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Regulating AI at work: labour relations, automation, and algorithmic management

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Introduction to the *Transfer* special issue. Regulating AI at work: labour relations, automation, and algorithmic management

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Recent innovations in artificial intelligence (AI) and machine learning, enabled by the shift to cloud computing and increasing internet speeds, have been at the core of a new wave of technological change. In services, AI is used to automate back-office business processes and to support front-line interactions with customers, patients or students. In manufacturing, AI-enabled robots, smart machines and computer-aided engineering and design can replace labour-intensive tasks while changing the skill demands for those who remain. Across industries, AI-based algorithms are being integrated into new tools to monitor worker behaviour and performance, and to automate traditional human resource management (HRM) processes, such as evaluation and coaching, training, and even hiring and firing decisions (Aloisi and De Stefano, 2022).

These trends have raised a number of questions concerning how these new technologies will affect work and workers, as well as the conditions for encouraging broadly shared benefits while mitigating harm. The articles in this special issue of *Transfer* seek to answer these questions through the dual lens of comparative labour law and employment relations research. Together, they provide new insights into how collective bargaining and government policy are responding to new digital and AI-based technologies, and how these institutions shape the ways in which technologies are adopted and deployed in the workplace.

Contemporary writing on the 'future of work' in the digital economy has focused overwhelmingly on identifying best practice policies to remedy worker displacement and privacy concerns (for example, Susskind, 2020; Zuboff, 2019). In contrast, the articles in this special issue show that 'institutions matter' for strategies and outcomes: national, industry and workplace context all influence whether and how new technologies are adopted and their impact on the workforce (Doellgast and Wagner, 2022). Countervailing worker power takes centre-stage in underpinning alternative strategies that increase data transparency, privacy and fairness, and that support more innovative and productive applications of AI. Worker representatives need to develop their own knowledge of these technologies, as well as their capacity to negotiate over their adoption and impacts. This knowledge and capacity are ultimately most effective, however, where unions and works councils

have real influence on decisions, through legal bargaining rights backed up by encompassing collective agreements, employment protections and data protection rules.

The interdisciplinary approach we take in this special issue is essential to mapping and analysing these initiatives accurately. Employment relations researchers often focus on how trade unions, employers and state actors respond to existing laws and institutions, but legal scholars are able to provide more detailed analyses of the rapidly evolving regulatory frameworks governing labour rights and technology at work. At the same time, legal analysis risks remaining empty if it ignores these actors' strategies and actions to apply technological innovation in workplaces and industries. Through combining the expertise of both fields, we hope to foster a more comprehensive understanding of the factors that support better outcomes in organisations and societies transitioning to an increasingly digital economy.

In the following sections, we summarise and discuss the findings from the articles in the special issue. The first set of articles compare union and policy responses to AI at the national level, analysing why these responses differ and how worker voice and union collective action are shaped by national institutions. A second set use matched case studies to examine industry-, company- or (regional) workplace-level collective negotiations or social dialogue on new technologies and their employment impacts. We conclude with a discussion of implications for policy-makers and trade unions.

Policy and union responses to AI at work: national cases and EU-level regulation

Much of the popular debate around the impact of new technologies on work and workers has focused on universal impacts on employment, skills and location decisions (for example, Baldwin, 2019; Susskind, 2020) or discretion, privacy and discrimination (Noble, 2018; O'Neil, 2017; Zuboff, 2019). Where public policy is invoked, its impacts are often hypothetical, as authors seek to outline best practice approaches that could be applied across national or industry contexts. On the one hand, public investments in training, government transfers, mobility vouchers or a universal basic income are proposed to ease dislocation and help move workers to new jobs and locations (Frey, 2020; Susskind, 2020). On the other hand, authors outline detailed proposals for regulating how AI is used, how citizen and employee data are protected, or methods for auditing algorithms (Ajunwa, 2019; O'Neil, 2017).

A central theme in the special issue is the difficulty involved in designing this kind of universal regulation purely in a 'top down' way via national or EU-level legislation, and the importance of collective bargaining, information and consultation, and co-determination to bring worker interests and voice into governance decisions.

