.e. the platform – might have a legal duty to provide the employee with sufficient work, making it impossible to withhold work while the platform worker is on the clock. Still, even when speaking of employees, an employer might decide to offer worse tasks or too much work as a disciplinary tactic (e.g. the excessive quota's in California). In this respect, in time, we may also see cases in which the operation of an automated system is audited in constructive dismissal cases.

Finally, it is appropriate to point out that AI could also play a role in the degree of self-disciplining in which employees partake. The accounts described in this chapter indicate that some workplaces have turned into spaces of continuous surveillance. Moreover, the software does not forget. Human supervisors might not notice something because they are busy doing something else or may forget someone made a similar mistake before. A computer system would not. If the capacity to observe all behaviours relentlessly is combined with an AI tailored to screen and monitor all that data, workers may well feel like having entered an unforgiving environment, triggering what some call '*anticipatory surveillance fear*' (Samek Lodovici et al., 2021, 48). Although this is an area that demands more research, it might be the case that the combination of these factors spurs a higher degree of self-disciplining, also triggering elevated pyschosocial risks for workers in terms of heightened stress in addition to the risks of discrimination and privacy invasion that we already mentioned, and we will discuss more extensively below.

To summarise:

- Recruitment seems to be a sphere of HRM in which AI could achieve some degree of generalisation. Nonetheless, it is worth emphasising that many of these tools remain largely untested. Companies have valid reasons to adopt a critical attitude towards these applications. It also requires expertise to interpret the findings of these applications correctly.
- AI seems poised to lead to more continuous forms of staff appraisal. However, it seems quite challenging to effectively incorporate AI in this area of activities because of the difficulties obtaining all necessary data to make an accurate appraisal, and issues interpreting the results of the AI's analysis. AI does not reach any form of 'objective truth'. HR staff has to learn how to interpret AI analysis without losing sight of the bigger picture.
- Some companies rely on algorithms and AI to distribute tasks, monitor workers and evaluate their performance and attitudes. Although the establishment of such sweeping 'surveillance loops' seems limited so far, in time, these may spread. In any

event, many more businesses can be expected to rely on AI to evaluate workers in the future. These AI-based evaluations will directly influence managers' decisions in terms of who receives work and who is put out of work. It is critical to follow up to what extent AI-powered evaluations are becoming a driving force behind the automated distribution of tasks; hence, taking managers out of the loop.

- Policymakers should not indulge in wishful thinking. AI will only benefit workers if designed to this end (e.g. the tension between higher productivity and workers' OSH as a guiding principle behind AI operations).
- In theory, AI could be used for rather specific purposes. Yet, the data needed to make even such limited decisions – e.g. which workers may leave the company – might just as well serve as input for other AI decision-making tools. As such, once a business meets the (digital) requirements for AI tools to be used effectively, it seems likely for a business to adopt multiple AI features instead of just a few.
- It is important to acknowledge that AI can sanction workers in various ways. Automated disciplinary sanctions based on evaluations are only one aspect.

3.3. Near-term possible development prospects (next five years)

Looking into the future of AI and its various applications is a perilous undertaking. Nevertheless, it is possible to cautiously sketch some general lines based on current research. Firstly, artificial general intelligence (AGI) or 'strong AI', which can attempt to solve almost any problem you throw at it, is not yet on the horizon. Concrete predictions of when such a system could come about must be viewed with a critical eye (Malone, Rus and Laubacher, 2020, 10 and 16; Devillé, Sergeyssels and Middag, 2021, 21). The literature is divided, with some authors believing incremental advances can lead to AGI, others thinking that one or a few '*paradigm-shifting developments*' are first needed, and a third group remaining somewhat sceptical about there being such a possibility at all (Boucher, 2020, 14). In any case, for the time being, AI will still only be deployed to perform a limited range of tasks or pursue a narrow set of objectives ('specialised AI'). Speculating about AGI is not without its merits, but it is superfluous for this study.

More relevant is to simply cover what tools are currently envisaged to make a significant impact. For example, Thomas Malone, Daniela Rus and Robert Laubacher emphasise that, under the right circumstances, contemporary AI is good at sensing, deciding, and creating. In the eyes of these authors, examples of sensing are AI systems that are better at analysing medical imagery than physicians. Likewise, some stores allow customers to walk through the checkout line as AI scans their groceries, and AI software already relies on records to predict when an Airbus aircraft requires preventive maintenance. Besides detecting certain things, AI is already and will most likely continue to be used to take (or assist in taking) a range of decisions, including extremely critical ones for people. In the field of work, it is reasonable to expect that using AI in recruitment will expand. Thirdly, AI systems might also be increasingly used to generate content. Whether or not to be later vetted by human workers, routine news articles, simple legal texts, as well as, for instance, product designs, could be developed by AI (Malone, Rus and Laubacher, 2020, 19-20).

As such, there are various ways in which AI may end up impacting our lives. With clock-like regularity, there is news of a particularly successful application (e.g. Knight, 2018a). At the same time, there are also signals that the future of AI is sometimes portrayed as brighter than it actually is. In October 2021, for example, *The Wall Street Journal* reported that internal documents at Facebook suggest that the success rate of the company's AI in removing content from Facebook can be considered dismal (Seetharaman, Horwitz and Scheck, 2021). Its performance in languages other than English is even worse. Similarly, Andrew Moore – the head of Google Cloud AI – has warned that '*implementing artificial intelligence successfully is a slog. […] Solving artificial-intelligence problems involves a lot of tough engineering and math and linear algebra and all that stuff. It very much isn't the magic-dust type of solution*' (Knight, 2018b). In this regard, it seems unlikely to see

major new developments within five years. For instance, Luciano Floridi predicts that despite all the hype of the last few years, a '*new* [AI] *winter is coming, we may try to learn some lessons, and avoid this yo-yo of unreasonable illusions and exaggerated disillusions. Let us not forget that the winter of AI should not be the winter of its opportunities*' (Floridi, 2021, 3).

Based on such accounts, it seems likely for AI to increasingly dominate those areas of the world of work where it is already an established feature. As businesses, in general, continue to digitalise their operations and, for instance, consultancy firms gain more experience in implementing AI into existing businesses, the technology will likely spread to new enterprises and sectors. Chipsets and sensors will probably keep being added to various tools and appliances, increasingly integrating them into the Internet of Things. Along those lines, as the work environment becomes more digitalised, employers might increasingly rely on algorithms to, for example, direct and manage workers. Algorithms could also be programmed to restrict workers from acting in certain ways, such as blocking emails and messages after working hours. Furthermore, workers' activities will be increasingly logged and rated through technology (Kellogg, Valentine and Christin, 2020). A more digitalised work environment will facilitate the use of AI in HRM. Essentially, businesses across the economy will increasingly meet the preconditions to effectively use AI, starting with the collection of data and metadata.

What remains important to note in this respect, however, is that, despite its benefits, even in those areas where AI succeeds – and even only focusing on its business case – it will still have certain drawbacks. One of these is its inability to identify causal links. This deficit has been so exemplified: '*It's as if you knew that the presence of clouds made rain likelier, but you didn't know clouds caused rain*' (Bergstein, 2020). For such reasons, we need to put the potential impact of AI at work into perspective. AI may contribute to teaching some valuable lessons, but it will not manage to fully grasp the complex functioning of work environments in the near future (and, quite possibly, it will never be able to do so, as this would require something too close to AGI). To that extent, whereas there is plenty of speculation about the future impact of AI on HRM, it remains to be seen in which areas the introduction of AI will actually be sustainable, functional and cost-effective. So far, the most immediate impact of AI seems to be in recruitment. The technology leads to fairly evident developments in this area. However, there remains a pertinent need to assess whether these AI-driven tools actually work or, instead, are '*pseudo-profound bullshit' — the results sound inspiring and meaningful, but they bear little resemblance to any objective truth*' (Rebele, 2019, 11). Moreover, even if these tools do work, it is still imperative to regulate their use, among other things, by requiring audits of these systems to guarantee equal employment opportunities (Ajunwa, 2021), and also by bringing them under the scrutiny of social dialogue processes (De Stefano and Taes, 2021).

Besides AI's use in recruitment, evidently, some businesses have more profoundly embraced the practices associated with the 'Amazonian Era' (Gilbert et al., 2021). They extensively rely on technology to implement a form of 'digital Taylorism' or 'new Taylorism' (Eurofound, 2020, 3). Still, what remains somewhat unclear is how AI, in particular, will intervene in this regard. As described, even assuming a business has the necessary data on workers to apply detailed HR analytics – and this is already a far-fetched assumption if the data collection and processing is to comply with data protection regulation, it is ultimately up to humans to decide for what purposes they want an AI to be leveraged. As hinted at by Albrecht and Kellerman, the practical impact of AI in HRM will depend on what AI ends up being good at, what makes economic sense for businesses,[32] and what is legally allowed. Research seems not yet to have scoped out what is likely to emerge along those lines. Thus far, numerous factors seem to have hampered the implementation of AI in HRM. For example, 'data

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[32] *Kreutzer and Sirrenberg suggest that introducing AI-applications in HR requires a case by case analysis. Sometimes it is worth it, at other times it is not. This contrasts with certain other AI-applications, for example in the analysis and predication of customer behaviour, which is a must do in their view (Kreutzer and Sirrenberg, 2020, 279).*

accessibility' is seen as a significant impairment at the workplace (Vial et al., 2021). Even if a business does manage to obtain quality work-related data, it may still suffer from a lack of technical knowledge about HR analytics and how AI fits into that picture, as well as difficulties in obtaining '*a good understanding of how to use the results of the analysis to improve performance*' (Nocker and Sena, 2019).

This is not to say that HR analytics and AI-enhanced tools are not already having a major impact on some workers. Of course, one large company where this is the case is Amazon. Its recent patents indicate how, in the future, a supervisor could wear an augmented reality headset that recognises individual workers and projects relevant information, such as '*demographic data about the user, location data within the facility, relationships with other users, messages for the user, navigation paths through the facility, access permissions*' (Delfanti, Radovac and Walker, 2021, 14). A second patent concerns a wristband or bracelet that would provide haptic feedback to monitor and direct workers. A third patent aims to recognise individual workers' levels of frustration. Such patents seem to further build on the idea that workers' surveillance is essential (*Ibid*). The same could be said for Walmart's patenting of a microphone system to eavesdrop on its workers and shoppers (Hanley and Hubbard, 2020, 13). The food delivery service Eleme, owned by Alibaba, already uses the Bluetooth function in workers' phones and beacons inside shops and restaurants to track their movement (Ren, 2021).

Policymakers, trade unions and employers' associations must carefully follow these practices. Some technologies are genuinely sinister. For instance, some scholars mention the injection of microchips into an employee's skin to transmit 'radio frequency identification' signals. The microchip would rely on near-field communication (NFC) for enabled devices, such as a photocopier, computer or door, to track when an individual makes contact (Bales and Stone, 2020, 20). In another example from the *Harvard Business Review*, AI consultant Alexandre Gonfalonieri asks readers to '*[i]magine if your manager could know whether you actually paid attention in your last Zoom meeting. Or, imagine if you could prepare your next presentation using only your thoughts. These scenarios might soon become a reality thanks to the development of brain-computer interfaces (BCIs)*' (Gonfalonieri, 2020).

On the one hand, we should not generalise such examples as if all businesses were to go along with such trends. Some employers will implement digital tools and AI to assist workers rather than 'hack' them. For instance, some researchers describe a future vision of a '*coupled network of humans and machines*' with '*fully integrated AI coachbots*' that improve people's abilities to analyse and predict what they are or should be doing (Babic et al., 2020, 64). On the other hand, we should not underestimate the appeal of the privacy-invasive AI tools mentioned in the previous paragraph either. As Tomas Chamorro-Premuzic and Ian Bailie contend, '*the temptation to force people into certain behaviors, or to use their personal data against them, is more real than one would think*' (Chamorro-Premuzic and Bailie, 2020). It is a tendency many have also seen expanding during the pandemic. The transition from working in the office to working at home has been accompanied by a sharp increase in the demand for online workplace surveillance tools (Aloisi and De Stefano, 2021a; Samek Lodovici et al., 2021, 55). Alongside, COVID-19 is said to have propelled the adoption of automation and AI (Lund et al., 2021), among other reasons, because many businesses have digitalised some of their activities, leading to more data that can be fed into AI systems (Leonardi, 2021).

These recent developments arguably foreshadow a more intense recourse to electronic surveillance, algorithmic management and (AI-driven) performance in the years ahead. At the same time, in many regards, the technology is still in its infancy (EU-OSHA, forthcoming). Sometimes it shows great potential, for better or worse; at other times, it could more accurately be described as 'snake oil' (O'Connor, 2021). What is certain is that, at present, AI usually still needs a relatively specific goal to pursue, such as a camera system noticing it when people are talking to one another, an AI tool analysing communication between employees to identify harassment, or an AI system

identifying workers that have low-performance ratings. Since some businesses are already deeply committed to such practices, and as it seems likely for other companies to follow suit, it is high time to demarcate the legal boundaries of these and other practices. In this vein, solutions must be '*systemic and wide-ranging, encompassing complementary tools coming from different legal domains, such as anti-discrimination law and occupational health and safety, based on the* [AI's] *final use*' (Aloisi and De Stefano, 2021a). The EU AI Act – discussed below – could become a crucial piece in this wide-ranging regulatory paradigm.

To summarise:

- AI is not a magic-dust solution. It will probably never become one.
- Many businesses will increasingly meet the preconditions to implement AI at work effectively.
- For the time being, AI serves specific human-defined goals. Policy discussions should also concentrate on what goals it should serve.
- AI and digital technologies, more broadly, will enable businesses to engage in certain detrimental practices. The time is now to set and enforce clear boundaries also to dissuade investments in illegal, unethical and undesirable AI applications.

3.4. Assessment of impacts

Previous sections have highlighted how AI will engrain itself into people's working life in various ways (section 3.1.), that AI will have an impact in many different fields of HRM (section 3.2.), and that it is unclear to what ends AI at work will develop (section 3.3.). In this respect, we will argue that it is not too late to influence the development of AI at work, ensuring it is operationalised to the benefit of all. This section presents some of AI's profound impacts on workplaces, highlighting the importance of regulatory intervention.

As Irene Mandl, Head of Unit at the European Labour Authority, highlights, '*AI has the potential to improve business performance, job creation, labour market access, workforce upskilling, and to reduce physical hazards, but at the same time it may lead to offshoring, job loss, cybersecurity issues, 'management by AI', platformisation of work, 24/7 on-call working time, and exploitation of employee monitoring possibilities*' (AIDA, 2021a, 4). The authors of this report believe that we should be cautious in outright dismissing the potential benefits of AI for the labour market on the whole. Nonetheless, we must also comprehend the profoundly negative changes AI may induce and recognise that AI systems will not automatically set their own goals. Their use may only be beneficial for the many if they are designed for these purposes. For the time being, it is possible to note that algorithmic management and AI-enabled systems have been introduced along with the idea of cutting HR costs and micromanaging and monitoring workers more closely, above all other considerations (Acemoglu, 2021). Nor should we underestimate the possibility that a technology that could be put to good use could also be reverse-engineered for far from commendable purposes (Kullmann and Cefaliello, 2022). Imagine a system that aims at detecting the risk of burnout of workers, for instance, by scanning messages to track keywords that would point in that direction. Apart from the evident risk for privacy invasion, this system could also be employed to dismiss someone just before burnout occurs.

This section does not plan to provide an all-exhaustive overview. It will focus on certain specific implications that seem relevant to carry into the regulatory discussion. With this in mind, first of all, the risk of AI to the automation of jobs should be restressed. As said in the introduction, in the short term, it might be most important to focus on the impact of AI on the quality of jobs; however, this should in no way dissuade us from already preparing for the prospect of technological unemployment. Indeed, the COVID-19 pandemic is said to have further accelerated automation, both through robots and software (Schwab and Malleret, 2020, 119-121). A future of less work, at

least '*for ordinary workers without scarce skills, and very possibly less work overall*', cannot be ruled out. Policy responses that reach beyond mere stilt calls for lifelong learning are needed (Estlund, 2021, 39).

Returning to the 'quality side' of the jobs, an evident implication of AI relates to its need for data. Once digitisation became widespread in the 1990s, policymakers advanced a vision of employers requiring a legitimate reason to collect personal data. Many legal systems furthermore require a sense of proportionality, in general, and purpose limitation, in particular, meaning the personal data should only be used for the purpose it was collected, as well as data minimisation (Hendrickx et al., forthcoming). Overall, the relevant legal provisions on data protection in Europe could be described '*as rather individualistic and defensive in nature against potential illegitimate uses of workers' personal data*' (Dagnino and Armaroli, 2019, 179). Many of the dynamics underpinning HR analytics are thus somewhat at odds with privacy standards. To obtain meaningful results, the company does not just need basic data; it requires 'strong data' across the board, deriving from various sources and covering many employees, something that cannot be easily reconciled with data minimisation, proportionality and purpose limitation. Arguably, many of the HR and computer science academic debates as well as the few policy discourses about workplace analytics and 'AI at work' seem to neglect the structural irreconcilability of these managerial practices with existing data protection regulation.

Indeed, efforts to introduce AI-enabled managerial practices at work could boost a process of mass 'datafication' that has been going on for much longer (Sartor, 2020, 15-16). As such, the broader literature describing how datafication or quantification of employees negatively affects human beings is of crucial importance to any discussion of AI at work (Ball, 2021; Ajunwa, forthcoming). For example, if it is indeed the case that governing workers by numbers, among other things, leads to an increase in mental illness at work (Supiot, 2017), it would be essential to take this into account not only by providers when designing an AI, or by employers when considering introducing it, but also when drafting any regulation to govern the introduction of AI-enabled tools at work. The quantification of work is furthermore alleged to lead to lots of 'meaningless' work in the eyes of workers (Hoeyer and Wadmann, 2020). As mentioned before, one example would be Amazon's demand for workers to fill in a daily survey question. More broadly, workers are asked to log all kinds of activities because the technology can otherwise not take them into account. Although perhaps essential to retain their jobs, this can be perceived as a 'meaningless' administrative burden.

Overall, an important question is how AI will fit into this datafication picture. Arguably, by adding an additional layer of complexity through an AI designed for advanced data analytics, there is a risk that too much importance will be attached to what the data indicates. A worker's and supervisor's opinions of the situation could be perceived as subjective and flawed compared to the system's assessment. In this sense, there is a risk of forgetting that due to the sheer complexity of human behaviour and interactions, especially at work, '*[a]nalytics and algorithms can never achieve true 'objectivity'*' (Jeske and Calvard, 2020, 254). They always turn the situation into a somewhat reductionist version suited to the AI. In this sense, no matter how ingenious AI might become, it will always resemble a 'horse with blinders'[33]. Questioning the legitimacy of recourse to such tools in making or assisting decisions having a substantial impact on people's lives and work, thus, is indispensable (Kaminski and Urban, 2021). Yet, current data protection rights do not seem sufficient to really hold the entities in control of the automated system accountable (Worker Info Exchange, 2021).

In addition to issues related to the increased reliance on data to govern the workplace, AI will also impact employment in various other ways. For example, in the view of ILO senior economist Janine Berg, technological change will not bring about an end to work. '*[W]hat we are witnessing instead*

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[33] *Like the horse, the AI sees what it is supposed to see. It is not expected to take broader contexts into consideration.*

is increased precariousness in the labor market. Technology is thus a tool used by enterprises to 'displace labor,' to more precarious and invisible forms of work' (Berg, 2019, 70). Illustrative of her argument is how an AI is used in scheduling software to create an on-call workforce, granting most working hours to the employees with the highest performance ratings. Of course, in theory, the scheduling software could also be developed to schedule hours to serve workers' work-life balance, granting more working hours to those who want more hours (*Ibid.*, 80-81). Yet, in most cases, that does not seem to be the goal that programmers and users of AI pursue.

