

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository: <https://orca.cardiff.ac.uk/id/eprint/176521/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Lloyd, Caroline and Payne, Jonathan 2025. Digitalisation, unions and 'country-effect': does union strength at the workplace matter? *Journal of Industrial Relations* 10.1177/00221856251326682

Publishers page:

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



Digitalisation, unions and ‘country-effect’: does union strength at the workplace matter?

Caroline Lloyd and Jonathan Payne

Contact: lloydc4@cardiff.ac.uk

****This is the pre-proof version of the manuscript accepted for publication in the *Journal of Industrial Relations* on 10-Feb-2025****

Abstract

Trade unions are potentially important actors in shaping digitalisation to benefit workers. Research suggests supportive national labour market institutions can help unions to influence digital change in the workplace. This article considers the reach of national institutions, or ‘country effect’, and its relationship with union strength at the workplace. It applies a multi-level analysis to explore union influence over digital technology in the food and drink processing sector in Norway and the UK, two countries with starkly contrasting institutions. Drawing on interviews with officers and shop stewards in two unions, it compares a sample of workplaces with relatively strong and weak union organisation. The findings indicate union strength at the workplace has a more significant impact on union’s role in digitalisation in Norway, where there are strong institutional supports, than in the UK where these are lacking. The article contributes to analysing the relationship between ‘country-effect’ and union strength at the workplace in the shaping of digitalisation.

Keywords: trade unions; international comparative; digitalisation; food and drink processing; Norway; UK

Introduction

Against the backdrop of contemporary debates surrounding digitalisation, an emerging literature emphasises the importance of trade unions in shaping technology to reflect workers' interests (Doellgast and Wagner, 2022). While much attention has focused on organising platform and gig workers (Forsyth, 2022), studies in the wider economy remain relatively few. These suggest some country differences in unions' ability to intervene in digitalisation at the workplace. Supportive national labour market institutions that assist with union organisation and provide rights to involvement in technological change have been shown to help, particularly in relation to Industry 4.0 in Germany and the Nordic countries (Haipeter, 2020; Rolandsson et al., 2019). In neoliberal economies lacking these supports, union involvement appears far more difficult to achieve (Rutherford and Frangi, 2020; Lloyd and Payne, 2023; Payne et al., 2023).

The prospects for union involvement and influence over digitalisation are also likely to vary by sector, given significant differences in union power and industrial relations structures within countries (Bechter et al., 2012). This article focuses on food and drink processing and considers how far the influence of labour market-related institutions and regulations – or more broadly, what we term, 'country effect' – is mediated by union strength at the workplace. In neoliberal economies, does strong workplace organisation enable unions to influence digitalisation, *despite* an unsupportive institutional environment? Conversely, in countries with supportive institutions, does influence diminish or even disappear where workplace organisation is relatively weak? In addressing these questions, the aim is to contribute to an analysis of the reach of 'country-effect' and the inter-relationship between national institutions and union power at workplace level in shaping digitalisation (Gasparri and Tassinari, 2020; Doellgast and Wagner, 2022; Lloyd and Payne, 2023; Payne et al., 2023).

Norway and the UK are selected for comparison due to their starkly contrasting institutional contexts. Norway is part of ‘the Nordic model’ of social dialogue and tripartism, whilst the UK is a neoliberal economy. Studies in Norwegian manufacturing have shown that supportive institutions help to foster local union-management cooperation around technological rationalisation and mutual gains (Rolandsson et al., 2019), including in well-organised food and drink processing plants (Lloyd and Payne, 2021). However, there has been little investigation of workplaces where union organisation is weaker. In the UK, no study has examined unions’ role in digitalisation in the sector. Given the paucity of national institutional supports, we would expect unions in the UK to find it difficult to engage employers over technology and to view digitalisation more as a ‘threat’ (Marenco and Siedl, 2021). However, in some workplaces, unions are well-organised and potentially have the power to secure some involvement and influence.

The article begins by outlining the importance of digitalisation as an issue for trade unions and the multi-level analytical approach used to explore their role and influence. It then examines what contemporary research can tell us about the relationship between national institutions and workplace union power in shaping digitalisation outcomes for workers. Next, the institutional context in Norway and the UK, along with key features of digitalisation and union organisation in the food and drink processing sector, are presented. Drawing upon interviews in a Norwegian union and a UK union, the findings section focuses primarily on shop stewards’ views of their role and influence. The research examines what might be considered *atypical* cases, given patterns of union organisation within the sector in each country, i.e. less well-organised workplaces in Norway and highly organised ones in the UK. Using this novel methodological approach, the focus is on whether these cases exhibit substantial differences compared with *typical* cases in each country. The article closes with a

discussion of the implications of the research for union influence over digitalisation and its contribution to an analysis of ‘country effect’ and union power at the workplace.

Digitalisation: what role for unions?

‘Digitalisation’ is often referred to as ‘a more systematic digital transformation’ affecting society (Soete, 2021: 35), compared with previous periods of computerisation, such as the introduction of computer-aided design and manufacturing in the 1980s. Rapid advances in storage and processing speeds have enabled the development of more advanced physical robots, process automation and algorithmic management tools, alongside forms of ‘artificial intelligence’. A recent OECD report (Milanez, 2023:23), in recognising there is ‘no widely accepted definition of AI’, refers in manufacturing contexts to virtual inspection tools, real-time data analysis and autonomous-guided vehicles. Other elements of digitalisation have been applied to employee monitoring and surveillance, such as ‘cyber-physical systems’ where sensors are attached to materials or tools in production, alongside digital CCTV and wearable tracking devices (Eurofound, 2020: 5).

It has been widely argued that digitalisation can have negative consequences for workers, particularly in relation to job losses and for those undertaking more routine tasks (Dellot and Wallace-Stephens, 2017; Spencer et al., 2021). Although the extent of worker displacement is highly disputed, few doubt that there will be some disruption to existing workplaces and job roles (Thompson, 2020). There are concerns that employers may use these technologies to undermine unions’ bargaining power as well as enhance precarity, adding to rising inequality (Grimshaw, 2020). Digital tools can be deployed to further codify workers’ tacit skills, enhance control and intensify work (Pfeiffer, 2016; Howcroft and Taylor, 2023; Milanez, 2023). Yet, digital automation is not inherently bad for workers as it offers

possibilities for reducing working time and could eliminate many routine and physically strenuous tasks (Spencer et al., 2021; Berg et al., 2023).

The key point is that outcomes are not determined by technology but ‘socially shaped’ (Mackenzie and Wajcman, 1985), and that unions could be important actors in the process as representatives of collective worker interests. This is not to deny that, once designed, technology can have effects, but many outcomes remain open to contestation and negotiation (Edwards and Ramirez, 2016). Critical is the ability of unions to influence decisions, given the power at their disposal within particular national, sector and workplace contexts (Lévasque and Murray, 2010; Gasparri and Tassinari, 2020). Historically, technology has often been low on unions’ national agendas and unions have intervened ‘only intermittently’ in workplace decisions on technological change (Hyman and Streeck, 1988: 3), notwithstanding some promising antecedents in Germany and the Nordic countries (Deutsch, 1986). In the current context, concerns over the potential impact of digitalisation have seen technology rise up the agenda in many unions, with a variety of attempts to engage employers and governments (Marenco and Siedl, 2020; industriaAll, 2021).

This article draws on a multi-level analysis of unions’ role in digitalisation which considers union power, operating at different levels, as central to outcomes for workers (Levasque and Murray, 2010; Gasparri and Tassinari, 2020; Lloyd and Payne 2023; Payne et al., 2023). At national level, unions may be involved in tripartite social dialogue or negotiations and have influence over regulatory, welfare and skills training institutions. At the sector level, the scope and inclusiveness of collective bargaining is important, for example in driving up wages and developing joint employer-union training initiatives. The workplace is where the technology is implemented, and therefore is a key site for union influence and action. The inter-relationships between these different levels have long been the subject of discussion within

industrial relations (Hollingsworth and Streeck, 1994), although theoretical advancement and empirical research remain under-developed.

