Finnish Institute of Occupational Health

IN COOPERATION WITH:

Karolinska Institutet

Psychosocial risks in the complex landscape of algorithmic management

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Nothern Dimension Partneship in Public Health and Social Well-being: OSH EG
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FORTE: Forskningsrådet för hälsa, arbetsliv och välfärd

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Algorithmic management at work – challenges, opportunities and strategies for occupational safety and health and wellbeing

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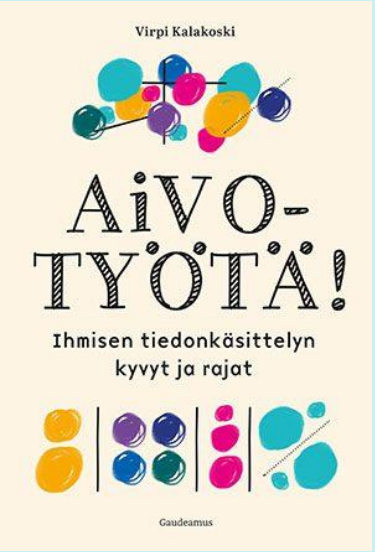
Work counselor

Conficts of Interest:
Speaker remuneration to FIOH,
excluding university teaching/science seminars
and textbooks by Sanoma & Gaudeamus

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Improving OSH with cognitive ergonomics



What is algorithmic management (AM)?

"The application of **digital technologies** to **augment or automate managerial** decision-making in the **organization of work**"

What is algorithmic management (AM)?

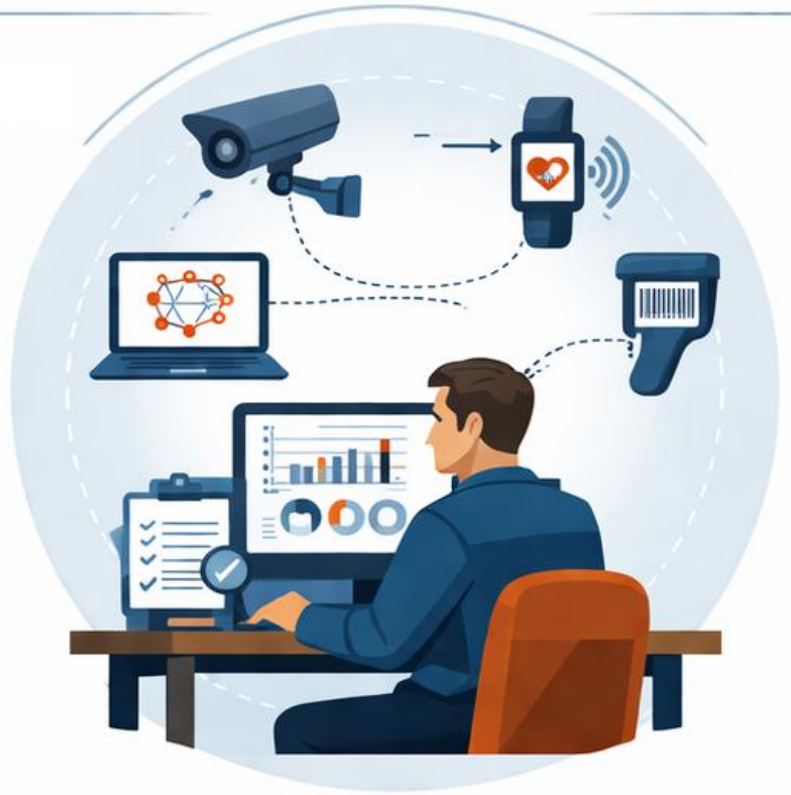
The application of **digital technologies** to augment or automate managerial decision-making in **the organization of work**

WHAT?

The organization of work: **the ways in which work is coordinated and controlled** to meet organizational goals

Managerial decision-making functions:

- directing, monitoring, or evaluating work
- workforce planning
- hiring, rewarding, promoting, disciplining, and firing workers



HOW?

Digital technologies: software-powered systems or tools that collect, use, or generate data.

Simple and more complex technologies **including artificial intelligence** and machine learning; could include hardware components such as wearable devices, cameras, and scanners

Definition from: Strauss-Raats, P., Gunn, V., Håkansta, C., Lind, R., Hernando Rodríguez, J. C., & Quinlan, M. (2024). Using a modified Delphi approach to advance a common definition of algorithmic management. Poster presentation at EPICOH Early Career Conference, Barcelona, Spain.