Similarly, suppose a business succeeds in performing perpetual staff appraisals instead of doing them every so often. That, too, would make it easier to shorten the duration of work contracts, with detrimental implications in terms of job and income precarity for workers. The OECD also mentions, for instance, how '*[a]dvances in information technology and artificial intelligence could enhance the benefits of outsourcing*' for employers (OECD, 2021). Cutting a long and complicated story short, AI may underpin and further enhance the casualisation and destabilisation of work, potentially worsening social and economic inequalities. The technology in itself does not have to spur those trends, but as things stand, it is likely to do so if its use is not adequately governed.

The same is true for the degree of surveillance occurring at the workplace (Edwards, Martin and Henderson, 2018). The many AI-driven surveillance practices described in the previous sections have '*an impact on freedom, privacy, but also autonomy and moral reasoning, which is much more relevant in a society in which the traditionally strict separation between private life and professional life is dissolving*' (Aloisi and Gramano, 2019, 99-100). When thinking about the potential harms of workplace surveillance through (AI-induced) digital tools, we must indeed not overlook how some of the technological developments that enable greater surveillance, at the same time, undercut the separation between private and professional life (De Stefano and Taes, 2021, 8). For these reasons, Moore rightly emphasises that policy discussions should be oriented towards addressing excessive surveillance, not just at the workplace but in people's 'workspace' (Moore, 2020, 1). Allowing AI to analyse CCTV footage at the workplace for OSH-related reasons is one thing. Having it screen individual desktop footage or using it to check webcam footage at home is quite another.

Nor it should be neglected that it is not just a matter of privacy. AI-enhanced algorithmic monitoring can jeopardise other fundamental rights at work, including collective ones. The possibility of these tools being used to bust unionisation is concrete (Bernhardt, Kresge and Suleiman, 2021, 16; Rogers, forthcoming). As Richard A. Bales and Katherine V. W. Stone remark, '*[a]fter all, a device that listens in on conversations can pick up union talk more effectively than can any company spy. Moreover, an AI algorithm that uses biomarkers and body language to identify which employees are dissatisfied at work can predict which ones are likely to become union supporters or simply troublemakers*' (Bales and Stone, 2020, 52). Furthermore, AI-powered tools pose certain problems for worker representatives, who might find it hard to engage in informed consultation regarding the use of such systems. Collective rights can be seen as a fundamental tool to rationalise how AI should be used at work. As such, in order to preserve this tool's utility to this end, a range of options for quickly and effectively addressing the use of technology to stifle workers' voices should be urgently examined (De Stefano, 2019, 41; see also De Stefano, 2020). Even pursuant to existing labour regulations in many European countries (Aloisi and Gramano, 2019), AI integration should already be the subject of collective bargaining and consultation. If, despite these standards, AI technologies are, in fact, designed to undercut those very processes, we run the risk of a deregulatory feedback loop, further aggravating the other risks associated with AI at work.

Most of these adverse effects – workers suffering from datafication, the casualisation of employment, the increased levels of surveillance – are not unavoidable, however. AI can be oriented towards improving working conditions, for instance, by keeping workers safer (Chamorro-Premuzic, 2020). This can occur in various ways, *inter alia*, by powering smart robots that replace humans in the most hazardous work tasks, augmenting workers' capabilities or identifying dangers. In terms of the latter, spotting driver fatigue in transport occupations or implementing fall-detection systems

in construction are early examples (Pishgar et al., 2021). At the same time, as is the case for many other promises of AI at work, this will not just happen naturally or automatically. It is legitimate to wonder whether businesses will invest in AI applications solely designed to increase workers' safety. For example, Moore rightly remarks that '*[w]hile watching Deliveroo riders hurtle past her in the rain,* [mathematician and data scientist] *Dr. O'Neil*[34] *considered the platforms directing the riders' work, which operate on the basis of efficiency and speed, and thus instigate riders to cycle in unsafe weather conditions. This clearly puts riders' very lives at risk. Dr. O'Neil calls algorithms 'toy models of the universe,' because these seemingly all-knowing entities actually only know what we tell them, and thus have major blind spots*' (Moore, 2019b, 66). Adrián Todolí-Signes offers a striking example in this respect. In countries such as Australia, delivery workers might want to reach their destination by taking a longer route through shaded streets. However, delivery platforms' systems do not know which roads are shaded. Hence, they direct workers to take the 'theoretically' fastest route even though the sun might be beating down on them in those locations, slowing down their delivery (Todolí-Signes, 2021b).

That narrow-mindedness is, indeed, a major challenge. It is possible to design AI systems with workers' safety as their primary concern. However, to what extent is it realistic to expect delivery platforms to automatically suspend their operations because the system finds weather conditions to be unacceptably hazardous? Consider also current investments into AI tools, such as cameras and wristbands, that seek to ensure that workers keep a sufficient distance during the COVID-19 pandemic. Most likely, businesses will seek a return on such an investment also after the health risks associated with the pandemic have ceased. If, for instance, these systems will then be used to enhance work monitoring, they could engender stress and prompt unsustainable work paces, heightening psychosocial and physical occupational risks. The introduction of AI at work can indeed cut both ways in terms of health and safety (EU-OSHA, forthcoming).

The story is somewhat similar for many of the other potential benefits of AI at work. Since the beginning, people analytics has been hailed as a means to foster equality, overcoming human biases (Bohnet, 2016). However, many applications of automation and AI to decision-making can lead to discriminatory outcomes (Kim, 2019; Köchling and Wehner, 2020, 830-835). One notable cause is that algorithms may incorporate implicit and explicit biases present in society. Algorithms are trained on data that reflect past behaviours; therefore, they might perpetuate the same potentially discriminatory patterns (De Stefano, 2019, 28-29; Candelon et al., 2021, 106-108). The choice of which data to use and how to weigh and process them is paramount. Some seemingly neutral characteristics and variables could, for instance, affect future performance. An often-used example is the distance prospective workers have to travel to work; having to travel long distances may lead to higher levels of turnover. Consequently, one can see why this would be a relevant variable to take into account. The drawback is, however, that more remote areas, often with lower housing prices, might correlate with racial origin or other protected grounds. Similarly, '*many employers in the US look for people who studied at famous and expensive universities. But it might be relatively rare for certain racial groups to study at those expensive universities. Therefore, it may have discriminatory effects if an employer selects job applicants on the basis of whether they studied at a famous university*' (Borgesius, 2018, 20).

The decision to cancel out such potential correlations is hard to make. AI can surely help to surpass human biases, but businesses need to be aware that humans, in return, should actively keep an eye out and tackle bias in AI (Manyika, Silberg and Presten, 2019). Something that risks rarely being the case if automated decision-making is purported and perceived to be the panacea against discrimination, as it often is. To this extent, it may even be '*easier to program bias out of a machine*

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[34] Phoebe Moore refers to Cathy O'Neil. The author of Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy and of The Shame Machine: Who Profits in the New Age of Humiliation. Both published by Penguin Random House.

than out of a mind, as management scholar Brian Uzzi puts it. Yet, human involvement in the system's operation will always be critical (Uzzi, 2020). Without it, patterns of discrimination can well be replicated or even bolstered by AI (Adams-Prassl, 2019, 139-140). Also, for this reason, much more attention should be paid to the potential discriminatory effects in all instances of algorithmic management instead of only in the hiring process (Bales and Stone, 2020, 60).

As noted above, another potential deployment of AI is that it can turn staff appraisals into a more continuous process. Some, therefore, see great promise in AI-driven reskilling and upskilling (Caine and Firth-Butterfield, 2020). In a pilot program conducted by Accenture in partnership with the World Economic Forum, Walmart and Unilever, an AI tool called 'SkyHive' is said to have broken down several job roles into sets of skills that people themselves in those job roles would fail to recognise. They '*were then able to use the AI to develop specific learning pathways from declining roles to emerging jobs, both internally and externally. In some cases, we found that people were already well prepared for new careers. They might only require a few months of training*' (Whittall and Hinton, 2021). As this example illustrates, AI may well perform a valuable role in upskilling and reskilling. However, as the ILO Global Commission on the Future of Work noted, the quality of these digitally induced or sustained learning pathways needs to be assured. Consequently, the Commission recommends that governments create quality assurance mechanisms, ensuring skills are portable, for instance (ILO Global Commission on the Future of Work, 2019, 31).

This concern also intersects with another problem raised by Bales and Stone. These authors expect workers to have a 'boundaryless workplace' in the future, working for multiple employers. With this premise in mind, they imagine workers to have an electronic resume produced by AI that captures workers' information as they move from one employer to the next. The problem with this, however, is that the information on that resume is derived from various companies. In their view, '*[i]f competing companies share information about employees and use that information to make hiring, discipline, promotion or other decisions, they run into several potential antitrust issues*.' For example, '*consider an HR services company that uses AI to conduct video job interviews of prospective employees, uses data analytics to construct a personality profile and predict future performance from those interviews, then sells that information to all companies who pay for its services*' (Bales and Stone, 2020, 34-35). Such practices could be in restraint of trade and at odds with privacy regulation. Nor should the risks of discriminatory outcomes of these automated processes be underestimated, based on what we discussed above. This also gives the opportunity to remark another severe danger of algorithmic discrimination: it risks propagating much beyond the single instance in which it occurs. A low rating assigned by a biased or flawed program during an interview or a performance review, for example, could be recorded in the system and affect future recruitment or review processes for all the employers using the same program or even different programs sharing, even partially, a dataset. Similar to how AI-determined training opportunities might steer workers in certain directions, also reliance on AI to generate electronic resumes may wire the labour market in completely undesirable ways.

Having discussed some of the more specific ways in which AI may impact the world of work, we will now turn our attention to some more overarching discussions. First, a broader critique regarding AI and related technologies is that it threatens to resemble paternalism. As one of the authors of the present report has argued elsewhere, '*[e]ven the most well-intentioned measures, including wellness programs, risk turning into forms of dystopian and paternalist control, unless a serious reflection on the use of technology at the workplace is carried out*' (De Stefano, 2019, 30; see also Ajunwa, Crawford and Schultz, 2017). People analytics, as such, already threatens workers sense of autonomy as their behaviour is increasingly recorded both in career and personal realms (Bodie et al., 2017, 1040-1041). Adding an AI to the mix that is designed to predict what workers will do and achieve, based on what they have done in the past, seems to constrain that sense of autonomy further.

Second, a central overarching theme in the literature on AI is its potentially opaque nature. Many scholars have warned how certain digital developments, in particular machine learning, can lead to so-called 'black boxes', in which case the system's operations are not easily accessible or too complex to understand, even for their programmers (Pasquale, 2016). Although not all AI systems are necessarily black boxes, machine learning algorithms do perform '*millions of calculations following their own internal logic. Even if the decisions are good quality, it is very difficult – often impossible – to explain the decision or its logic in a way that makes sense to human experts, let alone for users, policy-makers, judges and juries*' (Boucher, 2020, 19). Given the difficulties encountered, a broad field of literature has developed regarding the need and means to open up such black boxes. Beyond the vital need to make the systems compatible with the rule of law and due process (Kaminski and Urban, 2021), some additional reasons to pursue transparency are that: (i) an improved understanding of the AI allows humans to improve it; (ii) transparency could increase the AI's legitimacy, increasing its acceptance among stakeholders; and (iii) transparency may make it easier for user enterprises to tailor the AI-product to their needs. There are undoubtedly other advantages as well. Still, some scholars have also rightly pointed out that transparency or 'explainability' does have drawbacks (Candelon et al., 2021, 109-110). It would, for example, make AI systems more vulnerable to attack and hacking (Burt, 2019). Consequently, intending to strike a balance, some have argued in favour of more limited forms of transparency that solely explain the reasons behind a decision rather than the actual decision-making process (de Fine Licht and de Fine Licht, 2020). The way in which these broader discussions on explainable AI will unwind will undoubtedly influence the degree to which end-users, workers and their representatives will be able to exert agency in relation to AI at work.

Furthermore, the issue of AI transparency intersects with the many questions regarding who is accountable when an AI is involved in decision-making. For example, on the one hand, a person may want to blame an AI for something going wrong at work, even if there is no objective proof it had anything to do with the AI. On the other hand, an AI might also make an unforeseeable mistake once in a while, yet it could seem as if a human is to blame (Matthews, 2020, 86-87). In both instances, who is accountable when the blame is shifted towards the AI or the human? Such questions about accountability become even more complicated because third-party suppliers are frequently involved (e.g. 'AIaaS'), further complicating the traditional instances of vicarious liabilities at work. Suppose a business developed an AI system that is indisputably the best on the market to detect a disease. Therefore, it seems rather likely for multiple hospitals to rely on that very same system. Well, '*[i]f algorithmic predictions were automatically turned into action without additional scrutiny or human monitoring, who becomes accountable for 'mistakes,' misdiagnoses*' (Faraj, Pachidi and Sayegh, 2018, 66)? The doctor, hospital and manufacturer will each have their arguments to place the blame on someone else.

Moreover, quite regularly, we can expect neither the worker/doctor nor the employer/hospital to have a concrete view on how the AI reaches its decision. Also, employers might essentially have little understanding about how a third party's AI completes the task, simply relying on the fact that it generally produces satisfactory results. Important to note in this regard is that ignorance is not a free pass. Contrary to workers, employers are free to decide to introduce AI tools in the workplace. As Giovanni Gaudio remarks, they '*remain free to decide whether to recur to algorithmic management tools, and are therefore responsible for this choice, from both a managerial and legal point of view, towards their workforce*' (Gaudio, forthcoming).

What makes matters worse is that AI systems are not static. The European Commission's white paper on AI is right to highlight that AI systems can be modified throughout their lifecycle (European Commission, 2020b, 14). This is not without its risks. Tesla, for example, recently recalled thousands of vehicles because an error in its full self-driving beta software could supposedly lead to the unexpected activation of the automatic emergency brake system (Alamalhodaei, 2021). What if malfunctioning is triggered by an update and occurs on the work floor? Furthermore, as mentioned

in a subsequent chapter, in anti-discrimination lawsuits, it could become even more challenging to determine whether an AI exhibited the same discriminatory patterns throughout its lifecycle, regardless of changes to algorithms or data. This ability to change must be taken into account when reflecting on transparency, accountability, and effective oversight.

To summarise:

AI-enabled tools and algorithmic management will have serious implications for the workplace. This section has stressed how:

- They will bolster the datafication of work, which has some underappreciated downsides.
- They could make work more precarious.
- They boost businesses' surveillance capabilities at and beyond the workplace, also invading workers' private lives and spaces.
- They can be used to frustrate union activities or to make it more difficult to collectively govern working conditions by shielding 'proprietary' AI from collective bargaining and consultation practices.
- They could improve workers' occupational safety and health, but only if this is a primary goal for its application. On the contrary, without sufficient safeguards, these technologies engender OSH risks.
- They can mitigate some discriminatory biases. However, unless adequate safeguards are taken, AI systems can easily slip in the opposite direction, creating discriminatory patterns of their own.
- They might achieve good results in training, reskilling and upskilling workers; yet, the quality of AI applications in this field needs to be further assessed.
- They could provoke undesirable effects for the labour market on the whole. For example, different employers can use the same AI tools in recruitment to make decisions. Having employers rely on the same – possibly flawed – personal data of workers (e.g. through electronic resumes) may raise problems under competition law. It may, moreover, make it unnecessarily complicated for some people to gain access to jobs because too many employers adopt a similar hiring approach.
- They may stimulate a paternalistic attitude in employment relations, reducing workers' autonomy.
- They raise transparency and explainability issues as well as accountability questions.
- It is challenging to maintain adequate oversight because of AI's continual updates.

4. Review of the regulatory context

4.1. Resolutions of the European Parliament

Since AI will affect many spheres of working life, having broad implications for both workers and businesses, the review of the regulatory context likewise covers many different fields of regulation. Section 4.1. first details the various resolutions adopted by the European Parliament. Section 4.2. subsequently assesses current EU legislation, including the GDPR and multiple instruments on workers' representation, OSH, working conditions and non-discrimination. Section 4.3. discusses the ongoing negotiations related to the European Commission's proposal for a Regulation laying down harmonised rules on AI. The section focuses on the interaction of this draft proposal with current EU labour and employment laws. Lastly, section 4.4. details the various other policy debates at the EU level that could impact AI governance at work.

The European Parliament has engaged in the AI-debate since 2017. In February of that year, it issued a resolution with recommendations to the Commission on Civil Law Rules on Robotics.[35] This instrument adopts '*a gradualist, pragmatic and cautious approach*' to not stifle innovation, mainly focusing on civil liability issues. It argues that robots are likely to become increasingly autonomous, taking quasi-independent decisions and interacting with their environment. Consequently, the legal responsibility for robots' harmful actions becomes crucial. In order to come up with solutions, the resolution calls on the Commission to, *inter alia*, establish an EU Agency for Robotics and Artificial Intelligence '*in order to provide the technical, ethical and regulatory expertise needed to support the relevant public actors, at both Union and Member State level, in their efforts to ensure a timely, ethical and well-informed response to the new opportunities and challenges, in particular those of a cross-border nature, arising from technological developments in robotics, such as in the transport sector*'.

Notably, the resolution's annex also contains a Code of Ethical Conduct for Robotics Engineers that stresses, for instance, the engineers' accountability for the social, environmental and human health impacts. One critique of the instrument regarded its narrow focus. Aída Ponce Del Castillo, a senior researcher at the European Trade Union Institute, argued: '*rather than trying to define robots, which can be divided into millions of sub-types depending on their functionalities, the Commission should adopt a wider approach, encompassing algorithms and AI, and take into consideration machines that have the capacity to learn, evolve and eventually become semi- or, maybe one day, fully autonomous*' (Ponce Del Castillo, 2017, 6). Additionally, also the European Parliament's mention of the possible attribution of legal personhood to robots raised concern. It could, for example, lead to owners and producers shielding themselves from legal liabilities, and it may increase the chances of the commodification of the people working alongside these types of machinery (De Stefano, 2019, 19-20). Spurred by the EP resolution, other scholars have explored the benefits and drawbacks of attributing legal personhood to AI applications (e.g. Bertolini, 2020).

In subsequent EP resolutions, the Parliament has repeatedly emphasised the importance of laying down clear ethical guidelines. This has been the case, for instance, in its resolution of 15 January 2019 on autonomous driving in European transport.[36] In its resolution of 12 February 2019 on a comprehensive European industrial policy on AI and robotics, the Parliament even asserted '*that Europe should take the lead on the global stage by deploying only ethically embedded AI*'.[37] It

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[35] *European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics, P8_TA(2017)0051.*

[36] *European Parliament resolution of 15 January 2019 on autonomous driving in European transport, P8_TA(2019)0005.*

[37] *European Parliament resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics, P8_TA(2019)0081.*

furthermore expressed great concern about the use of emotional surveillance programmes, such as those monitoring the mental conditions of workers.

On 20 October 2020, the European Parliament issued three additional AI resolutions. The first resolution offered recommendations to the Commission on a civil liability regime for AI. In it, since the majority of MEPs are convinced that the Digital Single Market needs to be fully harmonised and that regulatory fragmentation should be avoided, they firmly believe '*that the new common rules for AI-systems should only take the form of a regulation*'.[38] The second resolution of 20 October governs the intellectual property rights for the development of AI technologies.[39] The third resolution, and the most relevant one for this study, contains recommendations on a framework of ethical aspects of AI, robotics and related technologies. It advances a proposal for a Regulation on '*ethical principles for the development, deployment and use of artificial intelligence, robotics and related technologies*'.[40] This proposal considers 'employment' a high-risk sector; additionally, recruitment is considered a high-risk use or purpose of AI.

