

Making algorithmic management safe and healthy for workers: addressing psychosocial risks in new legal provisions¹

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Abstract

The increasing deployment of algorithmic management in the workplace poses significant occupational safety and health risks for workers. In this article, we argue that existing and proposed EU regulatory frameworks are inadequate to address these risks, especially psychosocial risks, created or exacerbated by algorithmic management. While existing and proposed regulatory frameworks have significant implications for employers' obligations to mitigate these risks, we identify several psychosocial risks created or exacerbated by algorithmic management and show how the current and proposed regulatory frameworks fall short of adequately addressing these risks. We observe that these frameworks, based largely in the 'safety by design' tradition, focus on the design phase of the technology lifecycle. This focus does not adequately address risks that arise in the use or deployment stage of algorithmic management. There is therefore a need for a standalone piece of legislation at the EU level on algorithmic management. To address these shortcomings, we outline suggestions for provisions necessary toward safe and healthy digitally managed work.

Keywords: Algorithmic management, artificial intelligence (AI), digitalisation, occupational safety and health (OSH), psychosocial risks, safety by design, workplace

1. Introduction

Algorithmic management (AM) refers to a relatively new phenomenon in which increasingly sophisticated information technologies are used to fully or partially automate management decisions about work. The rise of AM has the potential to fundamentally change *where* and *how* people work, *who* performs work and *how people perceive work*.² Recruitment, productivity assessment, restructuring, people analytics, and other workplace human resource and management activities previously conducted entirely by humans have been enhanced with various hardware and software tools for decades. However, the latest advancements in AM

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² Nicola Stacey and others, 'Foresight on New and Emerging Occupational Safety and Health Risks Associated with Digitalisation by 2025' (European Agency for Safety and Health at Work, European Risk Observatory Report, 2018).

applications have begun to involve artificial intelligence (AI).³ AI tends to involve an element of unpredictability, and may exacerbate the tendency, already present in AM, to reduce opportunities for human participation in work decision-making.⁴ As a result, the introduction of AI-based AM systems into the workplace raises new questions, especially for the occupational safety and health (OSH) of the workers these systems manage.⁵ How will workers be impacted, for example, if new management technologies significantly reduce the opportunities for human intervention in work related decision-making?⁶ What OSH risks does such a change pose? What regulations exist to protect workers from these risks?

This article argues that existing regulatory frameworks are inadequate to manage the OSH risks posed by the introduction of AM. A variety of ‘hard’ and ‘soft’ laws, frameworks, and standards—such as product safety law, labour law, OSH regulation, data protection law, and voluntary frameworks and technical standards—have some implications for employers’ obligations to mitigate the impacts of management technologies on workers. None of these, however, fully addresses the OSH risks posed by AM, especially AI-based AM.

A key failure of prevailing approaches to regulating technology safety is their reliance on ‘Safety by Design’ (SbD). This method focuses on one phase of the technology lifecycle: the design phase.⁷ SbD envisions that a technology can be made safe for users via decisions taken during invention, design, and early testing. This approach is used, for example, in the automobile and medical industries. However, this approach is inadequate for AM technologies, because the safety of AM does not rely solely on how it is designed, but also, and perhaps most importantly, on *how it is used* and *what decisions are ‘made’ by machines*.⁸ The safety impact of choices made in the use or implementation phase of the technology lifecycle are particularly significant for highly configurable technologies such as AM systems. This is even more the case for systems that ‘learn’—ie, those whose outputs in response to given inputs change without human intervention—such as AI- and machine learning-based AM. As a result, to

³ Sara Baiocco and others, ‘The Algorithmic Management of Work and Its Implications in Different Contexts’ (Background Paper Series of the Joint EU-ILO Project, Background Paper 9, June 2022); Karin Reinhold and others, ‘Artificial Intelligence for Worker Management: Implications for Occupational Safety and Health’ (European Agency for Safety and Health at Work, 2022); Phoebe V Moore, ‘Data Subjects, Digital Surveillance, AI and the Future of Work’ (European Parliamentary Research Service, PE 656305, December 2020).

⁴ Valerio De Stefano, ‘AI and Digital Tools in Workplace Management and Evaluation: An Assessment of the EU’s Legal Framework’ (European Parliamentary Research Service, PE 729516, May 2022).

⁵ Phoebe V Moore, ‘OSH and the Future of Work: Benefits and Risks of Artificial Intelligence Tools in Workplaces’ (European Safety and Health Agency Discussion Paper, 2019).

⁶ Jeremias Adams-Prassl, ‘What If Your Boss Was an Algorithm? Economic Incentives, Legal Challenges, and the Rise of Artificial Intelligence at Work’ (2019) 41 Comparative Labor Law & Policy Journal 123.

⁷ ‘Safety by design’ emerges from the automobile, science, and medical industries, where liability questions are enormous and are related to the possibility for serious physical harm of human subjects. SbD is relatively new in technology ecosystem discussions. The Australian eSafety Commissioner has emphasised SbD as a way to minimise online threats. (However, typically, technology innovation has been coterminous with the push to ‘move fast and break things’ rather than taking risk into account early in the process of design. Even so, designing safety into management processes enacted by technology is simply not enough, because management of work and workers, and the surrounding psychosocial and power relations, are not comparable to, eg, a car crashing or a drug becoming lethal. See ‘Safety by Design Is about Making Sure That the Foundations and Scaffolds Are in Place to Build Safe and Positive Online Environments’ (*eSafety Commissioner*) <<https://www.esafety.gov.au/industry/safety-by-design>> accessed 20 January 2023.

⁸ SbD models play a limited role because they can be mainly applied by researchers involved in the design of interventions and they are not fully exploitable by OSH practitioners because they do not guide practitioners into a systematic and structured fashion in the identification of the mechanisms and the contextual factors relevant for the particular OSH intervention. The models limit themselves to provide a generic definition of mechanisms and contextual factors, assuming that practitioners will be autonomously able to identify specific mechanisms and contextual factors based on their skills and previous experience. See Donato Masi and others, ‘Design of OSH Interventions: A Model to Improve Their Actual Implementation’ (2019) 115 Safety Science 51, 51–52.

effectively manage OSH risks posed by AM, the relevant regulations must set minimum standards and procedural requirements not only during design but also during implementation and all later phases of use. In the EU context, regulation must ensure that workers in all EU Member States benefit from the same protection while working with AM systems. Minimum standards should therefore be set at EU level.