Visualization produced by Copilot.

Algorithmic management is common in Europe

A manager survey found that **79% of companies** in France, Germany, Italy and Spain used at least one algorithmic management tool
(OECD, 2025; incl. traditional time tracking)

- Allocating work tasks 47%
- Tracking (active) working time 44%
- Allocating work shifts 43%
- Monitoring task performance 40%
- Providing work instructions 37%
- Setting work targets 19%
- Monitoring work pace 15% [...]

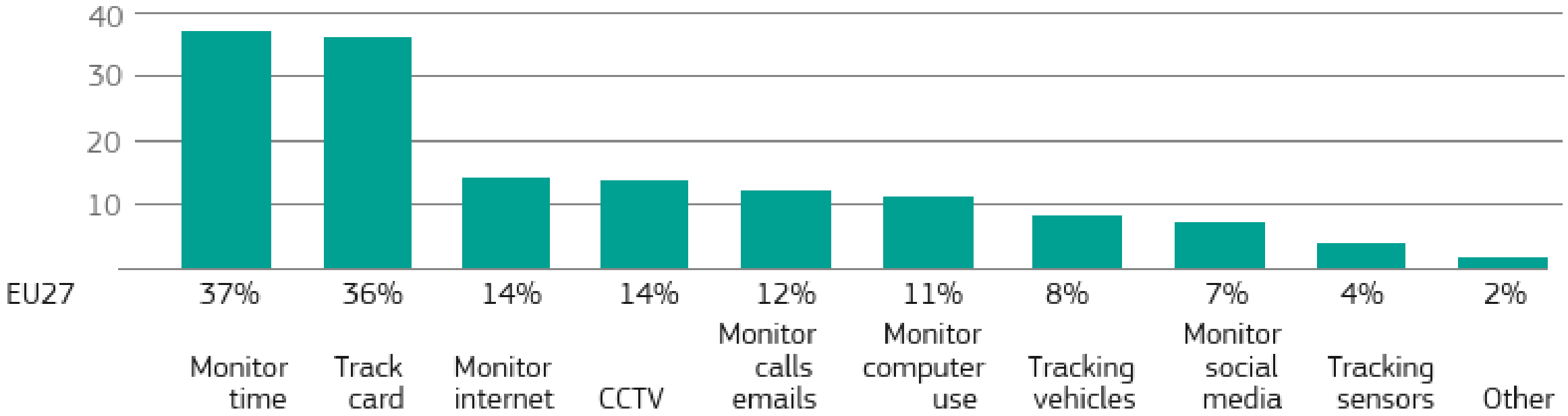
In Nordic survey data from **selected sectors 76% of employees** reported knowing or believing that their workplace used at least one form of algorithmic management (FEPS, 2024)

- Monitoring work pace 42%
- Monitoring computer use 42%
- Assessing work performance 40%
- Automatic tracking of working time and breaks 40%
- Allocating work tasks 34%
- Allocating work shifts 28% [...]

FOR DETAILS, SEE : Gonzalez Vazquez, I., Fernandez Macias, E., Wright, S. and Villani, D., Digital Monitoring, Algorithmic Management and the Platformisation of Work in Europe, Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/9406086 JRC143072.

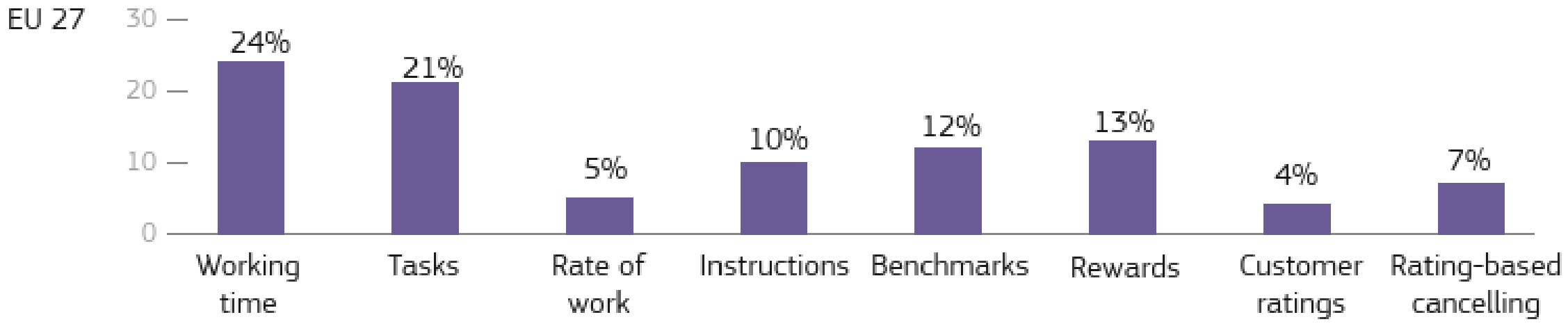
Figure 14.

