DIGITAL PROGRAMME
ALGORITHMS AT THE WORKPLACE

ALGORITHMIC MANAGEMENT IN THE WORKPLACE

CASE STUDIES ON THE IMPACT OF ALGORITHMIC TECHNOLOGIES IN SEVEN SECTORS IN THE NORDICS

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This policy study unpacks the impacts of algorithmic management (AM) and digital technologies on workers, particularly focusing on the implications for European policy and trade union strategy. AM refers to the use of computer algorithms to control workers, while many other digital tools are increasingly used to monitor and transform work practices in other ways.

This study brings together research on the use of AM in traditional workplaces – that is, non-platform work – across Finland, Sweden and Norway. Drawing on sectoral case studies (Finland: transport & logistics and retail; Sweden: transport, retail and warehousing; Norway: finance and journalism), the research revealed significant impacts on worker rights and wellbeing, as well as shifts in the balance of power between labour and capital. The findings indicate that, while the detrimental impacts of technology are not a foregone conclusion, and that digitalisation can benefit and support workers, often it instead undermines autonomy, promotes pressure and internal competition, and creates increasingly opaque decision-making processes.

The integration of AM systems has raised substantial concerns regarding mental and physical health. Workers are subjected to continuous surveillance and performance tracking, which can lead to increased stress and reduced job satisfaction. Increasingly, automated workplaces were also found to increase injury risk in some cases, while automated scheduling systems for drivers squeezed the space to fulfil basic human needs and created potential accident risks.

Digitalisation was also found to exacerbate existing power imbalances between labour and capital. These systems often operate as "black boxes", making it difficult for workers to understand or challenge the decisions made by these technologies, while the decisions around their implementation are often closed off from adequate worker participation and negotiation. In sectors like Norwegian finance and Swedish retail, individual performance tracking has fostered a competitive atmosphere, undermining collective action and solidarity among workers.

To address these challenges, policymakers must consider both immediate and long-term strategies. The policy study calls for the following interventions, building on the existing groundwork of European legislation:

1) **Collective bargaining and worker involvement:** support and acknowledge the role of trade unions in negotiating the implementation and use of AM tools. This includes:

   - recognising the importance of collective data, ensuring trade unions can invoke rights on behalf of workers, as allowed under Article 88 of the General Data Protection Regulation (GDPR);

   - ensuring a potential AI at work directive grants worker representatives a legal right to meaningful involvement in the rollout and use of AM systems at all levels (EU, member state and firm level); and

   - supporting the capacity building amongst trade union representatives through expert advice for the co-determination on AM, and training programmes to build 'epistemic capacity'.

2) **Enhanced worker protections:** strengthen occupational health and safety regulations under Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work. This includes specific amendments to cover risks posed by AM, ensuring that worker

representatives are empowered to enforce these protections effectively.

3) **Transparency and accountability:** implement stringent transparency requirements for AM systems, drawing from the Artificial Intelligence (AI) Act and extending the Platform Work Directive (PWD) to traditional workers. This involves:

   - informing workers and their representatives about the use of automated monitoring or decision-making systems, as mandated by Article 9 of the PWD; and

   - ensuring human oversight of automated systems, as outlined in Article 10 of the PWD, and providing workers with explanations of automated decisions, per Article 11.

4) **Sector-specific legislation:** consider specific regulatory measures for high-risk environments, such as the AI Act's classification of workplaces as high-risk environments. This includes:

   - conducting fundamental rights impact assessments for high-risk AI systems as per Article 27 of the AI Act; and

   - banning practices that unduly pressure workers or compromise their health and safety, drawing from Article 12 of the PWD.

5) **Enhanced data protection:** enforce the GDPR's requirements more stringently within the workplace, particularly Articles 13, 14 and 22, to protect worker data. Ensure that any use of worker data for AM complies with GDPR standards, and extend protection to collective data via complementary legislation.

6) **Regulatory collaboration:** promote cooperation between national labour inspectorates and the European Agency for Safety and Health at Work to develop guidelines for applying existing occupational health and safety regulations to digitalised workplaces. Engage with the International Labour Organization to establish global standards for AM.

INTRODUCTION

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"Technology and digitalisation promise a wave of workplace productivity, efficiency and security. We are told that increasing automation will reduce the strains of unfulfilling tasks, making space for human creativity and ingenuity to flourish."

Technology and digitalisation promise a wave of workplace productivity, efficiency and security. We are told that increasing automation will reduce the strains of unfulfilling tasks, making space for human creativity and ingenuity to flourish. In particular, algorithmic management (AM) – the use of algorithms and artificial intelligence (AI) to direct and control workers[1] – has been identified as a new path to "seamless" workplace optimisation.

"While the digitalisation of workplaces holds undeniable potential – and has brought about real benefits in a number of domains – its effects have been far from harmless."

However, while this narrative is no doubt alluring, the reality is far more complex. While the digitalisation of workplaces holds undeniable potential – and has brought about real benefits in a number of domains – its effects have been far from harmless. Driven by the competitive logic of global capitalism, the development and deployment of workplace technologies can act as a ruthless force, imposing strict pressures, greater precarity and reduced autonomy on workers in the name of increasing profit.[2] But it doesn't have to be this way. The march of technological progress is not preordained, and a future where digital tools can support rather than undermine workers' agency and welfare, while still generating significant gains for businesses, is possible.[3]

AM is most commonly associated with the platform economy,[4] and its use in platform work has thus received most attention in current research, including via other studies published by FEPS.[5] However, the increasing "platformisation of work" in traditional workplaces,[6] along with wider trends of digitalisation and the spread of AM[7] warrant attention. For example, a recent joint study by the International Labour Organization (ILO) and Joint Research Centre of the European Commission has given detailed insights into how far the use of such tools has progressed in Europe, and gestures to the huge importance of institutional and regulatory frameworks in mediating the outcomes of this surge.[8]

At least in theory, the Nordic countries seem better placed than most to realise such a future, where technological development is steered collaboratively by labour and capital for mutual benefit. The more longstanding history of labour organising in the Nordic countries[9] renders action in traditional workplaces to address the impacts of emerging technologies perhaps more feasible in the shorter term, and capable of acting as a demonstrator for the wider European economy. It is for this reason that this European policy study synthesises and expands on a series exploring the impacts of AM and digital technologies on traditional workers across the Nordic region. Qualitative case studies were conducted across Finland, Sweden and Norway, along with a theoretical overview of AM in workplaces.[10] Elsewhere, a mass worker survey was conducted and bolstered the findings of this stream of work with a wider overview.[11] This policy study draws particularly on the qualitative portion of this work, engaging union-affiliated workers and trade unionists. Table 1 provides an overview of the studies.

Table 1. An overview of the country studies discussed in this policy study.

Country	Norway		Sweden			Finland	
Sectors studied	**Finance**	**Journalism**	**Transport**	**Retail**	**Warehousing**	**Transport & logistics**	**Retail**
Technologies identified	Performance measurement systems; Compliance automation tools; Workplace "temperature" tracker [employee sentiments]; Microsoft Teams; Generative AI tools; Digital whistleblowing channels; Chatbots; Digital courses	Digital HR and complaint management systems; Digital performance management systems; Metrics and data analytics tools; AI content generation tools; Security applications; Fact-checking technologies	Route planning systems; Global positioning systems (GPS); Eco-driving systems; Driver monitoring systems	Automated order and inventory management systems; Picking systems, hand-held devices and wearables; Planning and scheduling systems; Self-checkouts; software-connected cameras	Mobile applications or similar electronic devices; GPS trackers; Automated sorting systems; Pick-by-voice headsets; Robot/conveyor belt delivery systems and instruction screens	Video surveillance; Waste bin sensors; Route planning systems; Tachographs; Mobile device for tracking goods, colloquially called the "Kapula" (translation: "Relay baton"); Warehouse automation & monitoring systems	Video surveillance; Cash register data; Electronic access control; Self-checkouts; Automated and predictive staff shift scheduling tools; Portable inventory trackers; Phones; inventory monitoring and ordering systems; Warehouse automation & monitoring systems
Data collection	16 interviews, 2 focus groups, 2 fieldwork visits		21 semi-structured interviews			10 semi-structured interviews	

The full contents of each of these studies are not summarised here. For a more detailed discussion of the sectoral findings and associated policy implications in each country, we point readers towards the full country studies published as standalone reports.[12]

Structure and framing of the policy study

After providing a brief conceptual overview of AM, the study will unpack the collated findings of the Nordic cases. Findings are organised around a series of thematic impacts, drawing on illustrative evidence from across the countries in each case. While the country studies pointed overwhelmingly to the detrimental impacts new technologies were already having, this bleak picture was not universal. A handful of far more positive reports emerged, giving a substantive sense of how workplace technological transformation might look different. Two of the most significant of these cases are recounted in detail, addressing their contrast with the prior section. Finally, we conclude by situating the findings in the context of European policy, including a discussion of the lessons that can be learned by progressives everywhere by attending to the Nordic model.

Our analysis builds on existing work, such as the excellent study by our colleagues at the JRC and ILO,[13] in two ways. Firstly, by adding further, granular insights into the effects of algorithmic and digital systems on workers and workplaces, particularly in the unique context of labour relations characterising the Nordic region. Secondly, it goes a step further by moving from recording effects on workers to considering the potential structural impacts on the distribution of power between labour and capital.

We thus frame the impacts of AM unearthed by our research as operating at two, intersecting levels:

1) worker rights and wellbeing; and

2) the balance of power between labour and capital.

The two are connected, as diminished labour power enables poorer treatment of workers, while diminished wellbeing and rights make it harder for workers to organise and act to check power (Figure 1). The study therefore organises impacts into these two levels.

Figure 1. The two intersecting levels of impacts of AM.

Worker rights and wellbeing

Diminished wellbeing and rights reduces workers´ability to organise and exert power.

Skewed balance of power enables reduction of rights and wellbeing considerations.

Balance of power between labour and capital
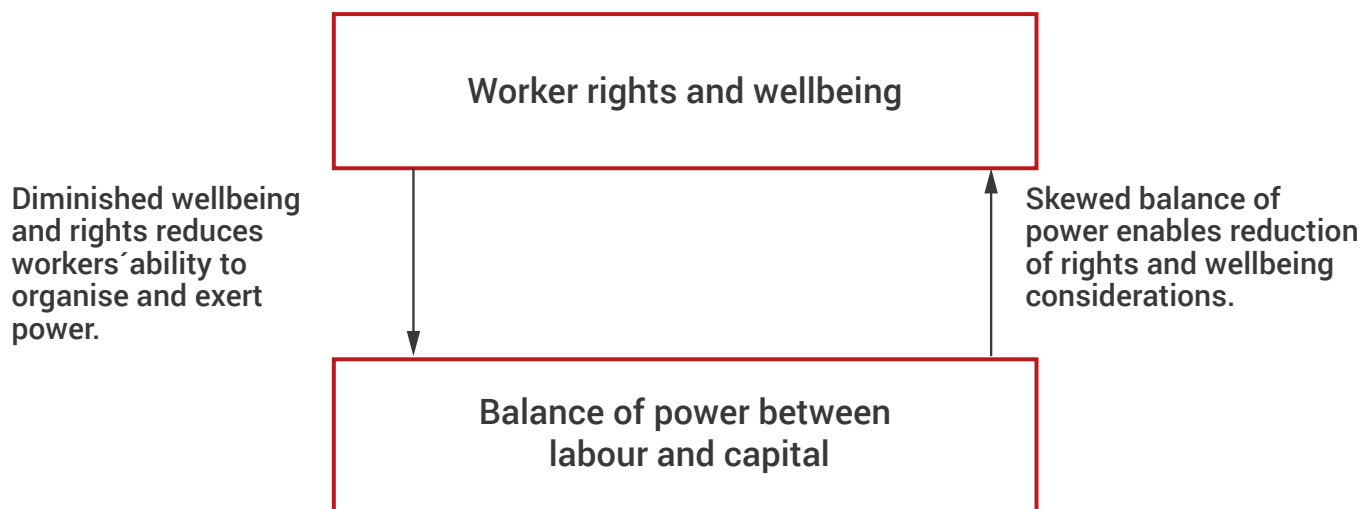
BACKGROUND

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AM and digitalisation

This section gives a preliminary overview of AM and digitalisation in the workplace. To avoid duplication, it eschews a full review of the literature, and readers interested in a deeper theoretical background on the topic are directed towards the companion study published by our colleagues Bonn Juego, Tereza Østbø Kuldova and Gerard Rinse Oosterwijk: "*Algorithms by and for the Workers: Towards a Fair, Democratic and Humane Digitalisation of the Workplace*".[14]

"Algorithmic management refers to the use of algorithms – computer-coded processes – to control workers. This control can take many forms, from coordinating labour through the use of algorithmic systems to performance evaluation and even hiring and firing."

