

ARTIFICIAL INTELLIGENCE FOR WORKER MANAGEMENT: PREVENTION MEASURES

Building on its foresight work, in 2020 the European Agency for Safety and Health at Work (EU-OSHA) initiated a four-year research programme on digitalisation and occupational safety and health (OSH). The aim of this programme is to support evidence-based policy-making by providing deeper insights into the consequences of digitalisation on workers' health, safety and wellbeing and how these are addressed at the research, policy and practice levels, as well as by describing examples of successful practices.

Complementing the findings presented in EU-OSHA (2022a), this policy brief is based on research findings extensively discussed in EU-OSHA (2022b) and focuses on the prevention measures and related recommendations, while a separate policy brief (EU-OSHA, 2022c) discusses OSH risks and opportunities of artificial intelligence (AI)-based worker management (AIWM) systems, as presented in EU-OSHA (2022a).

AIWM is an umbrella term that refers to a worker management system that gathers data, often in real time, on the workspace, workers, the work they do and the (digital) tools they use for their work, which is then fed into an AI-based model that makes automated or semi-automated decisions or provides information for decision-makers on worker management-related questions (EU-OSHA, 2019; European Commission, 2021; European Parliamentary Research Service, 2020; High-Level Expert Group on Artificial Intelligence, 2019a). It is one of the recent developments in the workplace that presents opportunities but also risks and challenges for workers' safety and health.

AIWM systems in the workplace can provide potential opportunities to improve OSH, as they can be used to improve workplaces' hazards monitoring or workers' mental health monitoring, representing an important chance to improve the health, safety and wellbeing of workers. For example, an AIWM system that directs workers might at the same time monitor their posture, alerting them of poor postures and of the increased risk of developing a musculoskeletal disorder (MSD). Similarly, such systems might also monitor workers' stress or risk of burnout or bullying by analysing their body language, speech patterns or writing patterns. AIWM systems can also be used to promote engagement and satisfaction in workers by, for example, fostering workers' easy communication and cooperation on tasks. In addition, AIWM may allow workers to personalise their workstation and/or their work based on their needs: an AIWM system can be used to identify if workers have ailments or impairments and to assign them work tasks or a schedule that is more appropriate and therefore meet the needs of the affected workers. Finally, AIWM systems might also help with designing and conducting OSH training and can support the design of OSH strategies, as they can be based on the data on the working environment, workers and the way they work, which these systems normally collect.

However, the use of AI to manage workers also poses numerous risks to OSH, especially in terms of psychosocial risks. AIWM systems can increase work intensity and the speed of work, as when they are used to direct workers, they might force workers to not take breaks or to work at high speed. AIWM systems can also significantly reduce the autonomy and the control workers have over their work, leading to high levels of stress and sometimes lower productivity, poor performance and increased levels of sickness absences. Furthermore, those AIWM systems that monitor and evaluate worker performance might create performance pressure. In turn, this might lead to health issues in workers, such as an increased risk of MSDs, or an increase in workers' exhaustion, accidents, stress, anxiety and fear of losing their jobs. Some AIWM systems, such as those that exercise a strict control on workers, are thought to dehumanise workers: such systems might 'datafy' workers, who become an object of data collection, and force them to work like machines, leading to decreased cognitive and intellectual capacities and creative thinking, a loss of autonomy, and a lack of independent and critical thought. This can result in work-related stress, fatigue, exhaustion, burnout, anxiety or fear of losing their job, techno-stress, techno-anxiety and techno-fatigue. Finally, intrusive AIWM systems that are based on intensive monitoring of workers can lead to collecting private and sensitive data and blurring of lines between work and private life. Such systems might also lead to discriminating against some workers, if the system is based on biased data that gives preferential treatment to, for example, workers of a specific age, ethnicity or gender.

Prevention of OSH risks stemming from AIWM systems

When introducing AIWM systems in the workplace, a precautionary principle is advised. Often, given the newness of the technology, it is impossible to predict all risks that might arise due to the use of an AIWM system. Hence, a human-centred approach should be adopted to carefully inform all the stages in designing, developing, integrating, using and assessing AIWM systems.

EU-OSHA (2022a) suggests that a strong ‘prevention through design’ approach that integrates a human-centred approach in the design and usage of AIWM is needed. AIWM should be designed, implemented and managed in a trustworthy, transparent, empowering and understandable way, guaranteeing workers’ consultation, participation and equal access to information, as well as putting humans in control, and therefore ensuring that AIWM is used not to replace workers but to support them. This can be achieved through different means, including open and effective dialogue, worker training and active participation in the development, implementation, use and evaluation of such systems, increasing awareness of relevant stakeholders (for example, developers, workers, employers) on how AIWM systems might negatively affect OSH, and creating a strong ethical framework describing how AIWM should be developed, implemented and used, as well as ensuring compliance with existing legal provisions applicable to AIWM.