De Stefano and Taes (2023) draw on research in eight EU countries to examine the risks of AI and automated decision-making systems, and trade union strategies to address these risks. Their focus is algorithmic management, or the use of AI tools to track and manage workers. They summarise several applications, including: worker surveillance; recording of physical health and mental status; anti-union practices; and decision-making related to worker hiring, direction, evaluation, and discipline. These lead to risks of algorithmic discrimination, unfair processing of workers' data and intrusion into their private lives, as well as to an unprecedented increase in employers' capacity to surveil workers in a way that is 'continuous, relentless and carried out through a panoply of tools and software that track workers' actions'. Managers themselves often do not understand how decisions are made, monitoring tools may intrude on workers' activities outside working hours, wage theft may result when systems incorrectly identify time on offline work tasks as 'idle time', and continuous monitoring may increase psychosocial risks.

De Stefano and Taes observe that these multiple risks are difficult to anticipate and regulate using data protection rules alone. Instead, they argue that collective bargaining and trade union initiatives are an essential component of efforts to ensure the protection of workers' rights and a more balanced distribution of benefits from new AI-based management tools. They give examples of several national-level initiatives to strengthen union information rights on algorithms in Spain, the United Kingdom and Italy, and discuss the role of both collective agreements and strategic litigation in underpinning a flexible system to mitigate risks associated with intensified surveillance and automated decision-making. In addition, they discuss the importance of educating worker representatives on both AI-based risks and strategies to address them, giving examples ranging from union-published guides on how to negotiate on relevant technologies, to new offices or organisations set up by trade unions to manage initiatives on algorithmic decision-making. Finally, they critique EU legislative proposals to regulate AI and platform work, arguing that they risk being ineffective at best or counterproductive at worst, through undermining some of the more promising examples of national regulation and trade union action.

Similar themes are given a national focus by Collins and Atkinson (2023), who examine the intersection between legal frameworks, collective bargaining and employers' algorithmic management choices in 'post-Brexit Britain'. They identify a number of similar negative worker consequences to those discussed by De Stefano and Taes, such as intensified employer control, work intensification, and associated stress and burnout. But they also discuss broader impacts on job quality connected to employers' enhanced capacity to source and manage labour outside traditional firm boundaries, as algorithmic management enables further 'fissuring' in the labour market. Thus, they argue, collective bargaining is needed to facilitate worker voice over the use of AI at work in a way that can be tailored to specific firm and industry contexts. In contrast, employment legislation is a 'blunt instrument' that is poorly suited to rapidly evolving algorithmic management practices, particularly as employers become increasingly creative in using fissuring or platform-based strategies to circumvent statutory labour rights.

Collins and Atkinson go on to discuss potential avenues or vehicles for workers to 'negotiate the algorithm' in the specific context of the United Kingdom. They point out that this context is a particularly challenging one for worker voice because of the framework of laws that privilege unilateral managerial prerogative. They argue, however, that even in this restricted context, UK workers could use existing institutions to make some headway. One strategy is to negotiate over the use of AI and algorithmic technologies connected with core issues on which UK unions have bargaining rights, such as where they are used to determine pay rates, set or allocate shifts, or authorise annual leave. The authors give several examples, including an agreement between the GMB union and Hermes requiring that the company's automated payment system be programmed in such a way that workers receive at least their minimum pay rate and bonuses, without a separate claims process; allowing unions to flag algorithmic risks during health and safety audits; and introducing a process through which workers could challenge technology-driven decisions. In addition, the combination of national information and consultation regulations and legislation on workplace health and safety together provide a potential framework for strengthening mandatory consultation with workers. This, Collins and Atkinson point out, could be used to negotiate agreements with employers to extend these rights to workplace technologies and algorithmic management.

While these represent potential avenues for strengthening worker voice, the authors point out that they are not sufficient in a UK context characterised by low trade union membership and bargaining coverage. Employers are under no obligation to reach agreement, even where unions are recognised, and industrial action is increasingly restricted. Thus, broader legal reform is necessary. Collins and Atkinson discuss the potential impact of EU-level regulations or directives – which they critique along similar lines to De Stefano and Taes. However, they conclude that even flawed

EU policies are unlikely to be adopted by a UK government committed to a hands-off approach to AI and data rights.

