

DIGITALISATION AND PSYCHOSOCIAL RISKS: KEY INSIGHTS AND POLICY POINTERS

1 Background

This policy brief discusses the impact of digitalisation on occupational safety and health (OSH) with a specific focus on psychosocial risks. It is based on the European Agency for Safety and Health at Work (EU-OSHA) report on the same topic, entitled 'Digital technologies at work and psychosocial risks: evidence and implications for occupational safety and health' (EU-OSHA 2024a)¹. Drawing from over 100 documents, including reports, policy briefs, discussion papers, case studies and results from the OSH Pulse 2022 survey and the ESENER 2019 questionnaire, the report outlines how digital technologies can influence work-related psychosocial risks and mental health, breaking down the impacts by type and purpose of technology, and the tasks that the technology is able to perform. The technologies cover five key areas: advanced robotics and artificial intelligence (AI), smart digital systems, digital platform work, remote working and artificial intelligence for worker management (AIWM).

2 Introduction

Digital technologies can improve working conditions and reduce occupational risks; for instance, advanced robotics can improve OSH by removing people from dangerous jobs and reducing exposure to physical, chemical and ergonomic risks. AI systems can carry out mundane and routine service tasks and thus reduce stress, overwork, musculoskeletal issues and even boredom as a result of repetitive work. Similarly, wearable devices can allow for proactive management of OSH risks by providing real-time data on environmental conditions, worker posture and other critical factors. Digital labour platforms give workers more flexible working hours and better work-life balance, and can increase inclusivity by letting in marginalised workers, given the low to no access barriers.

At the same time, digitalisation poses new challenges by changing the dynamics of work and bringing about new forms of work organisation, such as flexible and remote working arrangements or platform work. In addition, advancements in technology could lead to increased prevalence of psychosocial risks across various sectors of the economy (Leka, et al. 2011). Findings from a recent report co-authored by EU-OSHA, the JRC and Eurofound (Urzi Brancati, et al. 2022) also highlight the relationship between advanced digital technologies and the presence of psychosocial risks in the workplace. Finally, recent findings from the OSH Pulse 2022 survey suggest that workers who use digital tools (basic and advanced) are more likely to report poor mental health at work than those who do not use any digital devices (EU-OSHA 2024b).

Understanding the impact of digitalisation in terms of psychosocial risks is crucial to enable employers and policymakers to create safer, more supportive work environments amid technological advances. By understanding the specific risks associated with digitalisation, organisations can put in place more effective preventive measures, to benefit employee well-being, while maintaining productivity and job satisfaction. Finally, addressing psychosocial risks is essential for creating inclusive and sustainable work environments where all workers can thrive. This is particularly important as the workforce becomes more diverse and digital technologies become more pervasive (EU-OSHA 2021j, EU-OSHA 2018b).

2.1 Defining psychosocial risks

Psychosocial risk factors are the **aspects of the design and management of work, and its social and organisational contexts, that have the potential to cause psychological or physical harm.**

¹ The report is available at: <https://osha.europa.eu/en/publications/digital-technologies-work-and-psychosocial-risks-evidence-and-implications-occupational-safety-and-health>

Psychosocial risks include time pressure, fear of job loss, poor communication, lack of autonomy, excessive workload and others detailed in Table 1.