The proposal suggests conducting an impartial, objective and external risk assessment by the national supervisory authority regarding such high-risk activities. That risk assessment is meant to ensure specific characteristics. Notably, high-risk technologies are subjected to complete human oversight at any time. Furthermore, they need to be resilient, have an adequate level of security, reliability, accuracy and be easily explainable. The AI must, moreover, be set up to disclose information to developers, deployers and users, and capable of being disabled or downgraded. The processes driving these high-risk tools need to be '*documented to the highest possible and applicable standards*'. The software, algorithms, and data used or produced must also be unbiased, leading to no discrimination. The proposal also stresses that AI systems have to respect workers' rights. Importantly, it contains a right to redress for natural or legal persons suffering injury or harm in these respects. The principal pillar of the proposed Regulation seems to be that high-risk AI is subjected to a compliance assessment, after which the respective national supervisory authority might issue a 'European certificate of ethical compliance'.[41]

Overall, the Parliament's actions have not been in vain; they have arguably influenced the European Commission's AI Act (de Matos Pinto, 2021). This proposal was made in April 2021. Previously, in June 2020, the Parliament had decided to set up a special committee on Artificial Intelligence in a Digital Age (AIDA).[42] AIDA's mandate includes analysing the future impact of AI on the EU economy, particularly in areas such as employment. The AIDA rapporteur published a draft report on AI in a digital age in November 2021. It sets out the AIDA Committee's views on the Commission's proposal. At the time of writing the present study, AIDA members were preparing amendments for consideration in the Special Committee. The forthcoming chapters make use of the draft report.

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[38] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence, P9_TA(2020)0276.*

[39] *European Parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies, P9_TA(2020)0277.*

[40] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

[41] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

[42] *European Parliament decision of 18 June 2020 on setting up a special committee on artificial intelligence in a digital age, and defining its responsibilities, numerical strength and term of office, P9_TA(2020)0162.*

4.2. Current EU legislation

4.2.1. EU Primary law

Before delving into the various pieces of EU legislation relevant to the discussion of how AI could be used in workspaces, we would like first to highlight a couple of points regarding EU primary law. Most notably, the Charter of Fundamental Rights of the European Union (Charter) became legally binding on 1 December 2009. It has the same legal value as the Treaties. As such, '*[g]iven that the provisions of the Charter are primary EU law, secondary EU law, as well as national law implementing EU law, must be interpreted in the light of those provisions*' (Lenaerts, 2020, 19). Additionally, Article 52(3) of the Charter states that the meaning and scope of the fundamental rights of the Charter shall be the same as those laid down by the European Convention on Human Rights (ECHR). '*This means, in essence, that the level of protection guaranteed by the Charter may not disregard that guaranteed by the ECHR*' (*Ibid.*, 26). Based on these provisions, any assessment of how current EU legislation relates to AI at work should inherently consider EU citizens' rights under the Charter. Moreover, the European Court of Human Rights' (ECtHR) case law becomes relevant to the extent it concerns a right in the Charter that corresponds to a right in the ECHR.

4.2.2. Secondary Law. The General Data Protection Regulation

Coming to secondary law, the EU's General Data Protection Regulation is a most relevant instrument in this field. The Regulation became applicable in May 2018, and some scholars immediately deemed it to have significant implications for AI developers that wanted their tools to draw on 'personal data' (Zarsky, 2017; Wallace and Castro, 2018). Others have since argued, though, that '*[t]he GDPR can be interpreted and applied in such a way that it does not hinder beneficial application of AI to personal data, and that it does not place EU companies at a disadvantage in comparison with non-European competitors*' (Sartor, 2020, 79). The European Commission's independent High-Level Expert Group on Artificial Intelligence furthermore remarked that the GDPR's fundamental rights-based approach '*should be fostered and its enforcement should be ensured*' (High-Level Expert Group on Artificial Intelligence, 2019b, 28). The following paragraphs seem to corroborate the view that the GDPR does not excessively constrain the use of AI at work.

As recalled in the very first Recital of the GDPR, pursuant to Article 8 of the Charter, everyone has the fundamental right to the protection of personal data concerning them. Personal data must be processed fairly, for specified purposes and only based on consent or another legitimate ground. Therefore, to the extent an AI tool requires using personal data, the GDPR and Charter might impose legal safeguards. In this regard, what can be considered 'personal data' is essential. According to Article 4 of the GDPR, personal data '*means 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*'. Arguably, this is a broad definition that principally encompasses most of the information relevant for HR purposes. In many instances, HR analytics or algorithmic management seems to require the information to be connected to an identifiable person. Moreover, Recital 26 of the GDPR adds that also 'pseudonymised'[43] personal data is covered, and '*[t]o determine whether a natural person is identifiable, account should be taken of all the means reasonably likely to be used, such as singling out, either by the controller or by another person to identify the natural person directly or indirectly*'.

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[43] '*Contentious though it is, personal data, "which ha[s] undergone pseudonymisation, which could be attributed to a natural person by the use of additional information," should be considered as falling within its scope–something that is very relevant for AI applications*' (Aloisi and Gramano, 2019, 103).

This is relevant because AI systems could make it possible to surreptitiously retrieve personal information, for example, through 'data fusion'[44].

Regarding the GDPR's scope, some scholars have convincingly argued that even inferred data is 'personal data' under the Regulation (Sartor, 2020, 38 and 40; *contra* Wachter and Mittelstadt, 2019). This is also the European Parliament's viewpoint. The Parliament '*is concerned that too often companies ignore the fact that inferred data is also personal data, subject to all safeguards under the GDPR*'.[45] Consequently, for example, if an employer automatically generates an employee's 'attrition score', then the data subject's right to rectification and erasure under the GDPR would '*apply to both the 'input personal data' (the personal data used to create the profile) and the 'output data' (the profile itself or 'score' assigned to the person)*' (Article 29 Data Protection Working Party, 2018a, 18). According to researcher Christina Colclough, whether or not data subjects have control over these inferences under the GDPR is a key topic (Colclough, 2020). Overall, then, it seems the GDPR is widely applicable to AI-related interactions at work, leading to a series of legal consequences.

Firstly, data processing will only be lawful if a legal ground exists. Usually, an easily applicable legal ground is 'consent'. However, for employers wishing to deploy AI-enabled managerial tools, generally, employees' consent to data processing is not a valid legal ground. *Inter alia*, based on Recital 43 of the GDPR, the Article 29 Data Protection Working Party (WP29), which is made up of the heads of the national data protection authorities (DPAs), stated the following: '*In cases where an employer says they require consent and there is a real or potential relevant prejudice that arises from the employee not consenting (which can be highly probable in the employment context, especially when it concerns the employer tracking the behaviour of the employee over time), then the consent is not valid since it is not and cannot be freely given*' (Article 29 Data Protection Working Party, 2017, 6).[46] Since, typically, an employee cannot genuinely provide free consent, another possible legal ground could be met if the processing is '*necessary for the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract*' (Article 6(1)(b)). Yet, the existence of this legal ground depends on what can be considered as 'necessary'. No one disputes, for example, that a certain degree of managerial control is necessary for the performance of an employment contract; however, this does not make it 'necessary' to implement a series of intrusive AI-driven surveillance tech. Therefore, this legal ground cannot amount to an overall free pass – the instances when an AI system is genuinely 'necessary' will be the exception rather than the rule.

Another flexible legal ground is to show that the processing is appropriate in light of employers' 'legitimate interests' (Article 6(1)(f)). Employers may have some legitimate interests related to their payroll, diversity policies, their right to instruct the workforce, and so forth (Hendrickx, 2019b, 159). However, when relying on this legal ground, employers will have to engage in a '*test of the balance of interests, which includes a fundamental rights assessment*'.[47] They also have to assess whether the processing is necessary, fair, proportionate and transparent (Adams-Prassl, 2019, 141). This test

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[44] *'While in isolation, individual data sets dispersed across thousands of servers may provide limited information insights, this limitation can be resolved by a process known as 'data fusion,' which merges, organizes, and correlates those data points. Once data is collected, synthesized, and analyzed, third parties create sophisticated profiles of their 'data subjects' that offer a trove of useful intelligence to anyone who wants to influence or manipulate purchasing choices and other decisions' (Manheim and Kaplan, 2019, 120).*

[45] *European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.*

[46] *The Working Party adds that even in the rather exceptional case when an employee's consent is valid, because it is undoubtedly freely given, 'it needs to be a specific and informed indication of the employee's wishes' (Article 29 Data Protection Working Party, 2017a, 7).*

[47] *European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.*

would, overall, entail that if '*an application provides benefits that are outweighed by the disadvantages imposed on the data subjects, we should conclude that the application fails to have a basis according to Article 6(1)(f)*' (Sartor, 2020, 50). For instance, keystroke logging or screen capturing practices are not grounded under this test (Adams-Prassl, 2019, 141). The need for a legal ground might, in other words, provide a significant limitation to the grounded use of AI-enabled monitoring applications at work. Again, this also depends on consent not being a valid legal ground in the context of work. The other aforementioned legal grounds, such as (b) and (f), as well as ground (c), which allows processing that is necessary for compliance with a legal obligation,[48] will allow for some AI-applications to be lawfully installed; yet, the respective 'necessity tests' and 'balance of interests test' severely restrict the use of many of the most intrusive AI applications.

Crucially, the impossibility of relying on consent as a legal ground does not seem to be limited to employees only but could apply regardless of employment status.[49] For instance, also in the case of a digital labour platform and a self-employed worker, a clear imbalance exists between the data controller (platform) and the subject (worker). The same is true for the relationship between many principals and their (nominal) contractors. Hence, there might be a need for another legal ground, such as 'legitimate interests', also in these cases. Furthermore, reliance on consent at the recruitment stage could be questionable as well. Much in the same way an employee cannot freely give consent, due to the risk of negative consequences, a jobseeker may well experience similar pressure to consent to any AI-driven recruitment tool. Jobseekers have a legitimate fear of not being selected when opposing to this, or also because the only way of applying, in practice, is through that tool. To that extent, if consent is also an inconceivable legal ground for jobseekers (Kullmann, 2019, 50; Kelly-Lyth, 2021b), it does seem probable for some AI-enabled recruitment tools to pass the 'test of the balance of interests'.

Secondly, the GDPR adheres to a 'purpose limitation' principle, meaning personal data should only be collected for specified, explicit and legitimate purposes. Data is not to be processed in a manner incompatible with those initial purposes. In this sense, there seems to be a tension between this principle and big data and AI-related practices. This tension springs from '*the use of algorithms (which means the purposes may not be explicit when the data is collected), the tendency to collect all the data (which means certain data may be collected for an unspecific, imprecise or inexplicit purpose), the repurposing of data (whereby data collected to improve performance of one service may be used and re-applied to new or third party services) and the generation of new types of data (again, where it is not clear to the individual what purpose the data will be used for from the outset)*' (Butterworth, 2018, 260). Regardless of the details, one can immediately sense unbridled AI processing at work is incompatible with this principle. According to Giovanni Sartor, if personal data is being used for individualised inferences, the following criteria need to be rigorously applied to evaluate the legitimateness of repurposing data: '*(a) the distance between the new purpose and the original purpose, (b) the alignment of the new purpose with the data subjects' expectations, the nature of the data and their impact on the data subjects' interests, and (c) the safeguards adopted by the controller to ensure fair processing and prevent undue impacts*' (Sartor, 2020, 45-46).[50]

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[48] *Since employers have a duty to keep employees safe, they might be entitled to engage in processing of personal data to that end under ground (c). Yet, again, the reliance on AI tools in this pursuit should be necessary to comply with this legal obligation, which might generally not be the case.*

[49] *Notably, in its Opinion 2/2017, whenever the Working Party uses the word 'employee', it 'does not intend to restrict the scope of this term merely to persons with an employment contract recognized as such under applicable labour laws. Over the past decades, new business models served by different types of labour relationships, and in particular employment on a freelance basis, have become more commonplace. This Opinion is intended to cover all situations where there is an employment relationship, regardless of whether this relationship is based on an employment contract' (Article 29 Data Protection Working Party, 2017a, 4).*

[50] *These criteria are found in Opinion 03/2013 on purpose limitation from the Article 29 Data Protection Working Party. See also Article 6(4) GDPR.*

Besides the principle of purpose limitation, the GDPR also strives for quality data. It mentions that '*every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay*' (Article 5(1)(d)). This accuracy principle poses a challenge to AI practices because the data they run on may not always be free of errors. As such, this principle offers data subjects a ground to intervene (Article 18). Furthermore, the GDPR also sticks to a 'data minimisation' principle, implying only the necessary personal data is collected. Accordingly, it is also prohibited to keep personal data when they are no longer needed. In light of how AI operates, data minimisation might also raise some issues (Mitrou, 2019, 49-51; Gaudio, forthcoming); for example, recruitment may involve the collection of all available information on the web, covering also personal data that is irrelevant to someone's aptitude for the job (Article 29 Data Protection Working Party, 2017, 11). Likewise, if a worker is equipped with wearables, is all the potential data that these wearables generate necessary? Since it often concerns health data, there are additional guarantees, making it particularly dubious whether using these tools in HR analytics is allowable (Article 29 Data Protection Working Party, 2017, 18).

Indeed, another potential legal limitation for some AI functionalities relates to Article 9 of the GDPR. In principle, it prohibits processing sensitive personal data '*revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation*'. This general prohibition has many exemptions; for instance, sensitive data that are manifestly made public by the data subject can be used. Nonetheless, Article 9 imposes an additional barrier that needs to be considered when dealing with sensitive data despite these exemptions. This is most notably relevant for what concerns 'biometric data'[51]. In this respect, an important open question is to what extent Article 9 constrains employers from relying on a combination of proxies to infer sensitive data.[52]

Subsequently, assuming an employer lawfully engages in AI-driven processing of workers' data, meeting all the aforementioned requirements, the GDPR confers a broad range of rights to data subjects. The first notable right concerns access to information regarding the processing of the data subject's personal data (Article 15). This individual right comes on top of data controllers' obligation to provide certain forms of information as standard (Article 13, 14 and 30[53]). This 'principle of transparency' is crucial. The WP29 has given clear indications about what this principle implies. For example, data controllers should '*separately spell out in unambiguous language what the most important consequences of the processing will be: in other words, what kind of effect will the specific processing described in a privacy statement/ notice actually have on a data subject?*' (Article 29 Data Protection Working Party, 2018b, 7). In the case of automated decision-making, which an AI could drive, the articles demand '*meaningful information about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject*'. While some might want to describe this as a 'right to explanation', there nevertheless remains significant

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[51] '*biometric data*' *means personal data resulting from specific technical processing relating to the physical, physiological or behavioural characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images or dactyloscopic data'. Article 4(14) GDPR.*

[52] *'To take a pre-processing example, if an applicant's CV states that they are the trustee of a charity that supports deaf people, the CV is not 'special category data', even though the employer might infer that the applicant is deaf. Similarly, even if one can infer ethnicity or religion from a name, the name is not generally 'special category' unless it is being processed with the intention of inferring such information' (Kelly-Lyth, 2021b).*

[53] *Article 30 contains a duty for each data controller and processor employing 250 persons or more to maintain a record of processing activities containing all the information mentioned in Article 30 GDPR. Controllers and processors with less employees are in principle exempted. This is 'unless the processing it carries out is likely to result in a risk to the rights and freedoms of data subjects, the processing is not occasional, or the processing includes special categories of data'. The question is whether a 'smaller' employer that relies on AI can still be exempted from the duties in Article 30, or will generally have to comply.*

uncertainty about what information these articles precisely demand from data controllers (Turner, 2019, 329). What is clear, however, is that employers owe workers extensive insight, and, moreover, DPAs should enforce these rules if an employer refuses to comply.

In this regard, it is essential to note that access to information can be seen as an enabling right meant to buttress the effective use of other GDPR rights. Arguably, '*the data controller has to 'explain' the decision in such a way that enables the data subject to assess whether the reasons that led to a particular outcome were legitimate and lawful*' (Bayamlıoğlu, 2021; see also Kaminski and Urban, 2021, 1980). The right to access information should allow workers to effectively assert their other rights, which, in fact, might restrict the use of AI-driven recruitment or algorithmic management. First of all, data subjects have a right to rectification (Article 16). Yet, it is not easy to assert that right if workers do not know on the basis of what data the AI generates its assessments. One cannot rectify the unknown. What seems more practical is that if there is a legitimate ground, the data subject can ask to erase personal data ('right to erasure') (Article 17). That right, moreover, implicitly provides the data subject with the possibility to contest the legitimacy of ongoing data processing. Another approach in this regard is for the data subject to ask for a restriction of processing instead of erasure (Article 18). This could happen, for example, if the data controller successfully manages to oppose the subject's claim to erase the data.

Additionally, a central right for workers in relation to AI-driven tools at work is Article 21's right to object to data processing, including profiling, if that processing is based on an employer's legitimate interests. As mentioned above, 'legitimate interests' will often be a legal ground referred to by employers. Accordingly, even if the balance of interests initially allowed for the AI tool to be used in the employer's legitimate interest, the individual workers can still object on grounds relating to their particular situation. The data controller has to demonstrate compelling legitimate grounds to counter the objection. In addition, Article 22 provides for a right for the data subjects not to be subjected to automated processing alone if this processing produces legal effects concerning them or significantly affects them. More specifically, it offers data subjects a right to human intervention,[54] a right to express their points of view and a right to contest the automated decision. Its guarantees are of the utmost relevance for automated decision-making in the world of work.

Article 22 has, for example, already been invoked in cases regarding digital labour platforms, such as Uber and Ola. One notable observation about these cases is that it has been difficult for workers to prove that the platform's decision-making is truly fully automated.[55] Oftentimes, platforms can argue that a human is actually in the loop before making the decisions; hence, Article 22 would not apply.[56] This is indeed a gutting limitation on the application of Article 22. Although disputed, some have argued that any level of human intervention would entail the decision is no longer 'automated' (Todolí-Signes, 2019, 471) – this results in the fear that companies may use a dressed-up 'straw man'[57] to neutralise these rights. Moreover, in one instance in which the automated nature of the decision was not disputed, Uber's decision to automatically suspend an account in response to a 'fraud alert' was not even deemed to have significantly affected that worker, according to a decision

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[54] '*Any review must be carried out by someone who has the appropriate authority and capability to change the decision. The reviewer should undertake a thorough assessment of all the relevant data, including any additional information provided by the data subject*' (Article 29 Data Protection Working Party, 2018a, 27).

[55] *In this regard, the cases illustrate the broader imbalance between data subjects and digital giants* (Degli-Esposti and Ferrándiz, 2021, 11-12).

[56] *Rechtbank Amsterdam 11 maart 2021, Case No. ECLI:NL:RBAMS:2021:1019.*

[57] '*The controller cannot avoid the Article 22 provisions by fabricating human involvement. For example, if someone routinely applies automatically generated profiles to individua ls without any actual influence on the result, this would still be a decision based solely on automated processing. To qualify as human involvement, the controller must ensure that any oversight of the decision is meaningful, rather than just a token gesture. It should be carried out by someone who has the authority and competence to change the decision. As part of the analysis, they should consider all the relevant data*' (Article 29 Data Protection Working Party, 2018a, 20-21).

of the Tribunal of Amsterdam. The Tribunal, therefore, refused to apply Article 22,[58] a decision that seems questionable, also considering a relevant opinion of the WP29.[59] The same decision was made for the allegedly automated way in which Uber connects drivers to passengers. The Tribunal in Amsterdam stated that it is evident that the 'batched-matching system' and the 'upfront-pricing system' will have an influence on the performance of the contract between Uber and the driver; however, in the opinion of the Tribunal, the claimants had not proven these systems' legal effects or any significant consequences for the data subjects.[60] What is more, even if Article 22 did apply, according to this ruling, the platforms could still have tried to prove that the automated decision-making was 'necessary' for the performance of the contract. The (employment) contract could thus provide for a justification to engage in profiling or fully automated decision-making, further limiting Article 22's potential for workers (Hendrickx, 2019b, 168).