Algorithmic management refers to the use of algorithms – computer-coded processes – to control workers. This control can take many forms, from coordinating labour through the use of algorithmic systems to performance evaluation and even hiring and firing. Modern algorithmic management systems draw on the use of AI technologies, such as machine learning. These enhanced technologies promise employers the opportunity to gather and leverage increasing insights into their business and workers, and optimise for efficiency through automated or semi-automated decisions.[15] While algorithmic management is commonly associated with platform work, where it is used to assign work tasks, direct work and evaluate performance,[16] it also now permeates a variety of more traditional workplaces.[17] For example, algorithmic management systems have been increasingly used to allocate and optimise work shifts, to screen and assess job applicants, assess employee performance, and even

address HR matters. This has sparked legitimate concerns about workers' rights and welfare, leading to a number of these functions being explicitly referenced in the EU's recent AI Act as "high risk", a categorisation carrying strict obligations around the use of AI systems.[18]

Algorithmic management systems rely on data to function. As such, they are underpinned by the related phenomenon of increasing workplace digitalisation and the rise of data-driven technologies.[19] Digitalisation denotes the move from analogue to digital systems in the workplace. This change is usually accompanied by "datafication",[20] a process where various aspects of workplace activities, including regarding workers themselves, are transformed into analysable data.[21] Examples of digital workplace technologies can include workplace surveillance tools, stock management systems[22] and digital HR platforms.[23] This wider array of data-driven digital workplace technologies are related to but discrete from algorithmic management systems, as they do not themselves make managerial decisions or recommendations affecting workers.

This study will take a broader approach to examine both algorithmic management in the strict sense and the wider use of digital tools, which have a significant impact on workers. This is a deliberate expansion of scope from the "strict" definition of algorithmic management outlined above and has been decided upon for two reasons.

"Algorithmic management, digitalisation and datafication are highly intertwined processes, and one cannot consider responses to the former without the latter."

Firstly, algorithmic management systems do not, and in fact cannot, operate alone. They rely heavily on the huge amounts of data being collected in

workplaces. Algorithmic management, digitalisation and datafication are highly intertwined processes, and one cannot consider responses to the former without the latter; the data collected acts as an input, which acts as a base layer for building and iterating algorithms.[24] Thus, it is paramount to draw attention not only to the impact of algorithmic management tools, but also more widely to look at this base layer and discern what the existing algorithms are basing their decision on, how this data is in fact created, and how actions are made "legible" and standardised.[25] Furthermore, focusing on the creation of this data layer allows for anticipatory action by considering how data might be used to create new algorithmic management practices.

Secondly, there is often a blurred line between the implementation of other workplace technologies and true algorithmic management systems. Our research highlighted that workers themselves often could not distinguish between different forms of workplace technology. Additionally, the creep of increasing algorithmic management takes place in the context of longer-running trends of workplace digitalisation and datafication.[26] Pre-existing technologies can create openings for the later use of algorithmic management, both through upgrading – as is seen by the addition of AI functionality to common tools, such as Microsoft Teams[27] – or simply through adjusting worker expectations to the increasing encroachment of technology. Finally, when we consider technologies from the perspective of the rights and welfare of workers, what matters is their *impact*. Many technologies, which cannot strictly be classed as examples of algorithmic management, can nonetheless have significant effects on workers and the workplace environment. Adopting too narrow a scope risks undermining joined-up action targeting all technologies that significantly affect workers' lives.

We thus argue that algorithmic management should be considered as a particular and more extreme extension of a longer-running process and logic around the use of workplace technologies, rather than a categorically different phenomenon.[28] Given this, it is important to consider the wider context of digitalisation and datafication, as well as specific

cases of algorithmic management. While this policy study thus adopts the framing of algorithmic management, the analysis should also be taken to encompass other forms of digital workplace technologies and the processes involved in their development and deployment.

"At the same time, it should be acknowledged that algorithmic systems, and in fact all workplace technologies, are not independent objects."

At the same time, it should be acknowledged that algorithmic systems, and in fact all workplace technologies, are not independent objects. Technology and data are sociotechnical systems, embedded in specific contexts and unable to work "by themselves".[29] All tools need people to develop, deploy and maintain them, and the contexts they are developed and deployed in matter. In this sense, the systems described and implemented in the case studies discussed below are also stories of changes in work. They illustrate how workers are increasingly embedded in and directed by a growing mass of data, while, at the same time, becoming not only service deliverers but maintainers of these new digital systems by producing data they require to operate. Foregrounding this enmeshment of human and machine is essential, as it gestures to the fundamentally social contingency of technological outcomes; the same technologies can have widely different effects, depending on how, where and why they are used. In fact, the very shape and functioning of these technologies themselves is a matter of human decision.[30] Rather than succumbing to a technological determinism or falling for what has been called "agency laundering" – placing accountability on the indisputable "facts" of algorithmic systems and disregarding the role of human decision-makers[31] – analysing socio-technical systems as a whole, with views from workers themselves can return us to a place of agency, capable of enacting change. This invites us not only to tell deterministically dystopian or naively utopian narratives of technologies, but to attune to the *specific ways* in which technologies shape work and workers, and workers can shape technology.

COLLATED IMPACTS

COLLATED IMPACTS

The three studies contained a number of overlapping findings with respect to worker impacts. Below, these are grouped into a series of high-level clusters targeting issues of particular importance to policy. The analysis follows the distinction outlined above between impacts operating directly on workers' rights and wellbeing, and those which might shift the balance of power between labour and capital. While the boundaries between these categories are blurred, and many effects of AM will have impacts spanning these groupings, this division is intended to provide analytical clarity to support targeted policy responses.

Worker rights and wellbeing

Mental and physical health

A number of studies pointed to the harms to physical and mental health algorithmic systems were capable of producing, and their ability to overwhelm the traditional checks of worker representation designed to safeguard workers' wellbeing. These findings point to a need for stronger policy safeguards around worker health and safety protections with respect to digital workplace systems, while ensuring that those worker representatives charged with enforcing these protections are adequately empowered to do so. Recommendations for such action are found in the later section "Policy actions to deal with the upper-level effects on the data use and privacy of workers".

"Welfare impacts were particularly present in the Swedish case studies."

Welfare impacts were particularly present in the Swedish case studies. In the transport sector, for example, the ride scheduling system had time allowances for pick-up and drop-off determined by the customer in line with economic considerations.

This created increased stress and pressure on drivers, but also systems programmed to neglect basic human needs, such as eating, drinking or taking a bathroom break, in the name of "streamlining". Taking a break required drivers to manually call for permission, while GPS tracking meant unauthorised breaks could lead to questions or disciplinary action from management or clients.

> "When you need to take a toilet break you are expected to call the traffic planning of the customer to say that you need to take a break. And then the answer can be that you need to wait until the next ride. Adults needing to ask permission to go to the toilet – that is a big discussion among us." (Swedish transport worker)

"A further source of stress was also identified in the tendency of particularly older systems to be inefficient and malfunction."

A further source of stress was also identified in the tendency of particularly older systems to be inefficient and malfunction. For example, informants reported system overloads at rush hour causing delays. The overall combination of tight scheduling, system inefficiencies and malfunctions of AM systems puts pressure on the psychosocial work environment, for example, through increased conflict risk, concern over the wellbeing of vulnerable passengers and even increased likelihood of accidents.

The Swedish warehousing case study showed even starker impacts. In the warehouse using pick-by-voice systems – where workers are directed by a headset delivering digital instructions around picking routes – informants reported that the constant monitoring and digital instructions had profound impacts on their mental health, even leading one worker to report hearing the virtual voice of the system in their dreams. Meanwhile, the warehouses using machine-complementary, stationary picking systems – the most automated systems found in the case studies, where workers stand statically and move mechanically delivered items into packing boxes in line with algorithmically generated, on-screen instructions – introduced additional physical challenges. While these systems reduced certain injury types associated with manual picking, their efficiency-optimising structure led to repetitive strain injuries due to the monotonous and repetitive nature of the tasks. The intensification of work and high productivity demands resulted in significant physical and mental exhaustion among workers:

"Everyone is extremely worn out when they get home. You don't have the energy to do anything. You eat, and you collapse; your body is completely exhausted. This is due to both the extremely high pace and the constant monitoring because you're logged into a screen. I am a union representative and safety officer, so no one targets me, but many colleagues feel constantly chased. […] Still it usually takes several hours after a shift before I can breathe normally. It was tough when my shifts ended at midnight, that it then took two to three hours before my body could relax." (Swedish warehouse worker)

The Swedish retail case study did not highlight such a severe picture of direct health impacts; however, some informants nonetheless highlighted that, in some cases, occupational safety and health representatives were not informed regarding the implementation of new digital systems, and thorough risk assessments were not conducted. While not framed strictly in terms of safety and health, inadequate involvement of worker representatives in the selection and implementation of new digital workplace systems, and an underplaying of the significance of their potential impact (which, by extension, implies a disregard for health and safety risks) was a recurring theme across both the Norwegian and Finnish case studies also.

"The introduction of regulatory technologies (RegTech) to "streamline" compliance processes was found to increase stress levels among compliance workers."

In the Norwegian case study of the finance sector, the introduction of regulatory technologies (RegTech) to "streamline" compliance processes was found to increase stress levels among compliance workers. Informants noted this was both due to detailed monitoring and performance pressures resulting from quantification of their work, coupled with increasing complexity of the compliance work itself. The informants from the Norwegian journalism sector reported similar impacts on their mental wellbeing. They found the number fixation driven by the data systems designed to optimise content for reader engagement stressful and demotivating, leaving them with little influence on their work practices.

Worker privacy and surveillance

"Digital and algorithmic technologies can enable extensive surveillance and data collection, leading to reports of both direct violations of the legal privacy and data rights outlined by legislation, such as the General Data Protection Regulation (GDPR)."

Across all the country case studies, issues around worker privacy abounded. Digital and algorithmic technologies can enable extensive surveillance and data collection, leading to reports of both direct violations of the legal privacy and data rights outlined by legislation, such as the General Data Protection Regulation (GDPR), but also the creep of a wider culture of surveillance and monitoring. Alongside reiterating the need for stronger enforcement of existing EU regulation, the findings present an issue for policymakers. In a number of cases, the surveillance identified did not directly violate any legal rights or collective agreements covering workers. However, the extent of data collection, at least intuitively, appears to overstep the bounds of propriety, and at a minimum creates unpleasant and untrusting workplace environments. Of course, not every negative practice can or should be regulated against, so progressive policymakers must identify how to work with trade unions and other stakeholders to address the full range of workplace impacts of increasing digitalisation, using the full range of tools available.

In the Finnish transport and logistics sector, union representatives reported that privacy and surveillance were constant issues. Informants from the retail sector expressed similar concerns about these issues, with one noting during a discussion of data collection that "we have discussions every year, what is the purpose of this?".