While existing and draft EU laws are relevant and potentially useful, they all leave significant AM-related OSH risks unaddressed. At least three major gaps can be identified. First, as mentioned above, AM poses OSH risks that may only become apparent in the context of use. That is, AM-related OSH risks emerge dynamically. The prevailing paradigm for existing OSH regulation, however—‘safety by design’—focuses on the design phase. Risk assessment at this phase is necessary, but not enough, and both *ex ante* and *ex post* assessment phases are necessary. Second, many of the OSH risks faced by workers resulting from AM—such as discrimination,⁹ arbitrary discipline,¹⁰ and privacy violations¹¹—fall in the domain of the psychosocial.¹² So far, however, OSH regulation does not sufficiently address psychosocial risks (PSR)—and indeed little research has focussed on AM-related PSR.¹³ Third, outside of OSH regulation, the body of regulation most obviously relevant to managing AM-related OSH risks is data protection law. However, data protection law does not account for the unique stakes and constraints faced by workers in the context of workplace data processing, including AM-related data processing. Human working subjects’ risks are quite different from other types of data subjects’ risks, such as those for consumers or citizens, because the imbalances of power between managers and workers are structural¹⁴—and while the majority of risks lie within the psychosocial realm, the impact on workers is material due to their reliance on a wage for survival. This has particular implications as cost of living and energy crises loom. For these

⁹ There are several different kinds of discriminatory biases that AM systems can perpetuate, including ‘historical, representation, technical, and emergent bias’. For a brief overview, see Alina Köchling and Marius Claus Wehner, ‘Discriminated by an Algorithm: A Systematic Review of Discrimination and Fairness by Algorithmic Decision-Making in the Context of HR Recruitment and HR Development’ (2020) 13 Business Research 795.

¹⁰ Baiocco and others (n 3).

¹¹ Peter W Cardon, Haibing Ma and Carolin Fleischmann, ‘Recorded Business Meetings and AI Algorithmic Tools: Negotiating Privacy Concerns, Psychological Safety, and Control’ [2021] International Journal of Business Communication.

¹² The empirical findings from a recent EU OSHA report indicates that the highest OSH risks resulting from the integration of AI systems into workplaces are psychosocial, which applies to automation fears in this context but can likewise be understood as significant for semi-automation of management. See Patricia Helen Rosen and others, ‘Cognitive Automation: Implications for Occupational Safety and Health’ (European Agency for Safety and Health at Work, 2022); see also Swenneke G van den Heuvel and others, ‘Management of Psychosocial Risks in European Workplaces: Evidence from the Second European Survey of Enterprises on New and Emerging Risks (ESENER-2)’ (European Agency for Safety and Health at Work, European Risk Observatory Report, 2018).

¹³ There are a number of reports on AM and OSH, but the majority are limited to investigations of platform work in the first instance; see, eg, Karolien Lenaerts and others, ‘Digital Platform Work and Occupational Safety and Health: A Review’ (European Agency for Safety and Health at Work, European Risk Observatory Report, 2021); Pierre Bérastégui, ‘Exposure to Psychosocial Risk Factors in the Gig Economy: A Systematic Review’ (ETUI, 2021) <<https://www.etui.org/publica>>. Two reports which cover the topic in more detail, in more industries, are Adrián Todolí-Signes, ‘Making Algorithms Safe for Workers: Occupational Risks Associated with Work Managed by Artificial Intelligence’ (2021) 27 Transfer: European Review of Labour and Research 433 and Phoebe V Moore, ‘The Threat of Physical and Psychosocial Violence and Harassment in Digitalized Work’ (International Labour Organization 2018).

¹⁴ For more on the limitations of data protection law in regulating AM, see Halefom Abraha, ‘Regulating Algorithmic Employment Decisions through Data Protection Law,’ elsewhere in this volume; see also Phoebe V Moore, ‘Problems in Protections for Working Data Subjects: The Social Relations of Data Production’ (2022) 1 Global Political Economy 257.

reasons, we see this as an increasingly important area for analysis and for proposals for an EU Directive on AM to address explicitly.¹⁵

This article first sets out the OSH risks posed by AM, in particular PSR, and assesses the adequacy of existing and proposed regulation in addressing these risks. It then analyses existing OSH and data protection regulations, proposed regulations governing algorithmic management and AI, and some voluntary frameworks and standards. The paper proceeds as follows. Section 2 outlines PSR posed or exacerbated by AM. Section 3 assesses existing relevant and proposed regulations in the European context. We find that these regulations are inadequate to provide sufficient protections for workers in the face of OSH risks posed or exacerbated by AM. We consider further how the legal framework at EU level can not only guarantee safe use of AM in all Member States but also how it interacts with the EU social acquis, including EU and national labour laws. We consider the extent to which existing and proposed regulatory frameworks guarantee space for social partners to retain ownership on key topics when AM is used. Section 4 considers the need for a standalone piece of legislation that would counterbalance the technical harmonisation of the Artificial Intelligence Act (AI Act), such as the hypothetical EU Directive on AM proposed by other authors in this special issue. We argue that there is indeed a necessity for this standalone legislation, and identify the key OSH content of this legislation. Section 5 concludes.

2. OSH & AM and the exacerbation of psychosocial risks

AM, in academic literature and analysis, refers to both human behaviour and technological competences. Human behaviour has already been influenced by technologies in the communication realm via social media, as well as replaced by technologies altogether; for example, in the factory setting via automation. AM is a set of technology-augmented practices that are enacted with, to some extent, human involvement. What makes AM novel—and the reason it is essential to identify ways to regulate its usage—is that there is no fixed way to predict what risks might arise before the implementation and deployment of products intended for AM. This is particularly relevant when AM products are augmented with AI, which is when human involvement is typically the most absent. It is important to note that AI and AM are not identical. AI is often understood as a technology that operates without human intervention, and its operations stand apart from other computational methods precisely because they aim to replace human intelligence with technological ‘intelligence’. One of the essential features of AI is that it adapts and evolves in a unique manner depending on the environment in which it is used. Unlike previous machines and products, AM—and particularly AM systems with AI augmentation—can directly influence power dynamics in the employment context. AM is not a traditional technology or means of production; rather, it is a semi-automated system that can ‘act’ as a manager.

AM differs from previous technologies addressed by OSH regulation in that it refers to both ongoing human behaviours and automated or semi-automated replacements for human behaviour. AM is not identical to automation, nor can it be equated with concepts in ‘datafication’ usually reserved for advertising and profiling. Therefore, protections against AM-related OSH risks require a different understanding of risks than those arising from, for example, automation of factory work. Nor is it appropriate to look at the detriments for social

¹⁵ See Jeremias Adams-Prassl and others, ‘Regulating Algorithmic Management: A Blueprint,’ elsewhere in this volume.

media users regarding anxiety surrounding relationships, likes, and pressures from advertisers to surrender data or from companies to participate in so-called ‘playbour’.¹⁶

Instead, because AM refers to how workers are managed with mechanical assistance, we should focus on OSH dimensions through the lens of how management is performed—or not performed—and how workers are impacted within the employment relationship. Given that AM refers to a mixture of machine processes that guide human behaviour *at work*, and given that workers are not subject to the same pressures that consumers or citizens face in the social relations of data production, storage, and use, we must position our arguments in ways that focus on *working data subjects* who face significant psychological and psychosocial pressures when areas of the employment relationship are semi-automated.¹⁷ Procedural protections against risks arising from algorithmic decision-making—such as the humans ‘in the loop,’ ‘above the loop,’ ‘before the loop,’ and ‘after the loop’ discussed in this issue¹⁸—must be implemented in different ways in different types of human relationships (eg, consumer with company, citizen with state), given the different power dynamics and the different salience of different types of risks in the different types of relationships. Here, we outline a series of OSH risks emerging as AM is introduced and integrated into workplace settings. We focus on psychosocial risks (PSR) because they are the least well-understood in this domain.