These three cases in which platform workers tried to rely on the GDPR to make their case about automated management are fairly illustrative of the broader interaction between the GDPR and algorithmic systems. The GDPR imposes many theoretical restrictions, and, in principle, it offers valuable rights to data subjects. Yet, ultimately, the workers in question did not manage to gain much, apart from being provided insight into their personal data and its use in certain respects (Worker Info Exchange, 2021). The rulings seem to show that the GDPR alone will not pose an unsurmountable barrier against algorithmic management. Instead, '*it is possible – and indeed likely – that the GDPR will be interpreted in such a way as to reconcile both desiderata: protecting data subjects and enabling useful applications of AI* (Sartor, 2020, 76).

This process of interpretation, which is needed because of the often vague and open formulation in the GDPR, is still in its infancy for what concerns automated decision-making and AI-induced inferences at work.[61] Although there is some degree of scepticism (Aloisi and Gramano, 2019, 108), the GDPR seems to have some potential to partially prevent the social harm related to these practices – much will, of course, depend on its interpretation.

One crucial issue is the extent to which employers will implement 'data protection by design and by default' (Article 25).[62] Likewise, it remains to be seen how thoroughly businesses conduct 'Data Protection Impact Assessments' (DPIAs) because of the high risk of their AI practices to workers' rights and freedoms (Article 35). Although DPIAs can make a critical contribution (Kaminski and Malgieri, 2021), they suffer from some complications. For example, as data controllers, employers are responsible for performing a DPIA even if they rely on recruitment software from a third-party supplier. This is problematic whenever suppliers collaborate insufficiently. Employers often lack the necessary technical expertise to make a meaningful assessment of the impact of algorithmic systems (Kelly-Lyth, 2021b). Furthermore, most importantly, the effectiveness of DPIA self-assessments will also depend on several other factors. First, unions and workers' representatives are

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[58] *Rechtbank Amsterdam 11 maart 2021, Case No. ECLI:NL:RBAMS:2021:1018.*

[59] *'It is difficult to be precise about what would be considered sufficiently significant to meet the threshold, although the following decisions could fall into this category: […] decisions that deny someone an employment opportunity or put them at a serious disadvantage' (Article 29 Data Protection Working Party, 2018a, 22).*

[60] *Rechtbank Amsterdam 11 maart 2021, Case No. ECLI:NL:RBAMS:2021:1020.*

[61] *The European Parliament 'calls on the EDPB to issue guidelines that classify different legitimate use cases of profiling according to their risks for the rights and freedoms of data subjects, along with recommendations for appropriate technical and organisational measures, and with a clear delineation of illegal-use cases; […] encourages the EDPB to clarify data processing for human resources purposes' European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.*

[62] *'This means that data controllers have to be proactive and continually assess the privacy impact of technology' (Hendrickx, 2019b, 161). For an example: (EDPB, 2020, 24).*

largely not involved in DPIAs, even though the WP29 calls upon employers to do so.[63] Second, external DPAs' degree of active involvement is essential (Article 36). These are meant to oversee this process of compulsory self-assessment and businesses' overall compliance with GDPR (e.g. on H&M, see Hamburg Commissioner for Data Protection and Freedom of Information, 2020). At present, however, the European Parliament '*[e]xpresses its concern about the uneven and sometimes non-existent enforcement of the GDPR by national DPAs more than two years after the start of its application, and therefore regrets that the enforcement situation has not substantially improved compared to the situation under Directive 95/46/EC*'.[64]

With this in mind, it remains to be seen whether the GDPR's tools can get a grip on the massive amount of semi-automated data processing that is bound to arise in the world of work. A few things are important to mention in this regard. First, the GDPR is not being utilised fully. The Parliament is convinced the DPAs are understaffed and underfinanced; it also regrets that the Member States have not made recourse to Article 80(2) of the GDPR.[65] That provision could entitle trade unions to lodge complaints and go to court without being mandated by data subjects, i.e. workers (Pato, 2019). Similarly, according to the European Economic and Social Committee, Article 88 of the GDPR '*gives Member States the option to establish more specific rules (through legislation or collective agreements) to guarantee the protection of rights and freedoms with regard to the processing of employees' personal data within the framework of employment relationships, and this provides genuine leverage that the states and social partners must use*' (EESC, 2018). So far, this advice does not seem to be followed. Article 88 of the GDPR, which foreshadows an essential role of the social partners in the governance of data collection and processing, including in the context of automated decision-making, is still massively underutilised. Furthermore, it is also important to keep thinking beyond the GDPR and privacy protections (De Stefano and Taes, 2021). Some scholars, for instance, argue in favour of an additional 'Privacy Due Diligence' requirement embedded in a human rights-based corporate responsibility scheme (Ebert, Wildhaber and Adams-Prassl, 2021).

What should also not be overlooked is how the GDPR intersects with a broader field of privacy law, made up of, among other instruments, the Council of Europe's Modernised Convention for the Protection of Individuals with Regard to the Processing of Personal Data. As noted, the GDPR's preamble explicitly references the Charter's right to data protection and right to privacy. Bearing in mind the Charter's interconnectedness with the ECHR, it is important to highlight the role of the ECtHR in, arguably, positioning privacy rights as a means to safeguard workers' autonomy. The Court's case law has firmly established the right to privacy in an employment context.[66] Along those lines, European courts seem to increasingly recognise, for example, a 'right to be let alone' in some areas of working life and a 'right to human interaction' at work (Hendrickx, 2019a). Such entitlements, flowing from the right to privacy, are fundamental to any discussion about the legitimacy of AI-supported screening and surveillance of workers and jobseekers. The ECtHR furthermore safeguards workers' ability to develop a 'social identity', providing a human rights foundation for the humanisation of work (Hendrickx, 2019b, 170-172). These developments should

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[63] 'The controller must 'seek the views of data subjects or their representatives' (Article 35(9)), 'where appropriate'. The WP29 considers that: - those views could be sought through a variety of means, depending on the context (e.g. a generic study related to the purpose and means of the processing operation, a question to the staff representatives, or usual surveys sent to the data controller's future customers) […] - if the data controller's final decision differs from the views of the data subjects, its reasons for going ahead or not should be documented' (Article 29 Data Protection Working Party, 2017b, 15).

[64] European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.

[65] European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.

[66] European Court of Human Rights 16 December 1992, Case No. 13710/88, Nimitz v. Germany; European Court of Human Rights, 5 September 2017, Case No. 61496/08, Bărbulescu v. Romania; European Court of Human Rights 28 November 2017, Case No. 70838/13, Antović and Mirković v. Montenegro.

be taken into account, for instance, to make widespread abstract discussions about ethics and AI more anchored to real-world fundamental rights. AI systems should indeed prevent harm to privacy (High-Level Expert Group on Artificial Intelligence, 2019a, 17); beyond the GDPR, other sources enshrining workers' general right to privacy can offer additional protection.

4.2.3. Transparency and worker involvement

As mentioned above, the GDPR obliges employers to share information about their data processing, and it provides workers with a right to information. In the general literature regarding the GDPR's effects on AI systems, many scholars express scepticism about the effectiveness of imposing such obligations and granting such rights (Mitrou, 2019, 53-59; Sartor, 2020, 53-56). Some have even suggested that relying on individual information rights to take control of machine learning systems may create a 'transparency fallacy' (Edwards and Veale, 2017, 67; see also Schubert and Hütt, 2019, 12).

Labour law scholars, in particular, add that the GDPR focuses on individual data subjects' rights to information. In contrast, labour and employment regulations more largely rely on collective rights and the involvement of workers' representatives, which are supposed to have more expertise (Hendrickx, 2019b, 169). In time, representatives could, for example, become more knowledgeable about how to effectively invoke the various rights on offer in the GDPR than an individual data subject could. Furthermore, unions can engage in collective bargaining to move beyond mere 'transparency' (De Stefano and Taes, 2021, 9). They could aim to establish a duty for the employer to offer practical explanations, consultations and collective bargaining regarding AI-driven systems. They could demand comprehensible answers to questions, such as how does the system work? And, who is responsible for the way it works (Floridi and Cowls, 2021, 12)? But also, importantly, should that system be allowed in the first place (De Stefano, 2020)? That collective dimension of data protection, reliant on collective actors instead of individual data subjects to make progress, is still significantly underdeveloped (Dagnino and Armaroli, 2019; Todolí-Signes, 2019).

In this regard, a poignant question is how the already existing EU legal framework on collective labour rights intersects with this finding. EU Directive 2002/14/EC establishes a general framework for informing and consulting employees in undertakings that employ at least 20 or 50 employees, depending on the EU Member State's choice. This duty to inform and consult covers any anticipatory measure that forms a threat to employment, and any decision that leads to 'substantial changes' in work organisation (Article 4(2)(c)). In certain instances, employees' representatives might have to, in other words, be informed and consulted about the implementation of new AI tools on an *ad hoc* basis. If it concerns 'substantial changes' to work organisation, then those consultations are meant to be conducted with a view of reaching an agreement (Article 4(4)(e)). More broadly, employees' representatives are also to be informed, on a regular basis, about the recent and probable developments of the undertaking's or the establishment's activities and economic situation (De Stefano, 2019, 43). The effectiveness of representatives' right to information and consultation will partially depend on how domestic legislation and courts have implemented the Directive. For example, at what point does an AI lead to 'substantial changes' to work organisation? Should the 'substantial' nature of the change even matter? For instance, in Spain, the recent 'riders law' has, more broadly, advanced a '*right of workers' representatives to be informed about the parameters, rules and instructions on which the algorithms that may have an impact on working conditions are based*' (Todolí-Signes, 2021c).

The relatively scarce attention that is being paid to Directive 2002/14/EC and its role in guiding AI implementation is quite surprising. All the more because research suggests that worker representation '*has the potential to significantly facilitate the introduction of new technologies in the workplace*', including AI (Janssen, 2021, 6; see also Autor, Mindell and Reynolds, 2020, 73; Belloc,

Burdin and Landini, 2020).[67] As such, if one of the objectives of the EU is to foster the sustainable introduction of AI in society, there is every reason to engage in a discussion on the role of unions, workers' representatives and employers' organisations in this regard. Moreover, in addition to economic considerations, participation by workers, their representatives and the social partners is also recommended from a human rights and ethical point of view (High-Level Expert Group on Artificial Intelligence, 2019b, 13; ILO Global Commission on the Future of Work, 2019, 41-42; United Nations High Commissioner for Human Rights, 2021, 16).[68] Thirdly, some argue that strong collective bargaining frameworks will make it more likely for decent jobs to arise as a result of AI (Deshpande et al., 2020, 29). Social dialogue is, in other words, also important in terms of desirable job creation.

As the European Social Partners Framework Agreement on Digitalisation from June 2020 illustrates, social partners acknowledge the benefits of AI. The document calls upon social partners at all levels to '*pro-actively explore the potential of digital technology and AI to increase the productivity of the enterprise and the well-being of the workforce, including a better allocation of tasks, augmented competence development and work capacities, the reduction of exposure to harmful working conditions.*' Similar to other policy instruments (EESC, 2017, 11; ILO Global Commission on the Future of Work, 2019, 43), the document also argues in favour of a 'human in control principle'. The European social partners furthermore refer to principles of fairness (no unfair bias and discrimination), safe deployment of AI through a risk assessment, and transparency and explicability with effective oversight. Workers affected by AI systems in HR procedures should be able to '*make a request for human intervention and/or contest the decision along with testing of the AI outcomes.*'[69] Many of these principles and requirements already have a basis in existing EU legislation.

4.2.4. Occupational safety and health

The EU Framework Agreement on Digitalisation calls for 'trustworthy AI' to be subjected to a risk assessment, '*including opportunities to improve safety and prevent harm such as for human physical integrity, psychological safety, confirmation bias or cognitive fatigue*'. As mentioned earlier, one of the great yet largely unfulfilled promises of new technologies has to do with their ability to keep workers safer and healthier. Many existing safety and health directives already attempt to ensure workplaces develop in this direction.

Notably, the Framework Directive 89/391/EEC imposes a duty upon employers '*to ensure the safety and health of workers in every aspect related to the work.*' Employers must take measures, including preventive ones, to preserve workers' safety and health, and, most importantly, they need to remain alert, adjusting the measures as necessary (Article 6(1)). Article 11 obliges employers to consult workers and/or their representatives, allowing them to engage '*on all questions relating to safety and health at work.*' The preamble of the Directive clarifies this issue:

'*employers shall be obliged to keep themselves informed of the latest advances in technology and scientific findings concerning workplace design, account being taken of the inherent dangers in their undertaking, and to inform accordingly the workers' representatives exercising participation*

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[67] '*The – rather negative – argument whereby management is supposedly investing in automation and robots to circumvent adversarial labour relations, rigid job protection or the influence of worker representatives on dismissals, is rejected by the econometric analysis. Instead, the empirical evidence points at positive mechanisms explaining the link between worker representation and investment in automation*' (Janssen, 2021, 6).

[68] The High Commissioner recommends that States and businesses ensure '*participation of all relevant stakeholders in decisions on the development, deployment and use of AI, in particular affected individuals and groups*'. The Expert Group is far more concrete. It recommends to inform and consult '*workers when developing or deploying AI, as set out in the existing texts adopted by the European institutions and the social partners. Workers (not only employees but also independent contractors) should be involved in discussions around the development, deployment or procurement of algorithmic scheduling and work distribution systems, to ensure compliance with health and safety legislation, data policy, working time legislation and work-life balance legislation. Social dialogue plays a key role to enable this.*'

[69] European Social Partners Framework Agreement on Digitalisation, June 2020.

rights under this Directive, so as to be able to guarantee a better level of protection of workers' health and safety).

Since employers are responsible for every OSH aspect related to the work, they are also in charge of preventing mental health risks (Stavroula and Aditya. 2014). As such, due to the psychosocial risks that AI tools may induce, the Framework Directive becomes very important in obliging employers to consider workers' experiences (see also the 2004 EU Framework Agreement on Work-Related Stress). Employers are effectively obliged to consider how algorithmic management might hurt their workforce's safety and (mental) health (EU-OSHA, forthcoming). At the same time, some have argued that this is not sufficient. Employers might be inclined to downplay the importance of 'invisible' software on OSH. Adopting a separate, more detailed standard that stresses what is at stake would probably incite employers to address the risks more adequately (Todolí-Signes, 2021a; Cefaliello, 2021). For example, the recent proposal of the European Commission for a Directive 'on improving working conditions in platform work' stresses the need for digital labour platforms to evaluate their algorithmic systems for OSH risks.[70]

In addition to the Framework Directive, under Directive 2009/104/EC on Work Equipment, employers must also ensure that work equipment is safe. This instrument likewise relies on consultation with workers' representatives. It contains various minimum requirements, among other things, focusing on self-propelled work equipment. Workers need to, among other things, be appropriately trained to engage with these tools. The instrument's approach, with various annexes detailing minimum requirements, is quite flexible. Adding AI-related minimum conditions could be a viable option.

Furthermore, besides keeping employers to account, EU law can also hone in on businesses that provide the tools workers use. For example, the Machinery Directive 2006/42/EC aims to ensure a high level of safety and protection for persons exposed to machinery. In an evaluation of this Directive, stakeholders mentioned that the existing instrument might insufficiently cover machinery with autonomous functions due to complex software systems (Simmonds, Brown and Rentel, 2017, 48-49). This was one reason why the European Commission advanced a proposal for a Regulation on machinery products. This proposal is mentioned in section 5.4.

4.2.5. Working conditions

As mentioned in previous chapters, AI-enabled practices at work can drive workers to the breaking point, which is one reason why OSH-related consultations are vital. An algorithm that principally aims to optimise logistics might not account for its impact on working conditions; an autonomous robot might operate at an unsustainable pace for workers who are in the same environment; an AI-driven scheduling tool may jeopardise people's work-life balance and job stability. In light of the risks, beyond OSH directives, other EU legislation aimed at protecting working conditions, such as working time, is relevant in governing AI algorithmic management at work.

For example, since robots can theoretically operate 24/7, increased robotisation may lead to increased working hours for workers that engage with such systems. On the other hand, assuming robots and AI systems are displacing labour, policymakers may decide to reduce overall working hours or increase levels of part-time work (Servoz, 2020, 99). Future developments may, in other words, have disparate consequences for working time arrangements. Working time is currently primarily governed by the Working Time Directive and Part-Time Work Directive. However, so far, the implications of AI-enabled tools and algorithmic management in these respects are still largely unmapped. For a start, it is important to monitor whether AI-related developments put significant stress on any of the rights attributed to workers in these Directives. It is not inconceivable that

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[70] *Article 7 of the proposal for a Directive of the European Parliament and of the Council on improving working conditions in platform work, 9 December 2021.*

certain problems may arise. If workers have a rest break, for instance, are those workers truly left alone by the AI systems with which they interact in the course of work? AI systems may effectively entice the worker to engage in training activities while taking a break – also through 'gamification' techniques – or could *de facto* penalise the worker for taking a break.[71] Likewise, the Working Time Directive contains annual leave entitlements for workers. Technology is frequently used to help businesses decide about holiday allocation (TUC, 2020, 21). To that extent, as the Court of Justice of the European Union (CJEU) ruled, '*an employer that does not allow a worker to exercise his right to paid annual leave must bear the consequences.*'[72] In no way should an employer be allowed to hide behind an algorithm in this respect.

Another issue that does seem to deserve some attention relates to standby time. The CJEU has had to specify when standby times ought to be considered 'working time' under the Working Time Directive.[73] The question is important because if standby time is seen as spare time instead of working time, the workers' standby time is left out of the equation for all rights under the Directive. Based on the CJEU's jurisprudence, by and large, if employers allow workers to remain standby elsewhere than at the workplace, most notably, standby at home, then whether or not this standby time should be perceived as working time depends on the extent to which the workers can meaningfully devote time to their personal interests. Judges have to look at the facts. Do those facts indicate that workers can genuinely spend time on their personal interests, regardless of remaining on standby? If not, the standby time counts as working time. The problem with this approach is that, in the future, it is not inconceivable for AI in scheduling tools to be relied upon to increasingly make sure workers' standby time should be legally classified as spare time instead of working time.

Current regulations on working time are not airtight. Considerable debates have already arisen regarding the abuse of on-call work. In that case, an agreement is signed without a clear commitment from the employer about the amount of work supplied to the worker. The recent mass adoption of ICT technologies has enabled constant connectivity between workers/jobseekers and employers/work providers (Spencer et al., 2021, 38). That digital environment enables businesses to work towards a 'just-in-time workforce', offering work as it arises (De Stefano, 2016). All of this leads to variable working hours for employees and an unstable income. One possibility could be for AI to further bolster this development and facilitate forms of 'contractual distancing', driving misclassification among remote workers (Countouris and De Stefano, 2021). Platform workers, such as food-delivery bikers, are already experiencing great uncertainty with erratic earnings (Schor et al., 2020). These platforms offer an extreme example because workers' are almost invariably classified as 'self-employed'; therefore, they are denied access to most labour protections.

Nor we should think employees are spared from algorithmically-induced employment insecurity (Kresge, 2020, 32). The relatively recent Directive (EU) 2019/1152 on transparent and predictable working conditions contains provisions to address businesses' abusive reliance on on-demand employment contracts. Article 10 grants workers with an entirely or mostly unpredictable work pattern the right to refuse a work assignment without suffering adverse consequences unless employers' on-call practices comply with that Article's preconditions. Article 11 additionally calls on the Member States to take measures to counteract the abusive use of on-demand employment

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[71] '*A video screen leaderboard system for the housekeeping staff at Disneyland hotels in Anaheim, California generated significant anxiety, embarrassment, and shame among workers, who labeled it "the electronic whip" (Lopez 2011). Seeing their performance ranked against that of coworkers on a large screen often caused some workers to skip bathroom breaks and others to become panicked about losing their jobs*' (Kim and Werbach, 2016, 166).