"Breaks are also followed by the same electronic access control system. The new policy was that also coffee breaks should be punched in, in addition to food breaks. This was not something the employees really like, there was a strong sentiment that the employer is surveilling, that big brother is watching all the time. For the employees it also felt like that they were no longer trusted, it broke down the trust between the employer and employees." (Finnish retail union representative)

Returning to transport and logistics, in some companies, the extensive real-time monitoring and tracking of driver performance required constant vigilance and intervention by union representatives to prevent misuse, undermining trust. This deterioration was further highlighted by workplace rumours about data collection, which informants highlighted, such as uniform badges acting as secret recording devices. Even where direct surveillance was forbidden, one informant noted that the vast amounts of data collection allowed for surveillance by proxy. Finally, the difficult and lengthy process of obtaining a personal data request outlined by one informant highlighted the difficulty workers face in navigating digital systems and enacting their rights.

The Swedish case studies tell a similar story. In the retail sector, informants also highlighted how employers indulged in illegal data practices, using digital systems in violation of privacy regulations. The same murky ambiguity around data collection plaguing Finnish workplaces was also found. In the transport sector, workers and managers were often unaware of the rules governing data collection and use, and no workers interviewed were formally informed of their rights around data. The lack of formal information on data management rights

leaves workers vulnerable to excessive monitoring by customers in particular, while unions identified a general lack of knowledge about the acceptability and legality of employee-monitoring practices, and a tendency to use systems without a full assessment of their legality. Meanwhile, in the warehouse sector, the pick-by-voice system's reliance on GPS for route optimisation allowed supervisors to monitor workers in real time, exacerbating feelings of stress and surveillance among employees.

The Norwegian case studies both identified similar dynamics, with pervasive and increasing surveillance found across both the journalism and finance sectors. However, the case studies also highlighted some more unique perspectives on the surveillance and privacy issue.

Firstly, both the finance and journalism sectors noted the increasing preoccupation with security as a major legitimising factor for ever more extensive oversight. From increased regulatory compliance burdens in the finance sector, to heightened physical and digital security measures in the journalism sector, the promotion of security was used to justify measures that imply a high degree of monitoring and surveillance. What's more, high levels of workplace trust across both sectors were found to sometimes hinder critical engagement by unions with the implications of surveillance on their work environment, especially when justified in terms of goals such as security.

"There is a tendency when pursuing cybersecurity to also do things that can compromise employees' privacy and rights. […] If you have access to an employee's account, and you suspect that something is wrong, the path to checking the employee's account is very short. Or if you have recordings of telephone conversations, which in principle was

because you are required to have them in certain situations by the authorities… […] The fact that there is so much, and that there is so much information collected in various fields about employees means that their privacy and the ability to have an overview of what type of information the employer has is almost hopeless. […] Cybersecurity, what should you do in connection with it, which the IT department sits on, is perhaps not something you discuss with employee representatives. At least not everywhere. There are quite a lot of measures that will go under the radar, but which will also have implications for individual employees." (Norwegian labour law specialist, finance sector)

Secondly, the AI-powered workplace "temperature checker" described in the finance sector case study gives an insight into the potential for digital technologies to enable a deeper and more insidious creep of surveillance into all aspects of working life. The tool promises to increase engagement and help reduce sick leave, stress and turnover. In practice, based on informants' accounts, it replaces the traditional annual surveys of the working environment with short questionnaires sent out every two weeks to measure worker feelings around certain workplace issues. The use of digital tools to monitor employee sentiments is not new, nor does it need to be particularly detrimental. However, the software was viewed by informants in one workplace as particularly invasive, even when compared to other performance monitoring tools, and points to the potential of digital workplace governance to be extended not only to workers' actions but to their feelings and emotions.

Use of worker data to optimise systems

An interesting dynamic that emerged in some of the studies relates to the use of non-private data. Algorithmic systems rely on vast amounts of data to function properly, and this data must come from somewhere. Often it is workers themselves who generate the data which underpins digital systems, through the monitoring of their everyday work. In this way, workers are generating alternative sources of value for their employers beyond the outputs of their work itself. Just as policymakers are now being forced to grapple with the issue of AI value generation being grounded in inputs created by others, they must now confront a similar issue in workplaces. Workers must be entitled to a fair share of all the value they generate for their employers, however this value is generated. And legislation must reflect the growing datafication of work and associated value extraction, to avoid the emergence of new forms of workplace exploitation.

The datafication of the workplace emerged as a cross-cutting theme. For example, a Norwegian informant from the finance sector noted a huge uptick in measurement, while in the Finnish transport and logistics sector another informant shared that the ease of data collection meant that everything that can be monitored now is.

> "I have worked in a bank since 1995, and we have always been measured on sales and number of phone calls, so that is not new. But what is new, is that everything is measured now, all departments in the bank and it is so much more detailed […] there is more and more you should do in the same time, more pressure and everything is recorded." (Norwegian mixed focus group member, finance sector)

While informants often focused on the use of data collection for surveillance and performance monitoring, the concept of "function creep" highlighted in the Norwegian study outlines how data collected for one purpose can easily be repurposed to other ends. In this case, even if data about workers is not collected with the explicit purpose of calibrating and upgrading algorithmic systems, using it in such a manner becomes an easy extension. This is particularly true where the data is non-private, and thus is not covered by legal restrictions on its (re)use.

A concrete example of such uses of worker data was found in the Finnish retail sector case study. Here, informants referenced the "clocking" of algorithmic shift management systems, where standardised timings for key tasks were inputted to calibrate its calculations. These timings were identified as a potential source of contest, holding the potential to discriminate against older or less-able-bodied workers if based on the time taken by younger, fitter workers to carry out tasks. However, more widely, they also represent a notable shift, where the data outputs of worker monitoring are then plugged back into the very systems used to manage workers, to further optimise them in the name of efficiency and ultimately profit. Alongside wider considerations around how such systems are implemented and used, if it is indeed worker-generated data that is helping them increase firm profits, then this should pose questions around worker entitlement to at least some share of these.

> "Yeah, the head union representative is also there, observing the situation, how it is done. In clocking we have to take into account that of course it can't be done on one person. Different workers are different. Different ages, different abilities, workers in different stages of their lives. So we can't clock things just according to the fastest and the most efficient person." (Finnish union representative, retail sector)

Balance of power between labour and capital

Reduced worker autonomy, security and the role of expert know-how

One of the most apparent ways that the use of digital workplace technologies has diminished the power of labour with respect to capital has been through the shifting in workers' roles. In particular, workers are increasingly left with less autonomy in carrying out their tasks, and the digitally transformed structure of the workplace appears to leave increasingly little room for expert knowledge around how to carry out work effectively, which has, in many cases, been built up by workers over many years. This creeping "digital Taylorism" not only directly limits worker power by reducing their ability to make choices day to day, but in the longer term creates workplaces where individual workers are more dispensable and interchangeable, with less knowledge and oversight than they had before. What's more, in many cases, the trajectory of this change points to ever-increasing automation, and job insecurity for those workers whose roles are being increasingly diminished to the point of prospective nonexistence. The reduced ability for employment to thus provide "decent work", along with the reduction in workers' bargaining power should be of concern to European policymakers.

"Reduced worker autonomy stemming from the use of algorithmic systems was identified across both Finnish case studies."

Reduced worker autonomy stemming from the use of algorithmic systems was identified across both Finnish case studies. In the transport and logistics sector, informants recounted how automated route planning systems' inability to account for factors such as weather changes forced them to choose between adhering to flawed, algorithmically generated instructions or using their initiative, risking reprimand for deviating from digital guidance systems. In the retail sector, automated shift planning and AI-driven recommendations were seen to have become central to workforce management

and were used to cover an increasing number of duties previously allocated to shift managers. Furthermore, workers reported suspicions that these systems led to shorter and more fragmented shifts, compounded by the use of apps for flexible shift picking. In retail warehouses, the use of AM to dictate worker behaviour extends even further, with one informant reporting management intervention based on not meeting targets around speed.

The Finnish cases also highlighted examples of how digital systems could erode workers' expert know-how. In the transport and logistics sector, automated shift planning itself illustrates this tendency, as did informants' complaints that dispatch officer posts historically filled by former drivers on the basis of their practical expertise were now simply populated with young engineers capable of operating the new digital systems. This shift was even more starkly highlighted in the Norwegian case study of the journalism sector. Journalists in Norway use highly similar technological solutions, resulting in a high specialisation and concentration of technological competence. Crucially, many IT services are outsourced, impeding effective co-determination by reducing the opportunity for tailored technological solutions that might better meet the needs of individual journalists. These were far more pervasive in the past.

> "Yeah, the routes are made by a computer and a human, but the thing is that none of these people who do them nowadays have spent a day of their lives collecting waste. Over there they are engineers and based on their calculations they calculate what can be done. And there are things missing from there, like this thing called the Finnish winter. Even at this moment, we have drivers being late. This is like the new normal." (Finnish union representative, transport and logistics sector)

In the Finnish retail case study, the shift to digital stock management systems – requiring all workers to digitally scan items into the system as they go about their tasks – was observed by one informant to mean that, whereas previously someone in the workplace would have a full, overall knowledge of the stock situation, under the present system no individual had such a complete understanding.

A similar picture emerged in the Swedish retail case study. Informants noted how automated ordering systems had made skills previously needed for order fulfilment redundant, causing frustration when systems failed, and workers lacked the understanding or means to correct issues. Here too, workers' autonomy was compromised, as digital technologies monitored and instructed them in real time, leading to feelings of professional judgement being undermined. And like in Finland, planning and scheduling systems were again found to centralise decision-making, shifting power from lower-level managers and workers to higher-level management, thus limiting workers' ability to influence their schedules. The research revealed concerns around lower incomes due to fractured shifts along with job insecurity, particularly for part-time and hourly workers, who face irregular and unpredictable schedules. This shift in power dynamics was found to have negatively impacted workers' ability to make requests and have their preferences considered. Additionally, on-site lower-level managers reported feeling overlooked and burdened with resolving worker dissatisfaction without having the authority to make changes.

"Officially, they say that it should facilitate the managers' work so that the managers can be more out on the floor, with more time for coaching. But I think in practice the managers feel overlooked. After all, they are removing a task that might not be super fun […] but if you've done a good job, you don't spend so much time on the schedule afterwards. Plus, it is the manager who will have to take the discussions with those who are not satisfied." (Swedish retail worker)

Job security was also a major concern emerging from the Norwegian financial sector case study. The growth of RegTech and compliance automation were identified by informants as sources of concern. Technological solutions driven by cost, efficiency and speed considerations were noted to imply job losses in compliance departments, unless their advance is matched by continuing regulatory growth. Furthermore, informants noted that not only were the compliance professions becoming more stressful but that increased datafication was also diminishing professional judgement and discretion.

"All that can be automised, will be automised. The bank management has expressed this very clearly. […] while we have seen enormous growth in both IT and compliance, we now see that some compliance functions are also headed for automation, also using AI." (Norwegian employee representative, finance sector)

Diminishing space for professional judgement was similarly identified in the Norwegian journalism sector. Here, informants described how the shift towards digital platforms has led to a reliance on data-driven journalism, where metrics and reader behaviour analytics – rather than journalists own judgement – guide news production. This trend has reshaped journalistic practices, emphasising market-oriented content creation and undermining journalistic authority on knowledge production.

## Limited agency over implementation and use

A recurring theme across almost all case studies for all three countries was the sidelining of employee representatives over decisions around whether and how to implement new algorithmic and digital systems in the workplace. As the evidence above shows, these technologies have the potential to have significant impacts on workers' everyday lives. It thus seems obvious that, under the Nordic model, they would be prime candidates for consultation and negotiation with staff and their representatives. This appears not to be so, with legal loopholes and differential power exploited to impose new technologies unilaterally, in many cases. Our findings demonstrate that worker involvement in the implementation and use of new technologies is the single, most-decisive factor in determining their impacts on the workplace. Policymakers should therefore attend closely to the issue, and where possible create legal support to ensure that workers are not bypassed.