The relationship between the power of unions at different levels is multi-directional. In the Nordic countries, the power of unions and the labour movement has helped to create a supportive institutional and regulatory context (Andersen et al., 2014). Its continuation, and possible extension, however, ultimately depends on the organisational strength of unions at the workplace. At the same time, workplace unions find it easier to organise where supportive regulations have been secured through these wider struggles – what has been termed ‘institutional power’ (Jensen et al., 1995). The sector also has an important bearing on how different industrial relations structures and organisation tend to evolve (Bechter et al., 2012). There may be certain commonalities related to competitive pressures, the goods and services produced, technology and work organisation, patterns of labour demand and skill requirements (Hollingsworth and Streeck, 1994). Unions, for example, are likely to find it harder to influence digitalisation in sectors such as retail or hospitality, where conditions make collective organisation more challenging (Alsos and Trygstad 2018).

The aim of this article is to explore internal variation in union workplace strength within *one* sector, under contrasting national institutional contexts. Membership density has long been questioned as a useful proxy for union strength and the ability to wield power (see Metten, 2021). What has been termed ‘associational power’ (Wright, 2000) also depends on the ability to mobilise members using active, well-resourced shop stewards (Lévesque and Murray, 2010; Refslund and Arnholtz, 2022). Workplace unions in a sector are likely to find it easier to be involved in digital change where there are supportive institutions that provide them with a role and specific rights. However, these still have to be operationalised and enforced by shop stewards. At the same time, organisational strength at the workplace may enable unions to have some influence even where institutional supports are limited. The relationship, therefore,

between union strength at the workplace and ‘country effect’ in the ability to shape digitalisation is potentially complex. The next section addresses this relationship by considering contemporary evidence on unions’ role in digitalisation at the workplace in different institutional contexts.

Unions and digitalisation at the workplace

Available studies of union influence on digitalisation, outside of the platform and gig economies, have tended to focus on countries with relatively supportive institutional environments. In the automotive and engineering sectors, German unions have been proactive in relation to Industry 4.0, linked to strong codetermination rights and a well-resourced knowledge base for shop stewards (Pulignano et al., 2023; Bosch and Schmitz-Kießler, 2020). In some workplaces, unions have negotiated ‘Agreements for the Future’ which focus on the preservation of jobs, training, and works councils’ participation in digitalisation projects (Haipeter, 2020). Other research points to codetermination over digital change in a variety of sectors in the Nordic countries (Rolandsson et al., 201; Lloyd and Payne, 2021&2023). There is also evidence that well-organised unions in Norway, Italy and Germany have drawn on codetermination rights, collective agreements or data protection legislation to restrict digital surveillance at the workplace (Stroud et al., 2020; Lloyd and Payne, 2023; Doellgast et al., 2023).

Existing research suggests that strong workplace organisation, aligned with supportive national institutions, has enabled workplace unions to engage with digitalisation. It is much more difficult, however, to know the extent of union involvement across workplaces or the depth of influence within them. In Germany, for example, IG Metall’s agreements over Industry 4.0 were described as ‘trailblazers’ rather than representative of the broader range of companies (Bosch and Schmitz-Kießler 2020: 203). In Italy, Cirillo et al. (2020) found

considerable variation in the extent of union involvement in digital change across four highly unionised companies in the automotive sector.

Where unions are less well-organised, there is limited evidence of their involvement and influence in digitalisation. In retail warehousing in France, unions have drawn on strong institutional supports to exert influence over digitalised performance management tools (Gautié et al., 2020). In some cases, they were able to restrict the use of disciplinary measures, including dismissals, for not meeting targets. In examples from other sectors, resistant management and weakly organised workplaces emerge as key factors in unions' lack of influence over digital change (Lloyd and Payne, 2023; Payne et al., 2023; Da Roit and Iannuzzi, 2023).

There has been less research examining union influence over digitalisation in neoliberal economies where institutional supports are lacking. In examples from the UK service sector, weak workplace organisation and an absence of sector coordination bodies have been found to restrict union influence over digital technologies (Korenelakis et al., 2022; Lloyd and Payne, 2023; Payne et al., 2023). Nevertheless, there are examples of workplace unions making a difference, particularly in relation to digital monitoring and surveillance (Murphy and Cullinane, 2021; Lloyd and Payne, 2023; Payne et al., 2023). More extensive union influence was found in Rutherford and Frangi's (2020: 761) study of Canadian automotive plants, where some workplace unions negotiated 'controls over production standards and ergonomics' that shaped how technology was introduced. Formal contract negotiations and health and safety committees were used to influence staffing levels, with union arguments centred on work capacity and fatigue. Advanced notice of potential job losses enabled unions to negotiate for workers to be retained through redeployment and retraining. Yet, it appears management-union relationships fell some way short of the codetermination approaches found in some workplaces in Germany and Norway (Bosch and Schmitz-Kießler, 2020; Rolandsson et al., 2019).

Supportive national institutions are clearly important for unions in their efforts to shape digitalisation. However, we still know little about how far ‘country effect’ plays out in less well-organised workplaces, while few studies directly compare across countries. In countries where unions lack institutional supports, there is limited evidence on the extent to which strong workplace organisation can enable shop stewards to influence digital change. Research was therefore undertaken in the food and drink processing sector in Norway and the UK to shed light on ‘country effect’ and the role played by union strength at workplace level.

Food and drink processing in Norway and the UK

Norway has an enduring ‘tripartite’ model characterised by social dialogue and multi-level collective bargaining where unions have remained strong and influential actors (Løken et al., 2013). These structures, supported by the country’s oil and gas industry, have helped underpin a high-wage, high-productivity economy, with relatively low levels of social inequality (Hemmings, 2018). A supportive institutional context is not only helpful to union organisation but also provides unions with rights in relation to changes to technology and work practices. The legally enforceable ‘Basic Agreements’ between the ‘peak-level’ union and employer confederations, alongside the Working Environment Act (WEA), require union representatives to be consulted and involved in technological change (Alsos and Trygstad, 2018). Sector agreements may add further elements, such as union vetoes over employee monitoring. There are also rights in company law for employee representation on company boards and strong data protection legislation applicable to the work environment.

By contrast, the UK has faced decades of state-driven neoliberalism, including labour market deregulation, whereby unions have experienced significant decline and policy marginalisation (Martinez-Lucio and MacKenzie, 2024). Income inequality is high and the economy has long suffered from relatively low labour productivity (Lewis and Bell, 2019).

Sectoral bargaining is largely absent from the private sector. Unions have no statutory rights to be consulted over technology, unless redundancies are involved, and rely on their ability to secure non-legally enforceable technology agreements at company or workplace level (TUC, 2017). There is no legal provision for worker representation on company boards and data protection legislation has been seen as relatively weak in protecting employees from excessive monitoring (Brand et al., 2023).

Food and drink processing is a significant employer in both countries, contributing nearly a quarter of manufacturing employment in Norway and close to a fifth in the UK (Eurostat, 2022). Notwithstanding the hype surrounding ‘Industry 4.0’, industrial robots are still the ‘new’ form of digital automation in the sector (Cirillo and Zygas, 2019). One estimate suggests only one in ten food producers in Europe use robots (Morrison, 2021), which tend to be found mainly in packing, packaging and palletising, and are more limited in pick-and-place food handling (Bader and Rahimifard, 2018). Other forms of digital technology include smart sensors to monitor and measure product size and quality, alongside large-scale data collection to monitor and control performance (Hassoun et al., 2023).

The Norwegian sector appears more advanced in automation and the use of digital technologies (Lloyd and Payne, 2019&2021). Investment levels are significantly above the UK, with gross value added per worker over 40 percent higher (Eurostat, 2020). Some UK workplaces are highly automated but many companies epitomise a long-term ‘British’ investment problem, where weak labour market regulation and low wages have encouraged low-cost competition and labour-intensive processes (Heasman and Morley, 2017; Lloyd and Payne, 2019). Despite increased use of digital technologies, since 2008 employment has remained relatively stable in both countries.¹

¹ In the UK, there were 372,847 employees in NACE_R2 manufacture of food products in 2008, compared to 396,800 in 2020. The comparable figure in Norway was 44, 987 in 2008 and 47, 871 in 2020 (Source Eurostat NACE Rev 2).