Table 1: Main psychosocial risks and potential mental health impacts

Psychosocial risk	Description and related mental health outcome
Fear of job loss /job insecurity/financial insecurity	Job and income insecurity are major work-related stressors and have been associated with poor mental health, burnout, depression, anxiety and physical health issues such as fatigue and pain.
Long or irregular working hours	Prolonged working hours or irregularity of working schedule can lead to fatigue, which is a significant health outcome.
Time pressure	Increases stress levels and can lead to rushed decisions and mistakes, compromising safety and health.
Excessive workload	Can lead to stress, burnout, and physical health problems due to sustained high levels of effort.
Monotonous work (work underload)	Can cause mental disengagement, reducing vigilance and increasing the risk of accidents.
Cognitive overload	Occurs when the amount of information-processing required exceeds the cognitive capacity of the individual; this may lead to decreased performance, increased stress and potential errors.
Poor communication or cooperation within the organisation	Creates confusion, misunderstandings and conflicts, affecting mental wellbeing and productivity.
Lack of involvement in making decisions that affect the worker	Reduces job satisfaction, increases stress, and can lead to decreased motivation and engagement.
Lack of autonomy and lack of control over one's work	Lack of autonomy or lack of influence over how the job is done, an important source of stress that negatively affects mental health, especially when coupled with high demand/time pressure/excessive workload.
Third-party violence (threats, abuse, assaults from members of the public): having to deal with difficult customers, patients, pupils, etc. and cyberviolence	Exposes workers to emotional strain and potential conflict, increasing stress levels. Exposure to abuse can directly affect mental and physical health, leading to stress, anxiety and long-term psychological harm.
Poor social relationships within the workplace, including harassment, cyberharassment, cyberbullying and sexual harassment	Can lead to isolation, decreased job satisfaction and mental health issues like depression and anxiety.
Conflicting demands and lack of role clarity	Cause stress and uncertainty, making it difficult for workers to prioritise tasks and manage their workload effectively.
Lack of support from management or colleagues	Leaves workers feeling undervalued and isolated, which can exacerbate stress and negatively affect mental health.
Sense of unfairness/discrimination	Undermines trust in the organisation and can lead to disengagement, stress and mental health issues.
Lack of adequate skills / lack of training	Leads to a lack of confidence and competence in performing job tasks, increasing stress and the risk of errors.

Psychosocial risk	Description and related mental health outcome
Lack of trust	<p>Lack of trust erodes the foundation of positive workplace relationships, leading to increased scepticism, reduced cooperation among workers and higher stress levels. This ultimately affects overall organisational effectiveness and employee wellbeing.</p> <p>Trust issues can also concern lack of trust in the technology, which may lead to over-reliance on it on one side and under-utilisation on the other.</p>
Change of job roles	<p>Change of job roles can be seen as a psychosocial risk as it may involve new skills that workers have not yet acquired and lack of adequate support and training; in addition, when the new role is perceived as less skilled or prestigious, it can lead to feelings of undervaluation or an identity crisis.</p> <p>Stress is more likely if workers are not informed or involved in the change process.</p>
Exposure to physical hazards at work	<p>Working in the presence of physical hazards can be stressful. While work-related stress exacerbates the risk of musculoskeletal injuries, or working at a fast pace can lead to a higher risk of accidents and injuries.</p>

Source: EU-OSHA 2024a

2.2 Defining the digital technologies

Advanced robotics and AI

Advanced robotics and AI are defined as intelligent machines that collect and analyse data, and make decisions. These systems are widespread in sectors such as healthcare, education, customer support, marketing and financial planning, employing mobile robots, assembly robots and exoskeleton robots. Adopting such technologies in a work setting brings several advantages, as advanced robotic systems are able to perform tasks more efficiently, with higher precision and endurance, and offer humans safer conditions by taking over the more dangerous tasks. AI and data analytics can also be used to improve efficiency of OSH inspections (EU-OSHA 2019d). However, the introduction of such technologies can also present some risks for the worker, which can be physical, organisational and psychosocial (EU-OSHA 2022a, EU-OSHA 2019c). For instance, the introduction of AI and advanced robotics can cause fear of job loss since the increased efficiency may reduce the need for human intervention. It may also lead to a lack of trust, with workers either overly dependent on or insufficiently using the technology, due to a misunderstanding of its capabilities.

The impact of advanced robotics and AI on psychosocial risks varies significantly with the nature of the task performed, be it cognitive, physical, routine, complex (non-routine) or a combination. When the technology performs physical tasks, it introduces safety risks related to direct interaction with machinery. In contrast, cognitive and combined tasks raise concerns about performance pressure and the need for mental adaptation to new systems, highlighting the mental strain and adjustment required beyond physical safety. By automating repetitive tasks, AI and advanced robotics may also lead to cognitive overload, as workers need to monitor and interact with complex systems.