Digital monitoring of work in the EU



Gonzalez Vazquez, I., Fernandez Macias, E., Wright, S. and Villani, D.,
Digital Monitoring, Algorithmic Management and the Platformisation of Work in Europe, Publications Office of the European Union, Luxembourg, 2025,
https://data.europa.eu/doi/10.2760/9406086 JRC143072.

Figure 19. Algorithmic management in the European Union

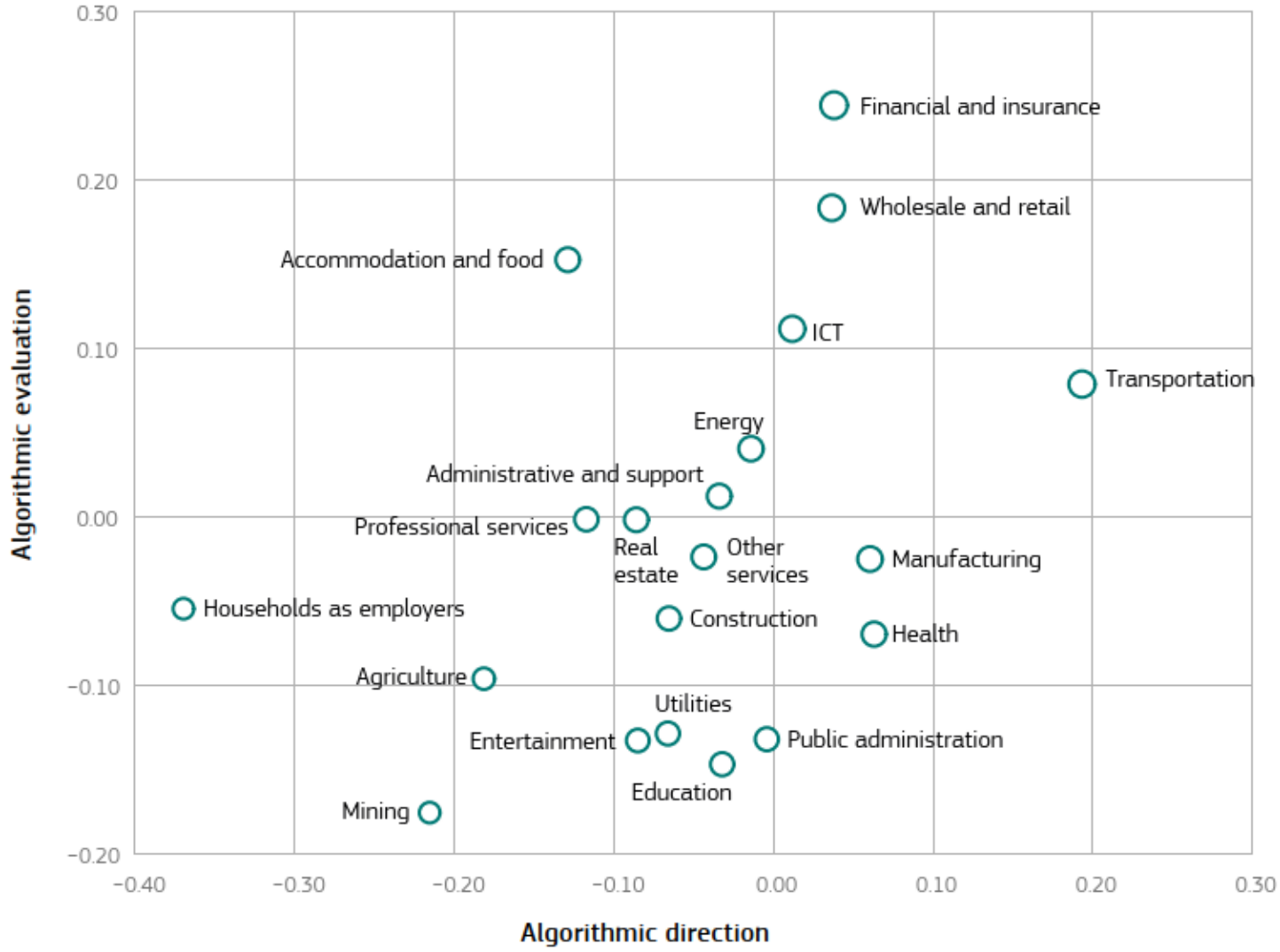


Gonzalez Vazquez, I., Fernandez Macias, E., Wright, S. and Villani, D.,
Digital Monitoring, Algorithmic Management and the Platformisation of Work in Europe, Publications Office of the European Union, Luxembourg, 2025,