In the Finnish retail sector, several informants expressed a sense of inevitability around technological transformation, implying that pushing back was futile. This sentiment may partly be due to the limited success they reported in using legal provisions, such as the Co-operation Act, to challenge technological changes imposed by employers. While the act technically requires worker consultation on significant changes, a number of informants noted that the rollout of new technologies is often presented as a small enough change to warrant bypassing these more significant channels

of communication, and where communication did occur it felt more like a formality in the face of an already settled decision.

Similarly, in the Swedish retail sector, two informants reported that worker representatives were not informed at all about the use of workplace technologies and, more worryingly, that data systems were also used illegally in violation of privacy regulations. Interviews from the Swedish transport sector highlighted that there too, workers and middle-level managers face limited involvement in decisions regarding the implementation and use of AM tools. A particular difficulty in transport is that customers (those organisations buying transport services; in this study, either municipalities or a chemical company) have significant control over digital systems that manage workers' activities, and the data they generate. This was found to create negative consequences for workers' access to information on how systems functioned, and their ability to voice issues with the systems. In passenger transport, drivers were told only to communicate problems to their managers rather than customers, but found their managers lacking in opportunities or incentives to raise these problems with the customers.

The sense of resignation found in Finland also appeared in Sweden. In the transport case study, the drivers themselves were described as relatively passive after previous attempts to be involved were unsuccessful. Furthermore, more insecure workers – such as those new to the job or vulnerable to job loss – were reported to face further barriers to raising issues with the systems. The struggle of insecure workers to speak up was also noted in the Swedish retail case. The interviews unearthed how many part-time and hourly workers feel powerless to demand improvements due to the insecure nature of their employment. This insecurity creates a skewed power dynamic, inhibiting resistance to worsening working conditions, as workers fear losing shifts or facing retaliation if they demand better: "We must just live with it now and take what comes" (Swedish transport worker).
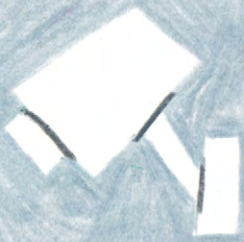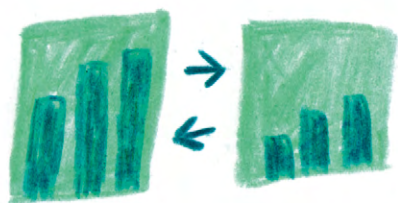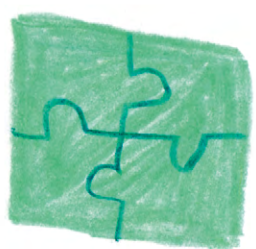
The Norwegian cases again contain many overlaps, but also offer further insights into how workers can end up sidelined. In the journalism sector, as elsewhere, informants reported how technological decisions were predominantly made by management, often justified by economic factors. This top-down approach limits the influence journalists and their representatives have on technology that directly affects their work. Despite this centralisation, these decision-making processes were rarely questioned, and informants reported high levels of trust in the expertise of those making technology-related decisions. Notably, this trust was also reported by some informants to be a product of necessity given lack of capacity, as much as anything else: "It's always controlled from above and justified and legitimized by economy". (Norwegian journalist and employee representative). "It's never decided whether it would be nice to have this kind of technology. It never is. It's introduced by the owner or management" (Norwegian journalist and employee representative).

The issue of trust also arose in the finance sector case study. Here, employees and their representatives often failed to question the use of AM tools. Instead, they were often simply accepted as necessary given the security landscape, without delving deeper into the specific systems and processes used in the name of security, how they have been used in practice and their actual consequences, including for workplace power relations. These dynamics are further exacerbated by the pressures noted by interviewees to keep up with the pace of sectoral digitalisation; fear of missing out or being left behind acts as another means of papering over potentially insidious aspects of emerging technologies. Even where union officials did seek to question the implementation of new technologies, the legitimation of systems in terms of common goals, such as growth, security and productivity, created issues. Faced with a default narrative that AM systems will enhance these ends, then union opposition becomes an opposition to the ends themselves, and is therefore easily dismissed.

"We hear only their version, their sales arguments. It is very difficult to challenge or to know what this product will mean in practice. It is impossible to know the consequences […] but we have good dialogue and both HR and legal are involved, and we see that legal is also asking questions […] and they have a lot of experience with risk assessment […] so I feel the processes are good, but at the same time, we never get the whole picture." (Norwegian trade union representative)

Internal competition, individualisation and fracturing of functions

"Labour power relies at its core on collectivity. Workers must organise themselves as a group to exert themselves with enough force to extract concessions from their employers."

Labour power relies at its core on collectivity. Workers must organise themselves as a group to exert themselves with enough force to extract concessions from their employers. Evidence from the case studies shows that undermining this collective capacity is another way in which digital and algorithmic systems can diminish worker power. Policymakers must work together with unions to find ways of bolstering collective labour power, lest it be irreversibly lost.

In Norway, the digital whistleblowing systems used in the finance sector present one example of how technology can undermine collective action. These systems enable the bypassing of traditional collective systems of accountability and enacting regimes where individuals directly report their concerns in an isolated manner, undermining the ability of unions to

maintain oversight or foster collective action around patterns of concerns. Similarly, in the Finnish retail sector, core HR functions are also being shifted to digital platforms, placing the responsibility for tracking and managing development progress on workers as individuals and again reducing the space for more collective visibility of issues: "My personal experience is that it is often right that they speak up, but that maybe the whistleblowing channel is not the best channel, that it should have been taken up through the co-operation channels with us" (Norwegian chief employee representative, finance sector).

Returning to Norway, the digitally enabled working structures, which now pervade the finance sector, also present challenges to traditional models of co-determination, and thus, unions' capacity to influence workplace outcomes. For example, digitalisation has enabled many institutions to adopt agile organisational structures inspired by Silicon Valley companies. This shift challenges traditional models of co-determination by creating more fluid and flexible organisational charts. Employees often work in project groups with leaders in different locations, complicating lines of responsibility and accountability. In the journalism sector, the digital transition has also led to a rise in multiskilled, flexible journalists who handle multiple aspects of news production. This trend has, in a different way, also contributed to the individualisation of work and reduced collective action among journalists.

"The individualisation of work can also lead to competition and conflict among workers, further undermining their organising capacity."

The individualisation of work can also lead to competition and conflict among workers, further undermining their organising capacity. In the Swedish retail sector, for example, digital tools were found to be used to collect data that was then used for individual performance appraisals. This can undermine social cohesion, foster competition and create conflicts among workers, eroding solidarity and trust. Similarly, in the Norwegian finance sector, informants reported the use of individualised

performance trackers created an everyone-for-themselves atmosphere, while in the journalism sector gamified awareness and security training apps encouraged mutual surveillance and peer benchmarking, where workers were surveilled not only by managers but by other workers:

> "It's a system that facilitates opportunism […] we're measured on everything, and it's linked to what we earn, to salary negotiations. It will always be that you think of yourself first, you think, what do I have to do to get more pay when. Then you'll say that you have to chase the KPIs, not think about the good, community or what's morally right." (Norwegian mixed sector focus group member)

"Informants reported the use of individualised performance trackers created an everyone-for-themselves atmosphere."

In the Swedish warehouse sector, conflicts were even more stark. The ability of some workers to "opt-out" of using the automated pick-by-voice system for health reasons created tensions and resentment among those who were continuously subjected to it. In other warehouses, using machine-complementary picking systems based on mechanised delivery and removal of goods to stationary workers, informants shared that less physically demanding or less closely surveilled tasks were preferred, leading to conflicts and a sense of injustice among workers based on who these were allocated to.

Black box systems and decisions

"Algorithmic systems can undermine workers' power by making decision-making exercises of power in the workplace."

Finally, algorithmic systems can undermine workers' power by making decision-making exercises of power in the workplace. The creeping digital transformation of workplaces can often be subtle, creating impacts that are not immediately apparent, even to those experiencing them. The results can be a complex and opaque web of systems, which are rendered unintelligible and difficult to navigate by workers and their representatives, closing off their ability to challenge the power dynamic they create.

Informants across the case studies admitted a lack of widespread awareness about the digital systems used in their workplaces, and the impacts they had on workplaces. In the Finnish retail study, several informants noted that their participation in the research was the first time they had reflected on these issues. Similarly, in the transport and logistics sector, multiple informants expressed uncertainty about the extent of data collection practices in their workplaces. Interviews in the Norwegian finance sector also unearthed an apparent general lack of awareness by employees about the systems and procedures used. Likewise, in the journalism sector, interviews painted a picture of journalists often lacking the time reflexivity needed to critically assess the implications of digital tools on their work and rights.

"New technologies can also appear complex and opaque, further reducing the possibility of worker influence."

New technologies can also appear complex and opaque, further reducing the possibility of worker influence. In Norway, informants from the finance sector noted that the technological complexity and variety of systems used across large financial institutions often make it difficult for local union representatives to fully understand or influence these systems. The researchers comment that this perceived complexity makes technologies seem overwhelming and uncontrollable, making workers more likely to simply accept them, rather than actively reflect on them as contingent conditions shaping their working lives. Similarly, in the Swedish transport sector, informants reflected that the complex and hidden nature of digital systems rendered navigating and working around their more negative impacts increasingly difficult.

> "I think it is necessary to understand algorithmic governance and to become part of steering the development and take the place at the negotiation table that is our right; we need competence and capacity building for both employees and trade union representatives […] I really hope these questions will come up higher on the agenda, we need to understand these digital systems and their consequences." (Norwegian mixed sector focus group member)
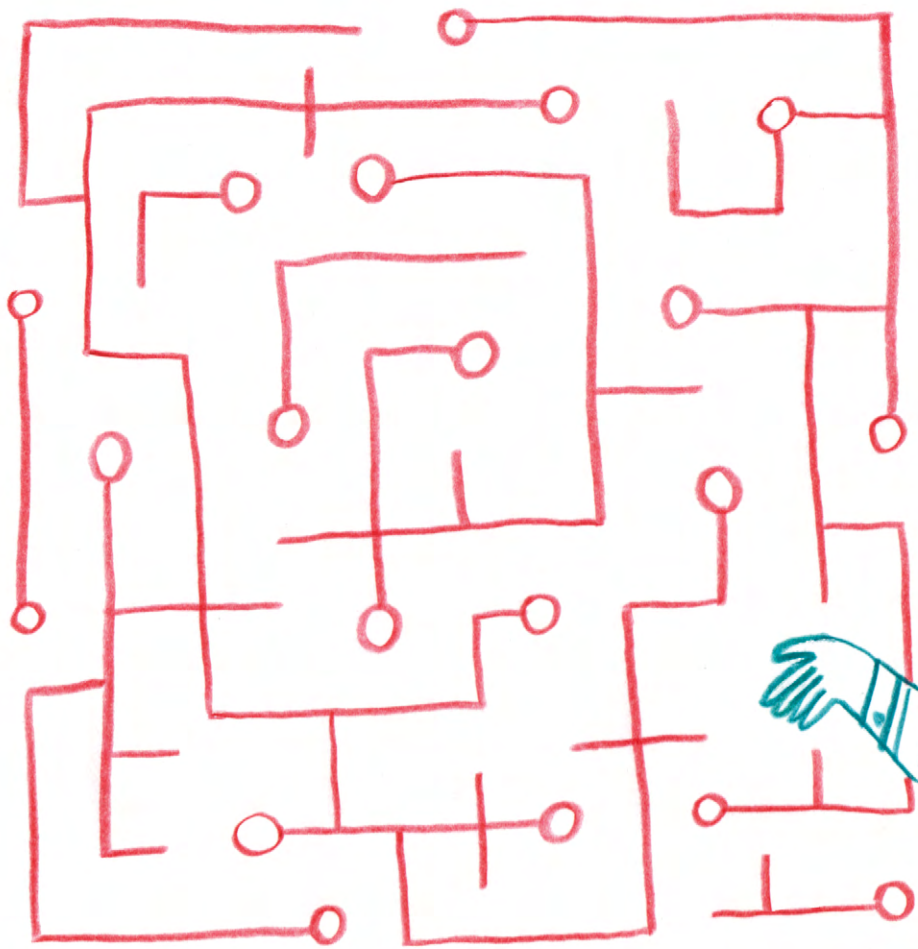
THE POSITIVE VIEW: SIGNS THAT THINGS CAN BE DIFFERENT

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The above evidence paints a worrying picture for all those concerned with worker power, rights and wellbeing in the digital age. However, the Nordic case studies did not present an entirely damning view of the impacts of workplace technologies. Examples also arose that pointed to the possibility of an alternative future, where digital tools and algorithms can benefit workers and businesses alike.