Effective workers/employer dialogue and workers’ participation

Human-centred AIWM systems should be pursued by organisations fostering effective dialogue between workers, employers and AIWM systems developers (where relevant), and – most importantly – ensuring workers’ involvement and participation in all stages of the design, development, implementation and assessment of AIWM systems in the workplace. Workers’ participation is considered by most of the consulted experts the cornerstone of preventing the negative impacts of AIWM on OSH and identifying the possible opportunities that come with them. That implies that workers should be at the table when deciding on safeguarding workers’ privacy and data protection, addressing surveillance, tracking and monitoring, making the purpose of AI algorithms transparent, ensuring the exercise of their right to explanations regarding decisions made by algorithms or machine learning models, and ensuring that workers’ safety and health is at the forefront of the discussion. This will allow to improve transparency, fairness, data privacy, trust, accountability and OSH within an organisation when using AIWM.

Considering the implications of AIWM for OSH at the early stages

It is also important to highlight that, in general, considerations on how AIWM can affect OSH should already be taken into account at the research and design phase of such systems. The key aspect here is that it is important to understand the original purpose for which AIWM systems are being introduced in workplaces (e.g. improving productivity, efficiency, cooperation between workers) and if this can pose risks to OSH. Hence, to ensure that AIWM systems do not lead to negative OSH effects, such systems should predominantly support and protect humans, ensuring their safety, sustainability and reliability (i.e. making sure that such systems do not make mistakes that might harm workers). In other words, newly designed AI-based systems need to be integrated into work environments in such a way that all their configurations focus on the health, safety and wellbeing of workers (EU-OSHA, 2018).

Risk assessment of AIWM in all stages

According to interviewed experts, an advanced risk assessment of AIWM needs to be conducted not only when the AIWM systems are deployed in the workplace (e.g. as part of the workplace risk assessment) but also at the earlier design and development stage by developers. The assessment should focus on the full range of possible impacts in terms of OSH challenges and risks, as identified and described in EU-OSHA (2022b), but also cover the opportunities and advantages offered by AIWM. In addition, given that AIWM systems are able to evolve and self-learn, a systematic approach of analysing AIWM and its effect on OSH is crucial. That is, the assessment of such systems should be carried out periodically, with the involvement of workers, to ensure that previously safe systems have not become harmful over time.

Skills and training for workers to understand and safely use AIWM systems

Some workers might lack the necessary skills and knowledge to fully understand AIWM systems and their potential risks, which limits how much they can contribute to ensuring ethical and transparent development, implementation and assessment of such systems. Because of this, experts recommend

providing relevant training for workers, which should focus on providing workers with sound awareness, knowledge and understanding of how AI works and how to work alongside it, and foreseeing how AI can change employees' tasks and roles at work, as well as the impact of AI on their health and career, are also crucial (Ponce del Castillo, 2020). These educational efforts should also provide workers with the know-how on how to challenge the decisions/recommendations made/proposed by an AI, or AIWM, system. This is also highlighted by Ponce del Castillo (2020) who emphasised that purely obtaining technical skills is insufficient. In addition, upskilling and reskilling efforts, according to several interviewed experts, should not solely be focused on workers but also on trade unions, employers' confederations and developers of AI-based systems. Education efforts should also focus on helping the older generation understand these new systems, as they might go against them due to the fact that they might be generally averse to new technologies and, due to this lack of knowledge, they might also feel anxiety, low self-esteem and/or insecurity (Alcover et al., 2021). Keeping this in mind, some interviewed experts recommended that special training with a focus on OSH should be compulsory for all workers and employers (companies) who deploy and use AI-based systems.

Developing an EU-level ethical framework

Ensuring that AIWM does not lead to negative OSH effects can be fostered, as highlighted by several interviewed experts, through the development of an EU-level ethical framework for digitalisation that would dictate how AIWM, and AI-based systems in general, can be used in the workplace. More specifically, interviewed experts considered that there are ethical ways to adopt and implement AIWM systems to promote safety and health at the workplace. This is supported by several publications (e.g. Abdullah, 2019), some of which even provide proposals on what such an ethical framework could look like (e.g. High-Level Expert Group on Artificial Intelligence, 2019b).

Recommendations

In order to address the risks related to the implementation of AIWM systems in the workplace, a number of recommendations for better prevention measures and to make the most of AIWM systems in terms of OSH improvements can be formulated.

Recommendation 1: AIWM systems need to be based on a human-centred approach

AIWM systems must be designed, implemented and managed to be safe and transparent, guaranteeing workers' consultation, participation, equal access to information at all stages, and making sure that humans are in command at any time. To ensure this, close and effective dialogue between workers and employers and collaboration between researchers, developers, industry, social partners and governments on research and innovation in designing AIWM are needed and should be actively pursued.

Recommendation 2: Risk assessment must be tailored to AIWM systems

Given the novelty of AIWM, risk assessment must cover all of the work-related factors, and it should be carried out together with specialists in the programming of algorithms in order to address and consider the existence of uncertainties and ascertained risks. In this regard, it seems necessary to develop standardised technical procedures for the risk assessment of AI-based systems based on sufficient scientific endorsement. The analysis should also follow a holistic approach, in order to address the possible risks of AIWM on OSH at different levels, such as at the specific job, organisation, sector, region or country. In addition, given that AIWM systems are able to evolve and self-learn, the assessments of such systems should be carried out periodically.