https://data.europa.eu/doi/10.2760/9406086 JRC143072.

Algorithmic management practices differ significantly across sectors and institutional contexts

algorithmic direction and algorithmic evaluation

Figure 21. Algorithmic management by sector in the EU

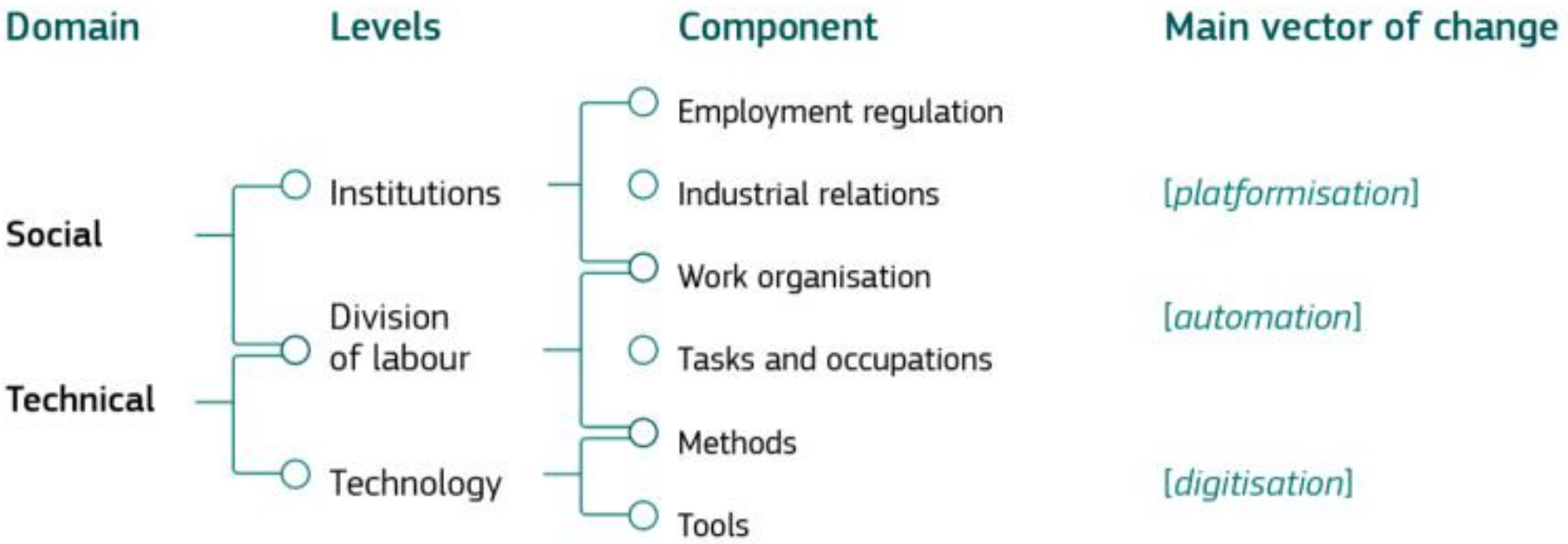


Source: authors' elaboration using AIM-WORK weighted data.

Gonzalez Vazquez, I., Fernandez Macias, E., Wright, S. and Villani, D., Digital Monitoring, Algorithmic Management and the Platformisation of Work in Europe, Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/9406086 JRC143072.