Psychosocial OSH risks

AM impacts workers through the creation of psychosocial OSH risks.¹⁹ Psychosociality refers to ‘the relation between intrapersonal psychological and environmental aspects’, where the term means ‘pertaining to the influence of social factors on an individual’s mind or behaviour, and to the interrelation of behavioural and social factors’.²⁰ Here we discuss threats to the psychological contract, discrimination, deskilling, worker autonomy, privacy, work acceleration, and discipline as AM-related PSR.

Psychological contract and trust

The ‘psychological contract’ refers to a set of expectations that go beyond the standard legally binding contract. Workers have a perception of what is expected of them and the obligations that the employer has toward them. These perceptions are not always entirely explicit, but there are a range of implicit promises surrounding workplaces or workspaces. Any threat to the psychological contract is a potential PSR because it may contribute to stress and anxiety.

Experimental research has documented how AM can weaken the workplace psychological contract. Tomprou and Lee, for example, investigated the impact of AM on the employee-employer relationship via five online experiments.²¹ They found that employees reported lower trust in the employment relationship when they saw increased decision-making

¹⁶ Julian Kücklich, ‘Precarious Playbour: Modders and the Digital Games Industry’ (2005) 5 *The Fibreculture Journal*.

¹⁷ Phoebe V Moore, ‘Problems in Protections for Working Data Subjects: The Social Relations of Data Production’ (2022) 1 *Global Political Economy* 257.

¹⁸ See especially Adams-Prassl and others (n 15).

¹⁹ Moore, ‘OSH and the Future of Work’ (n 5); ‘AI and Nanotech Risk Outpacing Our Safeguards’ *IOSH Magazine* (25 August 2017) <<https://www.ioshmagazine.com/ai-and-nanotech-risk-outpacing-our-safeguards>> accessed 20 January 2023.

²⁰ Adriana Dias Barbosa Vizzotto and others, ‘Psychosocial Characteristics’ in Marc D Gellman and J Rick Turner (eds), *Encyclopedia of Behavioral Medicine* (Springer 2013) <http://link.springer.com/10.1007/978-1-4419-1005-9_918> accessed 20 January 2023; van den Heuvel and others (n 12).

²¹ Maria Tomprou and Min Kyung Lee, ‘Employment Relationships in Algorithmic Management: A Psychological Contract Perspective’ (2022) 126 *Computers in Human Behavior* 106997.

power allocated to algorithmic systems as opposed to human decision-makers. This reduced trust in the employment relationship can threaten the psychological contract and thus pose increased psychosocial risks.

Discrimination, bias, and unfairness

One tendency among technologically optimistic employers and software vendors is to portray AM systems as inherently meritocratic, objective, and impartial—impossible to bribe or deceive—and as holding out the possibility for eliminating the risk of bias. However, as Aloisi and De Stefano have argued convincingly, this is ‘too good to be true’: if data that is used to train algorithms reflect discriminatory practices, then predictions and decisions from the past are reflected and therefore are likely to be reproduced.²² Biometric data gathering technologies could in theory reduce bias; eg, if an interviewee’s energy levels are low, a machine could detect this and notify the interviewer that their interview performance may not accurately signal their potential in the role. However, evidence strongly shows that hiring preferences are replicated in the way an algorithm teaches itself to identify specific candidates, as occurred in the now-infamous case of Amazon’s CV screening system.²³ If the data provided to an algorithm reflects a preexisting bias, then scores for ‘in group’ related text on job applications or in biometric data such as facial expressions are higher, and this can lead to discriminatory outcomes.²⁴ Where the sexual orientation, age, and gender cues of a new applicant do not match those of the dominant category, this can lead to discriminatory exclusion if the workforce has been populated by members of the historically advantaged demographic (in the case of Amazon’s CV screening software, white males).

Deskilling and moral deskilling

Deskilling ‘occurs when machines assume so much work previously assumed by people that workers begin to lose their acquired skill and fail to learn new ones’.²⁵ The simplification of operations can reduce the need for workers to develop or maintain skills.²⁶ Indeed, workers lose technical skills as machines complete increasingly complex tasks, and face declining wages and lost opportunities as the value of their skills decline and their capacity to practise the art of craftsmanship is subject to alienation and loss of status and meaning.²⁷ Another concern is the possibility of ‘moral deskilling’, where ‘moral skills appear just as vulnerable to disruption or devaluation by technology-driven shifts in human practices as are professional or artisanal skills such as machining, shoemaking, or gardening’.²⁸ This is particularly evident in fields or sectors that have traditionally contained an ethical dimension in the execution of work-

²² Antonio Aloisi and Valerio De Stefano, *Your Boss Is an Algorithm: Artificial Intelligence, Platform Work and Labour* (Hart Publishing 2022).

²³ Rachel Goodman, ‘Why Amazon’s Automated Hiring Tool Discriminated Against Women’ (*ACLU.org*, 12 October 2018) <<https://www.aclu.org/news/womens-rights/why-amazons-automated-hiring-tool-discriminated-against>> accessed 20 January 2023.

²⁴ Moore, ‘OSH and the Future of Work’ (n 5).

²⁵ Elizabeth E Joh, ‘The Consequences of Automating and Deskilling the Police’ (2019) 64 *UCLA Law Review* 134.

²⁶ Simon Schaupp, ‘Cybernetic Proletarianization: Spirals of Devaluation and Conflict in Digitalized Production’ (2022) 46 *Capital & Class* 11; Mohammad Hossein Jarrahi and others, ‘Algorithmic Management in a Work Context’ (2021) 8 *Big Data & Society* <<http://journals.sagepub.com/doi/10.1177/20539517211020332>> accessed 20 January 2023.

²⁷ Harry Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century* (25th anniversary edn, Monthly Review Press 1998); David Kunst, ‘Deskilling among Manufacturing Production Workers’ (2020) Tinbergen Institute Discussion Papers 19-050/VI; Richard Sennett, *The Craftsman* (Yale University Press 2008).

²⁸ Shannon Vallor, ‘Moral Deskilling and Upskilling in a New Machine Age: Reflections on the Ambiguous Future of Character’ (2015) 28 *Philosophy & Technology* 107.

related tasks, like the military, healthcare, and education. The loss of moral skills is detrimental to society at large as they ‘are a prerequisite to the cultivation of virtuous character’.²⁹ This becomes an OSH risk due to workers’ fear of job loss and alienation.