Smart digital systems

Smart digital systems encompass a range of technologies including sensor-based devices, AI, IoT, wearables, wireless technologies, AR/VR and drones. EU-OSHA's literature on smart digital systems highlights both the risks and the opportunities deriving from the adoption of such technologies. Among the opportunities are that smart digital systems can prevent and minimise harm to workers, improve OSH compliance, help with achieving informed decision-making and provide more training opportunities in virtual environments. The challenges are related to user acceptance and trust, invasion of privacy, reliability of the technology, and a number of psychosocial risk factors such as lack of trust, workload increase and time pressure, lack of worker autonomy and so on (EU-OSHA 2023q, EU-OSHA 2023r).

Digital platform work

Digital platform work - defined as all paid labour mediated through online platforms - is characterised by non-standard working arrangements, algorithmic management, involvement of three parties, and a shift of risks and responsibilities to workers (EU-OSHA 2021e). Digital platform work can bring benefits to

workers such as increased autonomy, more flexible working hours and improved work-life balance. However, it is also associated with various challenges: the use of algorithmic management (that is the use of technological tools for remote workforce management, relying on data collection and surveillance to enable automated decision-making) permits increased control of workers and their work, and the monitoring of their work environments, therefore reducing job autonomy and increasing performance pressure; at the same time, the presence of non-standard working arrangements means that platform workers are generally classified as self-employed, and therefore not covered by OSH legislation in most EU countries (EU-OSHA 2022v, EU-OSHA 2021e).

Remote working

Remote working technologies refer to digital tools and systems that facilitate work outside the traditional workplace (such as an office or factory). This includes remote work, telework and hybrid work. Remote working technologies offer flexibility and autonomy, potentially increasing productivity and can benefit workers with chronic conditions by allowing them to better manage their symptoms, including fatigue. However, the use of these technologies can also be associated with several psychosocial risk factors, including work-life balance issues, feelings of isolation, constant connectivity leading to increased workloads, reduced autonomy and poor social relationships (EU-OSHA 2021d, EU-OSHA 2021b, EU-OSHA 2021c, EU-OSHA 2023gg, EU-OSHA 2023z).

AI for worker management (AIWM)

AI for worker management (AIWM) technologies collect real-time data from the workspace, workers, and their activities. These data are processed by AI systems to make automated or semi-automated decisions or to provide information to decision-makers such as HR managers and employers. The use of AIWM can present significant benefits, such as improved scheduling and task allocation, optimised work organisation, and provide better information to identify OSH issues; however, it may introduce psychosocial risk factors and stress due to continuous surveillance (EU-OSHA 2022y, EU-OSHA 2022ee, Urzi Brancati, et al. 2022). The lack of transparency in AIWM systems may foster a lack of trust and a sense of unfairness among employees. Additionally, the reduction in work autonomy and the need for constant adaptation to new technologies can contribute to job dissatisfaction.

3 Findings from EU-OSHA's literature

The psychosocial risk factors identified in the review of EU-OSHA's literature for the five digitalisation areas described in section 2.2. are presented in Table 2.

Table 2: Psychosocial risk factors associated with each technology

Psychosocial risk factors	AI for worker management (AIWM)	Digital platform work	Smart digital systems	Advanced robotics and AI	Remote working
Lack of trust	√	√	√	√	
Cognitive overload	√	√		√	
Fear of job loss/job insecurity	√	√		√	
Poor communication and poor social relationships	√		√		√
Sense of unfairness	√	√	√		
Time pressure	√	√	√		
Lack of autonomy	√	√			√
Poor work-life balance	√	√			√
Deskilling/Need for upskilling	√			√	
Workload increase			√		√
Lack of training	√		√		
Professional isolation		√			√
Changes in job content				√	

Source: author's elaboration

A quick glance at Table 2 reveals that the presence of psychosocial risk factors varies across technologies, and that some of the technologies (notably AIWM) are associated with a larger number of psychosocial risk factors. The most prevalent psychosocial risk factors are lack of trust, cognitive overload, fear of job loss, poor communication and a sense of unfairness.