Automation-Digitisation-Platformisation (ADP) framework
(Fernández-Macías 2018, Fernández-Macías et al, 2025)

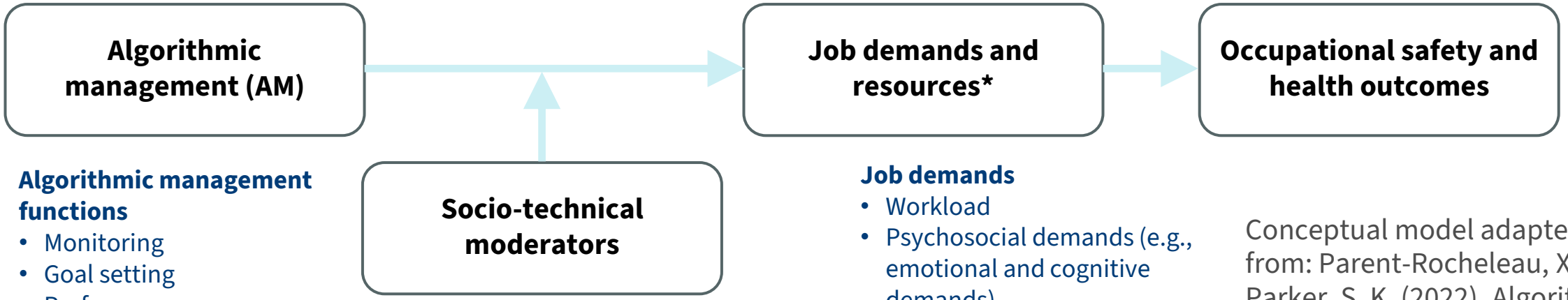
Figure 1
Domains, levels and components of the ADP conceptual framework



Source: Fernandez-Macias et al. 2025.

Gonzalez Vazquez, I., Fernandez Macias, E., Wright, S. and Villani, D.,
Digital Monitoring, Algorithmic Management and the Platformisation of Work in Europe, Publications Office of the European Union, Luxembourg, 2025,
https://data.europa.eu/doi/10.2760/9406086 JRC143072.

Why algorithmic management matters for OSH?



Algorithmic management functions
- Monitoring
- Goal setting
- Performance management
- Scheduling
- Compensation
- Job termination

System transparency (e.g., about how and why)

System fairness (e.g., minimization of biases, accuracy and appropriateness of decisions, privacy of individual data and decisions)

Human influence (e.g., voice or control over the system, human input to the system, ability to opt out of the system)

Job demands
- Workload
- Psychosocial demands (e.g., emotional and cognitive demands)
- Physical demands
- Job insecurity

Job resources
- Autonomy
- Social support
- Feedback
- Role clarity
- Task variety
- Task significance

Conceptual model adapted from: Parent-Rocheleau, X., & Parker, S. K. (2022). Algorithms as work designers: How algorithmic management influences the design of jobs. *Human resource management review, 32*(3), 100838.

*Job demands and resources are conceptualized according to the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007; 2017)

Knowledge gaps & our objective in ALGOSH

- AM is widely discussed for efficiency and organizational gains
- The effects of AM on **occupational safety and health** are less well understood
  - How workers **in conventional** work settings experience AM in their daily work?
  - How AM shapes and reconfigures **job demands and resources**?

- Empirical foundation
  - semi-structured observational interviews with workers, supervisors, and specialist roles in Finland (N = 44) and Sweden (N = 26)
  - being managed by algorithms or involved in the design, implementation, or use of AM systems
  - within office and care work environments utilizing AM in customer service, office-based roles, and scheduling
  - various AM systems were used to support task allocation, performance monitoring, evaluation

Preliminary findings (Lahti et al. in prep.)

Three cross-cutting themes capturing the most salient psychosocial mechanisms

- Theme 1. **Surveillance and self-surveillance:**
  The datafication of work introduces continuous monitoring and expands expectations of self-monitoring and data production

- Theme 2. **Work intensification and reduced autonomy:**
  Performance-oriented management practices, enabled by algorithmic systems, intensify job demands and constrain autonomy

- Theme 3. **Mixed effects on resources:** *Access to performance information as the primary AM-related resource, alongside weakening of social resources*

Research suggests the need for practical assessment tools for psychosocial workload factors related to AM

- AM reshapes work
  - increases job demands
  - erodes job resources
  - interventions to decrease negative effects and enhance positive effects are under-researched and infrequently implemented in practice
- ➢ Impacts of AM practices on daily work may **compromise occupational safety and health (OSH)**.