Given these various restrictions, the authors identify three broad strategies for the United Kingdom. The first is to establish mechanisms giving workers more information about technologies used in their workplaces, including strengthening trade unions' role and rights. The second is to impose joint liability on companies for breaches of employment law associated with algorithmic management technologies they develop or market. The third is to develop parallel regulation setting minimum standards for decent work, protecting against bias or discrimination associated with algorithms, redress against unfair decisions and dismissals linked to these technologies, and prohibitions on certain 'automatically [or inherently] unfair' uses of technology in the workplaces.

The article by Krzywdzinski, Gerst and Butollo (2023) takes up similar themes, but in the more strongly regulated context of Germany, thus presenting an interesting contrast to Collins and Atkinson's UK-based analysis. Reading these two articles together, it becomes clear that while the challenges associated with strengthening worker voice in the design and use of AI are universal, national industrial relations institutions can make a significant difference for outcomes. In Germany, worker representatives have much stronger bargaining rights over a broader range of management decisions than their counterparts in the United Kingdom, including technology use for monitoring and control. The authors also focus on the metal industry, which has high union density and bargaining coverage, as well as strong traditions of social partnership.

One interesting twist in Krzywdzinski et al.'s analysis is that they discuss not only the risks to workers, but also how worker voice can help to address the challenges management faces in actually implementing AI in the workplace. Their focus also extends beyond algorithmic management or people analytics, to the use of AI in cognitive assistance systems, industrial analytics, and autonomous vehicles, transportation systems, and robots. They summarise findings from organisational research, which concludes that these different forms of AI are unlikely to produce 'meaningful and usable outcomes' without mechanisms to ensure that users participate in developing models, selecting and maintaining data, and verifying results. The example of Germany suggests that strong social dialogue with employee representatives may be among the more robust means of strengthening these kinds of supportive participatory mechanisms across firms. Put another way, worker voice may not only underpin better worker outcomes associated with AI, but also provide benefits to firms in terms of productivity and innovation gains.

The authors situate trade union strategies in the broader regulatory discussion on AI in Germany. They argue that the 'German AI strategy' has a strong corporatist orientation, which can be observed in, first, the strong involvement of company and employee representatives in expert bodies; second, trade union involvement in AI standardisation processes; and third, the reform of legal co-determination rights to require company-funded experts to assist works councils in understanding new AI systems and to explicitly extend information and co-determination rights to HR processes affected by AI applications.

This national 'corporatist' background sets the stage for specific union activities that draw on these more considerable institutional power resources. German unions participate in a range of think tank platforms and government initiatives that bring together stakeholders to exchange ideas and formulate policy recommendations. And they have launched numerous initiatives to support works councils, such as IG Metall's Transformation Atlas, developed in workshops in over 20,000 companies to introduce works councils to digitalisation and AI. Krzywdzinski et al. observe that unions have learned from these projects that active co-determination is needed during technology planning and design; and thus that it needs to be more flexible, faster and rooted in a 'strategic perspective on AI implementation processes'. They give three examples that illustrate what these changes might look like, including an agreement on AI systems at IBM that establishes an AI

Ethics Council; an agreement for the implementation of Industry 4.0 projects at Airbus that establishes a process for works councils to participate in strategy-building and 'technology introduction processes'; and a joint strategy agreement at Merck that enables works councils to participate more effectively in digitalisation projects.

A key question the authors' analysis raises concerns how far these best practice company-level examples can be replicated in other German workplaces. As they point out, these are all companies where works councils are already strong and where trust in management is well established. They thus represent a shrinking traditional core of the German economy at a time of declining union density and bargaining coverage. The effectiveness of trade union strategies will also be measured by their success in organising new members and supporting increased works council capacity in less well-organised workplaces.