In Norway, around half of the sector's workforce is unionised, similar to the national average (Nergaard, 2022). Workers are organised by *Norsk Nærings-og Nytelsesmiddelarbeiderforbund* (NNN, the Norwegian Union of Food, Beverage and Allied Workers), which has over 28,000 members and is an affiliate of the main union confederation, *Landsorganisasjonen i Norge* (LO). NNN negotiates sectoral agreements with the employers' association, along with company and plant agreements. The sectoral agreements provide minimum wages for all signed-up companies. Faced with some aggressive anti-union employers in fish processing and the undercutting of wages, NNN successfully applied for the legal extension of these pay rates to all workers in the subsector from 2015.

These sectoral agreements benefit those workplaces where unions are weaker. For example, in 2023, NNN took part in four days of selective strikes with other manufacturing unions, where members were called out in some well-organised workplaces. They were successful in increasing the minimum sector pay offer, with additional increases for the lowest paid.² Hourly minimum wages in the food and drink sector are relatively high for 'unqualified' workers at NOK206.03 in 2023 (approximately £16), with a median hourly wage for food processing operatives of NOK247.00 (£19) (Statistics Norway, 2024).

A recent report, examining the perspectives of NNN shop stewards, highlights 'considerable variation in size, resources and trade union density' (Ødegård et al., 2019: 8). The union has a strong presence in 'larger organisations', where there is usually 'daily contact' between plant management and shop stewards but struggles in new areas and parts of fish-processing (Ødegård et al., 2019: 8). Other research finds that in some well-organised workplaces, shop stewards are closely involved in digital changes (Lloyd and Payne, 2021). Union influence was achieved using a range of legal and collectively-agreed mechanisms, including representation on company and management boards, and involvement in 'project'

² https://news.industriall-europe.eu/documents/upload/2023/4/638176801156081828_NO_-_strike_over.pdf

groups overseeing the purchasing and implementation of digital technologies. However, there is a lack of research examining unions' role in digital change in hard-to-organise workplaces, where there are often high concentrations of migrant workers, such as fish processing (Stachowski and Rasmussen, 2021: 575).

In the UK, union density in food manufacturing is 16 percent; data on collective bargaining coverage only exists for manufacturing, where the figure is 28 percent (DBT, 2023). There is no sectoral bargaining, with negotiations confined to company and workplace level. Several competing unions are active in the sector, primarily Unite, GMB, USDAW and BFAWU, all of which are affiliated to the Trades Union Congress (TUC). Pay rates for operatives vary markedly, even in unionised workplaces, from close to the statutory National Minimum Wage (NMW, £10.42 in April 2023) to upwards of 70 percent higher.

Unionised workplaces are mainly found in established multinational companies, such as Coca-Cola, or large UK companies, like Premier Foods. Some of these workplaces have high union density and well-organised shop stewards, with wage rates significantly above the industry average (Sensi, 2022), Unite, for example, has been successful at mobilising workers in these companies around pay over the last two years, following a number of threatened and actual strikes (Unite, 2024). In other unionised companies, pay is close to the minimum wage, while some large workplaces have resisted unionisation efforts (Lever and Milbourne, 2017). Many sub-sectors, including some unionised workplaces, are dominated by low-skilled, low-paid jobs with poor working conditions (Heasman and Morley, 2017). However, little is known about the role that shop stewards are playing in digital change in any of these workplaces.

Research methods

How far does the strength of union organisation at the workplace matter for union involvement and influence in digitalisation in food and drink processing, given the contrasting institutional

environments of the UK and Norway. To explore this key question, research was undertaken with NNN, the food and drinks workers' union in Norway, and the general union, Unite, in the UK, which is one of the biggest organisers in the sector. The research sought to examine union perspectives, focusing primarily on shop stewards' views of their role and influence in digital change.

Shop stewards were selected from, what are termed, 'typical' and 'atypical' workplaces. These terms are not intended to signify the majority or minority of workplaces. Rather typical refers to what might be expected in the unionised parts of the sector in each country, and atypical to those that do not fit as well. Typical in Norway, therefore, denotes a workplace with strong union organisation, and in the UK a workplace with relatively weak union organisation. Atypical is a weakly organised workplace in Norway and a strongly unionised workplace in the UK. Reflecting the aforementioned problem of relying on union density as a proxy for union strength, strong union organisation is defined as a combination of relatively high union density, the presence of an active shop steward network, evidence of beneficial outcomes for workers in terms of pay and conditions, along with shop stewards' own assessment.

The research involved semi-structured interviews with shop stewards in five workplaces in each country (see Table 1). Interviews were also undertaken with union officers whose remit included the food and drink processing sector or digitalisation policy. These officers assisted with initial contacts and the identification of relevant workplaces. A purposeful sampling approach was adopted (Patton, 2002), targeting shop stewards in workplaces that had experienced digitalisation and which had varying degrees of union strength. There are some country differences in the size of these workplaces, in particular four of the five UK cases are larger workplaces (over 500 workers), compared to only one in Norway (see Table 2). This may have some impact on the findings, as past evidence indicates

that larger workplaces tend to have higher union density and shop steward presence (e.g. Schnabel, 2013).

Table 1: Research interviews

Organisation	Position
UK	
Unite national office	national officer1; national officer2
Unite regional office	regional officer1; regional officer2
UK-Drinks1	lead shop steward; senior shop steward
UK-Drinks2	senior shop steward
UK-Food	lead shop steward; senior shop steward
UK-Fish1	shop steward
UK-Fish 2	senior shop steward
Norway	
NNN national office	national officer1; national officer2; national officer3; national officer4
NNN regional office	regional officer
N-Food	senior shop steward
N-Cheese1	senior shop steward
N-Cheese2	shop steward
N-Fish1	lead shop steward; senior shop steward; shop steward
N-Fish2	senior shop steward
Total	23

Note: lead shop steward is an elected representative who organises across workplaces; senior shop steward is the main representative at the plant.

Shop stewards were asked to identify the main digital technologies that had been introduced at their plant, which were typically robots and digital control and monitoring systems, thereby shaping the focus of the interviews. However, digital technologies can be difficult to separate from other forms of automation; a new production line, for example, may incorporate a robot for just one operation, alongside upgraded mechanical machines. Similarly, digital control mechanisms can be applied to particular machines or an entire system. Unsurprisingly, shop stewards rarely drew clear distinctions between these different

technologies when discussing digitalisation, and therefore the processes and influence explored in the findings are often interlinked.

Twenty-three interviews were undertaken online across the two unions between 2021 and 2023. These were conducted in English, apart from one workplace in Norway where an NNN officer acted as a translator. Those with officers focused on the union's approach to digitalisation and the role of the national and sector level in providing supports for involvement. Alongside broad contextual questions around the work process and union organisation, interviews with shop stewards explored involvement in digitalisation in their workplace, the mechanisms through which any involvement was achieved, and whether there were specific examples where they had secured better outcomes. Interviews lasted from 60 to 100 minutes and were audio-recorded and fully transcribed.

The data were analysed thematically, using themes and sub-themes derived from existing literature and the theoretical approach. The main themes included 'power and organisation at workplace level' and 'influence mechanisms at national, sector and workplace level'. These were supplemented with an inductive analysis that addressed emergent themes that arose from the interviews, such as the role of company-level committees. Any issues requiring clarification were followed up via email with participants. To address whether the findings from the selected cases were considered to reflect the broader picture of 'typical' and 'atypical' unionised workplaces within the sector, follow-up meetings were held in-person with representatives from the two unions. At NNN, a two-hour discussion was conducted with senior national and regional officers, and, at Unite a three-hour workshop was undertaken with senior officers and around 30 shop stewards from a range of companies in the sector. While these meetings could not confirm the representativeness of the cases, the general findings were generally in-line with their experiences.

Research findings

This section begins with an overview of the perspectives of union officers on the approach of NNN and Unite towards digitalisation in the sector and their reflections on union influence at workplace level. It then examines shop stewards' perspectives on their role in digital changes in 'typical' and 'atypical' workplaces. Given the analytical purchase provided by 'atypical' cases, more space is devoted to these examples.