Lack of trust is the most frequently reported risk factor, found in four out of the five technological areas: AIWM, digital platform work, smart digital systems and advanced robotics and AI. All four technologies share factors such as a lack of transparency, continuous surveillance and data privacy issues, which may foster distrust. Addressing these issues requires improving transparency, ensuring lack of bias and data privacy, involving workers in the implementation phase of the technology, and providing clear communication on how these technologies are used as well as how decisions are made, especially regarding the hiring, firing, or promotion of workers. Additionally, a **sense of unfairness** is reported in AIWM, digital platform work and smart digital systems, indicating perceptions of inequality and biased treatment related to automated decision-making and opaque data processing. In this case, transparency on how the data are processed and used, and on how decisions are made is paramount, as well as worker involvement and ensuring unbiased systems are used as a tool but not relied on for decision-making.

Cognitive overload is another significant risk factor, observed in AIWM, digital platform work, and advanced robotics and AI. It appears to be driven by factors such as increased information processing, system complexity, continuous learning demands and real-time decision making. To address these issues, it is essential to provide comprehensive training and upskilling programmes, ensure user-friendly system designs, allow for sufficient rest breaks, foster a supportive work environment, and promote more variation in work tasks to reach a balance between more cognitively demanding tasks and other less challenging assignments.

Similarly, **fear of job loss or job insecurity** is a common concern associated with AIWM, digital platform work and advanced robotics and AI, driven by factors such as automation, precarious work conditions, and the efficiency of AI and robotics in performing human tasks. Addressing these fears requires transparent communication about the role of technology in the workplace, involvement of workers in the implementation process of the technology, taking on reskilling and upskilling initiatives, and supportive management practices to reassure workers.

Poor communication and **poor social relationships** also appear to be notable problems, identified in AIWM, smart digital systems and remote working technologies. They appear to be driven by factors such as reduced face-to-face interactions, reliance on automated systems and lack of transparency. Addressing these issues requires promoting open and transparent communication channels, encouraging regular team meetings in person, providing opportunities for social engagement, and ensuring that communication technology, such as videoconferencing tools, complements rather than replaces human interactions.

Time pressure is typically associated with AIWM, digital platform work and smart digital systems, while **workload increases** are also present in telework. Both can lead to rushed decisions and mistakes, stress, burnout and physical health problems due to sustained high levels of effort.

Some psychosocial risk factors relate to the specific nature of the technologies: for instance, **professional isolation** is a risk factor only present in telework and platform work, given that both involve working independently away from a traditional office setting, reduced face-to-face interactions and fewer opportunities for spontaneous communication with colleagues and supervisors.

Among the topic areas covered in this analysis, AIWM stands out, as it is associated with the most psychosocial risk factors, including lack of trust, cognitive overload, fear of job loss, poor communication and social relationships, sense of unfairness, time pressure, lack of autonomy, poor work-life balance, deskilling or need for upskilling, and lack of training. Numerous psychosocial risk factors are also observed in digital platform work, making it another significant area of concern. In addition to that, tasks performed by platform workers in specific jobs, expose workers to additional risk factors (for example exposure to distressing content causing psychological trauma in platform workers working in content moderation; cognitive overload due to intense mental focus in relation with high-skilled online tasks, including programming). Smart digital systems pose risks such as workload increases and time pressure, as these systems can raise productivity expectations. Remote working technologies are associated with the lowest number of psychosocial risk factors. They offer flexibility and convenience; however, they may also lead to poor work-life balance and social isolation. Probably the most significant risk factor concerns continuous connectivity.

4 Policy pointers and examples of good practices

EU-OSHA's literature on digitalisation and OSH, which also includes various case studies describing good practices, underlines the importance of several key practices for effective management of psychosocial risks associated with digitalisation.