Worker autonomy

There are many ways in which ‘work decision algorithms’ negatively impact worker autonomy, thus causing further threats to OSH.³⁰ AM jeopardises ‘decision autonomy’ because ‘workers lose discretion over their work, and thereby the ability to make even small decisions about their work themselves’.³¹ Therefore, workers ‘will not be trained and rather [will] be forced to implement decisions that previously they had the power to shape’.³² AM subdues ‘value autonomy’, stripping workers of the right to exercise their own preferences in production: ‘if people analytics determines that there is a better way to perform a particular job task, the managerial imperative will of course be to deploy that task methodology across all similar positions in the organisation,’ and this will ‘limit the freedom of humans to work according to their own styles and preferences’.³³

Privacy and function creep

An arguably inherent imperative of AM is based on technological functions that can constantly (and in real time) observe and report on worker behaviours, leading to workers feeling spied upon, a clear PSR. ‘Purpose limitation’ is a feature of the rights within the GDPR, referring to the requirement for data to only be used for the purposes of intentions already indicated by the data collector and processor, avoiding function creep. This is very difficult to monitor, however, and there is likewise an ongoing issue with concerns about the ‘inferences’ that can be made based on data.³⁴ AM relies on a ‘balance between the employer’s pecuniary interests in monitoring productivity and the employees’ privacy interests’.³⁵

Discipline

The most obvious method of worker discipline by AM is termination or deactivation of the work relationship. Platform workers may be most vulnerable here, as they are often restricted by precarious employment contracts³⁶ and therefore not entitled to protections like the prohibition against arbitrary dismissal. The very real prospect of abrupt and even random termination by AM could motivate risky and harmful dynamics leading to PSR of anxiety and fear of job loss. The ‘fear of “deactivation” from the platform . . . may [even] coerce [workers] into accepting unsafe or exploitative conditions of work’.³⁷

²⁹ *ibid.*

³⁰ Charlotte Franziska Unruh and others, ‘Human Autonomy in Algorithmic Management’, *Proceedings of the 2022 AAAI/ACM Conference on AI, Ethics, and Society* (ACM 2022) <<https://dl.acm.org/doi/10.1145/3514094.3534168>> accessed 21 January 2023.

³¹ *ibid.*

³² Jarrahi and others (n 26).

³³ Brett S Sharp, ‘Policy Implications of People Analytics and the Automated Workplace’ in Ryan Kiggins (ed), *The Political Economy of Robots* (Springer 2018).

³⁴ Sandra Wachter and Brent Mittelstadt, ‘A Right to Reasonable Inferences: Re-Thinking Data Protection Law in the Age of Big Data and AI’ [2019] 2 *Columbia Business Law Review* 494.

³⁵ Ifeoma Ajunwa, ‘Algorithms at Work: Productivity Monitoring Applications and Wearable Technology as the New Data-Centric Research Agenda for Employment and Labor Law’ (2018) 63 *St Louis University Law Journal* 21.

³⁶ Janine Berg, ‘Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers’ (2016) ILO Working Papers, Conditions of Work and Employment series no 74.

³⁷ Bama Athreya, ‘Slaves to Technology: Worker Control in the Surveillance Economy’ [2020] 15 *Anti-Trafficking Review* 82.

Another discipline method is the distribution of work. AM allows sellers to connect labour services with service consumers, but ‘the structure of platform [. . .] work is far from the ideal type of a free marketplace’—because platforms facilitate these market transactions ‘within the context of technical control systems that shape and constrain workers’ choices’.³⁸ To further complicate matters, the operation of these AM systems is invisible to workers. Indeed, the ‘logic of pay and disbursement of orders is black-boxed beyond workers’ view, and subject to frequent change, [so] workers often experience the algorithm as arbitrary and inscrutable’.³⁹

Work intensification

There is a substantial ‘correlation between the existence of [worker] monitoring and workplaces where the pace of work is significantly determined by machines and computers’.⁴⁰ Thus, in practice, ‘centralised algorithmic control may also lead to work intensification and to worsened working time quality . . . [because] the number of tasks to undertake increases and/or the time to complete these tasks decreases’.⁴¹ Indeed, targets are set centrally by algorithms, leaving out workers’ specific personal situations or needs. Workers feel they must match their pace of work to what a client needs and are subject to time pressures and stress.⁴²

The distribution of jobs compels workers to meet AM-determined targets. Further, customer ratings can play an important role in shaping how work is distributed. Previous research has demonstrated that ‘workers with the best scores and the most experience tended to receive more work due to clients’ preferences and the platforms’ algorithmic ranking of workers within search results’.⁴³ This puts a great deal of pressure on workers on such platforms to ‘maintain a high average rating and good accuracy scores’.⁴⁴—

We have argued here that the use of algorithms for management is already having, and is likely to continue to have, a negative impact on workers’ health and safety. In the following section, we discuss the limitations of existing and proposed European legislation in OSH, platform work, and in the draft AI Act in protecting workers from these emerging OSH risks. In particular, as we have argued, AM poses significant psychosocial risks that are not addressed by existing or proposed regulation. We therefore join other contributors to this volume in suggesting an entirely new European Directive on Algorithmic Management. We suggest further that this Directive should contain an emphasis on OSH. Within this Directive we suggest that the ways that AM is implemented should be subject to risk assessments, which are already required by the EU OSH Framework Directive (89/391/EEC) (OSH FD)⁴⁵ and also in the Platform Work Directive (PWD), but that risk assessments should occur not only in the design phase but also throughout the course of use. The overlap with the risk assessments proposed in the AI Act draft are also relevant. Thus, the next sections examine how existing or

³⁸ Kathleen Griesbach and others, ‘Algorithmic Control in Platform Food Delivery Work’ [2019] 5 *Socius: Sociological Research for a Dynamic World* 2378023119870041.

³⁹ *ibid.*

⁴⁰ Sara Riso, ‘Employee Monitoring and Surveillance: The Challenges of Digitalisation’ (Eurofound, 9 December 2020).

⁴¹ Baiocco and others (n 3).

⁴² *ibid.*

⁴³ Alex J Wood and others, ‘Good Gig, Bad Gig: Autonomy and Algorithmic Control in the Global Gig Economy’ (2019) 33 *Work, Employment and Society* 56.

⁴⁴ *ibid.* 64; see also Alessandro Gandini, *The Reputation Economy: Understanding Knowledge Work in Digital Society* (Palgrave Macmillan 2016).

⁴⁵ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work [1989] OJ L 183/1.

soon to be adopted regulation could address the OSH risks we have emphasised, and indicate a series of suggestions for improving on these.

3. ‘One-time’ OSH risk assessments: inadequate for dynamic unknown risks of AM

Many existing and currently proposed EU instruments are relevant for addressing OSH risks raised by AM. Key examples include the OSH FD, the proposed AI Act, the draft PWD, and ISO standards such as ISO 9241-210 (on ‘Human-centred Design for Interactive Systems’) and ISO 45-003 (on ‘Guidelines for Managing Psychosocial Risks’).

However, there are four main deficiencies with how these instruments interact. First, those instruments that explicitly mention AM, such as the draft PWD, are too narrow in scope. The draft PWD in particular only applies to platform work. Second, those instruments that apply broadly, such as the OSH FD, do not explicitly address AM. Third, those instruments that apply broadly and do mention AM, such as the draft AI Act, are not designed for the organisational realities of the employment context—in particular, the power imbalance inherent to the employment relationship. Fourth and most crucially, none of these instruments account for the dynamic emergence of previously unknown OSH risks from the ongoing deployment of AM: they all follow in the SbD tradition, which effectively assumes that all crucial OSH risks can be assessed and mitigated in the design phase.