NNN and Unite: the approach to digitalisation

Distinctive union positions regarding digitalisation could be observed from the interviews with national officers in NNN and Unite. NNN's approach is to welcome digital technology provided unions and workers are involved and there are benefits for workers. NNN officers stressed the importance of employers investing in technology to improve productivity and cost competitiveness, seen as necessary to maintain high-wage jobs in Norway, but accepted that some jobs could be lost. As one officer explained, 'if we don't have the technology... then you can easily move all this production... to cheap labour countries' (NNN-national-officer1). More broadly, a buoyant jobs market and well-resourced retraining opportunities were seen as critical in enabling displaced workers to find new jobs.

Unite officers insisted the main priority was to defend jobs. As one commented: 'We're pro-jobs. We only exist really for defending workers' rights and defending and protecting jobs' (national-officer2). National policy statements emphasise that digital automation is critical for the UK's manufacturing future, but that it can be accommodated without any loss of jobs (or pay) by reducing working time (Unite, 2020). Officers also emphasised that workers who lose their jobs are often faced with a lack of good quality jobs in the local economy, alongside a punitive welfare system.

In Norway, national officers argued that many employers were willing to work with shop stewards around digitalisation in recognising that this could improve productivity. Even

where management was reluctant to engage, shop stewards could draw on legal rights and national collective agreements to press for involvement, although they accepted that much would depend upon whether they were proactive in this respect. Central to NNN's strategy is the retention and retraining of existing production operatives to undertake new and, in some cases, more advanced job roles following digitalisation. One officer explained that while many employers accepted the 'need for education and upskilling' (NNN-national-officer2), some were unreceptive to the involvement of shop stewards in digitalisation.

In Unite, in contrast to the position in Norway, officers stated that securing union involvement in digitalisation is extremely challenging. Without legal rights in relation to technology and no sectoral collective agreements, Unite's main strategy is to negotiate New Technology Agreements (NTAs) with individual employers (Unite, 2022). Officers noted that progress was extremely difficult with only a handful of NTAs concluded in the sector. One officer commented that some employers 'really want to involve the union' (Unite-regional-officer1). Another gave an example of one company described as 'forward thinking' with managers who understood that working with the union 'benefits both parties' (Unite-national-officer2).

Both NNN and Unite seek to shape digitalisation to reflect workers' interests but differ in their approach and priorities. These can be traced, in part, to their national institutional contexts and marked differences in supports for union organisation and involvement. The prospects for union influence over digitalisation are much better in Norway than the UK; however, the picture is not uniform in either case. The next section examines 'typical' workplaces in both countries to ascertain how far they conform to expectations of 'country effect'.

Table 2: Workplace characteristics

	Union density (%)	Relative strength of shop steward organisation	Plant size	Level of automation	Wages relative to sector in each country
Norway typical					
N-Food	90	Strong	100-200	High	Above sector
N-Cheese1	90	Strong	100-200	High	Sector
N-Fish1	90	Strong	100-200	Medium	Above sector
Norway atypical					
N-Cheese2	65	Weak	100-200	High	Sector
N-Fish2	60	Weak	500-1000	Low	Sector
UK atypical					
UK-Drinks1	80	Strong	500-1000	High	High
UK-Drinks2	80	Strong	500-1000	High	High
UK-Food	80	Strong	200-500	Medium	High
UK typical					
UK-Fish	50	Weak	over 1000	Low	Low
UK-Meat	60	Weak	over 1000	Very low	Low

Source: Interviews & union/company websites

The typical cases

Three of the five Norwegian plants (N-Cheese1, N-Food and N-Fish1) are deemed typical cases, with union density over 90% and shop stewards describing the local union as strong, with effective organisation across different plants in the company (see Table 2). Robust forms of cooperation between shop stewards and plant management were reported, alongside extensive and early union involvement in technology changes, in accordance with rights in the WEA and collective agreements. Levels of digitalisation and automation were relatively high. Shop stewards reported that they were provided with information about investment and decisions at an early stage through regular meetings with plant management and via worker representation on company boards. This allowed the union to challenge plans and be involved in decisions over purchasing technology. In all three cases, shop stewards stated that they made

suggestions about areas for digital investment, primarily aimed at reducing strenuous or repetitive tasks.

At N-Fish1 and N-Food, shop stewards outlined the usual process that followed a proposal to invest. A project steering group would be established that included managers, the senior shop steward and a workplace environment rep, who might visit technology suppliers, and would be part of the decision-making. Once the technology was purchased, working groups would be formed to discuss implementation, staffing and training, with relevant workers and union representatives involved. As one shop steward explained:

Management has learnt that if they have all the shop stewards and health and safety reps with them, they get the best solutions because they're the ones who are going to work with the equipment. (N-Fish1)

In some cases, shops stewards reported that they could halt projects. At N-Cheese1, the shop steward emphasised their role on the company board, where they could 'stop a lot of projects' at an early stage if 'we don't like the idea'. The 'biggest win' at N-Fish1 had involved successfully challenging a company report at a board meeting that proposed to centralise production and close most of the division's plants.

Shop stewards claimed they could also influence staffing levels, for example by jointly assessing with management the numbers required on each production line in relation to work effort and safety. This did not mean that the union could prevent most automation-driven job losses. At N-Food, on-going investment in technology had seen employment shrink from 1500 to under 200 over a 25-year period. Productivity gains enabled the union to negotiate wages and benefits for remaining workers above the sector rates, and ensured production operatives were retrained to take on new roles. Examples were also given of how shop stewards had restricted the use of digital technology to monitor workers, including attempts to install cameras (N-Fish1) and introduce individual monitoring (N-Cheese1). They explained how citing the provisions in the WEA meant that such moves could be easily thwarted.

In the UK, two of the five plants (UK-Fish and UK-Meat) are considered typical, with relatively weak union organisation, reflected in pay rates starting at just above the NMW. At UK-Fish, a large fish processing site, despite union density of around 50 percent, the union struggled to recruit shop stewards. The shop steward claimed the union had no power ‘whatsoever’ at the plant, and that workers ‘would not go on strike’ (shop-steward). At UK-Meat, density was around 60 percent. Although shop steward organisation was somewhat better, an officer described the company as ‘the biggest rogue and exploiter within the sector’ (regional-organiser2).

UK-Fish has some advanced automated lines that include robotics, while other areas are predominantly manual. In UK-Meat, most processes are labour intensive, with only a few robots used for some aspects of packing. Neither plant had any collective agreement in relation to technological change. Shop stewards explained that they had little or no involvement in digitalisation, apart from when there were potential redundancies or changes in roles. The shop steward at UK-Fish noted that technology:

It would just arrive in the workplace generally...as union reps we don’t tend to have any sort of influence on that side of it really. (UK-Fish-shop-steward)

In both cases, however, shop stewards had managed to secure agreements over the speed of *mechanical* production lines and were resisting management attempts to covertly increase them.

Digital surveillance systems for food safety purposes had become more prevalent in both workplaces and were also being used to monitor workers. At UK-Meat, the shop steward had stopped cameras that were in the process of being installed in toilets and had succeeded in removing listening devices from the factory floor. At UK-Fish, although there was little resistance to cameras, shop stewards represented workers in disciplinary cases, arguing that the company’s CCTV policy did not stipulate they could be used for performance issues.

These cases are broadly consistent with what might be expected in terms of union involvement and influence, given the national institutional environment and the relative power of unions at the workplace. While they provide evidence of ‘country effect’, even in weakly organised workplaces in the UK, unions still make a difference when it comes to potential redundancies and digital monitoring and surveillance. The next section considers the atypical cases and whether supportive national institutions make themselves felt in Norwegian workplaces with weaker union organisation. It also explores the case of strong workplace unions in the UK and if they can achieve substantive involvement and influence over digital changes.

Atypical cases: union involvement

In the UK, three plants (UK-Drinks1, UK-Drinks2 and UK-Food) are classified as atypical (see Table 2), with union membership exceeding 80 percent and shop stewards insisting they were well organised. All are owned by overseas multi-national companies with other manufacturing facilities in the country. Collective bargaining occurs primarily at UK company-level, and regular national meetings take place between shop stewards and management. Pay rates and benefits in the companies are among the best in the sector, which interviewees attributed to the strength of the union.