[72] *European Court of Justice 29 November 2017, Case No. ECLI:EU:C:2017:914, Conley King v. The Sash Window Workshop Ltd, Richard Dollar.*

[73] *European Court of Justice 21 February 2018, Case No. ECLI:EU:C:2018:82, Ville de Nivelles v. Rudy Matzak; European Court of Justice 9 March 2021, Case No. ECLI:EU:C:2021:182, D.J. v. Radiotelevizija Slovenija; European Court of Justice 9 March 2021, Case No. ECLI:EU:C:2021:183, RJ v. Stadt Offenbach am Main.*

contracts.[74] As this Directive is currently still being transposed into Member States' domestic law, it remains to be seen whether these measures will manage to constrain casual work arrangements satisfactorily.

Furthermore, as mentioned earlier in section 3.2.2., AI will probably be used to evaluate workers more continuously. That might raise some issues concerning the excessive use of fixed-term employment contracts. Employers have long used fixed-term contracts to circumvent dismissal protections provided for open-ended employment contracts. EU Directive 1999/70/EC concerning the framework agreement on fixed-term work contains provisions to prevent employers from abusively relying on successive fixed-term contracts. Although these protections have their merit, the system is far from being without limits. Once a Member State has introduced any measures to notionally limit this type of abuse, the CJEU '*does not very strictly check whether the measures are sufficiently effective and have a sufficiently deterring effect*' (van der Mei, 2020, 88). As such, if AI tools assist in generating continuous performance statistics, it might entice employers to maximally avail themselves of the possibility of using fixed-term contracts. Rather recently, Article 12 of the Transparent and Predictable Working Conditions Directive has provided workers with a right to request a form of employment with more predictable and secure working conditions. However, since the employer has only to provide a reasoned written reply to such a request, it is unclear whether this provision will make any real difference.

On an entirely different note, whereas some workers may wonder why an algorithmic system does not grant them any work or fear that they will not receive a successive fixed-term contract, other employees might feel overwhelmed by the never-ending workstream. The COVID-19 pandemic has made many aware of this risk, as surveys show how teleworkers' working hours increased, causing them to work during their free time (Eurofound, 2021, 4). In this respect, the 2002 EU Framework Agreement on Telework says very little about teleworkers' risk of 'work overload'. Teleworkers are, in principle, asked to manage the organisation of their working time. The agreement also states that teleworkers' workload and performance standards should be the same as those of comparable workers at the employer's premises (Section 9). Yet, this does not seem to offer much effective protection in practice.

Therefore, the 2020 EU Framework Agreement on Digitalisation describes the modalities of disconnection, calling for '*a culture that avoids out of hours contact*' and a clear understanding that '*the worker is not obliged to be contactable*' outside working hours.[75] In a similar vein, the European Parliament 2021 with recommendations to the Commission on the right to disconnect.[76] Importantly, this right is not just relevant for teleworkers. Recital 16 points out that the right to disconnect '*allows workers to refrain from engaging in work-related tasks, activities and electronic communication, such as phone calls, emails and other messages, outside their working time, including during rest periods, official and annual holidays maternity, paternity and parental leave, and other types of leave, without facing any adverse consequences*'. Based on this description, the right might just as well provide regular office workers with an opportunity for redress if their employer's app continues to push notifications after working hours. Such a right to disconnect might also mark a clear boundary that cannot be overlooked when designing work-related AI. Most notably, Portugal has recently adopted new rules that oblige employers to refrain from contacting employees outside of working hours, except in situations of force majeure. Violating this duty may lead to administrative penalties (Bateman, 2021).

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[74] One possibility is '*a rebuttable presumption of the existence of an employment contract with a minimum amount of paid hours based on the average hours worked during a given period*' (Article 11).

[75] European Social Partners Framework Agreement on Digitalisation, June 2020.

[76] European Parliament resolution of 21 January 2021 with recommendations to the Commission on the right to disconnect, P9_TA(2021)0021.

Finally, regarding the enforcement of existing labour rights, Directive (EU) 2019/1937 on the protection of whistle-blowers should also be highlighted. In its resolution of 20 October 2020, the European Parliament proposed to amend the Directive to ensure whistle-blowers are protected when reporting on breaches of Union law concerning the '*development, deployment and use of artificial intelligence, robotics and related technologies*'.[77] This idea has also been mentioned in others' policy documents (FLI, 2021). Considering how AI developers are most aware of AI's ins and outs, it would make sense to confer protection to them as whistle-blowers. This might be an essential pathway to discover illegal or undesirable practices. Along those lines, it is also worth asking if this protection should also extend beyond developers, covering, for example, consultants that 'deploy' it at the client's enterprise.

4.2.6. Anti-discrimination

The ways algorithms and AI may impact biases and discrimination has received widespread coverage in the general literature on AI and EU non-discrimination law (Borgesius, 2020; Xenidis and Senden, 2020). Some studies have explicitly focused on potential algorithmic discrimination in recruitment or at the workplace more generally.

At the EU level, there is a significant number of non-discrimination instruments. Secondary legislation is, moreover, overarched by primary provisions like Article 21 of the Charter stating that any discrimination based on any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited.[78] This article could serve as an umbrella provision contributing to improved coherence between the separate directives (Ward, 2018).

Looking at the various directives, first and foremost, Council Directive 2000/78/EC of 27 November 2000 establishes a general framework for equal treatment in employment and occupation. It covers discrimination on the grounds of religion, belief, disability, age and sexual orientation. Additionally, Directive 2000/43/EC advanced a framework for combatting discrimination on racial and ethnic origin. Directive 2006/54/EC, subsequently, addressed gender discrimination in matters of employment and occupation. The latter has been supplemented by Directive 2010/41/EU, covering equal treatment between men and women engaged in an activity in a self-employed capacity.

This body of EU non-discrimination law has a relatively broad scope. This entails it does cover many of the AI applications at work, albeit with one caveat. Regarding self-employed workers, some scholars warn: '*it seems the* [directives'] *protection is limited to rights of access to a profession or activity, not equal treatment once access has been obtained (i.e. during the exercise of the activity)*' (Barnard and Blackham, 2018, 206). This implies, for instance, that self-employed platform workers will face an uphill battle when seeking protections against platform users' discriminatory treatment. Unless it concerns false or dependent self-employed workers, EU equality law, as such, arguably provides independent contractors with fairly marginal protections (Kullmann, 2018).

Coming to the operation of EU anti-discrimination legislation, one of its essential elements is the irrelevance of intent. It does not matter whether the AI programmers intended to engage in disparate treatment. Once an algorithmic model uses protected grounds directly as variables or through proxies, the operation may constitute discrimination, regardless of anyone's intentions

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[77] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

[78] *Article 3 of the Treaty on European Union explicitly states the Union shall combat social exclusion and discrimination. Similarly, the Treaty on the Functioning of the European Union stresses that the Union shall aim to combat discrimination in defining and implementing its policies and activities (Article 10), and contains various articles with more specific instructions, such as on the principle of equal pay for male and female workers (Article 157).*

(Xenidis and Senden, 2020). That itself is helpful for claimants. For example, a Court in Bologna ruled that 'Frank', the algorithm used by Deliveroo, indirectly discriminated against some couriers who cancelled their shifts within 24 hours prior to these shifts.[79] The reason underlying the courier's cancellation was irrelevant from Deliveroo's point of view; the ranking of all workers who cancel too late is lowered. Hence, if couriers cancelled because they were sick or undertook collective action, they would be treated exactly the same as persons who cancelled for no justifiable reason. In this regard, even if Deliveroo may not have intended for this process to have these indirectly discriminatory effects, the Court nonetheless ruled in favour of the claimants, who were supported by Cgil, the most representative Italian labour union (Aloisi and De Stefano, 2021b).

Along these lines, mobilising the legislation in court seems feasible yet far from easy. The following paragraphs briefly discuss why this appears to be the case. Notably, non-discrimination laws make a distinction between direct and indirect discrimination. In the case of the former, one group of workers is treated less favourably than another in a comparable situation based on a discriminatory ground, such as age, race or disability. Indirect discrimination instead requires an apparently neutral provision, criterion or practice that puts persons having any protected feature at a particular disadvantage compared with other persons.[80]

Sandra Wachter et al. raise a first legitimate point of concern. Arguably, the most significant pathway to enforce non-discrimination law in the EU is through individuals that file a claim in court. However, as they point out, '[c]ompared to traditional forms of discrimination, automated discrimination is more abstract and unintuitive, subtle, and intangible' (Wachter, Mittelstadt and Russell, 2021, 5). This is likely to affect jobseekers' and workers' propensity to take a case to court because they have to first sense injustice before taking action. Subsequently, assuming individuals' do for some reason suspect discriminatory practices to occur, they have to prove at least *prima facie* discrimination, i.e. facts such as a statistical disparity from which it may be presumed that there has been discrimination (Gaudio, forthcoming).

That means claimants need to produce enough facts before the burden of proof shifts, after which the defendant has to show the processing happens based on objective factors unrelated to any form of discrimination. In this respect, even if the GDPR's right of access to information and the 'right to an explanation' in case of automated decision-making may allow data subjects to gain relevant information (Todolí-Signes, 2019, 478), it might nevertheless remain challenging to establish enough *prima facie* evidence showing there is a disadvantage (Kelly-Lyth, 2021b). For example, noticing that a manager discriminates against pregnant women is one thing, figuring out whether AI-driven tech can be used to predict the likelihood that someone becomes pregnant in the near future – and that this info is, in fact, used in employment-related decisions – is something else (HBS Digital Initiative, 2021).[81]

Nonetheless, the *prima facie* threshold is crucial to force those in possession of the AI – and who are supposed to understand how it works, already a far-fetched assumption in most cases – to come

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[79] *Tribunale Ordinario di Bologna 31 dicembre 2020, Case No. 2949/2019.*

[80] *A classic example is an employer's policy that prohibits the wearing of political, philosophical or religious signs in a general and undifferentiated way, or a policy that precludes any head covering, but most significantly impacts Muslim women who want to wear a headscarf (Howard, 2021).*

[81] *'To give a hypothetical example: an organisation could discriminate against pregnant women, while that discrimination would be difficult to discover. The US retail store Target reportedly constructed a "pregnancy prediction" score, based on around 25 products, by analysing the shopping behaviour of customers. If a woman buys some of those products, Target can predict with reasonable accuracy that she is pregnant. Target wanted to reach people with advertising during moments in life when they are more likely to change their shopping habits. Therefore, Target wanted to know when female customers were going to give birth. "We knew that if we could identify them in their second trimester, there's a good chance we could capture them for years". Target used the prediction for targeted marketing, but an organisation could also use such a prediction for discrimination' (Borgesius, 2018, 22-23).*

forward with far more detailed evidence (Gaudio, forthcoming). In this respect, building on the CJEU's reasoning in *Danfoss*,[82] it is crucial to explore the extent to which the AI user's unwillingness to provide the claimant with the information necessary to build a non-discrimination lawsuit could suffice to shift the burden of proof to the defendant (Allen, 2020, 18). The effectiveness of individual court cases in this area would indeed seem to largely hinge on how easily the burden of proof is shifted.

Additionally, policymakers should also think about other methods than simply relying on individual plaintiffs to halt potentially discriminatory AI (Wachter, Mittelstadt and Russell, 2021). An important point of reference in this respect is the GDPR's DPIAs, which tend to be obligatory in relation to AI at work. Such assessments look at the risks to the rights and freedoms of data subjects, including the risk of discrimination. They could develop into a tool offering the necessary transparency (Kelly-Lyth, 2021b). Another option is to create the capacity needed to issue certifications (Schubert and Hütt, 2019), or engage in algorithmic audits (Engler, 2021). Audits can serve various ends (Vecchione, Barocas and Levy, 2021; Ajunwa, 2021). For instance, the auditing system could be set to analyse an employer's practices in response to a credible complaint, e.g. a whistle-blower. Still, it may just as well serve as an official form of certification or become mandatory once an AI tool reaches a critical mass of users.

Apart from these general – 'structural' – issues, there are also more specific ones. People with disabilities, for example, can expect reasonable adjustments to be made during in-person interviews; yet, it remains unclear how AI tools will be programmed to follow suit (CDEI, 2020). This is a significant issue also in light of Article 26 of the Charter.[83] Another specific legal question highlighted by Miriam Kullmann and others relates to protecting undisclosed know-how and trade secrets. The algorithmic systems and AI used in HR management are probably covered under Directive (EU) 2016/943 as a protected trade secret. Therefore, on the one hand, a demand to disclose the entire algorithmic system could meet obstacles of this nature; on the other hand, given how difficult it already is to prove algorithmic discrimination, the relevant laws should arguably not further complicate this task. It remains to be seen how this balance will be struck (e.g. ICO and The Alan Turing Institute, 2020).

Moreover, there are also hurdles of a more practical nature. As discussed above, some AI systems are not inert; they continue to change. This could potentially lead to discriminatory outcomes during specific periods and not at other times. For this reason, it is essential to maintain detailed documentation indicating how the algorithms have developed over time (Kullmann, 2019, 52-53).

4.3. Ongoing negotiations related to the AI Act

Alongside the European Parliament's initiatives (section 4.1.), the European Commission has also been engaged in the AI debate by developing an AI strategy.[84] These efforts led to an AI package published in April 2021. The centre piece of this package is the proposal for an AI Act. The purpose of this Act, as explained in Recital 1 of the draft, '*is to improve the functioning of the internal market by laying down a uniform legal framework in particular for the development, marketing and use of*

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[82] '*Directive 75/117 on equal pay for men and women must be interpreted as meaning that where an undertaking applies a system of pay which is totally lacking in transparency, it is for the employer to prove that his practice in the matter of wages is not discriminatory, if a female worker establishes, in relation to a relatively large number of employees, that the average pay for women is less than that for men.*' European Court of Justice 17 October 1989, Case No. ECLI:EU:C:1989:383, Handels- og Kontorfunktionærernes Forbund I Danmark v. Dansk Arbejdsgiverforening, acting on behalf of Danfoss.

[83] '*The Union recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community.*'

[84] *European Commission, Communication from the Commission: Artificial Intelligence for Europe, European Union, 2018.*

artificial intelligence in conformity with Union values. This Regulation pursues a number of overriding reasons of public interest, such as a high level of protection of health, safety and fundamental rights, and it ensures the free movement of AI-based goods and services cross-border, thus preventing Member States from imposing restrictions on the development, marketing and use of AI systems, unless explicitly authorised by this Regulation.'

Since the previous chapters have covered many relevant EU laws, it is evident that the AI Act does not arise in a legal vacuum. Instead, there are already various ways in which AI is subjected to regulations, including many work-related instruments. Furthermore, although not covered above, laws and regulations at the domestic level also govern how new technologies have to be introduced and used at the workplace (De Stefano and Taes, 2021). These domestic instruments provide employee representatives with rights to consultation, or, quite often, they even provide a right to co-determination (Moore, 2020, 87-88 and 93-94; see also Aloisi and Gramano, 2019). Drawing inspiration from this type of regulation, some consider it essential to create '*a new right for all workers to have reasonable 'involvement' in the design and deployment of algorithmic systems*' (All-Party Parliamentary Group on the Future of Work, 2021, 15).

Compared to these regulatory frameworks that aim to safeguard workers' health and safety, privacy, personal data and voice at work in general, the AI Act is arguably somewhat narrow. It advances a legal framework for 'trustworthy AI'. The reasoning is as follows: if AI is trusted because the risks associated with its uses are addressed, its uptake is promoted. The overarching goal is, therefore, to stimulate the uptake and spread of AI in the EU. As part of this endeavour, the Commission aims to create a single market for 'lawful, safe and trustworthy AI', countering market fragmentation. The proposal's explanatory memorandum expresses this so: '*an emerging patchwork of potentially divergent national rules will hamper the seamless circulation of products and services related to AI systems across the EU and will be ineffective in ensuring the safety and protection of fundamental rights and Union values across the different Member States.*'

The proposal's goals are reflected in its primary legal basis. Article 114 of the Treaty on the Functioning of the European Union is used to harmonise or approximate the EU Member States' laws so as to establish or ensure the functioning of the internal market (see for a detailed analysis, Adams-Prassl and Veale, forthcoming). Once a harmonisation measure like this is adopted, a Member State can notify the Commission that the country deems it necessary to maintain national provisions relating to the protection of the working environment. If this happens, the Commission must approve or reject the national provisions involved. This decision is made after verifying whether or not the provisions are a means of arbitrary discrimination or a disguised restriction on trade between the Member States, and whether or not they would constitute an obstacle to the functioning of the internal market. In practice, the Regulation will, in most cases, function as a 'ceiling' instead of a 'floor' for labour and employment protection (De Stefano and Taes, 2021).

Therefore, bearing in mind that the AI Act may undercut national provisions relating to the protection of the working environment, it is not surprising trade unions are concerned (ETUC, 2021). As previous chapters have scoped out, AI will likely permeate the world of work in various ways. It might feature in work tools and HR management systems; in time, it could practically be integrated into most objects workers interact with at work. The proposal's idea is for AI in employment contexts to be self-evaluated by its providers first, guaranteeing it is trustworthy. Once this happens, it should be given almost free rein. Ultimately, with very few exceptions, the proposal assumes the use of AI tools is to be fostered, and its implementation in the world of work is seen as desirable. The problem with this assumption is that, as this report discussed at length, even from a fundamental-rights perspective, there are many instances in which AI's functioning is far from desirable. For example, Jennifer Cobbe and Jatinder Singh, computer scientists at the University of Cambridge, '*echo assertions that introducing AI into video surveillance and other digital information-gathering infrastructure alters power dynamics in favour of those controlling previously 'dumb' systems, requiring reconsideration of how to retain an appropriate balance of societal interests and*

*fundamental rights and potentially limiting the expansion of digital infrastructure that might otherwise seem appropriate*¹ (Cobbe and Singh, 2021, 24). The risk is that the proposed AI Act will gut any regulatory or collective-based attempt to provide a counterweight, opening the door to the 'Amazonian Era' described in section 3.2.3.

This is because, first of all, the Act's definition of an AI system aims to be technology-neutral and future proof, leading to a broad description (Kelly-Lyth, 2021a, 3; Veale and Borgesius, 2021). It encompasses any software that is developed with a technique or approach listed in annex I, pursues human-defined objectives, and generates outputs, such as content, predictions, recommendations, or decisions, influencing the environments the system interacts with, be it in a physical or digital dimension (Recital 6 and Article 3(1)). One could rightly wonder whether this covers about every computer program (Ebers et al., 2021, 590). As the Recital clarifies, AI can function on a stand-alone basis or be integrated into a larger product. In this sense, since AI is projected to 'quite possibly' become a general-purpose technology along the lines of steam, electricity and ICT (Crafts, 2021), it might become a dominant component in any product. Coupled with the effects of the legal harmonisation basis discussed above, the broad description of AI combined with its potential future omnipresence, therefore, risks severely restricting worker voice regarding the future use of all technologies at work.

Additionally, as noted, the AI Act favours the introduction and use of AI. In contrast, although workers and their representatives are not principally always opposed to AI (*supra* section 4.2.3.), the general sense is that they lack adequate legal tools to offset its risks. The AI Act is purported to be of help in this regard by, for example, banning specific AI practices and evaluating high-risk systems; however, some fear the AI Act's bar was set too low and that the 'ceiling' effect mentioned above will not allow countering this.