Because of its dynamic nature, AM creates new risks that are extremely difficult to predict during design and pre-deployment assessment. The dynamic nature of AM, especially but not only AI-based AM, makes it extremely challenging to plan for ‘safe outcomes’ in the design phase. As a result, it is instead necessary to devise an ongoing process that can empower affected stakeholders—especially workers and their representatives—to voice and address new risks as they arise. Because the outcome cannot be entirely determined *ex ante* in the design phase, a process must be designed to manage harms that emerge in deployment. Risk mitigation in the workplace setting must move from a ‘linear’ or ‘one-time’ paradigm to a ‘circular’ or ‘ongoing’ paradigm⁴⁶ that makes use of reporting channels for workers and ‘co-governance’ (ie, consultation, co-design, or co-determination) structures and processes.

The rest of this section proceeds in two parts. First, we discuss how the currently prevailing approach to OSH regulation, safety by design (‘SbD’), relies on a ‘one-time’ risk assessment paradigm, and explain why it is not adequate in the context of AM. We then consider the existing potentially relevant instruments (legislation and standards) from four perspectives: 1) general risk assessment, 2) worker involvement, 3) reporting channels, and 4) worker understanding. We argue that while these instruments provide some practical tools and useful inspiration, they are not adequate. The next section then proposes updates for an instrument that can adequately create safeguards given the limitations indicated.

A paradigm shift to tackle AM: from ‘safe-by-design’ to ‘design for responsibility’

SbD is the idea that providers or manufacturers can address safety issues during the research and development (R&D) phase of the product lifecycle. During the design phase, providers

⁴⁶ One way of thinking about this problem is that the SbD approach is ‘feedforward’, but what is needed is a ‘feedback’ approach that can incorporate the instability of the social world. For a deeper analysis of how these engineering concepts apply to social policy, see Per Molander, *The Anatomy of Inequality: Its Social and Economic Origins—and Solutions* (Melville House 2017).

should anticipate all foreseeable risks caused by the use or misuse of their product. The draft AI Act, especially as applied to AM (which is considered ‘high-risk’), follows this reasoning (Title III, Chapter 2).⁴⁷ Once the risks are assessed, the provider should ensure the elimination or reduction of the risks, as far as possible, through adequate design and development (Article 9(4)).⁴⁸ However, SbD is inadequate when there is a dimension of uncertainty.⁴⁹ Indeed, for new technologies that practitioners have little experience operating, and given that some risks will appear only once the technologies are in use, relying only on *ex ante* risk assessment may not be enough to guarantee safe use. This is especially true for technologies where human behaviour plays a significant role.

To render technologies safe for use, van de Poel and Robaey thus call for a shift towards ‘design for responsibility’ (DfR). According to them, the solution is to determine who should be responsible for the safety of technologies with a high degree of uncertainty:

[a solution] should not be sought in giving all responsibility for safety to the users, or other stakeholders and actors in the value chain, but rather in a model of shared responsibility for safety. Such shared responsibility may be more effective in achieving safety, as it can also tap into the resources of users and may be more fair, as it also provides opportunities to actors other than the designers to shape technology.⁵⁰

van de Poel and Robaey note that one way to achieve design for shared responsibility would be to guarantee that the user can learn about the technology and its hazards whilst using it, and can make hazard-reducing adjustments.⁵¹ So rather than simply involving users in the design phase, the authors advocate for leaving some space for them to take ownership and responsibility during implementation and throughout the course of its use. DfR could resolve one of the main criticisms against the draft AI Act and correct for the ways in which the SbD approach does not consider the rights and crucial roles of social partners (employers, workers, and their representatives).⁵² Recognising that AM involves a high degree of uncertainty during its design phase underlines the importance of having strong co-design mechanisms, not only during the initial operation of the technology in the work setting, but also on an ongoing basis.

⁴⁷ AI Act, Title 3, ch 2. In the latest EU OSH Strategic Framework for the period 2021–2027, the Commission stressed that EU OSH legislation already covers many of the risks that arise from changing industries, equipment, and workplaces. Regarding complementary legislation which could be needed, the Commission referred to the AI Act proposal as part of the legal framework addressing the risks of certain AI systems used in employment and/or worker management (Commission, ‘EU strategic framework on health and safety at work 2021-2027 Occupational safety and health in a changing world of work’ (Communication) COM (2021) 323 final, 7). However, the primary aim of the AI Act is not to make AI safe for workers; it is to guarantee or monitor safe entry into the European market. While the Commission recognises that AI can help reduce risks of dangerous tasks, it also stresses that new technologies pose a number of challenges (ibid 6).

⁴⁸ Michael Veale and Frederik Zuiderveen Borgesius, ‘Demystifying the Draft EU Artificial Intelligence Act: Analysing the Good, the Bad, and the Unclear Elements of the Proposed Approach’ (2021) 22 *Computer Law Review International* 97, 103 [noting that ‘providers of high-risk AI systems must create a quality management system, a standardised practice already widely present in firms. The AI Act specifies what this entails, featuring a documented risk management system updated throughout the system’s lifetime.’ The problem with the discussion of a required risk management system is that there is no real discussion of the process of learning from post market application; no address of liability where AM creates harm; and no guarantee that a system will be updated based on real feedback via/with worker consultation, nor recognition of OSH risks that are not immediately observable, such as PSR].

⁴⁹ Ibo van de Poel and Zoë Robaey, ‘Safe-by-Design: From Safety to Responsibility’ (2017) 11 *NanoEthics* 297, 298.

⁵⁰ *ibid* 303.

⁵¹ *ibid* 304.

⁵² Aude Cefaliello and Miriam Kullmann, ‘Offering False Security: How the Draft Artificial Intelligence Act Undermines Fundamental Workers Rights’ (2022) 13 *European Labour Law Journal* 542.

That is, consultation and co-design activities should take place *any time* changes are made to the system that may change the risks associated with its operation. In the context of AM, this would mean that (a) workers must be informed about the specific AM systems operating in their workplace and the potential related hazards—eg, PSR—that might arise, and (b) be provided with opportunities, channels, and mechanisms—for example, co-design and formal consultation procedures—to adapt its usage to avoid or reduce those hazards.

General occupational risk assessment

The ‘risk management’ approach embodying the general principles of prevention are at the centre of the EU OSH Legal Framework, in particular the OSH Framework Directive. Under the OSH FD, the employer should assess the risks related to all aspects of work and adopt a coherent prevention plan to eliminate or mitigate risks whilst prioritising collective over individual measures. The measures should be adopted and implemented after consultation with workers or their representatives. These principles are not written as being specific to AM in the OSH FD, but the requirements remain relevant. Indeed, workers or their representatives should be consulted when an employer plans to introduce new technology into the workplace (Article 6(3)(c)). The prevention plan should cover ‘technology, organisation of work, working conditions, [. . .] and the influence of factors related to the working environment.’