Investments across the companies in digital and other automation technologies has involved the continued concentration of production into fewer plants. UK-Drinks2, a centre for new investment, was the most automated of the three cases, and the only one that had not experienced job losses. UK-Drinks1 had contracted over the years, with some redundancies linked to digitalisation. Management had warned of future job losses stemming from plans to introduce autonomous-guided vehicles. UK-Food faced an imminent threat of redundancies, related to loss of production to other ‘more efficient’ sites. Shop stewards referred to a situation

where plants were pitted against one another for investment that could stave-off redundancies or closure.

Relationships with plant management varied, although in all three cases these were said to be better at UK company level. At Drinks1, the management's approach had changed, both at the plant and internationally, from being very positive to 'more aggressive', where the 'trend is not to consult' (lead-shop-steward). However, if local management failed to respect agreements, shop stewards could ensure they were followed by going 'above their heads' (Drinks1-lead-shop-steward) direct to UK company managers. At Drinks2, union-management relations at the plant were described as 'very good', although some managers were 'a bit anti-union' (senior-shop-steward). The lead shop steward at UK-Food commented there was 'a fairly respectful relationship on both sides', but insisted 'it certainly isn't partnership, we wouldn't let it be'. Shop stewards in these strongly organised plants were deeply sceptical of 'partnership' in the UK context, seeing it as being on employers' terms, and a way of undermining union strength and independence.

Despite their organisational strength, in none of these cases had shop stewards managed to secure an NTA. Nevertheless, UK-Drinks1 and UK-Drinks2 had negotiated local agreements that required management to inform or consult the union on any planned changes affecting workers. At UK-Drinks1, there was a formal consultative body said to be dominated by shop stewards, along with regular meetings between the union and plant management where technology could be discussed.

If they're going to change technology, they have to talk to us... redundancies it's consultation; if there's significant changes to people's terms and conditions, it's got to be negotiated. (UK-Drinks1-senior-shop-steward)

At UK-Drinks2, the local agreement stipulated that shop stewards should be informed of new technology at an early stage. Although there was no formal consultative body at the plant, the senior shop steward explained that management would generally 'sit down...and go through it

with me'. Notwithstanding these agreements, shop stewards in both plants reported that they had no influence over initial technology decisions.

Let's be crystal clear...We know straight away if they're bringing it to us, they've already purchased it and it's on its way in. (UK-Drinks1-lead-shop-steward)

I'm always saying, 'look, we've got a recognition and procedure agreement, you should be talking to me before we get to this stage.' (UK-Drinks2-senior-shop-steward)

In contrast, there was no forum available for consultation over technology at UK-Food and, in the words of the shop steward, 'there's no discussion' (lead-shop-steward). In none of the plants was there any evidence of systematic participation of shop stewards, or workers, in the implementation of digital technologies.

Turning to Norway, two plants can be described as 'atypical' workplaces with relatively weak workplace organisation (Table 2). One is a large Norwegian-owned fish processing plant (N-Fish2), the other a cheese producer owned by a private equity company (N-Cheese2). Although both are covered by sectoral collective agreements, they face different challenges in terms of union organisation. N-Fish2 operates in a remote location, with a workforce comprising 80 percent migrant workers, primarily from Eastern Europe. Relationships with management were described by the lead shop steward as 'up and down' and 'average' for the subsector. With labour turnover around 20 percent, the union had to constantly work at recruiting new members. N-Cheese2 is a smaller plant where many workers have been employed for a long time. The shop steward described the relationship with company management as 'distant', with the owners lacking any tradition of working with unions.

N-Fish2 is part of an expanding company, the plant having experienced increased investment in digital technologies and rising employment. It has a mix of the 'latest technology', combined with manual processes in certain areas of filleting and cutting. By contrast, N-Cheese2 is highly automated, with digital traceability, online control systems and

robotics, and has seen relatively stable employment over the last 20 years. Both companies had employee representatives on their boards but they were neither NNN members nor production workers. At N-Fish2, the shop steward considered this placed the union at a disadvantage. At N-Cheese2, the shop steward had served on the board of the subsidiary company covering the plant, but no longer chose to attend as ‘no decisions are taken there’. Decisions were said to be made higher up in the company structure where no employee representation was required.

In line with the collective agreements and the WEA, monthly meetings took place between the plant manager and senior shop steward in both workplaces. At N-Cheese2, this involved the manager discussing with the shop stewards ‘what is new and what is going to be in the future.’ However, there was little involvement in decisions over technology or how they were implemented:

I would like to be [involved] very early in the process...so I can have a say or have something to contribute to make it better. But then they have bought it and it just arrives. (N-Cheese2-shop-steward)

Similarly, at N-Fish2, management ‘mostly tell us what is going to happen’, with shop stewards ‘usually involved too late’ (N-Fish2-senior-shop-steward). For example, new machines were due to be introduced, however, the union had still not been provided with the drawings as required. Workers at N-Cheese2 were said to have some engagement during installation but this was not the case at N-Fish2. In both cases, shop stewards insisted that they had asked for earlier involvement, only for management to continually make excuses. The shop steward at N-Fish2 appeared more proactive and was going to seek help from the national union. There were also plans to use a procedure which allows an approach to the company board to press for the enforcement of legal rights.

The findings indicate that shop stewards in these atypical cases in the UK and Norway had no substantive involvement in decisions over the introduction of digital technologies and a very limited role in implementation. In the UK, strong workplace organisation did not afford

unions the ability to intervene significantly, suggesting that without national institutional supports this is likely to be extremely difficult in this sector. In the Norwegian cases, weak workplace organisation appears to reduce significantly shop stewards' ability to draw on institutional supports, and limits 'country effect'. The next section considers whether shop stewards in these cases were still able to exert some influence over how digitalisation impacts workers and, if so, through what mechanisms.

Atypical cases: union influence

At UK-Drinks1 and UK-Food, a major priority for shop stewards was preventing job losses, resulting from a combination of digitalisation, other forms of automation, and company restructuring. As one noted:

To me, job losses is the most important thing going. Right? Because once you've lost a job, you'll never get it back again...these are human beings with families.
(UK-Drinks1-lead-shop-steward)

However, the evidence suggests they were having limited impact. At UK-Drinks1, the planned introduction of an automated storage and retrieval system had threatened the jobs of 50 fork-lift truck operators. The shop stewards produced a counterproposal, which had managed to save ten jobs, primarily through redeployment. More generally, they had convinced management to change the redundancy process through extending offers of voluntary severance to other groups of workers, thereby expanding redeployment opportunities for those affected.

At UK-Food, faced with well over 100 threatened redundancies, shop stewards were preparing a response, involving proposed reductions in working time if there was a lack of volunteers for redundancy. The lead shop steward explained that the aim was for the work to be 'spread out over more people' and that they would be prepared to 'ballot [for a strike] over it'. Shop stewards at both plants noted that the union's success in securing relatively generous voluntary redundancy packages made it harder to mobilise workers to resist job losses as there

would be no compulsory redundancies. As the lead shop steward at UK-Drinks1 explained: ‘people are wanting to jump with a decent redundancy package...there’s a queue now to go’.

Of the three plants, the shop stewards at UK-Drinks1 appeared to have most influence over digitalisation, with their main aim being to try and ‘keep it labour intensive’ when new systems were introduced (UK-Drinks1-senior-shop-steward). The shop stewards sought to influence staffing levels by insisting on the need for workers to be available if there was a break-down, and raising health and safety issues to restrict worker flexibility across lines. Although they had slowed down job losses, the shop stewards acknowledged they had been unable to prevent the ‘deskilling’ of production roles. To avoid redundancies, they had agreed that the company would no longer recruit to the two higher skilled grades. Over time, more complex tasks had shifted to engineers, leaving some operatives only able to carry out ‘basic maintenance’ and ‘spanner work’. New recruits were trained at the lowest skill level, with upward progression no longer available. As the senior shop steward noted: ‘we’ve not lost a great deal of bodies, but we’ve lost the skill’.