Hassel and Özkiziltan (2023) also focus on policy and trade union responses to AI in Germany. However, they use the German context to present a more differentiated analysis of how effective responses may differ depending on the type of risk AI poses for work. Direct risks include those commonly associated with algorithmic management, and thus also discussed in some detail by De Stefano and Taes (2023): discrimination, surveillance and information asymmetries that favour employers. Indirect risks, in contrast, are associated with job loss, relocation or changing skill demands as a result of automation and fissuring of work. They argue that European and national regulation can address direct risks, but that indirect risks require approaches based more on sector-specific monitoring and expertise, particularly as the specific consequences of AI are muddled by their interconnection with broader dynamics of economic and supply chain restructuring.

The authors illustrate the interaction between direct and indirect risks using the example of the transport and logistics sector, which is characterised by both extensive automation of tasks and increased surveillance, discrimination and information asymmetries. They give examples such as Amazon's use of employee tracking systems in its warehouses and the use of algorithmic management to distribute workload in a way that penalises 'troublemakers'. In addition, they observe that Amazon has exacerbated fissuring by encouraging private logistics hubs and centres, as well as last-mile delivery models.

Their analysis of approaches to governing these different risks then makes reference to the German context. They observe that Germany has overall low deployment of AI-based algorithmic management tools associated with direct risks, but that as these begin to affect growing numbers of workers, they can be addressed through regulation, such as the EU Artificial Intelligence Act or the Directive on platform work. Similar to the other authors, Hassel and Özkiziltan critique these proposals because they neglect stakeholder participation and collective labour rights, and call for a more explicit focus on regulating workplace AI tools and extending bargaining rights to platform workers. In Germany, the German Data Protection Act, the Works Constitution Act and the German Telemedia Act provide a strong legal framework, requiring works council approval for the use of surveillance tools, while gender equality and non-discrimination rules give some safeguards. Both could be further strengthened and extended to new groups of workers, however.

The task of addressing the indirect risks of AI is more complicated, and thus requires approaches tailored to different socio-economic and political settings. Here, Hassel and Özkiziltan suggest, a well grounded understanding of how AI is transforming specific sectors can help in designing more targeted policy responses. Thus, they recommend that both unions and governments invest in 'competence centres for research and regulation on technology-driven industrial restructuring', producing research on the role of AI in restructuring and proposals based on this research to regulate subcontracting, employers' supply chain liability, and the regulation of self-employment. This, in turn, could inform social security and training policies.

Finally, Molina et al. (2023) provide a fitting conclusion to the set of papers on national policy and collective bargaining responses with an international comparison of the regulation of AI and algorithms in Denmark, Germany, Hungary and Spain. Thus, their analysis helps to situate the German example discussed by Krzywdzinski et al. and Hassel and Özkiziltan within a broader European context.

The authors begin by covering now familiar ground, including the risks associated with AI in the workplace and limitations of EU-level regulation. They argue that a multi-level response is needed to address AI impacts on employment relations. They differentiate between protective mechanisms (state regulations or multi-employer collective agreements setting minimum standards) and participative standards (giving employees or their representatives bargaining rights and resources to govern processes through direct participation).

Molina et al. then use these two categories to map out policy and union responses to AI and algorithms across their four case studies. Both Denmark and Germany show incremental change based on strong participative standards, applied through health and safety or collaboration committees in Denmark and works councils in Germany, whose rights to evaluate AI systems were reinforced by the Works Council Modernisation Act. Denmark has also shown some innovation in establishing protective mechanisms through local collective agreements in fintech and food delivery. Spain is characterised by a combination of protective mechanisms and strengthened participative standards, via collective agreements in new 'AI-intensive' sectors such as delivery platforms and banking that give worker representatives additional rights to access algorithms; and a 2021 law regulating the collective right to access parameters and instructions on AI and algorithms. In Hungary, both areas are largely absent, with reliance primarily on GDPR rules that follow from EU directives. This reflects both overall social partner weakness and a reluctance by the state to impose regulations that may harm FDI.