- ➢ There is a need for guidance and methods
  - a checklist to assist in detecting and managing AM-related psychosocial stressors in regular workplaces
  - for labor inspectors, OSH specialists and organizational psychologists

Risk assessment checklist development

Step 1: Interviews in Finland and Sweden
(elderly care, social work, public service organisations; participants N=66 from multiple work roles, sites, and teams)

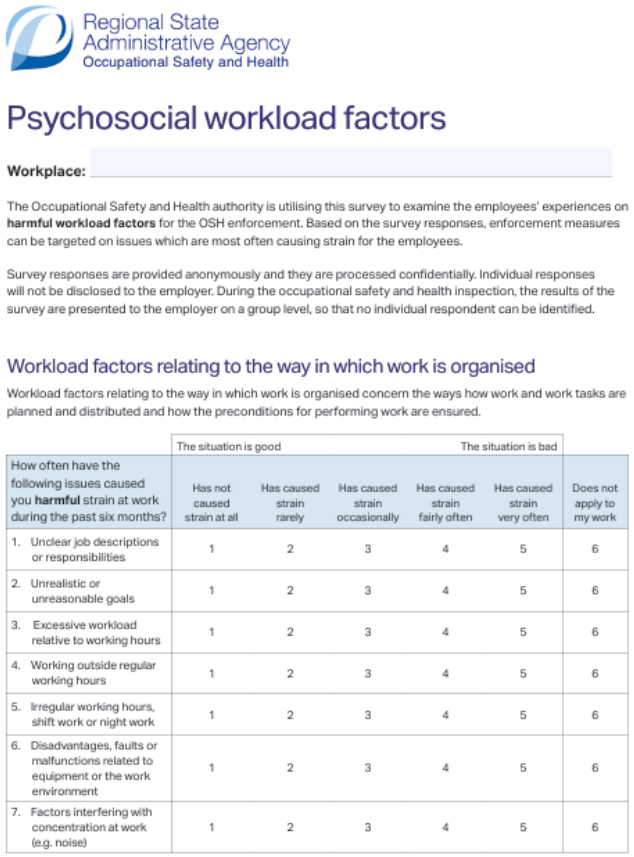
Step 2: Template analysis: OSH-related demands and resources from worker and supervisor perspectives

Step 3: Participatory workshops for RA content and format

Step 4: Development and testing



We enriched the material provided by the Occupational Safety and Health Administration in Finland



Regional State Administrative Agency
Occupational Safety and Health

Psychosocial workload factors

Workplace: _____

The Occupational Safety and Health authority is utilising this survey to examine the employees' experiences on **harmful workload factors** for the OSH enforcement. Based on the survey responses, enforcement measures can be targeted on issues which are most often causing strain for the employees.

Survey responses are provided anonymously and they are processed confidentially. Individual responses will not be disclosed to the employer. During the occupational safety and health inspection, the results of the survey are presented to the employer on a group level, so that no individual respondent can be identified.

Workload factors relating to the way in which work is organised

Workload factors relating to the way in which work is organised concern the ways how work and work tasks are planned and distributed and how the preconditions for performing work are ensured.

	The situation is good			The situation is bad		
How often have the following issues caused you **harmful** strain at work during the past six months?	Has not caused strain at all	Has caused strain rarely	Has caused strain occasionally	Has caused strain fairly often	Has caused strain very often	Does not apply to my work
1. Unclear job descriptions or responsibilities	1	2	3	4	5	6
2. Unrealistic or unreasonable goals	1	2	3	4	5	6
3. Excessive workload relative to working hours	1	2	3	4	5	6
4. Working outside regular working hours	1	2	3	4	5	6
5. Irregular working hours, shift work or night work	1	2	3	4	5	6
6. Disadvantages, faults or malfunctions related to equipment or the work environment	1	2	3	4	5	6
7. Factors interfering with concentration at work (e.g. noise)	1	2	3	4	5	6

3. ALGORITHM-ASSISTED AGGREGATED PERFORMANCE MANAGEMENT (TARGETS AND EVALUATION)

3.1 System use, features, and functioning

- 3.1.1 Data entry in multiple systems (for the generation of performance metrics)
- 3.1.2 Unreliability of the performance metrics
  - 3.1.2.1 Assessing the reliability of the performance metrics
- 3.1.3 Poor compatibility of performance metrics with the work context