It thus remains essential to 'break the ceiling'. There are various reasons why. Overall, since the AI Act wants people to trust AI, it probably does not want to become scolded for its potential deregulatory effect. That would seem antithetical. In its current state, the draft AI Act legitimises the introduction of AI at work. To the extent AI systems comply with the applicable conditions under the Act, the systems will be allowed to enter the market without, in principle, having to fulfil additional requirements determined by domestic laws and collective bargaining agreements. In this regard, as current domestic laws and collective bargaining agreements may impose more stringent constraints than the AI Act, all such nationally determined constraints may come under scrutiny, also because of the 'liberalising' legal basis of this Act.

For example, the Belgian national collective bargaining agreement no. 81 clarifies that there are only four limited reasons why an employer may monitor workers' online communications. Furthermore, it attaches great importance to the principle of proportionality, meaning that the employer should proceed in such way as to not impinge in the worker's privacy. If the e-monitoring does result in an intrusion into privacy, this intrusion must be kept to a minimum.

Similar to this country example, other EU Member States have other laws and regulations that constrain the employers' ability to intrude on the privacy of workers in the digital realm and to introduce technology to monitor them. If the AI Act allows for AI software to perform e-monitoring, the question is what room this type of domestic legislation will continue to have. We could end up in a situation where employers that do not use AI are not allowed to read any e-mails of the workers because, unless there are clear indications of malicious activity, this is a disproportionate intrusion into their privacy; however, employers that do use AI may be allowed to continuously screen employees' e-mails towards certain ends, as the AI system complies with all conditions prescribed by the AI Act, and, hence, the domestic laws in place ought not to constrain the AI system's operation any further.

Also, building on this example, most notably, the AI Act claims to be without prejudice to the GDPR and even to complement that instrument. As discussed, Article 88 of the GDPR explicitly allows the Member States to provide more specific rules to protect the rights and freedoms regarding the processing of workers' personal data in the employment context. The lack of any similar provision in the AI Act, allowing Member States to take additional measures to guarantee trustworthy AI in the workplace, seems to be at odds with the GDPR's approach. Along those lines, what if a Member State wants to make use of Article 88 but discovers that the AI Act severely limits the Member State's options in as far as an AI is involved (Aloisi and De Stefano, 2021c)? The interaction between the GDPR and the AI Act certainly deserves additional care, as also mentioned by the European Data Protection Board (Bergholm, 2021; EDPB and EDPS, 2021).[85]

On a more general note, another reason to break the regulatory ceiling is advanced by Frederik Borgesius. He remarks that, in the past, '[t]o mitigate problems caused by the industrial revolution, we needed different laws for work safety, consumer protection, the environment, etc. In different sectors, the risks are different, and different norms and values are at stake' (Borgesius, 2020). This sectoral approach has also been emphasised in, for instance, the discussions related to civil liabilities for AI-induced harm (Bertolini, 2020).[86] According to Borgesius and Bertolini, we might want more sector-specific rules for algorithmic decision-making and AI. This, however, is not the approach of the AI Act, which seems to take a somewhat universalistic top-down course. The proposal does identify high-risk areas for AI systems. Yet, it does not make further differentiations, meaning a high-risk AI system in education is treated quite similar to a high-risk AI system in workers' management. Most importantly, it seemingly discourages other regulators from acting upon sectoral concerns. As such, the Act risks overgeneralising its regulatory solutions, neglecting to deal with particularities that are at stake in different sectors.

The low level of protection the AI Act provides is also problematic. Along those lines, although the Act attempts to somewhat resemble the GDPR by drawing on a fundamental rights narrative, it seems much less focused on protecting citizens' rights, including workers' rights, than the GDPR (de Matos Pinto, 2021).

Specifically, some observers argue that the list of unacceptable risks, hence determining what AI practices are prohibited, is too narrow (AlgorithmWatch, 2021, 9; Biber, 2021). The same critique could be made when reflecting on the field of work. For what concerns this context, Article 5 of the draft AI Act prohibits, most notably, AI systems that deploy '*subliminal techniques beyond a person's consciousness in order to materially distort a person's behaviour in a manner that causes or is likely to cause that person or another person physical or psychological harm*'. An example given by an Officer of the European Commission is of an AI intent on finding the perfect frequency to create an inaudible sound that pushes truck drivers to drive longer than healthy (Veale and Borgesius, 2021). Scholars have highlighted how this example is highly improbable, and in any case, unlawful (Kelly-Lyth, 2021a, 4). Indeed, the question should be whether there are no other, less

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[85] *The European Parliament made some relevant comments in its resolution regarding the evaluation of the GDPR. It regrets 'that the Commission itself does not always have a consistent approach to data protection in legislative proposals; stresses that a reference to the application of the GDPR, or 'without prejudice to the GDPR', does not automatically make a proposal GDPR compliant; calls on the Commission to consult the European Data Protection Supervisor (EDPS) and the EDPB where there is an impact on the protection of individuals' rights and freedoms with regard to the processing of personal data following the adoption of proposals for a legislative act; calls further on the Commission, when preparing proposals or recommendations, to endeavour to consult the EDPS, in order to ensure consistency of data protection rules throughout the Union, and to always conduct an impact assessment'. European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.*

[86] *'AI is pervasive and will be used in diverse fields – such as consultancy, consumer products and services, mobility, online connectivity, energy production and distribution, police and justice administration –, where EU and MS liability rules are already sector-specific. The advent of AI does not justify a shift towards a universal regulatory approach' (Bertolini, 2020, 122).*

hideous AI applications that likewise deserve to be prohibited. For example, algorithmic work surveillance is bound to become highly problematic if left unchecked. AI can likely enable its most invasive forms, as it allows compiling and analysing all the data to provide unprecedented levels of insight. To that extent, some have called to outlaw practices in which AI is used to create a surveillance 'panopticon'[87] (Ponce Del Castillo, 2021, 8). Indeed, as mentioned above, there are certain aspects of modern work surveillance that deserve a very critical stance. In particular, the use of AI to assess the emotional state of workers – and people in general – is a contender to make it to the list of unacceptable risks (Crawford et al., 2019, 50-51; EDPB and EDPS, 2021, 12).[88] The same could be said, for instance, for facial recognition technologies (Bernhardt, Kresge and Suleiman, 2021, 22), or biometric identification systems (Ebers et al., 2021, 592-593). Among other reasons, this seems appropriate because these practices can hypercharge worker surveillance.

Moving on from the unacceptable risks, we should highlight that 'employment, workers management and access to self-employment' is considered a high-risk area (De Stefano and Taes, 2021). Annexe III more specifically points to high-risk '*AI systems intended to be used for recruitment or selection of natural persons, notably for advertising vacancies, screening or filtering applications, evaluating candidates in the course of interviews or tests*', and to high-risk '*AI intended to be used for making decisions on promotion and termination of work-related contractual relationships, for task allocation and for monitoring and evaluating performance and behavior of persons in such relationships*' (Kelly-Lyth, 2021a). These systems need to fulfil the requirements of chapter 2 of the proposal. This entails providers, i.e. the ones that develop AI systems or have them developed to place them on the market, must establish and maintain a risk management system, which, among other things, performs regular analysis of known and foreseeable risks (Article 9). The chapter also makes demands regarding the data used to train models, the technical documentation needed, the record-keeping, the transparency of the system, the level of human oversight and the accuracy, robustness and cybersecurity of the system (Articles 10-15). Ultimately, it is the responsibility of the provider of a high-risk system to engage in self-assessment, verifying whether all of the requirements are met (Article 16). Some have remarked that since it is likely for this list of high-risk areas not to be entirely satisfactory, a light version of self-assessments would also be appropriate for systems that, so far, are not classified high risk but could arguably qualify for this classification (AlgorithmWatch, 2021, 4).

Regardless of this discussion about how to delineate what is high-risk, in practice, what is likely to happen is that in the years to come, the European Standardisation Organisations will draft harmonised standards, which transpose the AI Act's minimum requirements for high-risk systems into more technical provisions (see Nativi and De Nigris, 2021). When providers follow these standards, something they can voluntarily opt for, they will enjoy a presumption of conformity, severely restricting their risks under the AI Act. If they do not, they will have to self-assess their high-risk AI system themselves; therefore, it might be the case that harmonised technical standards, instead of the AI Act itself, will end up playing a very significant role. This fact is not without controversy. As Michael Veale and Frederik Borgesius highlight, '*the Commission's long practice of privately outsourcing complex negotiations* [to standardisation organisations] *has been controversial for years. The Draft AI Act may trigger more attention to this constitutional problem*' (Veale and Borgesius, 2021; see also Ebers et al., 2021, 594-595).

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[87] *On the concept, see: (Manokha, 2018).*

[88] *'Expresses great concern about the employment of AI applications, including facial and voice recognition, in 'emotional surveillance' programmes, i.e. monitoring the mental conditions of workers and citizens in order to increase productivity and preserve social stability, sometimes coupled with 'social credit' systems, as already seen in China, for instance; stresses that such programmes are inherently at odds with European values and norms protecting the rights and freedoms of individuals'. European Parliament resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics, P8_TA(2019)0081.*

Leaving aside the question about the desirability of technical standardisation driving the field of AI, more broadly, commentators contend that these internal 'conformity assessment procedures' for high-risk systems are insufficient (AlgorithmWatch, 2021, 5; Biber, 2021; EDPB and EDPS, 2021, 12-13; Ebers et al., 2021, 595; Kop, 2021, 8). Likewise, scholars who focus on the potential impact of AI at work observe that self-assessment could easily become a rubber stamp (Kelly-Lyth, 2021a, 7; Ponce Del Castillo, 2021, 5). Many would prefer to see an external *ex-ante* assessment by third parties in this respect. Unfortunately, the chances of this happening seem rather slim. For example, the draft report of the Parliament's AIDA Committee mentions:

> '*that obligatory ex ante risk self-assessments, comparable with CE markings or data protection impact assessments, combined with market surveillance based on clear rules and standards, and complemented with ex post enforcement for high-risk AI systems, seem to be a sufficiently robust governance approach for AI; warns that overly burdensome conformity assessment obligations could create significant burdens that make the business models of AI developers and companies economically unviable*' (AIDA, 2021b).

As such, since external control is likely to remain relatively limited, it would be crucial to ensure self-assessment does not descend into empty formalities. This risk manifests itself along at least two lines. First, as mentioned above, self-assessments may not be implemented seriously enough, resulting in a convenient way to present high-risk AI systems as trustworthy. Accordingly, there might be a need for adequate *ex-post* procedures in this respect to ensure compliance by providers.[89] Second, Article 14 demands human oversight, something relevant also in employment-related AI systems. In this respect, it is also worth noting that the AI Act references the very real risk of 'automation bias' (Todolí-Signes, 2021a), implying that people are inclined not to override the suggestions made by an algorithm. However, despite this awareness, it is uncertain whether the Act provides enough safeguards to establish effective human oversight. Martin Ebers and others stress, for instance, that Article 14 demands for the watchers to '*fully understand the capacities and limitations of the high-risk AI system and be able to duly monitor its operation, so that signs of anomalies, dysfunctions and unexpected performance can be detected and addressed as soon as possible*'; that requirement is simply not realistic in their opinion (Ebers et al., 2021, 596).

To that extent, it seems opportune to revisit the question of how human oversight can be effectively and realistically ensured. Workers' representatives, for example, often enjoy particular dismissal protections because their function at the enterprise demands additional safeguards to ensure they can properly fulfil their job. In a similar vein, workers performing human oversight might need an appropriate legal status to perform their function within the enterprise without constraint and fear of retaliation if they decide to deviate from the course of action suggested by AI systems. Such a status would also make it relatively easy to provide them with specific rights to training. In this regard, a draft of the EU Act, that was leaked to the press days before its official release, provided that people in charge of human oversight were to be put in the position, among other things, to '*decide not to use the high-risk AI system or its outputs in any particular situation without any reason to fear negative consequences*.' Commenting on the draft, one of us argued that it was problematic that it did not explicitly mention the need to provide managers and supervisors with the specialised training and powers to counter the specific implications of the use of these systems in the context of work (De Stefano, 2021a). He also stated that, without explicit workplace protection, this provision might not adequately prevent disciplinary actions from employers. The final proposal for the AI Act, however, does not even mention anymore the need to attenuate the fear of negative consequences

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[89] '*As only those with obligations under the Draft AI Act can challenge regulators' decisions, rather than those whose fundamental rights deployed AI systems affect, the Draft AI Act lacks a bottom-up force to hold regulators to account for weak enforcement. Data protection law where affected groups can raise complaints is already characterised by inaction and paralysis. Enforcement of the Draft AI Act therefore seems likely to play out in an even more lacklustre way than it has with the GDPR to date*' (Veale and Borgesius, 2021).

for the human supervisors who reverse or disregard the outputs of high-risk AI systems. Certainly, this does not seem enough to ensure effective human oversight in the context of work.

Another crucial issue is the lack of involvement by social partners in the decisions made in the framework of this Act. For instance, some argue that revising the list of high-risk systems and setting technical standards at the European Standardisation Organisations should involve the public (Ebers et al., 2021, 593-595), including the social partners (ETUC, 2021). Another critical remark is that the Act does not provide those subjected to AI who feel they have suffered harm with any possibility of claiming redress (Ponce Del Castillo, 2021, 6; Veale and Borgesius 2021; AlgorithmWatch, 2021, 8).[90] This lack of individual rights has been highlighted as one of the most critical elements of the Act (Ebers et al., 2021, 600). Furthermore, contrary to the GDPR, the Act does not provide individuals with significant access to personally relevant information (Kelly-Lyth, 2021a, 7-8).[91] Only the users are given information, which would mean employers in the context of work.

Additionally, there are some criticalities in how the self-employed are included in the provision of Annex III concerning AI systems used at work. As discussed above, the provision mentions 'Employment, workers management and access to self-employment'. It then lists two types of relevant instruments: under letter a), systems used in recruitment; under letter b), systems used to, broadly speaking, manage people in 'work-related contractual relationships' and monitor and evaluate their performance. While it is undoubtedly positive that the self-employed are included in the protection of the AI Act, it should not be underestimated that some of the AI-enabled management tools may come at odds with genuine forms of self-employment. In fact, self-employment is not compatible with intrusive and detailed monitoring of the work performance, which becomes possible when powered by AI. A business's reliance on constant tracking of workers' movement, strict monitoring of the work pace, and tech-enabled control of messaging, browsing activity and use of computers contrasts with a worker's self-employed status, especially when an AI is used to combine information deduced from these features. Even if all the measures were taken to comply with the AI Act and workers' fundamental rights, these systems, if put in place to monitor the self-employed, may ground the reclassification of the working relationship into one of employment. It is essential, therefore, to specifically clarify that the fact that a management system is allowable under the AI Act does not prevent that the use of this system in relation to self-employed persons could lead to the reclassification of those persons under the existing standards used to determine an employment relationship.

Lastly, in principle, the users have few obligations under the current AI Act; in essence, they have to follow the instruction manual handed by the provider of the AI system (Veale and Borgesius, 2021). Users, such as employers, may, however, become considered providers, hence subjected to the corresponding obligations, if they modify the intended purpose of a high-risk AI system or make a substantial modification. This shift in obligations might raise some issues, though, because '*users of general-purpose AI-as-a-Service APIs, designed to be repurposed, changed and configured, may find themselves with conformity assessment obligations without the capacity or expertise to carry them out*' (Veale and Borgesius, 2021). To make matters even more complicated, the users of an AI system – the employers in the world of work – are already seen as the data controllers under the GDPR, meaning they have to conduct DPIAs. Likewise, they might have to perform a risk assessment under OSH regulations. However, under the AI Act, it is the provider, not the user, that would have to perform the assessment unless this obligation shifts because the user makes substantial changes to the AI. Since these obligations, deriving from the GDPR – OSH laws and AI Act, misalign, some suggest making the users responsible for the conformity assessment under the AI Act (Ebers et al.,

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[90] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

[91] *'In this regard, we recommend that the AIA should be amended to include an obligation to explain AI-based predictions or decisions to the affected persons in order to safeguard the rights and freedoms of individuals' (Ebers et al., 2021, 596).*

2021, 597). While this might make sense in some cases, there is probably quite often also a need to involve the original developer. Policymakers may want to reconsider how to allocate obligations between providers and users. This is probably one of those areas where the universalistic approach of the AI Act conflicts with the various ways in which 'users'[92] will rely on AI. Developing one pattern that justifiably allocates obligations across all provider-user relationships, ranging between Microsoft licencing an AI to an SME and a niche software company selling an AI to a corporate giant, is an arduous task; even more, given the range of purposes that AI systems might serve.

4.4. Policy debates

The AI Act is only one piece of a larger regulatory scene. Another key component of the European Commission's recent initiatives on the digital market is the Digital Services Act package. It is made up of the Digital Services Act and Digital Markets Act. Similar to the AI Act, the former aims to lay down harmonised rules in the internal market, this time in relation to the provision of digital intermediation services. Initially, from a workers' protection point of view, it was hoped the instrument could spur some protections, most notably for platform workers (Ponce Del Castillo, 2020). However, the final EU Commission's proposal for a Regulation on a single market for digital services (Digital Services Act) does not seem to deliver on that point. Article 27, for example, requires 'very large online platforms' to put in place reasonable, proportionate and effective mitigation measures, counteracting specific systemic risks. This should be done, *inter alia*, in relation to the platform's content moderation or 'recommender' systems and their decision-making processes. As such, in as far as the platform relies on AI in these respects, the Digital Services Act would seem to matter to AI governance because it imposes another sort of risk assessment. Yet, the Act does not seem oriented towards digital labour platforms, focusing, in particular, on services known as 'mere conduit', 'caching' and 'hosting' services. It thus targets social media and online marketplaces, among others.

Similarly, the Digital Markets Act – officially called the Regulation on contestable and fair markets in the digital sector – does not seem to offer much recourse for workers either. The Act aims to regulate platforms' 'gatekeeper' function. In 2019 the EU adopted a Regulation on promoting fairness and transparency for business users of online intermediation services. As the Digital Market Act's explanatory memorandum mentions, the Act builds on this Regulation to establish '*clearly defined obligations vis-a-vis a very limited number of cross-border providers of core platform services that serve as important gateways for business users to reach end users.*' The Act essentially aims to preserve fair competition in the digital realm.

Besides the Digital Services Act package, the Commission is also moving ahead with a revision of European rules on product safety (European Commission, 2020a). The proposal for a Regulation on machinery products (Machinery Regulation), which would replace the 2006 Machinery Directive, seems most important for what concerns workplace safety. As Recital 11 of the draft Machinery Regulation states:

> '*Recently, more advanced machines, which are less dependent on human operators, have been introduced on the market. These machines, known as collaborative robots or cobots, are working on defined tasks and in structured environments, yet they can learn to perform new actions in this context and become more autonomous. Further refinements to machines, already in place or to be expected, include real-time processing of information, problem solving, mobility, sensor systems, learning, adaptability, and capability of operating in unstructured environments (e.g. construction sites).*'

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[92] *"user' means any natural or legal person, public authority, agency or other body using an AI system under its authority, except where the AI system is used in the course of a personal non-professional activity' Article 3 AI Act.*

The Regulation needs to account for close interaction between humans and robots in workspaces, as mentioned above, as well as robots' autonomous features. To that end, the draft Regulation suggests a sort of interplay between the risk assessment carried out pursuant to the AI Act and the risk assessment needed for the machinery product under the proposed Machinery Regulation.

Furthermore, there is the enduring question about legal liabilities concerning the deployment of AI. As the European Commission observed, some of the characteristics of AI '*could make it hard to trace the damage back to a person, which would be necessary for a fault-based claim in accordance with most national rules. This could significantly increase the costs for victims and means that liability claims against others than producers may be difficult to make or prove*' (European Commission, 2020b, 15). This may call for additional rule-setting at the EU level, in addition to a revision of the Product Liability Directive 85/374/EEC. The EU Parliament's AIDA Committee has taken a position on this question. The Committee is:

> '*convinced that despite the legal challenges caused by AI systems, there is no need for a complete revision of the existing liability rules; stresses that the Product Liability Directive and the national fault-based liability regimes can in principle remain the centrepiece legislation for countering most harm caused by AI; underlines that only in some cases could there be inappropriate outcomes, but warns that any revision should take the existing product safety legislation into account and should solely be based on clearly identified gaps*' (AIDA, 2021b).