When applied to AM, these provisions could be combined with other instruments. ISO standard 45-003 on ‘Guidelines for Managing Psychosocial Risk’, for example, includes a section on managing PSR. This section explicitly mentions workload and work pace—such as high levels of machine pacing and high levels of repetitive work—and ‘misuse of digital surveillance’ in the context of worker supervision. Relatedly, software is explicitly mentioned in Annex 1(3) of the Directive on Display Screen Equipment on ‘operator/computer interface.’⁵³ The Display Directive requires that when designing, selecting, commissioning, and modifying software, employers must ensure that software is adaptable to the worker’s level of knowledge or experience, and that systems display information in a format and at a pace which are adapted to workers.

These provisions are relevant to AM even though they do not refer explicitly to AM. However, they are largely linear in their approach to risk assessment and mitigation. That is, the obligations of evaluation and prevention of the risks take place at a few specific moments in time (‘designing, selecting, commissioning, and modifying software’). Although the inclusion of an obligation to assess new risks when ‘modifying’ software is helpful, these provisions do not take into consideration that the impact of AM on workers can change over time without proactive modification of the software, simply due to the ongoing and dynamic processing of data by AM.

The only OSH provision making an explicit reference to AM in EU law is seen within the draft PWD, in Art. 7:

1. Digital labour platforms [shall] **regularly** monitor and evaluate the impact of individual decisions taken or supported by automated monitoring and decision-making systems, as referred to in art 6(1), on working conditions
2. Without prejudice to Directive 89/391/EEC and related directives in the field of safety and health at work, digital labour platforms shall:

⁵³ Council Directive (EC) 90/270 of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment, ‘Display Directive’.

- (a) evaluate the risks of automated monitoring and decision-making systems to the safety and health of platform workers, in particular as regards possible risks of work-related accidents, psychosocial and ergonomic risks;
- (b) assess whether the safeguards of those systems are appropriate for the risks identified in view of the specific characteristics of the work environment;
- (c) introduce appropriate preventive and protective measures.

They shall not use automated monitoring and decision-making systems in any manner that puts undue pressure on platform workers or otherwise puts at risk the physical and mental health of platform workers.

The draft PWD implies that evaluation of AM and its impact on OSH should be ‘regular.’ Considering the fact that AM exacerbates PSR, this should be interpreted to mean that risk assessments must be conducted in a dynamic way, in response to requests from workers and their representatives. However, even if the PWD is adopted in full, it has limited scope, because it covers only ‘platform workers’.⁵⁴ There is no legally binding provision that explicitly mentions AM as posing a hazard for OSH; a ‘safe’ implementation of AM does not necessarily mean safe functioning over time. AM is a dynamic process with an element of uncertainty not only during the design, conception, and R&D phase, but also during implementation in the workplace. In mitigating OSH risks posed, we need not only consider that the general principle of prevention applies to AM; we must also take account of the specific, dynamically evolving nature of AM, and the likely emergence of unanticipated OSH risks. A good method by which to do so is to establish communication channels by which workers and their representatives can trigger efforts to address them.

Workers’ involvement and communication channels regarding specific AM decisions

The consultation of workers and representatives should be a central point in the development of a prevention plan to eliminate or mitigate OSH hazards, but there is, currently, no legal mechanism available to workers’ representatives to trigger a new evaluation of risks. Therefore, the collective (internal) involvement of workers in the deployment of AM will be limited. This section looks at the possible alleviations for this limitation.

Article 13(2)(d) of the OSH FD could be relevant. Here, workers have the obligation to ‘immediately inform the employer and/or the workers with specific responsibility for the safety and health of workers of any work situation they have reasonable grounds for considering represents a serious and immediate danger to safety and health and of any shortcomings in the protection arrangements.’ As previously discussed, even if a managerial algorithm is designed with OSH considerations, the output of the AM system might have a direct impact on OSH. The question remains: to whom should workers report a deficiency of the algorithm? Should it be the worker working directly with the technology; should it be a manager who oversees the entire work process; or should it be a trained health and safety representative? The human overseeing the algorithm may even be the same human with the power to overrule its outputs. A combined reading of the requirement for human oversight seen in the draft AI Act and Article 13(2)(d) of the OSH FD should lead to the obligation for the *employer* to establish a channel of communication if an algorithm places workers in situations of serious and immediate danger. However, such a situation is only likely to occur in a small number of cases, simply because there are not very many cases where it is obvious that an algorithm creates immediate,

⁵⁴ Aude Cefaliello, ‘An Occupational Health and Safety Perspective on EU Initiatives to Regulate Platform Work: Patching up Gaps or Structural Game Changers?’ (2023) 1 Journal of Work Health and Safety Regulation 67 (forthcoming).

observable danger such as physical injury or another more obvious harm. Algorithms may be used for disciplinary purposes such as deactivation, discussed above, which could be argued to put a worker in immediate danger; eg, because it results in immediate loss of income. However, it is difficult to prove that this is an OSH risk rather than simply a wage reduction. So even with such regulations, this combination of laws would affect only a minority of the workers who interact with algorithms. It is unlikely that AM will lead to immediate danger that can be immediately decipherable. Instead, we can argue it may lead to serious and long-lasting danger that PSR produces, such as the mental health degradation that anxiety eventually causes.

To address more structural OSH issues, the OSH FD provides workers and their representatives with the right to appeal to the authority responsible for OSH protection at work, if they consider that the measures taken, and the means employed by the employer, are inadequate for the purpose of ensuring OSH.⁵⁵ Labour inspectorates seem to be the authority responsible for responding to the OSH hazards caused by AM. This would offer an external channel of reporting. Alternatively, the PWD and the Social Partners' Framework Agreement on Digitalisation⁵⁶ raise an important possibility for internal complaint handling procedures. The proposed PWD provides for 'human review of significant decisions' (Article 8). Similarly, the Framework Agreement on Digitalisation states that an affected worker should be able to make a request for 'human intervention,' or be able to contest specific decisions made by AM systems. These provisions should be clarified to ensure that they apply to decisions posing OSH risks. As with other previously discussed aspects, however, the main problem is that the proposed PWD applies only to platform work, and the Framework Agreement is entirely voluntary. Therefore, at the very least perhaps, mandatory obligations are needed that would require all employers to provide communication channels for workers to initiate timely reviews of AM decisions posing OSH risks.

Workers' understanding of AM

In the deployment and operation of AM, workers' understanding of the technology will give them a better sense of ownership and involvement, which is crucial to ensuring safety. There is a risk that the lack of understanding of often-opaque systems might lead workers to resist them, including attempts to sabotage them.⁵⁷ To avoid such resistance, there is a need to guarantee that workers understand (1) what the AM systems are doing and how they work; (2) the risks that might be linked with the deployment and operation of AM (especially but not limited to PSR such as stress and anxiety); and (3) what they can do to mitigate these risks.