Taken together, the five papers discussed above provide a remarkably consistent picture of both the challenges to and possibilities for strengthening regulation of AI at work. Their findings demonstrate that collective bargaining and collective voice based on strong 'participative standards' are proving their value for protecting workers against risks associated with algorithmic management, but also for encouraging productivity-enhancing skill investments and worker involvement in implementing a broader set of AI-based tools. The articles document a range of examples of creative agreements, in countries with very different industrial relations institutions and legal frameworks. At the same time, they also show that these kinds of initiatives to 'negotiate the algorithm' are more common and have more significant impact on practices and outcomes where unions and works councils have stronger countervailing power underpinned by strong and effective labour legislation, at both the national and industry or company level.

Negotiating over AI in industries and firms: comparative case studies

The final three articles in this special issue are based on comparative case studies at the industry, company and (regional) workplace levels. They address general questions similar to those discussed above, but offer different insights into the question of *why* worker representatives' strategies and bargaining power differ across countries. In addition, by looking more closely at case study firms and industries, the authors are able to explore the specific impacts of AI on work and workers in, as Hassel and Özkiziltan (2023) put it, specific 'socio-economic and political settings', as well as the situated politics of labour–management negotiations over strategies and outcomes.

Doellgast, Wagner and O'Brady (2023) compare union and works council responses to algorithmic management in two matched case telecommunications companies in Germany and Norway. In both cases, call centre jobs had been transformed by AI-based applications aimed at automating tasks and supporting workers, including chatbots and voice bots, back-office robotic process automation (RPA), and front-office assistance systems. These had led to thousands of job cuts, though mainly among subcontractors or offshore subsidiaries. The domestic call centre workforce experienced the impact of these new technologies in increased work complexity and intensity, combined with restricted discretion over how to respond to customers or diagnose technical problems. While these formed the backdrop for union and works council initiatives to negotiate over AI, the authors focus more directly on worker representatives' efforts to influence how AI was used in 'algorithmic management', including remote monitoring (for example, speech analytics in AI-based coaching apps) and workforce management (for example, workflow algorithms and analytic tools).

Worker representatives in the two cases similarly sought to restrict monitoring and establish new rules on how employers collect and use employee data. Their strategies differed, however. In the German case, works councils organised more proactive projects focusing on current and future digitalisation measures, and negotiated formal works agreements that established processes and rules targeting new IT systems and AI-based software. These included a workforce analytics pilot agreement and an AI ethics manifesto, which laid out principles concerning employee-data use and mechanisms for contesting algorithm-based decisions. In the Norwegian case, unions relied more on established social dialogue institutions to negotiate informal agreements. When management unilaterally adopted monitoring technologies using random screen shots, this established consultation process broke down and the union escalated the conflict to the National Data Protection Authority, which ruled in their favour. This contributed to re-establishing consensual social dialogue over new tools; for example, restricting the use of speech analytics tools in coaching or performance evaluation.

Doellgast et al. argue that traditions of strong union and works council power in these two cases underpinned overall favourable outcomes for workers. However, they also find differences, which they explain as following from two factors underpinning 'institutional power': first, the structure and level of bargaining rights, and second, different forms of support for inter-union cooperation on technological change. In the German case stronger co-determination rights and a coordinated structure for worker representatives to exchange information and best practices contributed to a comprehensive and forward-looking set of agreements on algorithmic management. In the Norwegian case the unions relied more on informal social dialogue backed by sectoral union power, a well organised membership, and the possibility to 'escalate' conflict up to the Data Protection Authority. But they lacked a structure to exchange best practices across firms or workplaces. Together, findings suggest that the combination of broad data protection rules and extensive co-determination rights, ideally exercised by coordinated worker representatives, provide the best support for strong worker voice in algorithmic management.

Pulignano, Hauptmeier and Frans (2023) present complementary findings on the differentiated role of institutions in two 'coordinated' countries with strong traditions of social regulation: Germany and Belgium. Their case studies are based in the very different sectoral context of the auto industry, and their focus is also broader than just AI or algorithmic management, as they compare union strategies toward the closely linked digital and green transitions in the sector. This entails both a shift to electric vehicle production and investments in technologies associated with Industry 4.0, such as 'the digital integration of autonomous robots, location detection technologies, smart sensors, wearable technologies and AI'. Both transitions are projected to reduce overall employment in production jobs, but also may increase demand for advanced technical skills and improve job quality by replacing repetitive and dangerous tasks.