Shop stewards at UK-Drinks1 and UK-Food reported that they were able to challenge the use of digital monitoring and surveillance devices and associated performance-related pay systems (said to be not in use at UK-Drinks2). At UK-Drinks1, the union had stopped management unilaterally introducing cameras into the plant, having reached an agreement which enabled the union to exercise control by advising over their placement: ‘so they’re only capturing... where the product could be contaminated’ (senior-shop-steward). They had also secured strict limits on data storage and a requirement that a shop steward be present if footage was to be reviewed. Similarly, at UK-Food, the union had thwarted management’s attempts to use cameras to watch workers. In addition, they had fought the introduction of an individual performance management system, using an overtime ban and a vote in favour of strike action.

As the lead shop steward noted: ‘performance management in here is history, we’ve absolutely shafted that’.

Health and safety arguments were used at UK-Drinks1 to limit digitalised forms of individual performance management. Shop stewards had prevented data from fingerprint recognition sensors on doors being used in disciplinary cases over time-keeping, arguing it would add to stress and sickness absence. Safety concerns were raised when a new digital management and tracking system was introduced for fork-lift drivers that could collect a wide range of data, including the detailed tasks workers performed and when they logged on and off. The union had argued that workers could be pressurised to speed-up to meet targets, thereby risking accidents. As the senior shop steward remarked: ‘it died a bit of a death...because we objected to it’.

In the two weakly organised workplaces in Norway, the picture reveals some similarities with the strongly unionised cases in the UK with a lack of substantive influence over digitalisation. Requirements within collective agreements and the WEA for union and worker participation were often not followed. As with other plants in the UK and Norway where manual tasks continue to be used on production lines, the shop steward had sought to limit the speed of work, given that management were ‘always trying to make us work faster’ (N-Fish2-senior-shop-steward). Neither N-Cheese2 nor N-Fish2 had experienced recent job losses and this was not an area of concern for the shop stewards.

In Norway, data protection law, the WEA and collective agreements place strict restrictions on the use of cameras and data for tracking individual worker performance. In neither plant did shop stewards report cameras being used to watch workers. At N-Fish2, while cameras monitored certain areas of production, as the shop steward noted, these ‘can’t be used in monitoring the people working; it’s not allowed by Norwegian law’. However, at N-Cheese2, a new digital production system had just been introduced on one line that could

monitor and collect data on individual workers. The shop steward had told management they were ‘a little bit concerned’ but, rather than insisting on the enforcement of regulations and the collective agreement, their approach was more cautious.

we have to try and see how it’s being used and also listening to these people who are working there, if they think this is a good thing or it’s a bad thing or it doesn’t affect them at all. (N-Cheese2-shop-steward)

The evidence from atypical cases in Norway and the UK suggests that shop stewards exert some influence over digitalisation. In the UK, strong workplace organisation has enabled shop stewards to have some, albeit limited, success in slowing down job losses, but greater influence in restricting digital monitoring and surveillance. In Norway, despite relatively weak workplace organisation, shop stewards emphasised the importance of formal protections in the legal and institutional framework for dealing with digitalisation, with also more influence in relation to digital monitoring and surveillance. However, this still depends on shops stewards’ ability and willingness to proactively enforce such protections.

Discussion

How far does the national institutional environment affect unions’ involvement and influence in digital change in the food and drink processing sector in Norway and the UK, and to what extent is ‘country effect’ mediated by union strength at workplace level? Two key findings emerge from the research. First, the involvement and influence gap between strongly organised and weakly organised workplaces in Norway appears more significant than in the UK. Second, comparing atypical cases (i.e. weakly organised workplaces in Norway with strongly organised workplaces in the UK) reveals limited involvement and influence over digitalisation. How might we explain these findings?

In Norway, the reach of ‘country effect’ emerges as more uneven. Notwithstanding a supportive institutional environment, there are significant differences in union involvement and

influence over digitalisation according to union strength at the workplace. The evidence from workplaces with strong union organisation re-affirms other studies of local union-management cooperation around digital change through long-term ‘mutual-gains’ partnerships (Rolandsson et al., 2019; Lloyd and Payne, 2021). However, conflicting interests remain, and examples were provided of management seeking to circumvent the union. This suggests that these relationships are an ongoing bargain that requires a strong local union to ensure influence continues and delivers benefits for workers. By contrast, in the atypical, weakly organised cases in Norway, there was little union involvement in digital change, despite requirements in collective agreements and the WEA. While there are formal mechanisms in Norway which shop stewards can use if management fails to comply, there was no evidence that they had made use of these rights in relation to digitalisation, indicating a lack of proactivity on the part of local shop stewards.

In the UK, the evidence suggests that an unsupportive institutional context may severely restrict union involvement in digitalisation, even where shop stewards are well organised and local agreements are in place. That is not to say they had no impact on digital change and, even in less well-organised workplaces, shop stewards were still able to have a mitigating effect. This similarity across workplaces may be partly attributed to employers’ long-standing reluctance to cede managerial prerogative over technical change (Wilson et al., 1982; Beirne and Ramsay, 1992). The absence of legal rights, alongside management’s refusal to share genuine decision-making over technology, may contribute to shop stewards’ often reactive and defensive position towards digitalisation (Marenco and Siedl, 2021).

Comparing *atypical* workplaces in Norway (weak union organisation) and the UK (strong union organisation), shop stewards had little influence or involvement in decisions over digitalisation. Both NNN and Unite have found it easier to mobilise workers to drive-up pay, as noted earlier, than to push for involvement in technological change. Given the institutional

supports available in Norway, it could be argued that prospects are more positive for NNN to make progress in less well-organised workplaces by engaging with shop stewards to help them to operationalise available rights. These workplaces already had union density of 50-65 percent, so this is likely to be more about strengthening the shop steward infrastructure and knowledge of their rights than simply recruiting more members.

Even where unions lack a significant role in digital change, there is evidence that they still make a difference, particularly when resisting digital monitoring and surveillance. Legislation plays an important role. In Norway, the WEA, provisions within legally-enforceable collective agreements and relatively strong data protection legislation mean that, even in weakly organised plants, it is potentially easier to challenge management through invoking these rights than in the UK where regulations are weaker. Shop stewards in well-organised workplaces in the UK tended to draw more on health and safety legislation to exert influence, similar to unions in the Canadian automotive sector (Rutherford and Frangi 2020). The cases from the UK also align with other research which finds that strong workplace unions are able to impose restrictions in countries where there are less supportive institutional environments (Stroud et al., 2020; Murphy and Cullinane, 2021). It also suggests that strong institutional supports are an aid for those workplaces where unions are weaker.

Do we see a ‘country effect’ in terms of workplace unions’ ability to prevent job losses from digitalisation? NNN sees digital automation as essential to plant productivity and competitiveness in a high wage economy and has been successful at safeguarding some jobs by pressurising companies to retrain in common with other Nordic manufacturing unions (Rolandsson et al., 2019; Garneau et al., 2023). Nevertheless, the union acknowledges that jobs are likely to be lost in the process. Unite’s position could be considered more radical, insisting no jobs need be sacrificed if working time is reduced as part of a technology agreement. While

Unite has no doubt saved some jobs (as is the case with NNN), there is little evidence that it has been able to successfully negotiate such agreements.

The mostly smaller size of the Norwegian workplaces in the study compared to the UK might suggest a ‘size-of-workplace effect’, although union strength has, historically, been associated with larger workplaces (Schnabel, 2013). Plants in this sector are, on average, smaller in Norway, potentially reflecting a limited home market and higher levels of automation than in the UK. It may be that because digitalisation has been in process for longer in many Norwegian workplaces, shop stewards are more likely to have experience of dealing with it and NNN is further ahead in providing supports and relevant training.

Conclusion

This article has explored the extent to which union strength at the workplace *mediates* the influence of national institutions (i.e. ‘country effect’) on union involvement and influence in digitalisation in the food and drink processing sector in Norway and the UK. The research finds that union strength at the workplace has a more significant impact in mediating ‘country effect’ in Norway than the UK. In the UK, strong workplace organisation does not compensate for an unsupportive national institutional and regulatory environment and enable shop stewards to secure a substantive role in digital change. In Norway, while shop stewards in well-organised workplaces are able to draw on a supportive institutional environment to secure significant involvement and influence, this is not the case in workplaces where union organisation is relatively weak.