Therefore, the Committee suggests: '*the introduction of a limited new liability mechanism for legal claims against the operator, who controls the risks associated with the AI system and who also often is the cheapest cost avoider; specifies that while high-risk AI systems should fall under strict liability, combined with mandatory insurance cover, victims of low-risk AI systems should only benefit from a presumption of fault against the operator*' (AIDA, 2021b). The document lacks any clarification of who can be considered an operator. However, the European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for AI already made similar suggestions.[93] Recital 10 of the proposal for a Regulation on liability for the operation of AI systems, which can be found in the annex to the resolution, highlights that since there are often several entities operating the AI-system in a meaningful way, both the 'frontend'[94] and the 'backend'[95] operator are targeted. The proposal advances joint and several liabilities between the two types of operators, leaving them the possibility to stipulate a right to recourse against one another (Recital 12). This position, taken by the European Parliament and the rapporteur of the AIDA Committee, can be expected to feed into the European Commission's broader consultation on adapting liability rules to the digital age and circular economy. The public consultation closed in January 2022, with an outcome planned for the third quarter of 2022.

Additionally, as mentioned, platform work has, in many respects, been at the forefront of broader labour market developments. As such, the European institutions have been reflecting on how to tackle it for quite some time. The most promising instrument until recently has been the Transparent and Predictable Working Conditions Directive, which regulates abusive on-demand work. Importantly, however, due to the personal scope of application of the said Directive, it is doubtful it will have any meaningful consequences for (nominally) self-employed platform workers (Bednarowicz, 2019). Furthermore, although both the Council Recommendation of 8 November

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[93] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence, P9_TA(2020)0276.*

[94] *'(e) 'frontend operator' means any natural or legal person who exercises a degree of control over a risk connected with the operation and functioning of the AI-system and benefits from its operation;' Article 3.*

[95] *'(f) 'backend operator' means any natural or legal person who, on a continuous basis, defines the features of the technology and provides data and an essential backend support service and therefore also exercises a degree of control over the risk connected with the operation and functioning of the AI-system;' Article 3.*

2019 on access to social protection for workers and the self-employed and the Regulation (EU) 2019/1150 of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services might be relevant for platform workers to some extent (Schoukens, 2020), it is the European Commission's recent proposal for a Directive 'on improving working conditions in platform work' that might make a real difference.[96]

The proposed Directive has three main goals: resolve the employment status of platform workers, provide for fairness, transparency and accountability in platforms' algorithmic management, and improve the enforcement of existing rules (De Stefano and Aloisi, 2021). Especially the second goal is relevant to any discussion on AI. The draft proposal obliges the digital labour platform to inform workers and their representatives thoroughly about how the algorithmic systems operate (Article 6). Furthermore, workers' representatives must be consulted on decisions likely to lead to the introduction of or substantial changes in the use of automated monitoring and decision-making systems (Article 9). The proposed Directive, moreover, limits the personal data these algorithmic systems can process (e.g. data related to emotions, psychological state, health and private conversations) (Article 6). Digital labour platforms must also evaluate the OSH risks, including psychosocial ones, of their algorithmic systems (Article 7), and offer a mechanism to overturn automated decisions (Article 8). Arguably, many of the articles included in this draft proposal can inspire much-needed changes to the AI Act. As a matter of fact, similar to the need to bring the AI Act into line with the GDPR, the former should likewise align itself with the goals of the platform work initiative. Beyond the platform economy, workers and their representatives should also be informed about how AI systems impact their working conditions, be consulted about these same systems and be allowed to question the outcomes that AI produces. Furthermore, all employers, not just digital labour platforms, should keep an eye on the potential OSH risks of their AI systems, and guarantee that certain forms of personal data are not processed through automated (AI) systems. Having said that, the proposed Directive on platform work seems to take for granted that algorithmic management should, in principle, be allowed, provided that it meets the Directive's requirements. It could instead be argued that algorithmic management should not be assumed as a 'given'. Its introduction should be – at the very least – a matter for negotiation with the social partners, sometimes also subject to public authorisation. This has been the approach taken in the past by some European national legislation concerning the use of technology, such as cameras, that may allow monitoring the work performance (Aloisi and Gramano, 2019). It is hard to see why algorithmic management – which relies on technologies that could be much more invasive than those more severely scrutinised in the past – should be held to lower regulatory standards.

Finally, in the wake of the GDPR's adoption, the European Commission also proposed the ePrivacy Regulation in 2017. The proposal had been sidelined for a long time until the EU Council adopted its position in early 2021. This is significant because the instrument aims to preserve the confidentiality of electronic communications. As noted earlier, electronic communications are a rich source of data for AI systems. Consequently, it is not surprising the ePrivacy proposal has also been the subject of fierce lobbying (Nemitz, 2018). As Giovanni Buttarelli, a former European Data Protection Supervisor, remarked in 2018:

> '*Older arguments opposing the GDPR are being rehashed: the argument, for example, that freedom to harvest personal data is needed in order to develop new technologies, such as Artificial Intelligence tools. It is posited that the lack of general data protection and privacy rules in the US*

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[96] *Proposal for a Directive of the European Parliament and of the Council on improving working conditions in platform work, 9 December 2021.*

and China will allow businesses in those countries to take advantage and increase their competitive edge. This argument is flawed[97] in several ways' (Buttarelli, 2018).

Considering these remarks, the ePrivacy Regulation is undoubtedly of relevance to debates on AI governance (Czarnocki, 2020).

To summarise:

- Notwithstanding the importance of ethics, the response to AI at work also needs to be based on established fundamental and human rights.
- The GDPR's data protection principles provide a crucial framework to mitigate the negative consequences of AI at work. A vital concern is to ensure adequate enforcement.
- Workers' and social partners' involvement in introducing and operating AI at work is essential. EU Directive 2002/14/EC offers starting points to spur such involvement. It is necessary to examine how Member States can adequately implement the Directive so that AI is the subject of 'systematic' social dialogue.
- When bringing AI into the workplace, employers have to perform risk assessments to identify and address OSH risks. This obligation must be more adequately considered.
- How AI systems will exactly impact people's working time is still largely unknown. Nevertheless, the current instruments that regulate working time will continue to be important both to ensure that some workers receive enough working hours and to preserve a tenable work-life balance for others.
- EU non-discrimination laws have some capacity to allow vetting AI systems at the workplace. These laws' effectiveness, however, will also depend on the ease with which the burden of proof in the Courts is placed on the user of the AI system instead of on the workers. Moreover, the number of alternative procedures available outside the courts to scrutinise AI systems will be determinative. Such external procedures for auditing and certification need to be explored.
- The draft AI Act intervenes in a setting where various EU and domestic laws already govern the use of AI at work. As such, despite the Act's proclaimed intentions, it risks imposing a regulatory 'ceiling', undercutting regulatory mechanisms that are vital to adequately govern AI and algorithmic management at work. In this respect, it is essential to put the AI Act at the service rather than above the other laws governing AI's implementation in the work environment.
- In addition to the draft AI Act, many other EU policy discussions might likewise frame the future use of AI systems in European workplaces. The many initiatives need to be coordinated. For example, the recent proposal for a Directive on platform work contains a chapter on algorithmic management. It offers some valuable and yet improvable protections for platform workers; unless the AI Act adopts a corresponding stance, workers outside of the platform economy will most likely be much less protected than platform workers.

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[97] *Namely, according to the author, a 'technology which is developed under the control of a surveillance system such as exists in China cannot be the solution for a democratic society based on the rule of law and respect of fundamental rights. Meanwhile, there is clear momentum growing for general rules and limits in the United States as well as most countries around the world, as concern increases about the unlimited use and abuse of personal data' (Buttarelli, 2018).*

5. Policy options

5.1. Critical points in the context of different legislative files

The GDPR is an instrument with great promise. However, its principles and criteria are quite flexible, making it challenging to apply the instrument consistently. As mentioned, the European Parliament has already suggested that the European Data Protection Board would adopt guidelines related to AI, profiling and fully automated decision-making in an HR environment. This tool could indeed be momentous for the world of work. Moreover, Article 88 of the GDPR enables the Member States to adopt more specific rules, also by means of collective bargaining, to ensure the protection of the rights and freedoms in respect of the processing of employees' personal data in the employment context. This article, as already mentioned, has yet to be substantially used by lawmakers and social partners.

In addition to bolstering the application of the GDPR in the field of employment, the most critical concern is about adequate enforcement. National DPAs are, in theory, the most crucial actors in this respect. Some authorities have acted against employers' surveillance practices in the past. For instance, the French DPA imposed a fine of €400 000 on the *Régie autonome des transports parisiens*, among other reasons, because it appeared excessive and contrary to the principle of data minimisation to record the number of strike days of individuals instead of just the total number of days of absence for the purpose of career advancement (CNIL, 2021). The Italian DPA issued a €2.6 million sanction against a food-delivery platform for alleged regulatory violations also linked to algorithmic discrimination (GPDP, 2021). More systemic interactions between the DPAs and civil society, including unions, are crucial in this respect to bring issues to the attention of DPAs (Degli-Esposti and Ferrándiz, 2021). However, employment has been a strategic and operational topic for only a very few countries, including France and Italy, so far (Barros Vale, Zanfir-Fortuna and van Eijk, 2021, 10). This subject would benefit from more scrutiny also elsewhere.

Nonetheless, even if that were to happen, it arguably remains unrealistic to expect DPAs to enforce the GDPR on a large scale in relation to employment matters. As such, it is worth exploring other ways of buttressing enforcement. As mentioned, DPIAs should involve workers or their representatives. Despite the provisions of GDPR and the WP29's guidelines, this is currently not happening, albeit it would put the social partners in a better position to scrutinise certain AI applications. Moreover, as noted, Article 80 enables Member States to allow trade unions to file GDPR proceedings irrespective of any individual claimant, a provision largely unutilised for the moment.

Similar to the GDPR, many other existing instruments are not currently used to their full potential. Regarding Directive 2002/14/EC on the information and consultation of employees' representatives, in the 2009 report on its implementation, Jean-Louis Cottigny (S&D, France, 2012-2014) agreed '*with the Commission that in some Member States the transposition of Directive 2002/14/EC has taken place in a minimal or deliberately vague manner or not at all*' (Cottigny, 2009). The inadequate implementation of this directive is also manifest in the AI debate. In theory, the directive might open the door to consultation on AI-related matters in several instances; yet, systematic engagement by workers' representatives in this field is lagging behind. It is thus urgent to revisit the debate on how to make this directive more effective.

Concerning the EU instruments on OSH, the impact of AI software on workers' health and safety, including its psychosocial elements, appear unlikely to receive the necessary attention in employers' risk assessments. In response, more awareness could thus be raised around some specific AI-related OSH risks, such as technostress (e.g. Cadieux et al., 2021). For instance, a social partners' agreement could be pursued, resembling the EU Framework Agreement on Work-Related Stress. The annexes in the Work Equipment Directive could also be revised. The European Agency on Occupational

Safety and Health (EU-OSHA) could likewise stress the issue, which could even feature in the discussions on the right to disconnect. In addition, a right to disconnect might serve to limit excessive surveillance, as it could pose clearer and urgently needed boundaries to limit AI's reach into workers' lives (EU-OSHA, forthcoming).

Another essential legal file is anti-discrimination law. It is urgent to review the options that could guarantee its application to algorithmic management and AI at work. Individual lawsuits are key elements of anti-discrimination enforcement. The claimants' success, as already mentioned, seems largely to hinge on how easily the burden of proof switches, i.e. requiring the employer to prove no discrimination occurred or that it can be justified instead of the claimant proving the opposite. Reaching the threshold of enough *prima facie* evidence is vital. The GDPR contains several mechanisms related to the principle of transparency that can enable claimants to meet this threshold (Gaudio, forthcoming). Nonetheless, many scholars argue that individual enforcement, albeit valuable, will not suffice. Indeed, it is also paramount to develop regulatory responses driven by public bodies to combat algorithmic discrimination, including by means of audits. Computer scientists should arguably be more involved in this regard. Policy-makers must reflect on how such alternative means can interact with court proceedings.

Lastly, the AI act has to be considered from this holistic perspective. It has long been clear that algorithms do not operate in a legal vacuum in the work context. The same is true for AI; however, the legal machinery needs to be reinforced to cope with its integration into the world of work. Currently, the draft AI act does not achieve this. In response, an explicit provision that the act is without prejudice to the GDPR and other labour laws, along the lines of what Article 88 of the GDPR prescribes, could be added to ensure that the AI act does not preempt any domestic legislation that can steer the use of AI towards sustainable ends (Aloisi and De Stefano, 2021c).[98]

Furthermore, as mentioned above, the leaked draft of the AI act contained a provision that people in charge of AI oversight needed to be able to '*decide not to use the high-risk AI system or its outputs in any particular situation without any reason to fear negative consequences*' (De Stefano, 2021a). Although this initial phrasing was arguably too vague to begin with, the regulation actually proposed no longer mentions anything of this sort. Provisions could be added to ensure that persons in charge of AI oversight obtain adequate protections to guarantee they can fulfil their tasks. Also, as part of this endeavour to truly put humans in command, one possibility would be to adapt the Whistleblower Directive to cover employees engaged with AI that report violations of EU and national regulation.

Additionally, the AI act seems to mostly rely on the fact that it imposes duties at the source of the AI (the provider). This duty on the provider comes in addition to the user/employer's duties under the GDPR, OSH and collective legal frameworks to engage in risk/impact assessments and consultation. Options should be explored to link up these various assessments, forming a coherent evaluation chain. In this vein, to the extent a thorough assessment is conducted at the source under the AI act, the employer, as the user of the AI system, could be in a better position to pass the DPIA, risk assessment and preliminary consultation. Instead, if these (self-)assessments by or for providers are of poor quality, the employer might struggle for the AI application to satisfy the requirements under the data protection, OSH, anti-discrimination and collective laws applicable to the employer. In other words, the employers' obligations under these respective regulations may also pressure the

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[98] We can think of examples such as the Spanish riders law, which contains the 'right of workers' representatives to be informed about the parameters, rules and instructions on which the algorithms that may have an impact on working conditions are based' (Todolí-Signes, 2021c). On another note, a new act in Portugal constrains an employer's possibilities of controlling teleworkers through ICT technology (Bateman, 2021). To the extent the AI Act considers an AI application trustworthy and approved through self-assessment, such laws would constrain employer's use of these AI systems; hence, it is not inconceivable these laws would violate the AI act because they impose additional roadblocks to the uptake of AI.

(self-)assessments under the AI act to remain of high quality with sufficient transparency, and not to become a rubber stamp.

In addition, as mentioned above, it has been argued that the AI act should go further and ban certain hazardous and invasive AI applications. Recital 41 merely mentions how '*[t]he fact that an AI system is classified as high risk under this Regulation should not be interpreted as indicating that the use of the system is necessarily lawful under other acts of Union law or under national law compatible with Union law, such as on the protection of personal data, on the use of polygraphs and similar tools or other systems to detect the emotional state of natural persons*.' Instead of pointing this out, however, the act could arguably be more daring in its own approach. For instance, inferring a natural person's emotions through AI should arguably be prohibited in principle (EDPB and EDPS, 2021, 12). Other AI-related practices that are evidently at odds with the fundamental rights of workers, including the many examples we discuss above, could likewise be directly prohibited.

This would spare labour inspectors, data protection and other enforcement authorities the work of having to argue why these tools violate privacy, OSH and other standards. Similarly, options should be explored to ensure that employers are not left alone in assessing the OSH risks of such tools and their compatibility with GDPR standards. If abusive practices are more proactively banned, authorities and employers could devote their time to assessing other AI applications, such as AI monitoring of fatigue, that, sometimes, might likewise unwillingly infringe fundamental rights but can, at other times, be implemented in a proportionate and justifiable manner. The AI act could take a clearer and more comprehensive stance on unacceptable uses of AI, or at least indicate which authority can make such a determination.

Furthermore, policy-makers should reflect on options for the enforcement of the act. For example, Aislinn Kelly-Lyth highlights the potential of Article 60. It creates an EU database for stand-alone high-risk AI systems, providing publicly available information about these individual AI systems (Kelly-Lyth, 2021a, 8). This system could increase transparency, but why should individuals with a legitimate interest not be allowed to request additional information beyond what is publicly available? The workers of an employer who relies on a third-party AI system could benefit from obtaining such information directly from the AI act's authorities. Likewise, imagine that hundreds of employers use an AI system, and, at some point, the system is subjected to legal scrutiny in some of these enterprises. It is entirely plausible for this EU database to serve as a central registry, documenting these issues. Article 62 already demands that providers of high-risk AI systems report any serious incident or any malfunctioning of AI systems that constitute a breach of obligations under Union law intended to protect fundamental rights. It would be helpful to spread such information beyond just the national public authorities that '*supervise or enforce the respect of obligations under Union law protecting fundamental rights*' (Article 64).

In 2020, the European Parliament proposed to hand natural or legal persons a right to seek redress for injury or harm caused by the development, deployment and use of high-risk AI in breach of Union law and the obligations set out in the proposed regulation on ethical principles for the development, deployment and use of artificial intelligence, robotics and related technologies.[99] The current AI act does not live up to that promise as information is largely shielded from those subjected to AI. Moreover, there is no single right to seek redress for AI subjects. This type of bottom-up accountability, however, would likely be of great support for the enforcement of the AI act. For example, by making it possible to file a negligence claim if a provider or user repeatedly violates the AI act or other forms of Union law, all parties could be pressured to take self-assessments more seriously. Options should be explored to ensure that the AI act creates a positive dynamic in which existing laws benefit from increased transparency obtained through the act. In turn, providers and

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[99] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

users would feel compelled to take their self-assessments and reporting duties under the AI act more seriously because of their accountability under existing anti-discrimination, privacy and other laws if problems do arise at a later stage, and, potentially, some form of redress under the AI act in the event of flagrant or persistent violations with harmful consequences for individuals. Should such a redress mechanism be introduced, further articles could allow businesses to commence regularisation processes – within a short period of time – without being penalised under the law, provided that full disclosure is made and the relevant authorities and the social partners are involved (De Stefano, 2021b).

5.2. An overview of policy options

Along the lines of the arguments presented so far, the following sections set out a range of possible policy options for a range of policy files:

Concerning the proposed AI act:

- **Break the 'regulatory ceiling'.** Allow Member States to impose additional requirements in some areas, such as most notably employment (Kelly-Lyth, 2021a; Veale and Borgesius, 2021), similar to what has been provided for in the GDPR (Aloisi and De Stefano, 2021a).
- **Reconsider the scope of the AI act.** Better define the act's scope, for example, by focusing on the impact of the technology rather than the specific type of technology (AlgorithmWatch, 2021), or by focusing on certain kinds of practices or uses (Biber, 2021).
- **Expand what are considered unacceptable hazards.** Better define and reconsider the list of AI systems that are banned, raising the bar of acceptability. For example, the use of biometric identification systems should be prohibited to a broader extent (AlgorithmWatch, 2021). The same should be true for all forms of emotional surveillance at work (EDPB and EDPS, 2021).[100]
- **Acknowledge the imbalance of power.** Explicitly acknowledge that AI systems will tend to exacerbate the imbalance of power between certain actors, notably between employers and workers (Kullmann and Cefaliello, 2021). Therefore, it is paramount to involve workers, their representatives and unions in the introduction and use of these technologies at work (AlgorithmWatch, 2021; ETUC, 2021).
- **Introduce preliminary impact assessments for any AI-based application.** Reconsider the approach to risk categorisation and require a preliminary impact assessment for any AI-based application, not only high-risk systems, allowing to determine the system's respective risk level on a case-by-case basis (AlgorithmWatch, 2021).
- **Redefine what are high-risk systems.** Reconsider the criteria that categorise an AI system, including at work, as a high-risk system, by, for example, pointing out that it is sufficient for the AI system to **potentially** have a significant harmful impact on health and safety, instead of an actual effect along those lines (Kullmann and Cefaliello, 2022).
- **Demand third-party assessments.** Implement third-party assessment for all high-risk AI systems as standard (Biber, 2021; Ebers et al., 2021, 595; ETUC, 2021; Kelly-Lyth, 2021a; Kop, 2021; Ponce Del Castillo, 2021).[101] Alternatively, an enforcement

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[100] See also European Parliament resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics, P8_TA(2019)0081.