The authors identify different strategic union responses to these challenges. In Germany, the union developed proactive strategies to influence the transition's impact on employment and working conditions, based on independent and long-term proposals. In contrast, the Belgian union was more reactive, focusing on short-term employment effects rather than proposing alternative investment or market strategies.

Pulignano et al. explain these strategies as following from employment relations institutions and union knowledge regimes. Similar to Doellgast et al. (and, indeed, most of the other articles in this special issue that discuss the German case), they emphasise the importance of Germany's strong co-determination rights, in both workplaces and the supervisory board. These rights and structures allow works councils to block management decisions while also giving them tools to understand the strategic context of these decisions. Belgium's narrower information and consultation rights mean that worker representatives have less opportunity to participate in management decision-making, and are more likely to focus on the impacts of those decisions on narrower topics on which workers do have bargaining rights and collective agreements: wages, employment and working conditions.

While bargaining rights are by now a familiar theme, the authors also address the importance of what they call 'union knowledge regimes' in explaining outcomes. German unions and works councils are able to draw on a broad body of knowledge produced by a range of research institutes, union research departments and foundations. They help to support well-informed strategies while also contributing to training or capacity development in works councils and unions. In contrast, Belgium has a knowledge regime that is less well funded, with fewer institutes and research departments. Thus, research tends to be targeted more to supporting social dialogue on wages and working conditions, with less expertise on Industry 4.0 or restructuring models within the framework of vehicle electrification.

Garneau, Pérez Lauzon and Lévesque (2023) again present complementary findings on the importance of both traditional institutions and creative actor strategies in their comparison of union responses to the digitalisation of work in aerospace manufacturing in Belgium (Wallonia), Denmark and Canada (Quebec). In this sector, the technological changes they describe have been incremental, including through computer numerical control, computer-aided engineering tools and design systems, and robotisation and automation, including the internet of things, 3D printing, and Enterprise Resource Planning (ERP) systems.

Their findings show different outcomes with regard to how unions engage with changes in work and employment associated with these new technologies. However, their responses are influenced not only by formal institutions, but also by unions' perceptions of threats and opportunities. Similar to findings by Pulignano et al., the Wallonian/Belgian unions view these changes primarily in terms of the threats they pose to employment in the sector – through job destruction and skills polarisation – but also to traditional industrial relations institutions. They also describe Belgian unions' strategy as 'defensive' rather than proactive, as they seek new job creation through traditional institutions but avoid sectoral intermediaries that might also be a useful resource because of their different knowledge and capacity. In Denmark, findings also look a lot more like the German auto case described by Pulignano et al.: unions see digitalisation more as an opportunity than as a threat, and they participate in both traditional sectoral bargaining and newer intermediary forums that give them a voice in national or industry strategies. Quebec/Canada represents a third pattern, grounded in a more 'liberal' institutional setting with traditions of enterprise-level bargaining. The union is more open to 'enlarging its repertoire of action' than the Belgian unions, seeing engagement with regional and sectoral intermediaries as an opportunity to save jobs and participate in problem framing. But they are not always able to translate this into bargaining power or an increased capacity to use traditional bargaining to help influence how technologies are actually adopted within firms and workplaces.

Garneau et al. emphasise the importance of deeply held union ideas to explain these differences, formed by their past and current experiences with technological changes, as well as their 'institutionally embedded' trust in traditional and newer institutions. Thus, in each case, unions face context-specific dilemmas, based on how they anticipate problems and mobilise frameworks through collective action.

Together, these three articles provide a nice complement to those focusing on national-level developments. First, they give more details on how different risks associated with new technologies are experienced by workers and negotiated over by worker representatives. Across the cases, concerns about employment and skills effects, on the one hand, and about worker autonomy, data privacy and psychosocial health on the other, are often difficult to separate clearly. Which topics become the focus of bargaining – and how unions strategise around the best approach to advance worker interests – are often closely connected with past strategies and available resources.