Recommendation 3: Raising awareness and sharing knowledge on AIWM systems

Raising awareness and sharing knowledge on AIWM systems usage and the related implications for OSH among employers, human resources departments, workers and their representatives, OSH actors including labour inspectorates and AIWM systems developers is of utmost importance. There is a clear need to provide training for managers and workers about AIWM systems, focusing on how these can affect OSH and how to prevent related risks. Upskilling and reskilling efforts should go beyond simply giving technical knowledge to workers and should focus on providing workers with sound awareness, knowledge and understanding of how AI works and how to safely work alongside it, and foreseeing how AI can change employees' tasks and roles at work, as well as the impact of AI on their health and career. Education efforts should also not solely focus on workers but also on trade unions, employers and their confederations, and developers of AI-based systems. Regarding support systems, workers

should have the means to request and get support on different issues related to AIWM and its possible effects on OSH.

Recommendation 4: Developing an EU-level ethical framework

Interviewed experts also emphasised the need for the development of an EU-level ethical framework that would dictate how AIWM, and AI-based systems in general, can be used in the workplace. At the same time, many experts agree that ethical frameworks alone will not be sufficient, and compliance with existing legal provisions applicable to AIWM (such as OSH legislation, the General Data Protection Regulation, or GDPR, forthcoming Artificial Intelligence Act and anti-discrimination law) should be ensured.

A number of additional recommendations relate more directly to the research and knowledge gaps that were identified. Overall, it is worth highlighting that in order to reduce and manage risks and make the most of the opportunities for OSH stemming from AIWM systems, it is crucial to rely on robust and evidence-based research, which will allow to design and implement informed interventions at workplace level and also policy and regulations at national or even EU levels. Research specifically focusing on the effects of AIWM on OSH, especially that based on empirical evidence, is rather limited, and a number of gaps and research needs exist, as pointed out by interviewed experts but also in relevant academic literature (e.g. European Commission, 2013; Kagermann et al., 2013).

Recommendation 5: Conducting interdisciplinary and holistic research on AIWM and OSH

More interdisciplinary and holistic research on how AIWM might affect OSH should be undertaken. The holistic approach should include, but should not be limited to, analysing how AIWM might affect OSH in general terms, how negative effects of OSH can be mitigated through a transparent and ethical design, development, implementation and analysis of AIWM systems, how to ensure that AIWM systems do not collect data on workers beyond what is needed for their functioning, how to help workers exercise their legal rights to prevent such systems from collecting unnecessary private information and how to help them to challenge the recommendations and decisions made by such systems, how to mitigate the negative effects of AIWM on OSH at the development stage, and more.

Recommendation 6: Include the human-in-command approach in the research on AIWM

Research should focus on identifying to what extent humans are kept in command and AIWM systems are used to support workers rather than replace them and that their deployment does not lead to OSH risks. More focused research would allow to improve existing regulations, which have many drawbacks, including not being based on social dialogue, seldom covering workers, not including a strong accountability clause of who is to blame when AIWM systems lead to harm, and more, by ensuring that workers are always kept at the centre of them, as stated by several interviewed experts and the literature (e.g. De Stefano, 2021; Ponce del Castillo, 2021).

Recommendation 7: Consider how business management models and AIWM interact

More research is needed to understand whether existing business management models are sufficient to prevent and manage the OSH risks that AIWM might bring. As the adoption of an AIWM system often requires changes to the business management model, it is not 'a given' that the interaction between the AIWM system and the existing business management model will not lead to OSH risks. Because of this, research should focus on evaluating if currently used business models are compatible with AIWM systems and if they will not lead to negative OSH effects. If research shows lack of compatibility, it is then important to develop new models that will ensure workers' health, safety and wellbeing when AIWM systems are introduced.

Recommendation 8: Pursuing knowledge sharing between researchers and AIWM developers

More knowledge sharing between researchers and developers of AIWM systems is needed. Given that AI-based systems rely heavily on programming and also often rely on big data, in order to ensure transparency, replicability and that such systems do not lead to harm, it is crucial that the developers of AIWM systems share all relevant information with the research community at large (including also the policy and OSH communities, and other relevant stakeholders). This will allow researchers to design and carry out more accurate and informed research about how such systems might affect OSH, which could be of help in designing risk assessment tools, prevention measures, policies and regulatory initiatives.

Recommendation 9: Research on AIWM systems and OSH should be carried out on a continuous basis

Analysis to determine whether AIWM systems continue to be safe should be carried out periodically. Given that AI-based systems are able to learn from the environment and evolve, it is incorrect to assume that they are stable and not changing (Dahlin, 2021). This means that research efforts on how AIWM affects OSH should not only be carried out once at the development or integration stage of AIWM systems. An evaluation/analysis should be carried out periodically to ensure that AIWM systems that were previously deemed safe are still harmless to workers.

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This policy brief was commissioned by the European Agency for Safety and Health at Work (EU-OSHA). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect the views of EU-OSHA.

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