[101] See also European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.

mechanism could be conceived that would subject problematic self-assessed high-risk systems to a third-party assessment at a later stage.

- **Acknowledge the value of existing laws.** Acknowledge the merits of existing privacy, non-discrimination and labour laws in dealing with algorithmic and AI systems. Safeguard existing and future legislation in these fields relative to the harmonisation aims of the act. Call on the Member States to evaluate that legislation to make sure it can be more effectively enforced in the AI context.
- **Stress that the use of AI may lead to employment reclassification.** Specify that the fact that a management system is allowable under the AI act does not exclude that the use of this system vis-à-vis self-employed persons could lead to the reclassification of those persons under the existing standards used to determine the existence of an employment relationship.
- **Demand transparent and democratic standardisation processes.** Guarantee that the European standardisation organisations' processes are transparent and democratic, also by including the social partners (AlgorithmWatch, 2021; ETUC, 2021).
- **Protect the workers' supervising AI systems.** Provide workers who are meant to perform AI oversight with the protections necessary for them to be able to perform their work and deviate from the course set by an AI without any fear of adverse consequences.
- **Reinforce non-discrimination safeguards.** Reconsider the requirements imposed by the AI act to make sure the risk of discrimination is adequately assessed in practice instead of under 'lab conditions' (AlgorithmWatch, 2021). In this respect, it might be necessary to assess certain requirements again once the system is introduced to the market.
- **Favour auditability and explainability.** Demand for AI systems in certain high-risk areas to be developed using techniques that favour 'auditability' and explainability (Borgesius, 2020, 1583).
- **Demand Fundamental Rights Impact Assessments.** Oblige providers of high-risk AI systems to make Fundamental Rights Impact Assessments that vary depending on the area in which the system is operationalised.[102] This would necessitate going beyond the procedural checklist already established under Chapter 2 of the AI act.
- **Expand the EU database.** The EU database prescribed in Article 60 of the draft AI act could become a much more important mechanism to achieve greater levels of transparency than it currently is (AlgorithmWatch, 2021; Ebers et al., 2021, 597; Kelly-Lyth, 2021a).
- **Identify the enforcement bodies.** Clarify the role of the enforcement bodies provided for in the AI act, for instance, in relation to the GDPR's enforcement mechanism, labour inspectorates and equality bodies in charge of enforcing non-discrimination law (AlgorithmWatch, 2021). Data protection authorities could be designated as national supervisory authorities pursuant to Article 59 of the draft AI act (EDPB and EDPS, 2021).
- **Increase coherence between the AI act and GDPR.** More broadly, pursue coherence between the AI act and the GDPR, for example, for what concerns the certification of AI systems under the AI act and GDPR, respectively (EDPB and EDPS, 2021).
- **Increase coherence with other EU policy initiatives.** Make sure the AI act aligns with other EU policy initiatives, such as the proposal for a directive on platform work.
- **Provide AI subjects with access to information.** Provide not only users but also the subjects of AI with access to information (AlgorithmWatch, 2021; Kelly-Lyth, 2021a).

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[102] For a discussion of such FRIAs, see: FRA, 2020.

- **Introduce (collective) redress mechanisms.** Introduce an effective (collective) redress mechanism for individuals subjected to AI (AlgorithmWatch, 2021; Ebers et al., 2021).[103]
- **Make it possible for businesses to commence a regularisation process.** Establish the possibility to issue a regularisation period during which businesses can correct their practices without being subjected to penalties under the act, subject to full disclosure and involvement of public authorities and the social partners.
- **Adequately fund and staff market surveillance authorities.** Guarantee that, in so far as market surveillance authorities become the main enforcers of the act, these authorities are well funded and staffed.

Concerning the GDPR:

- **Introduce comprehensive compliance schemes.** Prompt the European Data Protection Board (EDPB) and other EU authorities to formulate a 'comprehensive compliance scheme' to ensure that automated decisions, in or outside of the field of employment, comply with the GDPR (Bayamlıoğlu, 2021). If the EDPB neglects to do so, national Data Protection Authorities (DPAs) can provide the guidance needed (Sartor, 2020, 80).
- **Stimulate systematic interactions between DPAs and civil society.** Push for more systemic interactions between the DPAs and civil society, including unions. This is crucial to bring issues to the attention of DPAs (Degli-Esposti and Ferrándiz, 2021).
- **Prioritise AI in employment as a topic for DPAs.** Since data protection in the field of employment does not seem to feature as a priority on the agenda of many DPAs, these public authorities could be stimulated to devote more time and resources to this end.
- **Issue guidance to employees.** Have the competent authorities provide concrete guidance about what the rights of data subjects in relation to AI systems at work entail; for example, what does it mean to provide information about the 'logic' of an AI system, or what rights do data subjects have in relation to 'inferred data' (Sartor, 2020, 81).
- **Issue guidance to employers.** Inform employers about the implications of the GDPR's principles for the implementation and operation of AI at work.
- **Clarify the test of the balance of interests.** The competent authorities should indicate what it means for employers to conduct a '*test of the balance of interests, which includes a fundamental rights assessment*' when introducing and running AI at work.[104] Accordingly, it should be clear how this intersects with workers' right to object to data processing when it is grounded on the employer's legitimate interests.
- **Explore complaint and notification mechanisms.** Envision new and more effective complaint and notification mechanisms with a view to better enforce the GDPR (Degli-Esposti and Ferrándiz, 2021).
- **Enable collective enforcement.** Enable collective enforcement in this field of law, for instance, through class actions (Sartor, 2020, 81; Moore, 2020).
- **Provide trade unions with the ability to bring claims.** Enable trade unions to bring cases under the GDPR without having to represent an individual claimant (Pato, 2019).
- **Make use of Article 88 GDPR.** Spur Member States to use Article 88 and issue more specific standards for personal data protection in employment (EESC, 2018), also by

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[103] *See also European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

[104] *European Parliament resolution of 25 March 2021 on the Commission evaluation report on the implementation of the General Data Protection Regulation two years after its application, P9_TA(2021)0111.*

encouraging collective bargaining in this field. This article could also be used to establish joint data protection committees, for instance (Todolí-Signes, 2019).

- **Expand the importance of Data Protection Impact Assessments.** Explore the potential role of employers' Data Protection Impact Assessments (DPIAs), inter alia, in addressing the risk of discrimination through AI systems at the workplace (Kelly-Lyth, 2021b). Note the importance of incorporating workers' representatives and unions in these DPIAs (Moore, 2020, 91).

- **Confirm that employers must keep records of processing activities.** Unambiguously confirm that, regardless of the amount of staff, an employer using a high-risk AI system must keep a record of processing activities in the sense of Article 30 GDPR.

- **Explore the meaning of 'personal data protection by design'.** Issue clarifications about what it means for AI systems to engage in 'personal data protection by design' (Mitrou, 2019; Sartor, 2020, 81).

- **Make a data protection officer mandatory.** Evaluate requiring that employers relying on high-risk AI systems designate a data protection officer (DPO) (Article 37 GDPR). Worker representatives could be added to cross-check the DPO's work (Moore, 2020, 89-90).

- **Establish a 'privacy due diligence' requirement.** Embed a privacy due diligence requirement into the human rights-based corporate responsibility scheme (Ebert, Wildhaber and Adams-Prassl, 2021).

Concerning the proposed EU directive on platform work:

- **Algorithmic management should not be seen 'as a given'.** Provide that algorithmic management is not taken 'as a given' and is not regulated to a lesser extent than what European national legislation already provides for other technological tools and applications that allow monitoring the work performance.

- **Maintain a presumption of employment that sufficiently covers workers.** Stress the need for the legislative initiative on platform work to have a broad personal scope of application to ensure (bogus) self-employed platform workers are not without any legal coverage (De Stefano and Aloisi, 2021). Consider strengthening the presumption, since the draft indicators may currently be exceedingly narrow and risk excluding some of the most vulnerable platform workers from the operation of the presumption.

- **Protect the workers' supervising platforms' algorithmic systems.** Ensure that workers involved in overseeing digital labour platforms' automated systems, including their impacts on OSH, can perform their work and deviate from the course set by an AI without any fear of adverse consequences.

Concerning the EU's anti-discrimination laws:

- **Ascertain whether and how claimants can bring sufficient *prima facie* evidence.** Investigate the difficulties for claimants in bringing sufficient *prima facie* evidence of discrimination. Alternative methods might have to be developed that enable claimants to bring statistical evidence that shows it is indeed likely the system discriminates (Wachter, Mittelstadt and Russell, 2021).

- **Make sure employers are cooperative.** Specify employers' obligations in terms of providing all relevant information once jobseekers or workers plan on lodging a non-discrimination claim in court, as well as what happens when an employer refuses to do so.

- **Introduce out-of-court mechanisms.** Introduce out-of-court mechanisms to detect discrimination in algorithms, such as certification or specialised auditing. Also,

consider clarifying the role of such processes in existing anti-discrimination regulations. For instance, the burden of proof for a claimant could be higher when a system has been certified in advance, or a court could decide in an interlocutory judgment to have an algorithmic system audited before making a final ruling.

- **Develop the concept of 'equality by design'.** Introduce the obligation for AI systems to implement an 'equality by design' approach, similar to the GDPR's 'data protection by design' approach (Xenidis and Senden, 2020).
- **Consider the potential role for equality bodies and trade unions.** Reflect on how equality bodies and trade unions can intervene to help certify AI systems, audit them or act against them in the courts, taking into consideration the connection with data protection laws (Kelly-Lyth, 2021b; Schubert and Hütt, 2019).
- **Highlight non-discrimination considerations in Data Protection Impact Assessments and balance of interest tests.** Clarify the importance of considering algorithms' and AI's potential discriminatory effects during the employer's DPIAs of such tools, and whenever the employer has to conduct a 'test of the balance of interests', taking into account data subjects' interests and fundamental rights.
- **Protect people with disabilities.** Pay special attention to how people with disabilities could be provided with reasonable adjustments when subjected to AI in recruitment and the world of work at large.
- **Strike a human rights-based balance between protecting trade secrets and scrutinising AI systems.** Search for best practices and reflect on how to strike a human rights-based balance between the protection of AI as a protected trade secret and the rights of individuals, unions and public authorities to scrutinise such systems, especially to discover discriminatory effects.

Concerning the EU's OSH acquis:

- **Negotiate a framework agreement.** Ask European social partners to negotiate a framework agreement on the OSH implications of AI to include this aspect under the Framework Directive.
- **Amend the annex of the Work Equipment Directive**. Amend the annex of the Work Equipment Directive to address the impact of AI in this field.
- **Provide adequate training.** Ensure that workers receive adequate training to deal with more autonomous tools and to spot the dangers of revising software in production processes (e.g., excessive quotas).
- **Follow-up on the draft machinery regulation.** Evaluate the changes being made to the machinery directive, bearing in mind the impact on workers' health and safety.

Concerning the Working Time Directive:

- **Evaluate AI's impact on the effective enjoyment of rights in this directive.** Remain vigilant to ensure AI systems do not undermine the effective enjoyment of workers' rights, for example, to rest breaks, holidays or their stand-by time being considered working time.
- **Futureproof this directive.** Engage in discussions on future changes to the directive in response to technological unemployment. Some suggestions have been to lower the maximum weekly working time and remove the opt-out clause (Spencer et al., 2021, 53).

Concerning the Fixed-Term Work Directive:

- **Evaluate protections against successive fixed-term employment contracts.** Be aware that AI might make it feasible to have a more continuous understanding of workers' performance levels, inciting employers to rely on fixed-term employment

contracts. Evaluate whether the implementation of this directive has led to adequate restraints on the successive use of fixed-term contracts that could resist this development.

Concerning the Transparent and Predictable Working Conditions Directive:

- **Follow-up on the implementation of this directive.** Verify whether Member States' implementation of the directive's articles regarding the abuse of on-call work is sufficient to constrain AI-enhanced scheduling.
- **Maintain the effectiveness of Article 12.** Ensure that the reliance on AI systems to schedule work is not a ground to decline the workers' right to request a form of employment with more predictable and secure working conditions under Article 12. It must be possible to readjust the AI along those lines or to overrule its decisions. Employers should not be able to use the argument that AI and algorithmic management tools are technologically unable to grant such a request to avoid the application of this provision.

Concerning the EU instruments on workers' information and consultation:

- **Evaluate the implementation of Directive 2002/14/EC – general framework for informing and consulting employees in the EU.** Explore whether Member States have adequately implemented the framework directive in a way that requires worker consultation whenever AI systems with significant effects for workers are implemented at work and whether these consultations meaningfully occur in practice.
- **Reassess at what point employers must provide information about an AI or involve workers' representatives.** Along the lines of the Spanish 'riders law', urge Member States to draft domestic laws so as to oblige employers to inform workers and their representatives about algorithms and AI at work, regardless of these tools making 'substantial changes' to the work organisation. Workers and representatives could even obtain a right to involvement rather than just information (All-Party Parliamentary Group on the Future of Work, 2021, 15).
- **Demand mandatory consultation for high-risk AI systems.** Aim at making consultation mandatory between the employer and workers' representatives whenever a high-risk AI system, as currently described in the AI act, is introduced to the workplace or is altered throughout its lifecycle.
- **Guarantee a broader technology information and consultation duty.** Reemphasise the Member States' obligation to frame their domestic legislation in a way that the directive becomes effective in this context, or, if necessary, revise the directive to guarantee a technology information and consultation duty concerning AI systems that can have a significant effect on work organisation (Spencer et al., 2021, 55).

Concerning other pending legislative files:

- **Support the right to disconnect.** Support the introduction of a **right to disconnect** at the EU level (Spencer et al., 2021, 52), or any other appropriate level, which could also serve to limit the invasion of workers' private lives by AI tools (EU-OSHA, forthcoming).[105]

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[105] *European Social Partners Framework Agreement on Digitalisation, June 2020; European Parliament resolution of 21 January 2021 with recommendations to the Commission on the right to disconnect, P9_TA(2021)0021.*

- **Pay attention to the eprivacy regulation.** Consider the eprivacy regulation as an opportunity to safeguard workers' communication from excessive AI monitoring.
- **Provide self-employed workers with a right to collective bargaining.** Adopt solutions that allow self-employed workers to bargain collectively without violating anti-trust laws (Countouris, De Stefano, Lianos, 2021; Servoz, 2019, 128). These workers will be subjected to AI systems; they currently lack the ability to restrain these systems collectively.

In terms of potential future initiatives:

- **Draft an ad hoc directive on AI in employment.** This instrument would be separate from the AI act. It would aim to govern the risks of AI in an employment context (Ponce Del Castillo, 2021).
- **Introduce new reporting duties.** Issue a directive requiring firms to report on the impacts of digital technologies on jobs, wages and the quality of work (Spencer et al., 2021, 54-55).
- **Draft a directive on the safety of algorithms.** Advance a specific directive on the safety of algorithms to reduce the occupational risks suffered by workers subject to AI (Todolí-Signes, 2021a).
- **Draft a directive on psychosocial risks.** Advance a directive on psychosocial risks that could, among other things, highlight the relation between automated systems, with or without AI features, and psychosocial risks (Cefaliello, 2021).
- **Amend the Whistleblower Directive.** Amend the Whistleblower Directive to unambiguously protect developers of AI and potentially other persons involved in the implementation thereof.[106]

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[106] *European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies, P9_TA(2020)0275.*

6. Conclusions

This study first argued that the introduction and operation of AI-enabled recruitment and managerial tools as well as any other form of algorithmic management at work require significant care and should not be implemented lightly. From the business perspective, this is also because data accessibility in many workplaces remains poor, particularly when it comes to quality data. Furthermore, existing devices and work tools may poorly support the incorporation of AI features, potentially demanding significant additional investment. AI tools from various suppliers are, moreover, not always compatible, which can lead to unexpected issues. Various departments with varied interests in one and the same company may even refuse to cooperate by sharing relevant data for one another's AI. Therefore, even simply from the business standpoint, mainstream discussions on AI seem to excessively present the situation as if AI lends itself to a 'plug and play' routine. At the same time, as discussed above, these discussions also tend to overemphasise the role that AI-enabled tools and algorithmic management may play in addressing or solving complex societal problems, including discrimination in employment and occupation as well as occupational health and safety.

While some of these practices may help in some instances, we also discussed how in other cases, the outcomes could be quite the opposite. We also argued that the main ideas and objectives behind the introduction of these practices and how these are incorporated in the design of software would significantly influence those outcomes. We have reported that a very significant thrust behind the introduction of AI-enabled and algorithmic-management systems currently seems to follow objectives of standardisation, enhanced monitoring and disciplining of the workforce more than anything else (see also Acemoglu, 2021). Some AI applications, such as scheduling tools that draw on sensor data or CCTV cameras that apply AI analysis, will critically influence working conditions, and not for the better.

This warrants regulatory mandates to fully consider OSH, data protection, and other labour and employment rights when designing these AI systems. Ex-ante risk and impact assessments by employers, as well as consultations, are already obligatory in some of these instances. The existing EU legislation could arguably be revisited to better clarify and reinforce such duties, leading to a precautionary attitude when introducing and implementing AI-enabled managerial tools at work. In addition, too often, the domestic implementation and enforcement of already existing EU laws leave much to be desired. The European Parliament might want to take action to address these enforcement gaps.

The current proposal for an AI act does not reflect all these criticalities. Of course, the final act could add valuable elements to the existing regulatory spectrum. For example, it could increase transparency not just for users but also for AI subjects, and it could force providers to make a thorough assessment of their AI's potential discriminatory effects and broader consequences for fundamental rights before bringing it to the market. The act could also contain a vital right to redress if providers neglect their duties under the regulation. However, as it stands, the proposed act refrains from doing so, broadly opting for a deregulatory approach that presents serious risks to the already existing regulations' ability to govern the introduction and use of AI at work. This outcome could be avoided by permitting the Member States and social partners to adopt additional rules related to AI in the working environment as well as by better coordinating its provisions with other EU legislation concerning employment and labour protection.

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This study focuses on options for regulating the use of AI enabled and algorithmic management systems in the world of work under EU law. The first part describes how these technologies are already being deployed, particularly in recruitment, staff appraisal, task distribution and disciplinary procedures. It discusses some near-term potential development prospects and presents an impact assessment, highlighting some of these technologies' most significant implications.

The second part addresses the regulatory field. It examines the different EU regulations and directives that are already relevant to regulating the use of AI in employment. Subsequently, it analyses the potential labour and employment implications of the European Commission's proposal for a regulation laying down harmonised rules on artificial intelligence (AI act). Finally, it summarises the other ongoing EU policy debates relevant to the regulation of AI at work.

The third and final part of this study reflects in detail upon the AI act and its potential impact on the existing EU social *acquis*. On this basis, it advances potential policy options across different EU legislative files, including but not limited to the AI act, to ensure that regulation keeps pace with technological development. It also argues that the AI act should 'serve' and complement – rather than over-ride – other regulatory standards that can already govern the introduction and use of AI-enabled and algorithmic-management systems at work.

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