Second, these articles all illustrate the importance of two dimensions of institutions for union success in advancing worker interests: strong formal bargaining rights and comprehensive collective agreements (underpinned by a well organised membership); and union access to (and engagement with) a broader network of intermediary institutions that support knowledge and strategy development and exchange. This second category is described as 'labour cooperation structures' by Doellgast et al., 'union knowledge regimes' by Pulignano et al., and 'intermediary forums' by Garneau et al. Both kinds of institutional support take different forms across the industry and company cases. But the authors agree that they are stronger in some cases (notably telecom and autos in Germany; and aerospace in Denmark) than others (autos and aerospace in Belgium; and aerospace in Canada). The Norwegian telecom case shows an interesting example in which recourse to the national data protection authority was used to bring employers back into cooperation with traditionally strong social dialogue institutions. This illustrates the importance of a longer-term view when studying how unions respond to a rapidly changing set of challenges associated with digitalisation and AI.

Conclusions

The articles in this special issue of *Transfer* together make a strong case that efforts to regulate the use of AI and algorithms at work are likely to be most effective where they are underpinned by, and supportive of, social dialogue with worker representatives. Legal protections guaranteeing worker privacy and discretion are blunt instruments without mechanisms that also strengthen worker voice in how these protections are implemented. Collective labour rights, and especially collective bargaining, are the most effective and proven tools to give workers real voice in the distribution of benefits or costs from the AI- and data-driven 'digital revolution'.

The articles also suggest specific lessons for trade unions seeking to develop broader strategies to engage with AI and digitalisation at work. First, they confirm the importance of traditional tools, such as bargaining rights and encompassing collective agreements, while also suggesting reforms that can help to better address new challenges posed by novel technologies. The articles give examples of creative approaches to updating existing bargaining rights to specifically mention AI-based tools, negotiating new sectoral and national agreements that give workers rights to information about algorithms used in the workplace, and including provisions on bargaining and consultation in legislation to strengthen data protection and human oversight of AI and algorithm applications. New organising to establish comprehensive sectoral agreements, particularly across firms' value chains, is essential for both closing off exit options from negotiated protections and strengthening unions' claims to broader legitimacy as representatives of worker interests. And organising workers in expanding occupations, particularly the engineers, data scientists and programmers responsible for

designing and using AI-based technologies, can underpin both expanded bargaining power and much needed expertise as the labour movement builds its own capacity to negotiate effectively on these tools and engage with policy-makers.

Second, the articles suggest that trade unions are best able to represent broader worker interests where they get involved early in the process of technology investment and deployment decisions, including engaging with broader strategies around skill investments, location decisions, and integrating AI with work design. This kind of deep involvement requires knowledge and expertise to be able to understand possible alternatives and advocate for those most likely to improve job quality and to avoid skill polarisation or worker displacement. Thus, a strong knowledge infrastructure or 'union knowledge regime' (Pulignano et al., 2023) that brings together research and industry expertise is crucial, ideally with union leadership. Together, these measures can help to support collective bargaining that not only influences the employment effects of AI-based change at work, but also mobilises workers' bargaining power behind alternative strategies grounded in mutual gains and a commitment to prioritising worker well-being. We hope that this special issue contributes substantively to these crucial endeavours by providing both an analytical base and comparative examples to support more effective policy decisions and social partner strategies.

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As all articles are refereed anonymously, please attach a separate page with your name, affiliation, email and postal address. Articles should be between 5000 and 8000 words including tables, notes and references and must be accompanied with an abstract of no more than 150 words and up to 8 keywords along with a short author biography.

The deadlines for submissions to the Open Issue 4-2024 are 1 April 2023, 1 July 2023, 1 October 2023, and 1 February 2024. Submissions will be reviewed by the Editors on a quarterly basis and the best ones will be selected for refereeing. Authors can submit to any of these deadlines, but the earlier submissions have a better chance of being accepted and published in the Open Issue 4-2024. Submissions accepted for publication in the Open issue can be published ahead of print on Online First.

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