The OSH FD already requires employers to inform workers about hazards in general and associated prevention plans. With regard to AM, the (voluntary) Framework Agreement on Digitalisation includes a commitment from the social partners that the introduction of AI systems will be transparent and explicable and entail effective human oversight. More recently, Article 6 of the PWD requires platforms to inform workers of automated decision-making systems which are used to take or support decisions that significantly affect working conditions, in particular those influencing OSH. These provisions exhibit a now familiar pattern: the applicability of existing OSH regulation to AM systems is unclear; the provisions of the PWD are a good start, but only apply to platform work; and the Framework Agreement on Digitalisation is good, but is entirely voluntary. A Directive on Algorithmic Management can take lessons from, and improve on, these instruments.

⁵⁵ OSH FD art 11(6).

⁵⁶ 'European Social Partners Framework Agreement on Digitalisation' (BusinessEurope, SMEUnited, CEEP and the ETUC 2020).

⁵⁷ Stacey and others (n 2).

4. What should be included in an EU Directive on Algorithmic Management at Work, from an OSH point of view?

There is a need for horizontal, legally binding provisions explicitly referring to AM. These provisions should guarantee the application of the general principles of risk prevention to mitigate AM-related risks, including but not limited to PSR, while also accounting for the dynamic nature of AM. They should establish both internal and external, as well as collective and individual, reporting mechanisms. However, such provisions would provide truly adequate protection only if complemented by other legislative instruments, such as a European Directive on Psychosocial Risks at Work. Indeed, it might not be appropriate to have detailed provision on PSR in a Directive on AM because adequate provisions to address PSR are needed beyond the situations involving AM (even if such provisions would also be applicable to AM).

The increased use of AM will exacerbate existing OSH risks,⁵⁸ but as outlined above, it is also likely to create new risks particularly in the PSR domain, altering the psychological contract, occasioning moral deskilling, weakening workers' autonomy, and inducing work intensification. Shaping the way AM is designed and used is crucial to address and mitigate these risks. In that respect, the existing EU OSH FD already applies to AM, but not in a satisfactory manner. We have already argued that we need additional legal provisions, but the question remains: what exactly should these provisions contain? In other words, would an OSH provision for an AM Directive be sufficient to address all the regulatory gaps discussed?

This special issue is centred on the question whether an AM Directive in the wider sense is necessary. Some of the proposed provisions of the Blueprint ARM Directive⁵⁹ would be relevant for OSH considerations. Indeed, Policy Option 2 of the wider Blueprint aims at ensuring that AM systems are only utilised for limited purposes, only when it is necessary for performing the employment contract or for compliance with a legal obligation to which the employer is subject, and only in a proportionate manner.⁶⁰ This provision would likely limit the risk that an AM system initially deployed for the purpose of managing or mitigating OSH risks is later used for worker monitoring, evaluation, and discipline. The necessity and the proportionality of an AM system—ie, the extent to which it meets the requirements imposed by Policy Option 2—should be considered during the consultation of the workers or their representatives. The assessment of potential OSH risks posed by algorithms should be considered at the same time.

⁵⁸ Bérastégui (n 13).

⁵⁹ Adams-Prassl and others (n 15).

⁶⁰ *ibid.* 'Policy Option 2: Specific and Limited Legal Bases' provides as follows:

Establish that the deployment and operation of an algorithmic management system shall be lawful only if:

- a. The deployment and operation of the system meets at least one of the following requirements:
 - i. It is intrinsically connected to and strictly necessary for the performance of the contract of employment or in order to take steps which are strictly necessary for entering into a contract of employment;
 - ii. It is necessary for compliance with a legal obligation to which the employer is subject; or
 - iii. It is necessary in order to protect the vital interests of the worker or of another natural person.
- b. The algorithmic management system is capable of achieving these goals in a proportionate manner.

Additionally, Policy Option 3 suggests that ‘establishing transparency requirements for employers and rights of information access for individuals’ is essential.⁶¹ However, we argue that the existence of AM; the nature, purpose and scope of AM; the input; the logic used; the outputs; the existence and extent of human involvement in decision-making; and perhaps most importantly, the consequences, should be the subjects not only of information passed on, but also *subjects for consultation* with the workers and their representatives. Indeed, the details of how these elements are implemented can create PSR and affect OSH. Thus, these aspects should be evaluated and, when necessary, mitigation and collective preventive measures should be discussed with workers. A requirement for consultation about the impact of AM on OSH would complement Policy Option 7 on the right to consultation regarding algorithmic management systems.⁶²

⁶¹ *ibid.* ‘Policy Option 3: Individual Notice Obligations’ provides as follows:

1. Establish obligations for employers to notify affected individuals of algorithmic management systems. Specifically:
 - a. Information regarding the use of algorithmic management systems shall be provided by the employer to all affected individuals at three points in time in relation to the employment relationship:
 - i. at the earliest technically feasible time during the employment application process;
 - ii. at the point at which a contract of employment is offered to a prospective employee; and
 - iii. at regular intervals throughout the duration of the employment relationship (at least once a year), in the event of a change in the risk posed by the system, and at any time upon request.
 - b. The information to be provided could include:
 - i. the existence of any algorithmic systems used in the process of monitoring, evaluating, or managing individuals or work, including, but not limited to, fully automated decision-making systems and scoring or evaluation systems whose outputs are used by human decision-makers;
 - ii. the nature, purpose, and scope of the systems used, including the specific decisions and categories of decisions they take or support (such as selection, recruitment, assignment of tasks, productivity control, promotions);
 - iii. all inputs, criteria, variables, correlations, and parameters used by the systems in producing those outputs;
 - iv. the logic used by the systems to produce their outputs, including, but not limited to, weightings of different inputs and parameters;
 - v. the outputs produced by the systems (eg, decisions, recommendations, scores);
 - vi. the consequences that the decisions taken or assisted by the algorithmic management systems may have on the individual;
 - vii. the existence and extent of human involvement in decision-making processes involving the systems, and the competence, authority, and accountability of the human persons involved;
 - viii. if the systems are provided by or sourced from a third party (eg, a software vendor or an open-source software package), or operated by a third party, the name of the third party and the name or common description of the software;
 - ix. information about individuals’ rights to receive information about the systems and decisions (or other outputs produced by those systems) affecting them, to request human review of the decisions or other outputs, and to contest the decisions or other outputs; and information about how to exercise those rights;
 - x. any other available avenues for recourse, such as rights to engage with relevant competent authorities (such as the data protection officer, worker representatives, data protection authority, labour body, or equality body) or to judicial remedy;
 - xi. contact information for the relevant competent authorities.
2. The notice shall be concise, transparent, and intelligible, using clear and plain language, and made available in an easily and continuously accessible electronic format.

⁶² *ibid.* ‘Policy Option 7: Information and Consultation Rights’ provides as follows:

Establish a formal right to information and consultation (for worker representatives) regarding the design, configuration, and deployment of algorithmic management systems, as well as regarding any changes to configuration that trigger individual notifications as set out in Policy Option 3.