The research makes four important contributions. First, it underlines the continued salience of unions’ institutional power in Norway in maintaining a supportive environment in which joint union-management approaches to digitalisation and the sharing of productivity gains are more likely to occur, also evidenced in other sectors (Rolandsson et al., 2019; Lloyd

and Payne, 2023). In the UK, where unions lack institutional power, the findings suggest that even with relatively strong workplace organisation, unions were unable to achieve anything remotely comparable. Second, the study demonstrates that the *reach* of ‘country-effect’ in relation to digital change in this sector appears to diminish significantly in Norway, when including ‘atypical’ workplaces that are relatively weakly organised. In the UK, there were limited differences between strong and weakly organised workplaces in influence over digital technology, in contrast to other areas, such as pay and benefits.

Third, unions still make a difference to worker outcomes in both countries even where union workplace power is limited. Legal and regulatory rights emerge as central to unions’ ability to restrict digital monitoring and surveillance. Health and safety regulations provide proactive shop stewards in neoliberal economies, like the UK, with ‘narrative resources’ (Lévesque and Murray, 2010) which they can use to block excessive monitoring (Rutherford and Frangi, 2020). In Norway, legally enforceable collective agreements and the WEA go much further and appear strong enough to enable shop stewards to limit forms of digital surveillance even in less well-organised workplaces. These findings underscore the importance of using regulations that are available and lend support for union campaigns to strengthen them in the UK (TUC, 2018).

Fourth, the study has implications for the ability of unions to resist jobs losses from digitalisation. Both NNN and Unite want to preserve jobs but even with strong workplace organisation they have only been able to affect numbers at the margins. This lack of influence may be more common in manufacturing, with evidence in banking, for example, that unions with strong institutional supports can restrict mass lay-offs (Kornelakis et al., 2022). On a more positive note, in both Norway and the UK, employment levels in food and drink processing have remained relatively stable over the last 20 years. Job losses and plant closures go alongside expansion and start-ups. Dealing with restructuring is easier for unions in Norway due to a

buoyant labour market, national tripartism and a supportive education and welfare system for displaced workers (Nilsen, 2020). Organising in new plants is also more difficult in the UK owing to the lack of sectoral bargaining, and statutory recognition procedures that are complex and weighted towards employers (Ewing and Hendy, 2017).

The article makes an important contribution to an emerging literature concerned with analysing how unions' ability to shape digitalisation at work is affected by union power at different levels of industrial relations (Gasparri and Tassinari, 2020; Lloyd and Payne, 2023; Payne et al., 2023). It emphasises the critical role of national institutional supports and how this links with union strength at the workplace. It has relevance to the power-resources approach, and the ways in which 'institutional power' and workplace 'associational power' are both important for unions' ability to shape digital change (Wright, 2000; Arnholtz and Refslund, 2024). The research also underscores the continuing divergence between national capitalisms, the specificity of sector dynamics and the variation in the development and deployment of digital technologies. Contrary to Doellgast and Wagner's (2022: 447) conclusion that 'the overwhelming impact of new digital technologies' is a 'weakening of unions', this sector does not suggest that this is the case. Rather, we see evidence of renewed or sustained union engagement with debates over digital technology.

The research has some limitations. Based solely on union interviews, it provides an incomplete account of the strength of union organisation as well as shop stewards' role and influence in digital change. Examining the perspectives of workers and management would afford further insights, helping to clarify how far employer approach matters and probing the conditions under which workers can be mobilised to support union involvement in digital change. While this study finds evidence of the effect of national institutions on shop stewards' involvement in and influence over digitalisation, it is important to avoid generalisation from one industry. Future research could explore whether these findings hold across other countries

and sectors, including countries that have similar institutional conditions. This could enrich an analysis of the relationship between ‘country-effect’ and union power at multiple levels in the social shaping of digitalisation.

References

Alsos K and Trygstad S (2018) Workplace democracy: representation and participation gaps in the Norwegian labour market model. In: Engelstad F, Holst C and Aakvaag GC (eds) *Democratic State and Democratic Society: Institutional Change in the Nordic Model*. Warsaw: De Gruyter, pp.232-254

Andersen SK, Dølvik JE and Ibsen CL (2014) *Nordic Labour Market Models in Open Markets*. Brussels: ETUI.

Bechter B, Brandl B and Meardi G (2012) Sectors or countries? Typologies and levels of analysis in comparative industrial relations. *European Journal of Industrial Relations* 18(3):185-202.

Berg J, Green F et al (2023) Risks to job quality from digital technologies: are industrial relations in Europe ready for the challenge? *European Journal of Industrial Relations*, onlinefirst.

Beirne M and Ramsay H (1992) Manna or monstrous regiment? Technology, control, or democracy in the workplace. In Beirne M and Ramsay H (eds) *Information Technology and Workplace Democracy*. London: Routledge, pp.1-55

Bosch G and Schmitz-Kießler J (2020) Shaping Industry 4.0 – an experimental approach developed by German trade unions. *Transfer: European Review of Labour and Research* 26(2):189-206.

- Brand J, Dencik L and Murphy S (2023) *The Datafied Workplace and Trade Unions in the UK*. Working Paper, Cardiff: Cardiff University. <https://orca.cardiff.ac.uk/id/eprint/158330/> accessed 30/04/2024.
- Cirillo V, Rinaldini M et al. (2020) Trade unions' responses to Industry 4.0 amid corporatism and resistance. LEM Working Paper, No.2020/21, Scuola Superiore Sant'Anna, Pisa.
- Cirillo V and Zayas J (2019) Digitalizing industry? Labor, technology and work organization: an introduction to the Forum. *Journal of Industrial and Business Economics* 46:313–321.
- Da Roit B and Iannuzzi F (2023) One of many roads to industry 4.0? Technology, policy, organisational adaptation and worker experience in 'Third Italy' SMEs. *New Technology, Work and Employment*, 38(2):252-271.
- DBT (Department for Business and Trade) (2023) *Trade Union Statistics 2022*. London: DBT.
- Dellot, B. and Wallace-Stephens, F. (2017) *The Age of Automation: Artificial Intelligence, Robotics and the Future of Low-skilled Work*. London: RSA.
- Deutsch S (1986) International experiences with technological change. *Monthly Labor Review* 109:35–40.
- Doellgast V and Wagner I (2022) Collective regulation and the future of work in the digital economy: Insights from comparative employment relations. *Journal of Industrial Relations*, 64(3):438-460.
- Doellgast V, Wagner I and O'Brady S (2023) Negotiating limits on algorithmic management in digitalised services: cases from Germany and Norway. *Transfer: European Review of Labour and Research* 29(1):105-120.
- Eurostat (2022) *Annual Enterprise Statistics (NACE Rev. 2)* [sbs_na_sca_r2]

Eurofound (2020), *Employee monitoring and surveillance: The challenges of digitalisation*, Publications Office of the European Union, Luxembourg.

Ewing K and Hendy J (2017) New perspectives on collective labour law: Trade union recognition and collective bargaining. *Industrial Law Journal*, 46(1):23-51.

Forsyth A (2022) *The Future of Unions and Worker Representation: The Digital Picket Line*. Bloomsbury Publishing.

Garneau JMÉ, Pérez-Lauzon S and Lévesque C (2023) Digitalisation of work in aerospace manufacturing: expanding union frames and repertoires of action in Belgium, Canada and Denmark. *Transfer: European Review of Labour and Research*, 29(1):139-154.

Gasparri S and Tassinari A (2020) ‘Smart’ industrial relations in the making? Insights from analysis of union responses to digitalization in Italy. *Relations Industrielles/Industrial Relations* 75(4):796-817.

Gautié J, Jaehrling K and Perez C (2020) Neo-Taylorism in the digital age: workplace transformations in French and German retail warehouses. *Relations Industrielles/Industrial Relations* 75(4):774–795.

Grimshaw D (2020) International organisations and the future of work: How new technologies and inequality shaped the narratives in 2019. *Journal of Industrial Relations*, 62(3):477-507.

Haipeter T (2020) Digitalisation, unions and participation: the German case of ‘Industry 4.0’. *Industrial Relations Journal* 51(3):242-260.

Hassoun A, Jagtap S et al (2023) Food processing 4.0: Current and future developments spurred by the fourth industrial revolution. *Food Control* 145:109-507.