A proactive and human-centred approach to OSH management is crucial

- It is vital to adopt a '**human-centred**' or '**human-in-command**' approach, with the worker at the centre and in command of the digital transformation, and not merely a passive subject of technology. Workers should be informed on what the technological changes entail, including operational changes, new safety protocols and procedures for emergency situations. Clearly outlining how these changes will affect individual roles and what employees can expect helps to reduce fears and build trust between management and staff.
- Jobs should be planned in such a way that not only **constant heavy physical workload should be avoided, but also excessive homogeneity in tasks**, to prevent a constant high mental workload. In addition, rest breaks should be incorporated into the work plan.
- Employers need to implement robust policies that guarantee adequate **training, clear communication and supportive management practices**. These measures are to promote a healthier, more secure and productive working environment, especially in workplaces where digital technologies are introduced.
- Providing comprehensive **training and upskilling** ensures that workers are well-prepared to handle new equipment and processes. This approach not only improves their skills but also boosts their confidence, significantly reducing stress related to potential job losses.
- **Worker involvement and engagement** are crucial elements to increase trust and reduce fear of job loss. This approach fosters a sense of ownership among workers and helps identify potential issues early on, allowing for a more seamless integration of new technologies into work practices.
- **Clear and open communication and information** are essential for managing the psychological risks associated with the introduction of AI and advanced robotics. It is vital to inform workers of what the technological changes entail, including operational changes, new safety protocols and procedures for emergency situations. Clearly outlining how these changes will affect individual roles and what employees can expect, helps to reduce fear and build trust between management and staff.
- **Ergonomic adjustments** should be made to ensure that the work environment is safe and comfortable, reducing physical strain on workers.

Risk and workload assessments

- Employers' mandatory **risk assessments** must cover risks stemming from digitalisation. These risk assessments should be accompanied by robust policies that ensure adequate worker information, participation, training, clear communication and supportive management practices. Such measures are essential not only for preventing the adverse effects of digitalisation but also for fostering a healthier, more secure and more productive working environment.
- Regular **workload assessments** and consequent adjustments are necessary to maintain a healthy work environment by ensuring tasks are distributed fairly and workers are not overburdened so as to prevent excessive pressure and cognitive overload.
- Given the widespread issue of poor work-life balance, which is associated with telework, platform work and AIWM technologies, ensuring the **right to disconnect**, while promoting **flexible work arrangements** is crucial for preventing employee stress and burnout.

Promoting social interactions

- To combat isolation and improve communication among (remote and hybrid) team members and between remote workers and managers, the EU-OSHA literature emphasises the importance of promoting social interaction among workers. Strategies include regular team meetings, informal interactions and virtual collaboration platforms.

- In the context of remote working, comprehensive teleworking agreements can help set clear expectations and boundaries.

Foster Trust and Transparency

- To foster trust, both between employers and employees and towards the technology, it is important that organisations provide information on the technology that is transparent in regard to how it should be used, if and what data are to be collected, how decisions are made, and so on.
- Where digitalised systems are used to take decisions or assist in decision-making about workers, these systems need to be fair and unbiased.

Fill Regulatory Gaps for Digitalisation

- Emerging risks related to digitalisation must be incorporated into OSH strategies as well as producing tailored codes of practice and guidance on the application of general OSH legal provisions concerning different types of digitalisation. This involves engaging a broad range of stakeholders, including workers and workers' organisations, to ensure that the strategies prevent psychosocial risks in a comprehensive and thorough manner, leading to more robust and responsive OSH policies.
- OSH needs to be embedded in directives, national legislation and stakeholder agreements on digitalisation when they are developed.

In conclusion, findings from a review of EU-OSHA's literature indicate a growing need to examine the impact of digitalisation on mental health. Research should focus on identifying the specific mental health challenges posed by digital technologies and developing evidence-based interventions.

Policymakers need to focus on efficient regulation and ensuring awareness of psychosocial risks stemming from digitalisation, while practitioners should implement strategies that promote mental well-being in digital work environments.

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Authors: Maria Cesira Urzı Brancati.

Project management: Sarah Copsey and Maurizio Curtarelli - European Agency for Safety and Health at Work (EU-OSHA).

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