In the EU context, this could be achieved by adding a new point (d) to Article 4(2) of Directive 2002/14, such as:

Therefore, an additional OSH-specific provision could be added to the proposed AM Directive. Our suggested wording for the OSH provisions, informed both by the OSH FD and the PWD, is as follows:

1. The employer shall regularly monitor and evaluate the impact of automated monitoring or decision-making systems on working conditions. There will be a mandatory assessment of associated OSH risks every time the employer takes steps to introduce the use of automated monitoring or decision-making systems, or takes steps to make changes likely to have significant impacts on OSH risks faced by workers.

2. Without prejudice to Directive 89/391/EEC and related directives in the field of OSH, the employer shall:

(a) evaluate the risks of automated monitoring and decision-making systems to the safety and health of workers, in particular as regards possible risks of work-related accidents, psychosocial and ergonomic risks;

(b) assess whether the safeguards of those systems are appropriate for the risks identified in view of the specific characteristics of the work environment;

(c) introduce appropriate preventive and protective measures;

(d) introduce internal and external reporting mechanisms, as defined in directive (EU) 2019/1937, when workers have reasonable grounds to believe that automated monitoring or decision-making systems represent a potential risk for their health and safety.

Employers shall not use automated monitoring or decision-making systems in any manner that puts undue pressure on workers or otherwise puts at risk the physical or mental health of workers.

3. The employer shall ensure that the planning and introduction of automated monitoring and decision-making systems are the subject of consultation with workers and/or their representatives, as regards the consequence of the choice of software, the working conditions and the working environment for the safety and health of workers.

4. Workers and/or their representatives are entitled to appeal, in accordance with national law and/or practice, to the authority responsible for safety and health protection at work if they consider that the use of automated monitoring or decision-making systems employed by the employer is either inadequate for the purposes of ensuring safety and health at work, or places their health and safety at risk of psychological or physical damage.

The employer shall ensure that a formal internal reporting channel exists through which workers or their representatives are able to submit their observations about the risks regarding the use of automated monitoring or

(d) information and consultation on decisions regarding the development, procurement, configuration, and deployment of algorithmic management systems, as well as any changes to the system or its configuration that affect, or can be expected to affect, working conditions.

Information and consultation rights are a minimum requirement. In Member States where existing worker governance rights, such as codetermination, go beyond information and consultation, algorithmic management should be explicitly added to the obligatory scope of those rights.

decision-making systems to the employer and to the competent authorities, at any given time.

Whenever workers' reports indicate a risk for significant impact on workers' health and safety, the employer shall assess the current and potential OSH impacts by the automated monitoring and decision-making systems as currently deployed and configured. The assessment process shall include information and consultation of worker representatives, or, if no representatives exist, of workers.

5. The employer should ensure sufficient human resources for monitoring the impact of automated monitoring and decision-making systems in accordance with this article. The persons charged by the employer with the function of monitoring shall have the necessary competence, training and authority to exercise that function. They shall enjoy protection from dismissal, disciplinary measures or other adverse treatment for overriding automated decisions or suggestions for decisions.

Considering that such provisions would complement the proposed requirement for 'Algorithmic Management Impact Assessments' (ARMIA) (Policy Option 8), Policy Option 8 could explicitly mention the obligations of evaluation of and consultation regarding the risks related to AM for OSH.⁶³ It would also have the benefit of re-emphasising the importance of the general principles of prevention (and OSH duties) of the OSH FD to situations involving the use of AM.

⁶³ *ibid.* 'Policy Option 8: Impact Assessments' provides as follows:

Employers should carry out annual 'algorithmic management impact assessments' (ARMIA) to evaluate the impacts of algorithmic management systems on working conditions.

- The ARMIA could include:
 - all 'system level' information which is to be provided to individual employees and applicants;
 - a description and evaluation of the relevant impacts and risks, by reference to quantitative information about the operation of the systems where relevant;
 - a description and assessment of any retained or new safeguards adopted to mitigate those impacts and risks;
 - an evaluation of the effectiveness of new and existing safeguards, including an assessment of whether they are appropriate for the impacts and risks identified;
 - a description of consultation carried out with workers and their representatives, and of the changes made in response to views expressed.
- Working conditions should be defined to include at least:
 - workers' access to work assignments, their earnings, their occupational safety and health, their working time, their promotion and their contractual status;
 - evaluation of risks to the safety and health of workers, in particular regarding possible risks of work-related accidents, psychosocial, and ergonomic risks;
 - other working conditions regulated in domestic law.
- Employers should consult worker representatives when identifying the risks and possible safeguards, and consider and include the views of worker representatives as part of the ARMIA.
- There should be clear publication requirements for the ARMIA:
 - The ARMIA is to be made publicly available, subject to redaction of confidential technical and commercial detail.
 - The full (unredacted) ARMIA is to be available to worker representatives and regulatory bodies, with suitable measures to protect confidentiality.

5. Conclusion

In this article, we presented a new set of considerations for discussions around the creation of an AM Directive. We have stressed that AM systems represent a risk to OSH on two grounds. Firstly, the impact of AM on managerial practices and work organisation can exacerbate existing risks, as well as create new ones, particularly when it comes to PSR. Secondly, the gathering of data necessary for the functioning of AM can also be a source of stress and anxiety due to the opacity of the systems, fear of and practices of real-time activities of constant surveillance, unpredictability of the software, new pressures on the psychological contract, mistrust, and pressures to overwork. This paper has focused on the managerial dimension of AM and has looked at the limitations on regulation that, while leaning in the SbD direction, simply cannot prevent the worst impacts of AM on workers which lie within the psychosocial domain. We have, therefore, suggested potential ways to prevent and mitigate in particular the psychosocial OSH risks faced by workers with the discussion of a new AM Directive.

Future research should examine in particular to what extent workers, as data subjects with some further protections in labour law and other laws, experience the impact of emerging OSH risks due to AM, and should suggest legal provisions to address it. One approach to this project could be to enhance existing legislation. As an input to the project of developing proposed enhancements, future research could systematically map how existing legislations in different bodies of law work together to protect workers against OSH risks potentially arising from, or exacerbated by, AM, especially PSR. Existing relevant legislation includes not only the regulations analysed in this paper, but also other labour laws—such as the Working Time Directive—and data protection regulations, such as, for example, the data protection impact assessments required by Article 35 GDPR. Given that some of the worst new OSH risks posed by AM are PSR, perhaps further creative thinking around such aspects as workers’ ‘right to personality’ as found within Article 22 of the Universal Human Rights Declaration, should be revisited to defend workers’ rights to a life outside of quantification. This would aid an examination of whether it is possible to conduct risk assessments and gather information during different consultation phases.⁶⁴ Rather than focusing on procedures that would simply help workers to supposedly cope with the negative effects of AM, or remaining limited by the mainstream SbD method, we must find ways to focus on the causes of risk as early as possible to reach effective prevention and to guarantee safe and healthy application of AM for workers.

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⁶⁴ See Antonio Aloisi, ‘Regulating Algorithmic Management at Work in the European Union: Data Protection, Non-Discrimination and Collective Rights’ [2023] *International Journal of Comparative Labour Law and Industrial Relations* (forthcoming).