Heasman M and Morley A (2017) *Earning a crust? A review of labour trends in UK food manufacturing*. Food Research Collaboration Policy Brief.

Hemmings P (2018) Norway's economy: Maintaining a successful business sector in a changing world. *OECD Economics Department Working Papers*, No 1459, OECD Publishing, Paris.

Hollingsworth J and Streeck W (1994) Countries and sectors: concluding remarks on performance, convergence and competitiveness. In: Hollingsworth J, Schmitter P and Streeck W (eds) *Governing Capitalist Economies: Performance and Control of Economic Sectors*. Oxford: Oxford University Press, pp.270-300.

HSE (Health and Safety Executive) (2023) *Occupational Health Topics*. <https://www.hse.gov.uk/food/healthtopics.htm> accessed 03/12/2023.

Howcroft D and Taylor P (2023) Automation and the future of work: A social shaping of technology approach. *New Technology, Work and Employment*, 38(2):351-370.

Hyman R and Streeck W (1988) Editors introduction. In: Hyman, R. and Streeck, W. (Eds.). *New Technology and Industrial Relations*. Oxford: Basil Blackwell, pp.1-16.

industriaAll (2021) Digitalisation in the post-COVID world: what role for industrial trade unions. https://news.industrialall-europe.eu/documents/upload/2021/9/637661806467382499_Report%20Digitalisation%20industrialAll%20Europe%20-%20FINAL.pdf

Jensen CS, Madsen JS and Due J (1995) A role for a pan-European trade union movement? Possibilities in European IR-regulation. *Industrial Relations Journal*, 26(1):4-18.

Kornelakis A, Kirov V and Thill P (2022) The digitalisation of service work: a comparative study of restructuring of the banking sector in the United Kingdom and Luxembourg. *European Journal of Industrial Relations* 28(3):253-272

Lever J and Milbourne P (2017) The structural invisibility of outsiders: the role of migrant labour in the meat-processing industry. *Sociology* 51(2):306-322.

Lévesque C and Murray G (2010) Understanding union power: resources and capabilities for renewing union capacity. *Transfer: European Review of Labour and Research* 16(3):333-350.

Lewis P and Bell K (2019) Understanding the UK's productivity problems: new technological solutions or the case for the renewal of old institutions. *Employee Relations* 41(2):296-312.

Lloyd C and Payne J (2019) Rethinking country effects: robots, AI and work futures in Norway and the UK. *New Technology, Work and Employment* 34(3): 208-225.

Lloyd C and Payne J (2021) Food for thought: robots, jobs and skills in food and drink processing in Norway and the UK. *New Technology, Work and Employment* 28(2): 272-290

Lloyd C and Payne J (2023) Trade unions, digitalisation and country effects: a comparative study of banking in Norway and the UK. *European Journal of Industrial Relations* 29(4): 325-345.

Løken E, Stokke T and Nergaard K (2013) *Labour Relations in Norway*. Oslo: FAFO.

Mackenzie D and Wajcman J (1985) *The social shaping of technology*. Open University Press.

Marenco M and Seidl T (2021) The discursive construction of digitalization: a comparative analysis of national discourses on the digital future of work. *European Political Science Review* 13(3):391-409.

Martínez Lucio M and MacKenzie R (2024) The state and industrial relations: Debates, concerns and contradictions in the forging of regulatory change in the UK. In: A Hodder and S Mustchin (eds.) *The Value of Industrial Relations*. Bristol, UK: Bristol University Press.

- Metten A (2021) Rethinking trade union density: A new index for measuring union strength. *Industrial Relations Journal* 52(6):528–49.
- Milanez A (2023) *The impact of AI on the workplace: evidence from OECD case studies of AI implementation*. OECD Social, Employment and Migration Working Papers No 288.
- Morrison O (2021) Robots ‘ready to extend reach’ in food industry. *FoodNavigator Europe*. <https://www.foodnavigator.com/Article/2021/12/07/Robots-ready-to-extend-reach-in-food-industry> accessed 18/6/2024.
- Murphy G and Cullinane N (2021) Performance management technologies and trade union responses: a case study from banking. *New Technology, Work and Employment* 36(3):285-306.
- Nergaard K (2022) *Organisasjonsgrader, tariffavtaledekning og arbeidskonflikter 2020 og 2021*. Fafo-notat, Oslo: FAFO.
- Nilsen ØA (2020) The Labor Market in Norway: 2000-2018. *NHH Dept. of Economics Discussion Paper* (04).
- Ødegård J, Steen J and Svarstad E (2019) *NNNs organisasjon – sett fra lokalledene*. Fafo-rapport 2019:12. Oslo: FAFO.
- Patton M (2002) *Qualitative Research and Evaluation Methods*. Thousand Oaks, CA: Sage.
- Payne J, Lloyd C and Jose SP (2023) ‘They tell us after they’ve decided things’: a cross-country analysis of unions and digitalisation in retail. *Industrial Relations Journal* 54(1): 3-19.
- Pfeiffer S (2016), Robots, Industry 4.0 and Humans, or Why Assembly Work is More Than Routine Work. *Societies* 6(2):16-42.

Pulignano V, Hauptmeier M and Frans D (2023) Determinants of union strategies towards the twin digital and green transitions in the German and Belgian automotive industry. *Transfer: European Review of Labour and Research* 29(1):121-138.

Refslund B and Arnholtz J (2022) Power resource theory revisited: the perils and promises for understanding contemporary labour politics. *Economic and Industrial Democracy* 43(4):1958-1979.

Rolandsson B, Dølvik J, et al. (2019) *Digitalization in Nordic manufacturing: some case-study illustrations*. Nordic Future of Work Project 2017–2020, Working Paper 3. Fafo: Oslo

Rutherford T and Frangi L (2020) Is Industry 4.0 a good fit for high performance work systems? Trade unions and workplace change in the Southern Ontario automotive assembly sector. *Relations Industrielles/Industrial Relations* 75(4):751-773.

Schnabel C (2013) Union membership and density: Some (not so) stylized facts and challenges. *European Journal of Industrial Relations*, 19(3):255-272.

Sensi J (2022) Cadbury ‘sets standard for food manufacturing’ with 17.5% pay rise *Grocery Gazette* 13th July. <https://www.grocerygazette.co.uk/2022/07/13/cadbury-sets-standard-for-food-manufacturing-with-17-5-pay-rise/> accessed 18/6/2024.

Soete L (2021) Destructive creation: Explaining the productivity paradox in the digital age in M Neufeind, J O’Reilly and F Ranft (eds) *Work in the Digital Age*, London: Rowman & Littlefield, pp29-46.

Spencer D, Cole M, et al. (2021) *Digital Automation and the Future of Work*. Brussels: European Union.

Stachowski J and Rasmussen B (2021) From valued stayers to working hands? The social consequences of changing employment relations among Polish migrants in farmed salmon industry in rural Norway. *European Countryside* 13(3):565-583.

Stroud D, Timperley V and Weinel M (2020) Digitalized drones in the steel industry: the social shaping of technology. *Relations Industrielles/Industrial Relations* 75(4):730-750.

Thompson P (2020) Capitalism, technology and work: interrogating the tipping point thesis. *The Political Quarterly* 91(2):299-309.

TUC (Trades Union Congress) (2017) *Shaping our Digital Future*. London: TUC.

TUC (2018) *I'll Be Watching You: A Report on Workplace Monitoring*. London: TUC.

TUC Wales Cymru (2021) *Negotiating the Future of Work: New Technology and Automation*.
<https://www.tuc.org.uk/sites/default/files/2021-12/Negotiating%20Automation%20-%20report.pdf>

Unite (2020) *Fighting for the Future of UK Manufacturing*. London: Unite.

Unite (2024) Unite Workplace Wins <https://www.unitetheunion.org/campaigns/unite-for-a-workers-economy-campaign/unite-workplace-wins> accessed 18/6/2024.

Wilson D, Butler R et al. (1982) The limits of trade union power in organisational decision making. *British Journal of Industrial Relations* 20(3):322-341.

Wright EO (2000) Working-class power, capitalist-class interests, and class compromise. *American Journal of Sociology* 105(4):957-100.