3.2 Effects of the system and related organizational practices on job characteristics

- 3.2.1 Being subject to continuous monitoring (work performance and progress)
- 3.2.2 Expectation of self-monitoring one's own performance metrics
  - 3.2.2.1 Aggregate information about one's own performance
- 3.2.3 Emphasis on quantitative performance targets in managerial practice
  - 3.2.3.1 Pressure to meet the performance targets
    - 3.2.3.1.1 Pressure to prioritize efficiency over quality
  - 3.2.3.2 Workload and work pace
  - 3.2.3.3 Opportunity/time for breaks
    - *3.2.3.3.1 Insufficient opportunity/time for breaks*
  - 3.2.3.4 Target and metric-oriented collegial climate
  - 3.2.3.5 Humanity in the supervisor's leadership approach
    - 3.2.3.5.1 Supervisor's strict and performance-driven leadership approach (lack of humanity)
  - 3.2.3.6 Regular performance discussions with supervisor
    - 3.2.3.6.1 Accountability to supervisor for reasons behind (weak) performance
    - 3.2.3.6.2 Corrective actions to improve (weak) performance

with detailed examples, based on the findings of the ALGOSH interviews

24.9.2026

Psychosocial workload factors survey of the Occupational safety and health authority in Finland

Tyosuojelu.fi
Website of the Occupational Safety and Health Administration in Finland

§ Legislation

Occupational Safety and Health Act (738/2002)

- Section 8 – Employers' general duty to exercise care
- Section 10 – Analysis and assessment of the risks at work
- Section 13 – Work design
- Section 25 – Avoiding and reducing workloads

Occupational Health Care Act (1383/2001)

- Section 10a – Reporting absences due to illness
- Section 12 – Content of occupational health care
- Section 15 – Duty of employer to provide information
- Section 17 – Duty of occupational health care service provider to provide advice and information

- **Psychosocial factors:**
  relate to the nature of work, work arrangement, and the social dynamics of the work community that **can have a harmful impact on employees' health.**
- Psychosocial workload can become an issue if these factors are **off balance, poorly managed or dysfunctional**
- The Occupational Safety and Health authority is utilising this survey to examine the **employees' experience on harmful factors** for the OSH enforcement.
- Based on the survey responses, **enforcement measures can be targeted** on most prevalent issues causing strain.

https://tyosuojelu.fi/en/working-conditions/psychosocial-workload

The preliminary version of the ALGOSH checklist for AM focus on the following dimensions of algorithmic management

Algorithmic…

1. shift scheduling
2. task scheduling
3. allocation of document-based tasks
4. management and monitoring of call work
5. performance management

Do these forms of algorithmic management occur at your workplace?

The examples are from social and healthcare settings (shift planning) and office environments (decision-making and customer service work)

Examples from the current version of the checklist for AM risks

Is the item / example

--	not relevant to us
X	in order at our workplace
?	should be examined further
!	action required

Factors related to work organization (7 items):
planning and allocation of work and tasks, and ensuring the preconditions for doing the work

Unclear job descriptions or responsibilities

- Does algorithmic management clarify job descriptions and responsibilities when tasks, workflows, and employees/roles must be defined precisely in the systems?

Unrealistic or unreasonable targets

- Do employees and supervisors experience the targets as realistic and reasonable, and do most employees have a genuine chance to reach the basic targets?

Excessive workload in relation to working time

- Have strict performance targets and monitoring them led to an excessive increase in workload and work pace?

Excessive amount of information or uncontrolled information overload

- Has algorithmic management increased the volume of information and different performance metrics available to supervisors to an unmanageable level?

Factors Related to Job Content (9 items):
the nature of the work and the job tasks

Lack of variation in work or monotonous work

- Is the algorithmic system set up to assign only certain types of tasks, and has the work become more one-sided as a result?
- Have easy tasks been automated, reducing the variation between more demanding and lighter tasks in the job?

Challenging or difficult tasks / Challenging or difficult situations in customer work

- Does the system decide the next task without giving the employee an opportunity to influence the difficulty of the next task?
- If there are (or have been) many demanding cases in one's own queue, does the system allow the employee to choose a lighter task?
- Have challenging customer situations become even more difficult because of rigid performance targets and/or increased time pressure related to algorithmic management?

Factors relating to the social functionality in the work community (6 items):
cooperation and interaction within the work community

Problems in cooperation and interaction between employees

- Does interaction between employees become more focused on metrics and targets, and in meetings does interaction focus mainly on team performance?
- Is each person's individual performance data visible to colleagues, and does this affect interaction between team members?

Problems in cooperation and interaction with the supervisor

- Are demanding shifts distributed evenly and fairly among different employees?

Harassment or other repeated inappropriate treatment occurring in the work community

- Does the visibility of personal performance data expose employees to harassment and inappropriate treatment related to individual characteristics?