Strikingly, the same thread runs through each of these examples. In every case, where workers and their representatives were involved deeply and meaningfully in the rollout of new technologies, they were better received and delivered better outcomes. The examples show that the results of meaningful co-determination extend beyond benefits for workers themselves, but actually improve the capacity for digital tools to function effectively in support of business goals. The lesson is obvious, and presents what is arguably the most important learning, that this Nordic-focused study can offer European policy at large: any policy approach that wishes to meaningfully support a workplace digital transformation which truly benefits everyone must have support for real co-determination at its heart.

Perhaps the most glowing example of algorithmic success was found in the Finnish transport and logistics case sector. In one bus depot, data collected on driving efficiency and similar metrics were gamified in a way that suited the workers to create friendly competitions over the metrics they measured. They reported an overwhelmingly positive experience in the use of the systems, and enjoyment in the comparisons and games they enabled. The crucial element here was the use of digital tools to support workers to reflect and improve, rather than impose strict expectations and pressures.

"There was one driver who said that it's a bit like having a co-driver next to you following and giving feedback – now it is this system doing it and the person said it was a good thing, and so does the employer." (Finnish union expert, transport and logistics sector)." (UR1)

What is striking is that a similar scenario could just as well be described in another company as overly invasive monitoring that impinges on the autonomy of the driver:

"When this [tracking system that measured, e.g., fuel efficiency] came to our company, it felt like the employer was pressing the boot on us. There were three of us testing the system at first and they told us no this is not about snooping around, it's just information for the employer." (Finnish transport and logistics worker)." (UR1)

Clearly, different bases of trust, cooperation and clear guidelines as to what the data collected can be used for can have vastly different reactions from the worker side. Likewise, in the retail sector in Finland, a union representative reported the use of "autonomous" shift planning, where larger and direct worker involvement in final shift decisions that were initially calculated by predictive systems was seen

as a competitive advantage for the company and worker retention.

> "Instead of artificial intelligence, we tried collective intelligence. In a way this was giving the ball to the workers, just like in some cases in the healthcare sector where this has been tried for a longer time and where they've had good experiences as well." (Finnish union representative, retail sector) (UR1)

In Norway, the finance sector presented a similarly interesting contrast. After evidence of an overwhelmingly negative reaction to the introduction of "temperature checking" software in one firm, another firm was able to enjoy dramatically better results when the trade union representation was actively involved in the process of deployment, including the selection and addition of questions:

> "There are pre-set questions, but we have removed some and then we have also added our own, and we changed some of them, so people do not misunderstand and then we also encouraged that they comment. […] the idea was to have a continual follow up and to work with it actively afterwards, to discuss it in the team or department. […] we were involved a lot, as it is important it is used correctly, and how the data from this system is then used; we argued that it cannot be the point to always have green, green, green." (Norwegian chief employee representative, finance sector)

In all these cases, worker involvement shaped technologies in a manner that allowed them to act as beneficial complements to human labour rather than controlling or constraining it. While relying on the Nordics' exceptional model of labour organising, they demonstrate that, with the right policy and support, such a future can be possible across the whole of Europe.

> "It felt like the base was good, that there was a good base for cooperation. There was a model that already existed and it was easy to build on top of that model" (Finnish trade union expert, transport and logistics sector).

"However, where a cooperative approach to technological change was taken and workers were given a meaningful say in the use of new tools, such change had the potential to be beneficial for both workers and businesses."

Our research has shown that unchecked use of AM and digital technologies can be disastrous, for both individual workers themselves and the ability of labour power to organise and enact beneficial change on their behalf. However, where a cooperative approach to technological change was taken and workers were given a meaningful say in the use of new tools, such change had the potential to be beneficial for both workers and businesses. Few places in Europe have as powerful and effective labour movements as the Nordic region. And so against this backdrop, there is a necessary role for policymakers, to protect workers from the worst potential impacts of workplace digitalisation, while also empowering trade unions across Europe to advocate and engage powerfully and cooperatively over the inevitable transformation of their workplaces. The next section outlines some prospective paths to achieving these goals.

POLICY IMPLICATIONS AT THE NORDIC AND EUROPEAN LEVEL

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The findings of this study point to serious implications for the European social model, and more so for the Nordic model, where traditionally high levels of worker protection are being tested by this wave of digitalisation of the workplace. As the Digital Research Programme was executed in the context of the Nordic countries, we can deduce some relevant policy recommendations for Finland, Norway and Sweden, while, at the same time, identifying cross-cutting issues at a pan-Nordic level and translate the findings to policymaking at the European level.

The EU legislator has been active in the last few years when it comes to the development and impact of AI on society. AI in the workplace, and more specifically AM, is an important subsegment of these developments and is covered under new legislation like the AI Act. And even though legislators indicated there will not be sector-specific rules for AI, it was announced that the workplace was such an important and transversal aspect for all Europeans that the need for a dedicated legal initiative was being investigated.[32]

Two levels of policy impact

Policy interventions should address the two levels of impact of AM, which have been outlined in the analysis above, while acknowledging there is an interplay between these two levels.

1) **Upper level: worker rights and wellbeing**
   When looking at the adverse effects of increased AM and digitalisation of work on workers' wellbeing, we have to look at the implications of AM on issues regarding occupational health and safety legislation, as well as data use and the privacy of workers under the GDPR and other relevant laws.

2) **Foundational level: balance of power between labour and capital**
   This addresses the shifting balance of power between labour and capital, between workers and management, that AM systems exacerbate, accelerate and capitalise on. Here, we must address the issues around the transparency of AM processes and the way workers can influence the deployment and use of these systems in their workplace. Trade unions will have to play a role in this, and we should look at policies that could support this need for workers' representation.

A comment on the division of roles between legislators and unions

Before diving into the legislative and policy implications and solutions, we need to acknowledge that, when it comes to labour legislation, there can be a difference of opinion between what is suggested in an EU-wide context and the specifics of the Nordic approach. In the Nordic countries, labour relations are, for a large part, negotiated in collective agreements, resulting in scepticism of Nordic legislators and unions towards EU legislation in the social domain for fear this will diminish their room to manoeuvre.

Most EU labour legislation comes in the form of directives that allow for member states to implement EU measures and minimum standards in their own legislative context, which differs from one country to the next. One thing we must ensure is that any form of European labour legislation does not hinder the Nordic unions from gaining the most from the collective bargaining process. At the same time, we must acknowledge that, elsewhere in Europe, or even in some sectors in the Nordics, organised labour does not have the same position and is in far

greater need of regulatory support to set minimum standards. The aim of regulation should be to bolster concessions from collective bargaining, not drag them down to a new lowest common denominator.

Putting our findings in the context of existing EU legislation

The rapid development of AI and AM has not escaped the attention of the European legislator, and two pieces of flagship legislation were recently adopted. The AI Act, as a transversal legislation that provides obligations for producers of AI systems, and the Platform Work Directive (PWD), which sets a strong precedent with a chapter on AM-related rules for a subsegment of the workforce.

The AI Act works on the basis of use case, where the context in which AI tools are deployed are classified from unacceptable risk to high- and low-risk use cases. In this regard, the workplace was identified as a high-risk environment. By default, this means that an impact assessment must be made for the use case of all workplace AI products; however, the final compromise version of the act allows for a number of exceptions to this.[33] This assessment shall consist of a description of the processes in which the AI system will be used in line with its intended purpose, a description of the period of time and the frequency with which each high-risk AI system is to be used, the categories of persons and groups likely to be affected, the specific risks of harm likely to have an impact on these persons or groups, a description of the implementation of human-oversight measures, and the measures to be taken in the case of the materialisation of those risks, including the arrangements for internal governance and complaint mechanisms. Time will tell if these self-assessment tests will have a real impact on the AI tools deployed in the workplace, or will turn out to be just a rubber stamp. This will also depend on the role the AI Office of the European Commission is willing to take in the implementation and enforcement of the AI Act. The question is, for example, if the AI Office will draw on the expertise of trade union experts regarding AM and its effects on workers, and if this expertise will be sought in their scientific panel or advisory forum.

Another relevant piece of legislation, the PWD, was adopted around the same time as the AI Act. And while the PWD only applies to a subsector of the labour force, the platform workers, it does set a strong precedent for the EU legislative approach to AM. This directive contains a whole chapter with rules for the deployment of AM, which, in the case of riders and other workers that work through an application, is AM in its purest form. Many elements of the chapter on AM in the PWD could be applied to workers in traditional sectors, regarding transparency, worker influence and the fact that AM cannot put undue pressure on workers that will lead to increased health and safety risks.[34]

It remains to be seen if the European Commission will come forward with a legislative proposal that creates rules for the use of AM in traditional sectors. On one hand, the AI Act is meant as transversal legislation, which will not be complemented by sector-specific legislation on AI. On the other hand, the workplace is a transversal domain, which affects the daily lives of the majority of Europeans, and might require extra attention and specific rules. This is why the European Commission has announced that it has ordered an extensive study into the current practices and the risks and opportunities for both workers and companies of AM tools.[35] This investigation could be the first step of a lengthy European legislative process that could lead to a directive or even a regulation. The mission letter sent by European Commission President Von der Leyen asks Roxana Mînzatu, Executive Vice-President-designate for People Skills and Preparedness, to focus on the impact of digitalisation in the world of work, which should include an initiative on algorithmic management.[36] And although there seems to be broad support amongst policymakers for the need to regulate this matter, we will have to wait for the new European Commission to put forward a proposal.

Table 2. Aspects of AM in the PWD that could apply to traditional sectors.

1. Limitations on processing of personal data by means of automated monitoring or decision-making systems (Article 7), amongst others, banning the use of any personal data on the emotional or psychological state of the person; monitoring private conversations; collecting data while the person is not working; data to predict the exercise of fundamental rights, including the right of association and collective bargaining; and any biometric data to establish the identity of the worker.

2. Transparency on automated monitoring or decision-making systems (Article 9) to inform workers, their representatives and competent national authorities of the use of automated monitoring or decision-making systems. That information has to include, amongst others, all types of decisions supported or taken by automated decision-making systems; the fact that such systems are in use or are in the process of being introduced; the categories of data and actions monitored, supervised or evaluated by such systems; and how the system is to achieve it.

3. Human oversight of automated systems (Article 10) to oversee, with the involvement of workers' representatives, and regularly evaluate the impact of individual decisions taken or supported by automated monitoring and decision-making systems on workers, their working conditions and equal treatment at work. Information on the evaluation shall be transmitted to workers' representatives and the competent national authorities upon their request. Any decision to restrict, suspend or terminate the contractual relationship or the account of a person performing platform work must be taken by a human being.

4. Human review (Article 11) that gives workers the right to obtain an explanation from the platform for any decision taken or supported by an automated decision-making system without undue delay. The explanation shall be presented in a transparent manner, using clear and plain language, and workers must be provided with access to a contact person designated to discuss and to clarify the facts, circumstances and reasons having led to the decision.