Other factors related to algorithmic management

Being under continuous monitoring

- Is the achievement of targets monitored at a more detailed level than before?
- Is performance monitored continuously in real time?

Conflicting pressures from different directions

- Does pressure to prioritise efficiency and output over quality or customers' needs create conflicts with customers (for the customer, handling the matter becomes more difficult or slower)

Opportunities to influence work

- Does any aspect of employees' opportunities to influence their work become too narrow—for example, the possibility to influence their own work pace, taking breaks, or recovering after demanding customer situations?

Negative longer-term consequences for the individual

- Does the transition to algorithmic management weaken employees' pay levels?
- Does achieving targets affect opportunities for advancement within the organisation?

Assessment of risks related to Algorithmic Management: Guide and checklist (version 2026-03-17)

GUIDE

- Assessment of risks related to algorithmic management
- Functions of algorithmic management
- Prevalence of algorithmic management
- Effects of algorithmic management.
- Purpose of this guide
- Background material for the checklist

CHECKLIST

- Part 0: Functions of algorithmic management
- Part 1: Workload factors related to work arrangements
- Part 2: Workload factors related to job content
- Part 3: Workload factors related to the social functioning of the work community
- Part 4: Other workload factors related to algorithmic management

There are psychosocial risks associated with AM, and we should identify and manage them

- Algorithmic management changes the socio-technical system of work in many ways
  - simultaneous changes in psychosocial factors, and related organizational practices and system usage.
- Many factors related to AM are not unique; we already have methods to manage them in other contexts
  - Identifying how these factors manifest in the context of daily work under AM
  - Understanding how AM increases or decreases the likelihood of existing threats and introduces new ones: fairness and justice; data protection, security, and privacy
  - Applying the knowledge we already have about reducing the negative effects and enhancing the positive effects of AM

Next steps in developing the material for assessing AM risks

- Feedback from the first version from the Finnish workplaces.
- Other feedback and workshops.
- Identifying the specific needs: countries, sectors, agents
- Supplementing the material with other findings of the ALGOSH group and other research.

- The checklist will be published late 2026 in Finland and early 2027 in Sweden, and also in English.
- Interested in participating during the next steps of the checklist development?
  - Please contact the ALGOSH team!
  - Virpi Kalakoski,
    Finnish Institute of Occupational Health
    virpi.kalakoski@TTL.FI

Finnish Institute of Occupational Health

Karolinska Institutet

FORTE: Forskningsrådet för hälsa, arbetsliv och välfärd

Thank you!

virpi.kalakoski@ttl.fi

Interested in commenting on the current version of the checklist?

Please contact me!

aigosh

The Occupational Safety and Health authority is utilising this survey to examine the employees' experiences on **harmful workload factors** for the OSH enforcement. Based on the survey responses, enforcement measures can be targeted on issues which are most often causing strain for the employees.

Focusing on the most harmful psycho-social workload factors

Workload factors relating to the way in which work is organised

7 items

Workload factors relating to the way in which work is organised concern the ways how work and work tasks are planned and distributed and how the preconditions for performing work are ensured.

Workload factors relating to the content of the work

9 items

Workload factors relating to the content of the work are factors associated with the work tasks and the nature of the work.

Workload factors relating to the social functionality in the work community

6 items

Workload factors relating to the social functionality in the work community are factors associated with the cooperation and interaction in the work community.

How often have the following issues caused you **harmful** strain at work during the past six months?	The situation is good				The situation is bad	
	Has not caused strain at all	Has caused strain rarely	Has caused strain occasionally	Has caused strain fairly often	Has caused strain very often	Does not apply to my work
1. Unclear job descriptions or responsibilities						
2. Unrealistic or unreasonable goals						
3. Excessive workload relative to working hours						
4. Working outside regular working hours						
8. Lack of variation, monotony						
9. Working with unclear instructions or expectations						
10. Information overload or uncontrolled information flow						
11. Performing several tas simultaneously						
17. Problems related to mutual cooperation and interaction between colleagues	1	2	3	4	5	6
18. Lack of support from colleagues in performing the work	1	2	3	4	5	6
19. Problems related to cooperation and interaction with the supervisor	1	2	3	4	5	6

https://tyosuojelu.fi/en/safety-and-health-in-workplace/indicators/psychosocial-workload-factors-survey

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- https://tyosuojelu.fi/tyosuojelu-tyopaikalla/tyoolosuhdemittarit/tyon-psykososiaaliset-kuormitustekijat-kysely

  -> also Swedish and English language versions

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