5. Safety and health (Article 12) requirements for the evaluation the risks of automated monitoring or decision-making systems on the safety and health of workers, for possible risks of work-related accidents and psychosocial and ergonomic risks, to assess whether the safeguards of those systems are appropriate for the risks identified in view of the specific characteristics of the work environment and to introduce appropriate preventive and protective measures. Platforms must ensure effective information, consultation and participation of workers and/or their representatives and the use of automated monitoring or decision-making systems may not in any manner put undue pressure on workers or otherwise put at risk the safety and the physical and mental health of platform workers.

6. Information and consultation (Article 13) of workers' representatives by platforms, as defined in Directive 2002/14/EC, must also cover decisions likely to lead to the introduction of or to substantial changes in the use of automated monitoring or decision-making systems and shall be carried out under the same modalities concerning the exercise of information and consultation rights. The platform workers' representatives may be assisted by an expert of their choice to examine the matter that is the subject of information and consultation and formulate an opinion. The expenses for the expert shall be borne by the platform, if they are proportionate.

Policy options to address the challenges of AM to the upper level, the adverse effects on the wellbeing of workers

To address our findings that AM is adversely affecting the wellbeing of workers, we need to turn to the existing occupational health and safety (OHS) legislation in place. A large part of the solution is to apply this legislation to the new realities of digitalising workplaces, where AM is increasingly creating risks for workers due to stress and strain. These aspects should be dealt with under the existing national and EU health and safety rules, such as Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work,[37] and the various national health and safety regulations that make the employer responsible for ensuring that employees do not become ill due to influences in the psychological work environment. These general OHS rules could be reinforced with some specific requirements of

a potential EU AM or AI in the workplace directive, which explicitly prohibits putting undue pressure on workers or otherwise putting at risk the safety and the physical and mental health of these workers through AM tools, as was done in the PWD.

A big question remains about the application of these rules and enforcement by the competent authorities – the labour inspection, for example – to ensure effective compliance in workplaces around Europe. There could be a need for guidelines in this regard, at the member state level, but also from the European Commission and the European Agency for Safety and Health at Work, on the application of relevant directives in a new context.[38] Also at the international level, the ILO has shown an interest in the topic of AM, and this could lead to an agreement on a convention with standards on the use of AM in traditional sectors.[39]

"By often splitting work into repetitive microtasks to gain efficiency, AM reduces worker wellbeing, their value as professionals and their overall skill sets."

By often splitting work into repetitive microtasks to gain efficiency, AM reduces worker wellbeing, their value as professionals and their overall skill sets. These effects are in themselves enough reason to consider limiting these practices for the sake of the autonomy and (mental) health of workers. Worker control over the performance of tasks and limits to extreme forms of minute-by-minute guidance, like the pick-by-voice system, could be considered an unwanted practice and could be banned or severely limited under an AI at work directive.

Since these AM systems are, in the end, ICT products, we can demand that they are safe for workers to use, following the logic of the AI Act, where it is demanded that adequate safeguards should be in place for the high-risk use case of the workplace. These safeguards need to be part of the code of these products, and it should come with liabilities for the company that creates the product and the employer that decides to introduce the system on its shop floor. On this matter, it remains to be seen what will be the outcome of the AI Liability Directive that

was proposed in 2022 by the European Commission, for which the legislative process has not yet been concluded. To support the enforcement of the rules and stimulate compliance with the different obligations of employers, it would be important that the AM systems and their output towards both workers and management are logged in a database, for labour inspectors and trade union representatives to verify whether the occupational health and safety rules are being respected. This information and data can also be used in negotiating the application of AM tools. Here, the PWD includes some interesting examples of provisions on AM that would be useful for trade union representatives in traditional sectors as well.

Nordic examples for dealing with the OHS aspects of AM

The Nordic focus of the research provides potential sources of inspiration for the rest of Europe. One potentially useful recommendation from the Finnish study is a precautionary principle for worker involvement, where decisions around new technologies would require meaningful input from worker representatives, unless watertight evidence could be provided that they posed no risk (as opposed to the current legislation, which requires evidence of likely "significant impact" to justify worker involvement). One Norwegian example is the role of a dedicated "data shop steward/ data trade union representative", as recognised in the Main Agreement (2022-2025) between the Norwegian Confederation of Trade Unions and the Confederation of Norwegian Enterprise. For a large part, these measures to deal with the health and safety aspects of AM are or would be dealt with in the context of collective bargaining, and will find their place in different collective agreements. This makes it difficult to directly translate or transpose these measures into EU legislation, which is made to regulate the very different labour market context of the EU. We could assess the feasibility and applicability of this precautionary principle or a dedicated data shop steward within an EU directive.

Policy actions to deal with the upper-level effects on the data use and privacy of workers

AM and other AI tools depend on workers' personal data to function. The EU has a GDPR in place that regulates the use of personal data, which also applies in the work environment. A more stringent application of the GDPR could put limits that prevent some of the adverse effects.

According to Articles 13 and 14 of the GDPR, the employer must inform employees about personal data collection and the existence of automated decision-making systems. Also, Article 22 of the GDPR applies in the workplace context and gives the worker "the right not to be subject to a decision based solely on automated processing", which produces legal effects concerning them or similarly significantly affects them. Since there has been a lack of enforcement of these general data protection rules, member states could consider actively transposing Article 80(2) of the GDPR, which would allow unions to bring "own-initiative" complaints and cases for non-compliance with the GDPR.

The constant and real-time surveillance of workers, which has expanded with the introduction of AM, should be questioned as a practice from the perspective of workers' fundamental rights and the tension and stress it creates to know you are constantly monitored. These practices are not compliant with the GDPR and should not be allowed. Still the practice in sectors like warehousing with the pick-by-voice system or similar AM systems in the transport sector or customer service are being used in many companies around the Nordics. Partly, this shows the need for enforcement of data rights; partly, it shows that there might need to be specific and explicit bans of the most-damaging AM systems, like pick-by-voice and other similar constant surveillance practices, set in EU law like an AI at work directive.

"The employment relationship requires specific data protection rules, and in light of its hierarchical nature, the notion of consenting to the use of one's data, a central concept of the GDPR, is ill-suited for the employment context."

The employment relationship requires specific data protection rules, and in light of its hierarchical nature, the notion of consenting to the use of one's data, a central concept of the GDPR, is ill-suited for the employment context. If a person's work is dependent on using the digital tools that are gathering data on them, they cannot be said to "freely" consent. This is why Article 88 of the GDPR allows member states to provide specific data protection rules for the employment context, by law or under collective agreements – as Finland has done and as Germany is planning on doing as well – to clarify data protection norms in the workplace, adapted to their national employment law frameworks and traditions.

When it comes to AM systems, they not only work with personal data, but also on the basis of the collective data of the workers. For data that is generated in the workplace, in the interaction between workers, the GDPR alone may not provide sufficient cover. In the GDPR, privacy rights are given to the individual, but in a work context, we need to acknowledge the role of the collective and trade unions to evoke rights on behalf of the workers they represent. In a potential European AI in the workplace legislation, the role of collective data should be recognised in complement to the private data of workers.

"In many cases, the shop floor data and non-personal worker data are being used to generate value for companies."

In many cases, the shop floor data and non-personal worker data are being used to generate value for companies. Through the mass worker data collected, the processes of AM can be optimised and certain AI systems can be trained on this data. Right now, workers do not see any returns on this contribution and the use of the data they generate. It is in line with the way our personal data is used by tech companies in return for "free" services, but the

workplace has a specific context, where workers do not always have the freedom to consent to the use of certain tools, because they need them to perform their duties under their contract. One could consider this data part of the output of the workers, for which they should be able to share in the profits generated, and to entitle workers to financial remuneration if their non-private data is to be used in this way. If not a financial reward, this data should be shared with the workers and their representatives, meaning that this data should be made available to the workers through their trade union to use in negotiations on working conditions and salary.

How should we address the foundational level of the shifting balance of power between labour and capital that AM systems exacerbate?

There is a paradox in AM and the relative power position of (organised) labour. On one hand, we have seen in the results of both the country case studies and the workers' survey that a high level of worker influence correlates to a mitigation of adverse effects on the autonomy, trust and job motivation of workers. It shows that the long-term success of implementing these tools might require a high level of co-determination. On the other hand, AM tools automate management tasks and create new opportunities for the surveillance and micromanagement of tasks that weaken the position of workers and take away their agency as professionals.

"The objective of AI in the workplace and AM should be to enhance workers and aid them in their performance; the reality is that, often, the machine is steering the workers to perform the tasks it cannot (yet) perform."

The objective of AI in the workplace and AM should be to enhance workers and aid them in their performance; the reality is that, often, the machine is steering the workers to perform the tasks it cannot (yet) perform. The human worker becomes an extension of the machine and not the other way around. That is why the trade unions

and labour movement have to come in to steer the development of this new wave of digitalisation in the right direction.

Most AM tools are developed in a context that does not consider co-determination

Many currently deployed AM tools are developed by big tech companies and often implemented with the help of consultants from these firms. It is not surprising that the Silicon Valley tech developers' worldview does not align well with the European social economic model. Even when working from a US context, it is important for product developers to consider the role of trade unions in the EU context, to allow for co-determination on the AM processes and their outcomes. When this does not come from these providers of AI products for the EU markets, it should be EU regulation that puts in place safeguards for trade unions to be able to negotiate on AM systems. In part, this could be the outcome of the AI Act, but the precedent set by the PWD could lead to more specific AI in the workplace rules that will enforce the position of organised labour in the balance of power.

This starts with transparency on the way the AM tools operate, to open up the black box that these systems are, not only for the workers but also for management. More stringent disclosure rules, using the example of the transparency requirements on AM tools of Article 9 of the PWD, should be extended to all sectors and all workers. There are also examples from the different Nordic country reports on how to create more transparency on the algorithmic tools, like the audit-type model recommended in the Finnish report.[40] Transparency can also support the bargaining position of labour by providing further reasons to limit the reach of datafication and digitalisation. For example, strict mandating of disclosures around data collection and AI tools, as part of emissions and sustainability reporting, can provide further grounds (in the form of their significant emissions) for trade unions to push back on their overuse.

But transparency alone is not enough, because one important finding is that there is a lack of expertise

amongst trade union representatives, and there is a need to build the capacity to evaluate the way AM tools are impacting workers and their working conditions. To make the most of this transparency on AM, an EU directive on AI in the workplace could mandate that worker representatives can call on external expert support to make sense of these disclosures. This need was recognised in Article 13 of the PWD on the information and consultation of platform workers. And to make sure to not only rely on external expertise, unions should invest in training and capacity building internally to engage, building "epistemic capacity".

A European model of digitising workplaces depends on strong worker involvement

In making policy for digitising workplaces, the EU and member state legislators need to acknowledge the role that trade unions have to play in achieving a European approach to AM. This means that they need to support the trade union movement to attain the trade union density needed to represent workers in negotiating the implementation of AM. One recent example of European legislation that recognises the role organised labour has to play is the Minimum Wage Directive, which demands action by the member state where the collective bargaining coverage rate is below a threshold of 80%. By enabling the conditions, either by law or after consulting social partners, and establishing an action plan to increase trade union density and collective bargaining coverage,[41] not only wages but also working conditions will benefit from worker representation, and a potential AI in the work directive should give workers' representatives certain rights to co-determination on how AI and AM systems are rolled out and used at all levels: the EU; member states; and individual firms. Even in the Nordic countries, we have found that the sectors that have the highest union density are best equipped to deal with the challenges of AM and have the resources and expertise to negotiate on the application of these systems. Sectors where the trade unions are not as strongly represented, like the retail sectors, will also require attention and support from the legislator to deliver the right

collective agreements in times of AM. Trade unions themselves can support this process by proactively engaging in peer learning and dissemination of best practices. Uni Europa's database of clauses in collective bargaining agreements dealing with AI and AM[42] presents one example of how best practices can be emulated from elsewhere.

Precarious working conditions go hand in hand with precarious contracts

The findings of the studies in this Digital Programme on AI in the workplace point to an increase in precariousness of workers in certain sectors. This is partly because of the increase in uncertainty that we found from the constant surveillance and instant evaluation of performance. But when discussing the power relations between labour and capital, we cannot ignore the precarious working conditions that arise from uncertain and short-term flexible labour contracts. In the platform sector, we have seen how precarious working conditions under AM came together with the lack of an employment contract, and were the reason to introduce a presumption of an employment relation in the PWD. The findings in the Swedish study show that this interplay can also arise in traditional sectors, while those on hourly contracts are less likely to challenge AM excesses. We risk starting a vicious circle, where more and more workers are confronted with insecure labour contracts and will not be able to negotiate limits to the adverse effects of AM in their workplace. If we allow AM without limits in combination with constant worker surveillance, this could, under extreme circumstances, allow firms to pay workers per performed task in a manner akin to the platform economy. This will result in a class of workers in some sectors being in a precarious work relationship constantly pressured by performance monitoring. There is EU legislation that aims to guarantee a minimum level of effective protection to temporary workers, like the Directive on Temporary Agency Work (2008/104/EC), where one could imagine rules that puts a limit on the negative interplay between short-term contracts and adverse effects of AM.[43]

CONCLUSION

CONCLUSION

The technological transformation of workplaces is regularly presented as an inevitable march, capable of progressing only in one direction. The results of the Nordic Digital Programme show that this narrative is far from a reality. While it is undeniable that the unchecked use of algorithmic and digital tools can harm not only workers themselves but their bargaining positions with their employers, new technologies can also improve workplace outcomes and support productive and meaningful work. Empowering workers to be meaningfully involved in the technological decisions that will come to dictate their working conditions has repeatedly been identified as the most decisive, determining factor in ensuring that these positive outcomes are achieved.

Here, the Nordic model, while far from perfect, can offer lessons for the rest of Europe. A central mission of progressive policymakers across Europe should be to strengthen the coverage and capacity of trade unions and worker organisations, to advocate powerfully on behalf of labour in a changing world. However, our research has shown that even the powerful Nordic unions risk being outpaced and outmatched by the speed of technological change. And what's more, we must acknowledge the immediate reality of a European labour force which is far less powerfully organised than in the Nordic region. Here, the role of legislation becomes clear, not as a constraint on collective bargaining and union advocacy but as a backstop and a platform, to support unions to go further and protect those workers who do not yet have the representation they need.

Recent EU legislation has been a positive step in providing this protection in limited cases, namely for platform workers, but it must go further to ensure that no workers or technologies fall through the cracks, and that the provisions it contains can be properly enforced. The Commission must start on this essential process today, for although the path of technological progress can and must be changed, it certainly will not wait.

ABOUT
THE FEPS-NORDIC
DIGITAL PROGRAMME:
ALGORITHMS AT
THE WORKPLACE

# ABOUT FEPS-NORDIC DIGITAL PROGRAMME: ALGORITHMS AT THE WORKPLACE

FEPS, together with our Nordic partners, Tankesmedjan Tiden, Kalevi Sorsa Saatio, Tankesmien Agenda, CEVEA, Arbejderbevægelsens Erhvervsråd (ECLM), Friedrich-Ebert-Stiftung Nordics, Cooperation Committee of the Nordic Labour Movement (SAMAK), and with the support of Nordics Trade Unions, came together for a Digital Research Programme to investigate these developments and their effects.

Over a period of two years, we worked together on three different research strands: one on company case studies of algorithmic management, where workers' performance is tracked and rated; another on online platforms, employment terms and algorithms; and research that led to this policy study on workers' experience in algorithmic management from surveys. Below, you will find more information on two previous publications of the FEPS-Nordics Digital Programme.

"Algorithms by and for the workers Towards a fair, democratic, and humane digitalisation of the workplace"

*Bonn Juego, Tereza Østbø Kuldova, Gerard Rinse Oosterwijk, January 2024*
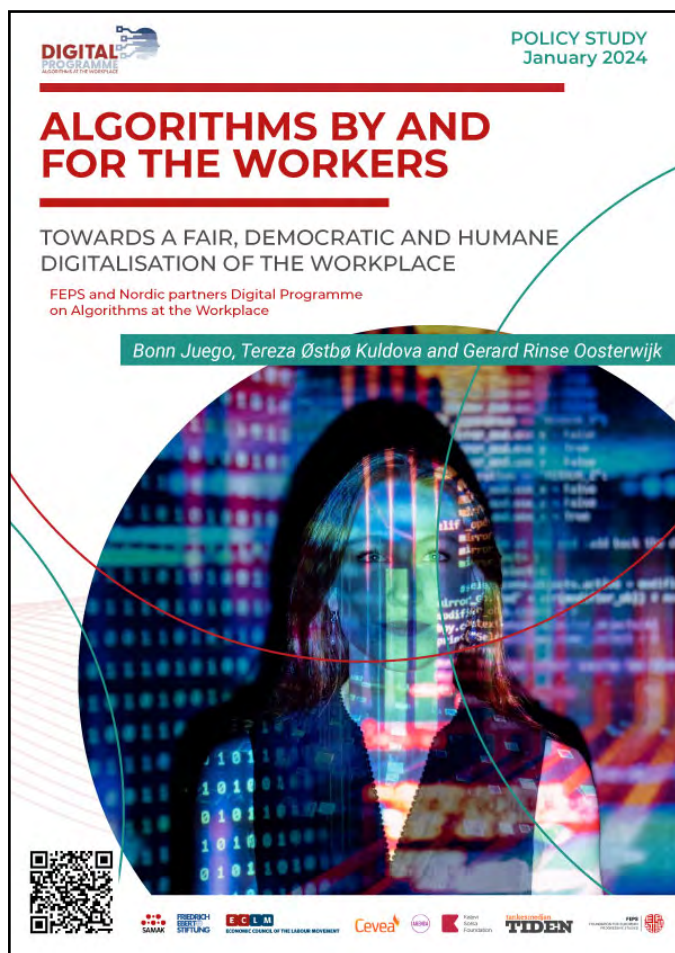
This policy study reflects on the complex interplay between technology and work, focusing on the impacts of algorithmic management (AM) techniques on workers' rights, dignity, and well-being. Drawing on preliminary findings from an ongoing study of FEPS in collaboration with Nordic-based partners, the policy study highlights the complexities and contradictions of AM and the limitations of current policies and institutions in dealing with the fast-paced digital transformation. It emphasises the importance of worker agency and participation in the innovation process.

It proposes the need to create socio-institutional frameworks to direct a pro-labour digital transition and institutionalise co-determination as a viable solution for workers to engage actively with incessant technical changes. It concludes with a forward-looking perspective, advocating for research methodologies and problem-solving approaches that cater to the needs of diverse working contexts. The purpose is to contribute to informed policymaking that ensures a fair, democratic, and humane work environment in the digital age.

Read it at https://feps-europe.eu/publication/algo-rithms-by-and-for-the-workers/

"Computer in command: Consequences of algorithmic management for workers"

Magnus Thorn Jensen, Gerard Rinse Oosterwijk & Asbjørn Sonne Nørgaard, June 2024
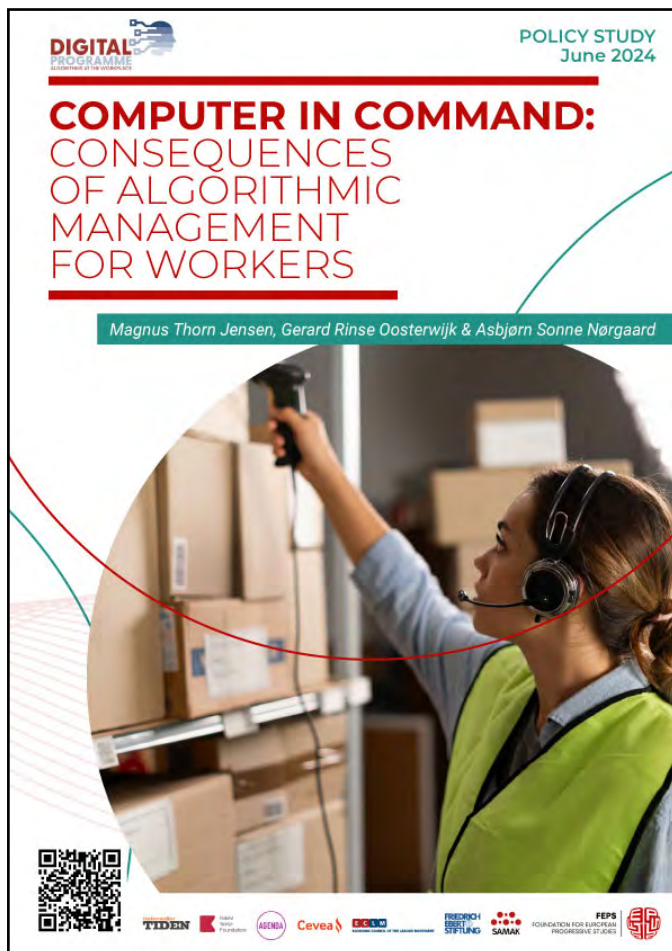
The integration of new technology in the workplace continues to spark intense debate. For years the debate has centered on the fear that robots and computers will displace human workers. Recently, the focus of the debate has shifted: rather than being replaced by computers, more and more employees find themselves managed by computers. Tasks that were once the domain of human managers are now performed by computer systems – a phenomenon known as 'algorithmic management'.

The study is based on a large survey conducted among union members in the warehousing and customer service/telemarketing sectors in Denmark, Sweden, Norway, and Finland.

This use of algorithmic management has several adverse consequences for employees. Workers exposed to algorithmic management experience less job autonomy, increased workloads, and heightened stress levels. Additionally, the study shows that algorithmic management is associated with less trust between employees and management, lower levels of job motivation and satisfaction, and a heightened fear of losing your job. Importantly, the study shows that these adverse consequences are not unavoidable altogether. High levels of employee influence in the workplace and transparency of company decisions significantly reduce the negative effects of algorithmic management. This is crucial insight for policymakers, unions, and others who want to ensure that the digitalization of work does not compromise job quality and workers' well-being.

Read it at https://feps-europe.eu/publication/computer-in-command/

"Algorithmic management and workplace digitalisation in Finland: Insights from the transport and logistics and retail sectors"

Theo Cox and Johannes Anttila, September 2024
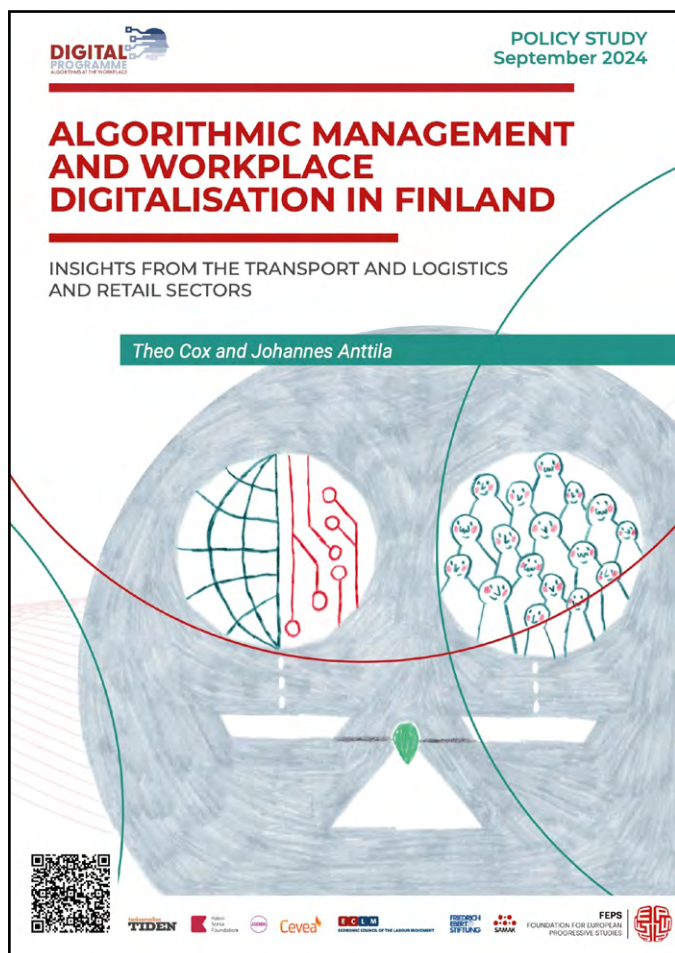
This policy study investigates the impacts of algorithmic management and digital technologies on traditional employment in Finland, with a particular focus on the transport, logistics, and retail sectors. Through qualitative case studies, it captures the lived experiences of workers and trade unionists, revealing how these technologies are altering workplace dynamics. The research highlights that trust and collaboration between employers and employees are crucial in determining whether these tools support or undermine worker welfare. As workers become deeply involved in generating the data that drives these systems, concerns around privacy, surveillance, and value distribution are increasingly pressing.

Offering detailed recommendations for Finnish policymakers and trade unions, the study emphasises the need for transparency, strengthened legal protections, and proactive strategies to ensure that technological advancements benefit both workers and businesses.

Read it at https://feps-europe.eu/publication/algorithmic-management-in-traditional-workplaces/

ENDNOTES

1   Baiocco, S., E. Fernández-Macías, U. Rani et al. (2022) "The algorithmic management of work and its implications in different contexts". JRC Working Papers Series on Labour, Education and Technology; H. Schildt (2020) *The Data Imperative: How Digitalization Is Reshaping Management, Organizing, and Work* (Oxford: Oxford University Press); A. J. Wood (2021) "Algorithmic management: Consequences for work organisation and working conditions". JRC Working Papers Series on Labour, Education and Technology. European Commission and Joint Research Center (JRC), 2021/7.

2   Juego, B, T. Østbø Kuldova, and G. R. Oosterwijk (2024) "Algorithms by and for the workers: Towards a fair, democratic and humane digitalisation of the workplace". Policy study. Foundation for European Progressive Studies, January.

3   Siddarth, D., D. Acemoglu, D. Allen et al. (2021) "How AI fails us". Harvard University Center for Ethics, 1 December.

4   Jarrahi, M. H. and W. Sutherland (2019) "Algorithmic management and algorithmic competencies: Understanding and appropriating algorithms in gig work", in N. Taylor, C. Christian-Lamb, M. Martin et al. (eds) *Information in Contemporary Society, Lecture Notes in Computer Science*, *Vol. 11420* (Cham: Springer International Publishing), pp. 578-589, DOI: 10.1007/978-3-030-15742-5_55; A. Bernhardt, L. Kresge and R. Suleiman (2022) "The data-driven workplace and the case for worker technology rights". *Data & Society*, 1(76): 3-29. DOI: 10.1177/00197939221131558; M. Möhlmann and L. Zalmanson (2017) "Hands on the wheel: Navigating algorithmic management and Uber drivers' autonomy". Proceedings of the International Conference on Information Systems, 10-13 December, Seoul, South Korea.

5   Iavind, K. L. and G. R. Oosterwijk. (2024) "Employment terms of platform workers: Data-driven analysis of online platforms in Denmark". January 2024. Policy study. Foundation for European Progressive Studies, January.

6   Fernandez Macias, E., M. C. Urzi Brancati, S. Wright et al. (2023) "The platformisation of work". Publications Office of the European Union. DOI: 10.2760/801282, JRC133016

7   Jarrahi, M. H., G. Newlands, M. K. Lee et al. (2021) "Algorithmic management in a work context". *Big Data & Society*, 2(8): DOI: 10.1177/20539517211020332

8   "Algorithmic management practices in regular workplaces are already a reality". European Commission, 23 February 2024.

9   Redvaldsen, D. (2019) "The labour movement". Nordics.info, 19 February.

10   Juego, B, T. Østbø Kuldova, and G. R. Oosterwijk (2024) "Algorithms by and for the workers: Towards a fair, democratic and humane digitalisation of the workplace".

11   Jensen, M. T., G. R. Oosterwijk and A. Sonne Nørgaard (2024) "Computer in command: Consequences of algorithmic management for workers". Policy study. Foundation for European Progressive Studies, June.

12   Håkansta, C., R. Lind, P. Strauss-Raats, and P. Blüme. Algorithmic Management: Experiences and Responses: Explorative Study of Companies and Trade Unions in the Swedish Warehousing, Retail and Transport Industries. Brussels: Foundation for European Progressive Studies, 2024; Kuldova, T. Ø., and G. Rudningen. Algorithmic Governance and Co-Determination in Norway: Insights from White-Collar Workers and Trade Union Representatives in Finance and News Media Industries. Oslo: Oslo Metropolitan UniversityFoundation for European Progressive Studies, 2024; Cox, T., and J. Antilla. Algorithmic Management and Workplace Digitalisation in Finland: Insights from Workers and Trade Union Representatives in the Transport and Logistics and Retail Sectors. Helsinki: Foundation for European Progressive Studies, 2024.

13   Rani, U., A. Pesole, and I. González Vázquez. Algorithmic Management Practices in Regular Workplaces: Case Studies in Logistics and Healthcare. Luxembourg: Joint Research Council and International Labour Organisation, 2024. https://data.europa.eu/doi/10.2760/712475.

14   Juego, B, T. Østbø Kuldova, and G. R. Oosterwijk (2024) "Algorithms by and for the workers: Towards a fair, democratic and humane digitalisation of the workplace".

15   Jarrahi, M. H., M. Möhlmann and M. K. Lee (2023) "Algorithmic management: The role of AI in managing workforces". MIT Sloan Management Review, 5 April.

16   Wang B, Wu C, Zhang A, Zhang H. (2023) "Gig worker's perceived algorithmic management, stress appraisal, and destructive deviant behavior". PLoS ONE, 11(18): e0294074. DOI: 10.1371/journal.pone.0294074

17   European Commission (2024) "Algorithmic management practices in regular workplaces are already a reality". EU Science Hub, 23 February.

18   "AI Act". European Commission.

19   Jarrahi, M. H., M. Möhlmann and M. K. Lee (2023) "Algorithmic management: The role of AI in managing workforces". MIT Sloan

Management Review, 5 April.

20   Mejias, U. A. and N. Couldry (2019) "Datafication". *Internet Policy Review*, 4(8). DOI: 10.14763/2019.4.1428; J. Sadowski (2019) "When data is capital: Datafication, accumulation, and extraction". Big Data & Society, 1(6). DOI: 10.1177/2053951718820549

21   van Dijck, J., T. Poell and M. de Waal (2019) *Platform Society: Public Values in a Connective World* (Oxford: Oxford University Press).

22   Kembro, J. and A. Norrman (2022) "The transformation from manual to smart warehousing: An exploratory study with Swedish retailers". *The International Journal of Logistics Management*, 5(33): 107-135. DOI: 10.1108/IJLM-11-2021-0525

23   Zhang, J. and Z. Chen (2022) "Exploring human resource management digital transformation in the digital age". *Journal of the Knowledge Economy*, 15: 1482-1498. DOI: 10.1007/s13132-023-01214-y

24   Mateescu, A., Nguyuen, A(2019) "Explainer: Algorithmic Management in the Workplace". Data & Society. https://datasociety.net/wp-content/uploads/2019/02/DS_Algorithmic_Management_Explainer.pdf

25   Scott, J. C. (1999) *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press).

26   Kinowska, H. and Ł. J. Sienkiewicz (2023) "Influence of algorithmic management practices on workplace well-being – evidence from European organisations". *Information Technology & People*, 8(36): 21-42. DOI: 10.1108/ITP-02-2022-0079

27   "AI features for Teams and Classic copilots" Microsoft Learn website. https://learn.microsoft.com/en-us/microsoft-copilot-studio/advanced-ai-features. Accessed 03 September 2024.

28   Baiocco, S., E. Fernandez-Macías, U. Rani et al. (2022) "The algorithmic management of work and its implications in different contexts".

29   Kellogg, K. C., M. A. Valentine and A. Christin (2020) "Algorithms at work: The new contested terrain of control". *Academy of Management Annals*, 1(14): 366-410. DOI: 10.5465/annals.2018.0174

30   Acemoglu, D. and S. Johnson (2023) *Power and Progress: Our Thousand-Year Struggle Over Technology and Prosperity* (New York: PublicAffairs).

31   Rubel, A., C. Castro and A. Pham (2019) "Agency laundering and information technologies". *Ethical Theory and Moral Practice*, 4(22): 1017-1041. DOI: 10.1007/s10677-019-10030-w

32   "VA kicks off a study exploring algorithmic management in the workplace". Visionary Analytics, 26 January 2023.

33   AI Act, Article 27: Fundamental rights impact assessment for high-risk AI systems.

34   Look into the need to specify more concretely the different measures of the PWD in the articles.

35   "VA kicks off a study exploring algorithmic management in the workplace". Visionary Analytics.

36   European Commission, Mission Letter, Ursula von der Leyen, President of the European Commission to Roxana Mînzatu, Executive Vice-President-designate for People, Skills and Preparedness, Brussels, 17 September 2024, https://commission.europa.eu/document/download/27ac73de-6b5c-430d-8504-a76b634d5f2d_en?filename=Mission%20letter%20-%20MINZATU.pdf

37   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: OJ L 183, 29.6.1989.

38   See the recent publication by EU OSHA: "Strategies for safety and health in an automated world". European Agency for Safety and Health at Work, 22 May 2024.

39   "Algorithmic management practices in regular workplaces are already a reality". International Labour Organization, 26 February 2024.

40   Cox, T. and A. Antilla (2024) "Algorithmic management and workplace digitalisation in Finland". FEPS.

41   "Minimum wage in the EU". European Union website.

42   "A database of AI and algorithmic management in collective bargaining agreements". UNI Europa, 15 March 2024.

43   "Working conditions – temporary agency workers". European Commission website.

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The Friedrich-Ebert-Stiftung (FES) is a non-profit German foundation funded by the Government of the Federal Republic of Germany, and headquartered in Bonn and Berlin. The FES office in Stockholm was founded in 2006 with the goal to foster German-Nordic cooperation. The regional project encompasses Sweden, Denmark, Finland, Iceland and Norway.

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Algorithmic management, utilising algorithms and artificial intelligence to oversee and direct workers, is increasingly shaping the landscape of European workplaces. While narratives of technology driven workplace transformation are alluring, the realities of increasingly automated and digitalised management present cause for concern. This EU policy study explores these impacts with a focus on the unique labour environments of the Nordic countries—Finland, Sweden, and Norway—where long-standing traditions of labour organisation intersect with rapidly advancing technologies.

Through detailed case studies across various sectors, including transport, retail, and finance, the report uncovers how these digital tools can exacerbate worker stress, diminish autonomy, and heighten job insecurity. However, it also identifies scenarios where meaningful worker participation and robust union involvement have mitigated these negative effects, showcasing the potential for more equitable outcomes.

The study highlights critical issues such as the erosion of worker rights, the increasing imbalance of power between labour and capital, and the pervasive nature of workplace surveillance. It provides targeted recommendations for EU policymakers, urging the implementation of stronger legal safeguards, greater transparency in algorithmic processes, and enhanced roles for trade unions in shaping the digital transformation.

This report advocates for a European approach that prioritises worker welfare alongside technological advancement, drawing lessons from the Nordic model to guide policy across the continent. A series of recommendations are offered to protect worker rights and wellbeing in the immediate instance, and also to redress the growing imbalance of power between labour and capital which emerging technologies threaten to exacerbate.

POLICY STUDY PUBLISHED IN OCTOBER 2024 BY: