Trade Unions, Labour rights and Technological Change

Dynamics and Best Practices

eticas foundation

COTEC FUNDACIÓN COTEC PARA LA INNOVACIÓN

IN COLLABORATION WITH

CCOO

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Dynamics and Best Practices

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EXECUTIVE SUMMARY

Unions have protected the rights of workers for more than a century. It is through collective bargaining and the demands of workers that many now have the right to ask for salary increases, access health services, and enjoy improved working conditions. However, unions in developed countries today perform their activities in a "fractured" atmosphere. The decline in trade union membership, increasing heterogeneity in labour relations between countries and the weakening of collective bargaining have all compromised the labour relations area of the European Social Model.

The possibility that robots may replace the human labour force has also inspired a variety of utopias and dystopias. The development of automation and artificial intelligence, as well as its progressive entry into domestic and workspaces, the possibility of incorporating robots appears increasingly real; and the voices of both fascination and alarm in regards to its impact on the workforce have intensified.

To tackle these questions, this report begins with a review of the main approaches that have traditionally been used to explain the relationship between technological development and unionisation in previous industrial revolutions. The report shows that technological development includes an extensive range of possibilities and a multiplicity of future outcomes, all of which underscores the need for trade unions to play a decisive role to prevent the worst scenarios for workers interests from becoming a reality. The report also explores the main challenges raised by the digitalisation, automation and platformisation of the economy. These have been identified as the main vectors of technological change that affect work assignments and occupations, working conditions, contractual conditions and industrial relationships in the 21st century. Each of these challenges will be dealt with independently.

The implications of digitalisation are then analysed, as is the use of sensors and processing devices to convert the process (or parts of it) into digital information (and vice versa), thereby optimising the significantly enhanced possibilities of processing, storing and communicating digital information.

The report explores these challenges in terms of task change, the destruction and creation of jobs as a consequence of the new opportunities for automation to replace human labour with machine for an increasing number of tasks within production and distribution processes. Platformisation is defined as the use of digital networks to coordinate the mobilisation of external assets into a labour force using algorithms, in this way generating the option of hiring workers anywhere in the world by the hour for specific services within less clearly defined labour relations frameworks.

In terms of proposals to contribute towards a new operating system to tackle the challenges described above but also with a view to maximising the opportunities of technological change, the report identifies some institutional approaches, which could contribute to the development of a labour relations framework that is able to protect the rights of workers in the new work reality.

Among others, potential approaches include a broad-based model for social dialogue to incorporate those who are currently not represented, the so-called "excluded" or outsiders; the need to anticipate "technological unemployment" by applying a focus on continuous learning, with a special emphasis on the development of creative, social and ICT related skills; the urgent need to design social programs to lessen the short term effects of labour market imbalances, and the opportunity to update labour market regulation for the new contexts.

In order to undertake these challenges while guaranteeing an organisational representativeness that can play a decisive role in the design of public policies and promote new regulations at the highest level, as well as negotiate sector and company specific responses to the new challenges, the report includes a review of best practices in the unions on an international scale, exploring practical case studies in which workers are engaged in action to overcome challenges in their working life.

In organisational terms, good practices include those that broaden the basis of social dialogue and take advantage of the potential that new technologies offer to implement tools and digital strategies in order to share information on a peer to peer basis, as well as accumulating intersectoral strength for better collective bargaining.

At the regulatory level, we analyse the participation of workers in the design of public policies intended to address the changes brought about by digital transformation of the labour market and new training initiatives jointly organised by representatives of workers and public and/or private actors to tackle the competence gaps through permanent training strategies.

From a perspective of workplace activities, we review a number of initiatives conducted by workers themselves to demand ethical standards for better work and improved use of technology, highlighting the need to develop public agendas and collective strategies to defend digital rights in their working lives. As this report shows, union innovation to foster a new and better future for workers is less about reinventing the wheel and more about adapting or developing tools for new scenarios.

This report is the result of the collaboration between Eticas Foundation, CCOO and COTEC, with the support of COTEC. For the last few months, we have been working together to organise the debate around the impact of technology on labour conditions and the future of work, both conceptually and in terms of practices. This report summarises the initial phase of this collaboration, by focusing on interviewing key informants, organising the relevant concepts and challenges and identifying best practices. The information gathered allowed us to define several pilots and strengthen the collaboration between the participating institutions. This will achieve a key milestone in July 2019 with an international conference in Madrid that gathers trade-unionists and researchers from around the world to exchange experiences and explore shared agendas and action strategies.

1. INTRODUCTION

Trade unions have been protecting workers' rights for almost two centuries. It is thanks to collective bargaining, the organisation of workers and their forceful measures, that millions of people currently enjoy the rights to demand wage increases, access to health services and the right to improve their working conditions. Nevertheless, **unions in developed countries operate today in a "fractured" world.** The growing heterogeneity in labour relations between countries, as well as within them, and the weakening of collective bargaining have compromised the dimension of labour relations within the framework of the European Social Model. This set of processes have contributed to greater social inequality and a perceived lessening of solidarity among workers, even in contexts such as Europe, where there is increased affiliation.

At the same time, the incorporation of new **technologies in the workplace** and the emergence of new jobs within production sectors based on **disruptive** technologies are having a double impact to the detriment of workers' rights, weakening the traditional mechanisms of **collective bargaining,** employment rates and quality, introduction of new ways of organising and distributing production locally and globally, and generation of new challenges around the use and abuse of data as well as automated decision-making based on algorithms and artificial intelligence. Overall, there is an increased sense that the impacts of automation, digitalisation and platformisation could change the balance of labour relations, while also increasing the lack of transparency and accountability.

In this framework, three dimensions of the relationship between technological progress and labour rights must be examined. First of all, and in line with the above, the **impact of automation and digitalisation on employment levels** must be properly analysed and anticipated. In a scenario of potentialities and risks, it is evident that there will be jobs and skills that will become redundant, others that will take on more relevance and others that will emerge as true innovations. But many of the emerging dynamics are not new. Although the progressive digitalisation of work has given rise to new models of production, such as platformisation,

which have developed rapidly and are part of legal and political frameworks that have not yet been adapted to the defence of labour rights; various problems that have historically affected workers, such as precarisation and labour exploitation, also remain.

The idea of robots replacing the human workforce has been feeding relatively distant utopias and dystopias for decades. Nevertheless, what John Maynard Keynes called "technological unemployment" in his "The General Theory of Employment, Interest and Money" (1936) has new characteristics today. With the advancement of automation and artificial intelligence, the warnings that predict a significant impact of these developments on work and even the disappearance of a very high percentage of unskilled jobs in advanced societies should be considered (Goos, 2018), but also questioned.

There are many approaches in this area that are driven by a weak understanding of the current state of technological development as well as the specific and multiple ways in which technology impacts workers and work. It is therefore necessary to prepare realistic roadmaps that allow us to face the challenges that these new socio-technical realities will bring. In fact, most jobs already require some kind of socio-technical interaction, and some sectors have been working with high levels of automation for decades. The need for realistic, evidence-based assessments of the future of work is urgent.

Secondly, there is a **need to start looking at technology as an enabler of rights and a tool to lessen power imbalances,** and to help unions develop their own digital and technological agenda. The changes brought about by digitalisation imply new skills, expectations and working conditions, as well as new challenges. For instance, the incorporation of continuous data-tracking of workers, the emergence of unaccountable algorithmic decision systems, matters of responsibility in human-machine interaction, or the need to adapt legal frameworks and collective and sector-specific agreements to the new socio-technical reality of work. Many of these challenges affect new sectors that have emerged around the platform economy, but also those working in well-established industries where unions continue to play an important role. While some of the emerging issues in the context of automation and digitisation are new, others are as old as the current economic system and can be addressed by mobilising existing tools, strategies

and institutional settings. There is space for technology to contribute to the defence of labour rights.

Thirdly, and following on this idea, the **role of the unions can and should be strengthened,** but their strategies for future collective bargaining and negotiation, as well as their role in defining the technology agenda, must be rethought. Machines have allowed serial production in the manufacturing context and mass production hitherto unthinkable (Stearns, 1991). The recent evolution of technologies makes it possible to work in decentralised networks by transforming distance into an almost irrelevant factor. With 'digital Taylorism', different parts of the production process are not only standardised and mechanised, but are often outsourced through technical and technological means. In addition, these same means of outsourcing perform a role of control of processes and work times. Thus, there is a progressive reduction of the types of work that physically unite workers and made the modern trade union movement possible. Remote working has promoted a weakening of collective ties in the trade union world, which now faces the challenge of articulating new strategies of action. The impact of this phenomenon on the forms of collective organisation is profound and undermines the foundations of modern trade unionism, which makes it essential to rethink both practices and strategies.

Faced with growing innovations, the purpose and usefulness of unions is often being questioned. But initiatives to address this are emerging both within and outside the trade union world. Although we could not find research providing a general and comparative picture of how unions around the world are preparing for these new challenges, we have identified initiatives such as that of the Italian Metalworkers Federation. This organisation recently conducted a study on automation and its impact on production systems, as well as the role of unions in this context. The European Trade Union Institute's Foresight Union has also issued several reports on digitalisation and artificial intelligence. A big part of these documents focuses precisely on identifying current best practices, which indicate that there is **room for trade unions taking a more leading and proactive role in addressing these emerging issues and challenges,** both in terms of relating to emerging sectors and struggles (which are often very precarious and pre-union), but also in relation to rethinking internal processes (designed until today for an increasingly less hegemonic organisation, based on a territorial

implementation and the constant communication between partners), expanding demands (to include privacy and the right to access data, among others), expanding technical capabilities (creating spaces of virtual relation and defence, and technologies to protect labour rights), developing a labour rights technological agenda (that also establishes limits and standards in technical specifications) and to rethink the social role of trade unions in shaping the political agenda of the digital era.

It is therefore urgent to evaluate the impact of new and old technological processes in all labour sectors and define long-term strategies that allow organised workers to identify and mitigate their negative effects. It is also crucial to **define where the ethical and legal limits of current technological practices in the workplace should be**, by generating specific recommendations that help employers and developers create solutions and technical specifications in line with current labour frameworks, and to create tools so that trade union organisations, as well as society, are better prepared to address the aforementioned challenges.

2. METHODOLOGY

The qualitative methodology of the project has been based on the following data collection techniques:

- **Desk research** to develop both a repository of resources and a state of the art that includes approaches, practices and problems. In addition to publications in scientific journals and articles in general and specialized media, material and studies developed by unions as well as by consultants and governments were analysed.

- **Structured interviews** with experts and, above all, with trade unionists, to verify and complete the information gathered in the desktop research phase. The interviews were combined with the documentary analysis to identify and compare the challenges and practices, in addition to the gaps, common points, conflicts and contradictions that exist within the framework of different experiences. The list of interviewed experts includes:

  i. **Aiha Nguyen:** Aiha Nguyen is a Data & Society's Labour Engagement Lead for the research initiative Social Instabilities in Labour Future.

  ii. **Cathy O'Neil:** Cathy O'Neil is a data scientist, blogger, contributing columnist at Bloomberg, and author of the recent book Weapons of Math Destruction.

  iii. **Christophe Degryse:** Christophe Degryse is Head of the Foresight Unit at the European Trade Union Institute (ETUI).

  iv. **David Autor:** David H. Autor is an American economist and professor of economics at the Massachusetts Institute of Technology (MIT).

  v. **Karen Gregory:** Karen Gregory is a lecturer in digital sociology at the University of Edinburgh specialized in digital labour and exploitation.

vi. **Karolien Lenaerts:** Karolien Lenaerts is a researcher in economy and labour at the Jobs & Skills Unit of the Centre for European Policy Studies.

vii. **Thiébaut Weber:** Thiébaut Weber is a trade unionist and former student activist in France. He was elected as European Trade Union Confederation's Confederal Secretary at the Paris Congress in 2015.

viii. **Werner Eichhorst:** Werner Eichhorst is Honorary Professor at Bremen University, affiliated with the Research Center on Inequality and Social Policy SOCIUM.

ix. **Zachary Kilhoffer:** Zachary Kilhoffer is a Researcher in the Jobs & Skills unit at Centre for European Policy Studies.

3. LABOUR UNIONS AND TECHNOLOGICAL CHANGE: STATE-OF-THE-ART

As part of this state-of-the-art review, we begin by describing historical trends in unionisation and technological development, outlining some of the characteristics of the so-called digital revolution. Then we discuss the key challenges posed by the current wave of technological change for employment, working conditions and industrial relations. These first two dimensions of the study constitute the necessary diagnosis to move forward in more proactive terms.

3.1 LABOUR UNIONS IN TIMES OF TECHNOLOGICAL CHANGE

As Garcia-Olaverri and Huerta (2011) stated in their research for Fundación Alternativas, although the Spanish case is an exception, union membership and collective bargaining coverage have declined since the 1960s. This trend is often attributed to the twin causes of globalisation and technological change. Because unions raise labour costs and reduce employers' flexibility, they are depicted as incompatible with profit maximisation in an information-based, globalised economy.

Regarding the specific impact of technological change on declining unionisation, there are two main lines of thinking identified by Mitukiewicz and Schmitt (2012). According to these authors, the first stems from the notion that technologically enabled productivity growth is historically much faster in manufacturing than in services. Because of this, it is argued that **the share of total employment in manufacturing falls continuously over time, as employment in the services sector rises.** Since unionisation has traditionally tended to be higher in manufacturing, the decline in that sector's share of total employment implies, all else constant, a long-term deterioration in union density.

The second line of thinking identified by Mitukiewicz and Schmitt (2012) emphasizes the idea that **technological change is biased against less skilled workers,** specifically those with non-supervisory roles or no university education.

Acemoglu et al (2000) claim that the root of de-unionisation is skill-biased technical change (SBTC), since it increases the relative competitive-market pay of skilled workers, weakening their incentive to join the unionised sector and undermining the coalition between skilled and unskilled workers that unions ultimately depend on. This notion is revised by David Autor when noting that, since the 1970s, technological developments have tended to undermine employment opportunities for workers in the broad middle of the wage distribution. For Autor et al. (2003), the automation and offshoring of routine middle-skilled tasks is a main driver of job polarisation, leaving the economy with two kinds of non-routine jobs that are difficult to automate or offshore: those based on less skilled, which require a face-to-face relation, 'manual tasks' and others based on more skilled, 'abstract tasks'.

Contrary to these arguments, however, Mitukiewicz and Schmitt (2012) found that, although technological change and globalisation undoubtedly weigh on unions in rich countries, national political traditions established in the period 1946 through 1980 have a strong capacity to predict changes in unionisation rates from 1980 to the present. In a study of 21 developed countries similarly impacted by both globalisation and technological change, **they found a substantial variation in unionisation trends across countries, based on broad difference between national political typologies.** While unions in countries in the social democratic tradition have managed to maintain and even expand collective bargaining coverage, with little or no decline in trade union density, countries in the liberal market tradition have generally seen collective bargaining coverage and trade union density plummet. Finally, countries that identified with a more conservative Christian Democratic tradition have fallen somewhere in between, with small to moderate declines in collective bargaining and somewhat larger declines in union density.

What the authors show is that, **more than technological change or globalisation, the main determinant of the union movement's fate is a place's politics, as reflected by its labour laws, industrial relations practices and political party structures.** This view is further corroborated by historical analyses. Modern trade unions emerged precisely during the first part of the industrial revolution, as an instrument through which to guarantee the dignity of workers in a period of intense technological change. This is made

especially clear by the historian David F. Noble in his groundbreaking study, Forces of Production: A Social History of Automation:

> *...Machines are never themselves the decisive forces of production, only their reflection. At every point, these technological developments are mediated by social power and domination, by irrational fantasies of omnipotence, by legitimating notions of progress, and by the contradictions rooted in the technological projects themselves and the social relations of production.*
>
> **[Noble, 1984].**

When we view it as a social process -and not "an autonomous, transcendent and deterministic force"- technological development suddenly contains a wide range of possibilities, **"a multiplicity of futures"** (Noble, 1984). Ultimately, its outcome is shaped by conflict and struggle, a terrain in which unions must play a critical role to avoid the imposition of the most unfavourable scenarios for workers' interests.

To illustrate this point, Noble describes how a **specific type of automation was favoured in the metallurgical industry,** precisely as a result of the political desire to reduce the power of workers (Noble 1984; Diani 1985). Specifically, he argues that the introduction of numerical control -a top-down style of programming- devalued the work of skilled machinists, granting more power to engineers and managers. This produced a certain polarisation in terms of skills, by substituting the work of the machinists while creating more demand for both high and low-skilled workers. Over time, programming became the template for industrial automation in the twentieth century.

Nevertheless, as Noble points out, this was neither the only option nor the most effective. Record-playback —often described as "programming by doing"— was just as effective as numerical control and would have put programming in the hands of machinists, taking advantage of their intelligence, creativity and judgement, rather than viewing their

input as a multiplier of human error. While both approaches sought to lower dependence on highly skilled workers, the latter lessened the degree of control exercised by engineers and management over workers, and the former increased it. It was the **existing power relations and political decisions made by a variety of actors, which led to one set of interests taking precedence over the other.** In this sense, it has been indicated that the Industrial Revolution had an impact on the workforce that also facilitated its organisation and defence. On the one hand, the industrial revolution negatively affected employment rates and, in its initial phase, the real wage (Thompson, 1966). On the other hand, Fordism and Taylorism, by bringing together large masses of workers in the same space, also favoured the emergence of modern trade unionism, based above all on factory organisation.

As a social process, technological development takes place over time. The economists Chris Freeman and Francisco Louçã (Freeman and Louçã, 2001) and Carlota Pérez (Pérez, 2003) make three claims regarding how it tends to unfold. The first claim is that changes in the methods and tools used in the economy tend to cluster around periodic 'revolutions', rather than following linear and incremental trends. The second is that there is a *time lag* between the initial big bang of innovation provoked by a technological revolution and its full transformation of the socioeconomic structure. The third is that, for a technological revolution to produce valued and shared benefits to society, the *institutional framework* has to significantly change in order to deal with the broad socioeconomic implications of the new forms of economic activity.

While the mid-20th century technological development Noble writes about was largely driven by advances in the energy sector, the so-called digital revolution driving **the current wave of technological change is often traced to the invention of the microprocessor in the early 1970s**. In the Freeman, Louçã and Pérez framework, it is the **fifth technological revolution of capitalism over the last 200 years.** The previous four were the initial Industrial Revolution (circa 1771), the steam and railways revolution (circa 1829), the steel, electricity and heavy engineering revolution (circa 1875), and the oil, automobile and mass production revolution (circa 1908).

Claim / Dependent variable	Main identified causes
Decline in unionisation and power of unions due to the (last) industrial revolution	• More jobs in services than in manufacturing, where unionisation is historically less widespread. • Bias against unskilled workers, who are statistically more likely to be unionised. • Dependence on national relational systems and political scenario (for instance, level of corporatism).

Table 1. Causal relations between unionisation decline and technological disruption

Source: Own elaboration.

3.2 Framing the Digital Revolution

In this section, we will analyse the main dimensions of the digital revolution and their impact on employment and working conditions. Although many researchers group practically all of the technological developments associated with the digital revolution under the concept of "digitalisation", some have used a somewhat narrower definition to isolate the specific effects of the growing centrality of data in the workplace. One example is provided by a Eurofound report, which departs from the framework of technological development established by Freeman and Louçã (2001) and Pérez (2003). From Eurofound's perspective, digitalisation is one of three main vectors of technological change affecting job tasks and occupations, working conditions, employment conditions and industrial relations in the 21st Century:

- **Digitalisation:** The use of sensors and rendering devices to translate (parts of) the physical production process into digital information (and vice versa), and thus take advantage of the greatly enhanced possibilities of processing, storage and communication of digital information.

- **Automation**: The replacement of human labour input by machine input for tasks within production and distribution processes. Although machine automation predates even the Industrial Revolution, today the use of digital technologies allows the algorithmic control of

machinery and, as a result, increases the kinds of tasks that can be automated. Today, digitally enabled machines and advances in artificial intelligence suggest that all kinds of tasks, including more "abstract" labour, can potentially be automated.

- **Platformisation**: The use of digital networks to coordinate economic transactions in an algorithmic way. In this sense, the concept of platformisation used here excludes online spaces that are sometimes considered to be platforms – most notably social networks. Platforms may be used to facilitate both commercial and non-commercial transactions, and their content includes both goods and services. The services exchanged can be further subdivided by two dimensions, namely the types of tasks involved (physical, intellectual or social) and where those tasks are carried out (in the local setting or online).

However, because digitalisation plays such a critical role in rendering specific tasks or even entire occupations automatable, the current wave of advances in automation cannot be understood as separate from even this narrower definition. With this in mind, we present the challenges posed by these two vectors together before moving on to the specific challenges posed by platformisation.

Digitalisation and automation

Degryse (2016) argues that the digitalisation of the economy and the marriage between Big Data and robotisation in particular, will herald a new economy and bring severe disruption to a number of areas. Its specific impact on labour markets can be broken down into four headings: job creation, job change, job destruction and job shift. With respect to the first, Degryse argues that **digitalisation means that new sectors, products and services will be created, and some others will be consequently destroyed.** Meanwhile, the author claims that task change will involve **new forms of worker/machine interaction and the emergence of new digital management, as well as exposure to new risks, including work intensification, various health and safety issues, an increasingly porous boundary between private and working life, training mismatches and new forms of discrimination.** According to the author, employment transformation will affect those employments easily transferred to online platforms.

The interviewed experts stressed the complex character of the transformations boosted by the digitalisation of labour, introducing some definitions about its impact on employment rates:

> *"The keyword in this is 'transformation'; there are different types of estimates of how many jobs will disappear by when -but this is not the crux of the issue- many more will be transformed, to a small or large degree (some tasks will be automated, some aspects of the job digitalised)."*
>
> **[Lenaerts, K. (2018). Phone interview].**

> *"Jobs are often made up of multiple tasks, some of which may actually be at risk. But does this mean that employment as such is threatened? In many cases, jobs can be expected to reorganise around new tasks. That's why it is very difficult to predict the number of jobs lost, created and transformed... To tell the truth, we do not have a crystal ball."*
>
> **(Degryse, C. (2018). Phone interview).**

The precise number of jobs impacted by these changes is the subject of intense scholarly debate. One widely circulated study by Frey and Osborne (2013) estimates that 47% of US employment faces a high risk of automation in the coming years. More recent studies, however, have considerably reduced the number of jobs at risk of automation. For instance, Artnz, Zierhan and Gregory (2016) put this share at 9% in the United States. This figure remains alarming, particularly because those job losses are, as Degryse also claims, unlikely to be distributed equally among the population. In a recent study for the OECD, Nedelkoska and Quintini (2018) claim that job losses on this scale would provoke disruption in local economies several times greater than that caused by the 1950s decline of the car industry in Detroit.

The cause of the divergence between Frey and Osborne's shocking estimates and the lower ones yielded by more recent attempts is the relationship between specific occupations, tasks and skills. The more recent studies mentioned above identify several factors likely to contain or somehow

mitigate the pace of so-called technological unemployment. This relates to the so-called bottlenecks to automation, which refers to tasks or jobs that due to their operational characteristics are difficult to automate with the current technological knowledge. According to the OECD's study, these activities include social intelligence, such as the ability to effectively negotiate complex social relationships, care for others or recognise cultural sensitivities; cognitive intelligence, such as creativity and complex reasoning; and perception and manipulation, such as the ability to carry out physical tasks in an unstructured work environment (Nedelkoska and Quintini, 2018).

The impact of technological change at the individual level of the employee was recently studied by Peng, Wang and Han (2018). Building on the job task framework by Autor et al. (2003), the authors examine how information technologies affect job task inputs, skill requirements, and worker employment. Their findings confirm Nedelkoska and Quintini's claim, showing that **employees who perform routine tasks are more likely to be displaced, while those who perform abstract or service tasks are less likely to be displaced.** Peng et al. also find that information technologies can be both upskilling and deskilling for worker employment. While increased adoption of information technologies demands a higher level of analytical skill and less routine-cognitive and nonroutine-manual skills, they found that routine skills do not help and actually made it harder for workers to get re-employed. Meanwhile, the increased demand for abstract jobs triggers the demand for highly educated workers, and computerisation of routine tasks reduces the demand for middle-skilled workers, yielding a fairly systematic skill polarisation among individual workers.

These findings are further elaborated by Nedelkoska and Quintini's (2018) study on the risk of automation and its interaction with training and the use of skills at work. This rather comprehensive study is notable for several reasons, not least because it refines Frey and Osborne's expert assessment and provides robust findings that account for the role of Machine Learning more precisely. Perhaps more importantly, it examines 32 countries. They find that, **across the 32 countries, nearly half the jobs are likely to be significantly affected by automation, based on the tasks they involve.** However, the degree of risk varies. About 14% of jobs in OECD countries are highly automatable. Another 32% have a risk of between 50% and 70%, pointing to the

possibility of significant change in the way these jobs are carried out as a result of automation, which will drastically change their skill requirements.

Nedelkoska and Quintini (2018) find that the variance in automatability across countries is large. While one-third of all jobs in Slovakia are highly automatable, this is only the case with 6% of jobs in Norway. Broadly, jobs in Anglo-Saxon, Nordic countries and the Netherlands are less automatable than jobs in Eastern European countries, South European countries, Germany, Chile and Japan. Like trends in unionisation, **the impacts of technological change on employment and working conditions are strongly shaped by national-level socio-political and economic factors.** According to the OECD study, variation in automatisation is better explained by the differences in the organisation of job tasks within economic sectors, than by the differences in the sectoral structure of national economies: about 30% is explained by cross-country differences in the structure of economic sectors and 70% is explained by the different occupational mixes employed in each country. Lenaerts outlines these factors:

"Some sectors will see more automation and digitalisation than others: for example, the automotive industry, financial sector, etc. Then it depends on who is working in this sector, what skills they have, and also the composition of companies (research shows that upskilling and reskilling is more difficult for older workers, that less opportunities are offered by SMEs than MNEs, and that especially those who could benefit most from training are the ones who participate least - low-skilled workers are a prime example of that)."

[Lenaerts, K. (2018). Phone interview].

The OECD study also finds that, absent structural changes, **automation is likely to exacerbate inequality,** as it mainly affects jobs in the manufacturing industry and agriculture. Some service sectors, such as postal and courier services, land transport and food services were also found to be highly automatable. The occupations with the highest estimated automatability typically only require basic to low level of education, while the least automatable occupations almost all require professional training and/or a university

education or higher. This finding appears to refute the claim that automation may affect highly skilled occupations. Indeed, the authors emphasize that **Artificial Intelligence puts more low-skilled jobs at risk** than previous waves of technological progress, when technology replaced primarily middle-skilled jobs, creating labour market polarisation. The most notable exception to this trend was the resistance of "low-skill" personal care workers to automation.

In terms of working conditions, a recent Eurofound (2018) study finds that, while it may improve intelligence and information on work processes in ways that reduce accidents and eliminate the need for isolated and repetitive tasks, the **digitalisation of economic processes raises some serious risks to the autonomy and privacy of workers.**

In this framework, another aspect of the impact of technology tackled in the trade union sphere during the last years is the impact of tracking and control technologies on workers. The next phase in the development and implementation of new technologies broadens the challenges that workers must face, by incorporating sensitive personal data (such as biometrics) into the day-to-day work, intensifying tracking during working hours (position GPS tracking and movement, exoskeletons, etc.) and integrating decision automation through algorithms, both in personal selection and dismissal processes. Trade unions have fought so that new technologies do not extend the working day and turn it into something portable. Some progress has also been made in the regulation of both the privacy of employees and their employees' communications in regards to limiting attention to work devices when not working, but overall we could not find any systematic attempts to address these challenges by trade unions, or to establish standards of acceptability of such technologies in the workplace, allowing workers and trade unions to have a voice in the process of adopting technologies that will affect them on a day-to-day basis. Concerning this process, Aiha Nguyen pointed out:

> *"Can we be tracked by an app? Absolutely. Can all work be managed and monitored quite so easily through an app? No"*
>
> **[Nguyen, N. (2018). Phone interview].**

Finally, digitalisation and automation are also likely to have concrete effects on many aspects of employment and its quality, as well as the physical and mental health of workers, as shown in a recent study on domestic workers and employment services, conducted by the European Social Observatory and the European Public Service Union (Peña-Casas et al 2018). This study found that, in the public employment sector, the effects of digitalisation included increases in the workload and pace of work and decreases in the control of the job content, while digitalisation is more recent in the home care sector and is limited to the use of digital tools to organise work and task planning. The impact of digitalisation mainly concerns the organisation and the planning of tasks, more than the content. In terms of physical health, respondents reported vision problems as a result of the intensive use of computers, musculoskeletal disorders such as tendinitis or back problems caused by prolonged immobility, cardiovascular problems linked to an increased risk of obesity and an increase in physical fatigue. In terms of mental health, researchers observed a higher incidence of stress due to increased workloads and changes in the organisation and pace of work, higher exposure to psychosocial pathologies (depression, mental exhaustion or burnout) and increased exposure to digital harassment. However, we have not found labour initiatives related to digitalisation and automation on Health and Safety issues.

Platformisation

One of the major effects of digitalisation is that it makes more complex organisational forms of production possible. As Eurofound (2018) point out, this may facilitate the breakdown and subcontracting of an increasing number of tasks, even in traditional production processes, which in turn **can disrupt union solidarity and result in less favourable conditions of employment for workers in terms of stability, income and working hours.** This is particularly visible in the case of platformisation, which is expanding at an impressive rate. Many innovative services based on technology base their contribution on the elimination of intermediaries and the 'collaboration' between equals. Through platforms and apps, these new services reduce costs by facilitating the exchange between actors (peer to peer, collaborative economy,…) and the mobilisation as assets of resources that until now did not fulfil that function (the case of cars in Uber and houses on Airbnb, to mention just a couple of examples). By June 2015,

17 companies operating in the platform economy were valued at over $1 billion (Owyang and Samuel, 2015; VB Profiles and Crowd Companies, 2015), 12 of which were based in the US, one in India (Olacabs), one in China (Kuaidi Dache), one in Australia (Freelancer), one in New Zealand (Trademe) and one in the UK (TransferWise). Just over five years into its existence, Uber had surpassed General Motors and Ford Motor Company in value (Chen 2015).

These business models based on the creation of platforms (spaces of relationship that do not contribute assets but mobilize assets from others) have already started some time ago to incorporate capital in the form of workforce into their business model. Thus, currently dozens of platforms (UpWork, Freelancer, Fiverr, etc.) offer the possibility of hiring hours of workers from anywhere in the world; workers who must compete with others to get contracts and whose framework of labour relations or jurisdiction are not clear. Amazon has been in charge of taking this model to the extreme by uniting the platform model with digital Taylorism in the creation of Mechanical Turk (MTurk), a marketplace for routine tasks that require 'human intelligence' that allows companies access to cheap and relocated workforce that makes a living via a keyboard -the so-called clickworkers. Other platforms, seeking business models in which the territory and proximity provide value, have applied the same logic for the local distribution of goods, mobilising in this case the physical strength of delivery drivers.

Drahokoupil and Piasna (2017) argue that work on platforms is part of a wider trend towards the increasing **fragmentation of work.** It takes different forms, ranging from short spells of employment with the same employer to moving between different work arrangements to juggling multiple jobs at the same time. The authors claim that, in all its forms, platform work signals **increasing job instability and is often fuelled by insufficient income from one job to cover the cost of living.** In their view, the key transformative market-making potential of platforms resides in its facilitation of the reorganisation of activities that traditionally offered opportunities for employment into self-employment. However, while platforms may have a transformative and potentially severe impact on the employment relationship in the future, Drahokoupil and Fabo (2016) argue that, so far, this impact has been varied and very limited. According to a 2016 Eurobarometer on the use of collaborative platforms, over one-third of the respondents who had

visited collaborative platforms said that they had provided services on them (32%). Nearly one in ten had provided services on these platforms once (9%), while almost one in five had offered services once every few months (18%). Finally, just one in twenty had regularly offered services via these platforms (5%).

Regarding some of the specific characteristics of workers in the platform economy, these were generally found to be **younger than average** (Berg 2016; Eurofound 2015; Huws et al. 2016; Ipeirotis 2010), though there is evidence of older and retired workers participating as well (Barnes et al. 2015). The gender distribution among workers in the platform economy is relatively even, though **men were somewhat more likely to do this type of work most often** (Berg 2016; Huws et al. 2016; Ipeirotis 2010). Research also suggests that those who participate in online work in the platform economy are far more likely than average to hold a degree-level qualification (Berg 2016; Eurofound 2015; Ipeirotis 2010). Once offline work is included, however, educational attainment levels are considerably closer to those of the general population (Huws et al. 2016).

Though one study (EU-OSHA, 2015) found evidence that some online platform work transferred transactions otherwise conducted in the informal economy to the formal sector, a major issue with platformisation has to do with **the regulation of their activities.** In the author's view, this is due to the dynamics of the sector, the apparent rule-avoiding behaviour of many online platforms, and the perception – encouraged by some of the online platforms – that, because their activities represent an entirely new business model resulting from rapid technological change, they should not be treated in the same way as any existing economic activities. Following Degryse, the establishment of clear legal definitions and frameworks for platform jobs is therefore crucial:

"There is of course also the whole question of clarification of the status of platform workers. How to get UBER drivers and DELIVEROO bikers into the existing legal status, in order to allow them to benefit from the social rights attached to them"

[Degryse, C. (2018). Phone interview].

Perhaps unsurprisingly, this lack of regulation leads workers to describe some of the problems often associated with information work. In a study for the European Parliament consisting of 1200 platform workers from across four platforms (Amazon Mechanical Turk, Clickworker, Crowdflower and Microworkers), **job and income security were seen to be key problems for those working in the platform economy, in addition to underemployment** (Forde et al. 2017). Workers in some countries fell in the grey area **between worker status and self-employment,** meaning they had none of the benefits of self-employment, in terms of control, and all the problems of income insecurity. In this study, average working hours across the platforms stood at 23 hours per week, with the median hourly pay six US dollars. Pay levels across the platforms were significantly lower than national minimum wage rates across European countries and the U.S., ranging from a 54.1% gap in France to 3.4% in the United States. Finally, up to 70 per cent of workers in the platform economy reported that they could not access basic schemes like pregnancy, childcare and housing benefits.

Lack of regulation also has direct and serious consequences for workers. A widely discussed paper by the European Agency for Safety and Health at Work (EU-OSHA 2015) identifies some of the health and safety risks related to platform work. Physical risks include **musculoskeletal problems, repetitive strain, work-related stress, visual strain and headaches**, among others. Meanwhile, physical health risks associated with offline work can be particularly hazardous, and are exacerbated by lack of training, lack of certification and lack of knowledge regarding relevant regulations among clients and/or workers. Moreover, lack of clarity in work specification, lack of proper safety equipment and clothing, exhaustion caused by long working hours, and generally exposure to risks that would not be accepted in a workplace environment, have been identified. Finally, a wide range of psychosocial risks arise from working conditions that include: extreme precariousness; the critical role played by employer and client ratings; the short notice inherent to the just-in-time "on-demand" model of the work; the interpenetration of work and non-work activities; the excessive intensity resulting from tight deadlines and low piece rates for micro-tasks, or fixed-fee jobs that encourage an excessively rapid pace of work among offline workers; among workers who must tag offensive content, an excessive psychological toll; in domestic or personal care work, excessive emotional toil; externalisation of insurance to

the crowdworker; lack of individual or collective voice; and development of anti-social and health-damaging habits as a result of isolation.

In addition to these risk factors, OSHA also identifies a number of **unresolved health-affecting issues** that include the status of online work exchanges, a lack of clarity regarding who the employer is, questions regarding insurance and legal liability, applicability of EU Directives and national labour regulations, consumer protection and public safety, and accreditation of qualifications and professional responsibility.

Addressing the above issues, Degryse summarises the multiple ways in which the digital revolution affects workers' rights and working conditions:

> *"with regard to robotisation and automation, the questions will focus on the qualifications of the workers, the support of these in the transformation of their jobs, but also the questions of health and safety, interface between machines and humans, the risk of intensification of work as well as increased managerial supervision, via all the new digital tools available (RFID chip, digital camera, GPS, etc.)."*
>
> **[Degryse, C. (2018). Phone interview].**

In line with this, a recent Eurofound (2018) report groups most of the above-explained implications of the digital revolution for work and employment in four axes:

- **Tasks and occupations:** The distribution of tasks in the economy and the occupational structure that are directly and continuously changing as a result of technological advances (every new technology involves some new way of carrying out a particular process, and therefore a change in the associated tasks).
- **Working conditions:** The physical, psychological and environmental requirements and conditions of work (also directly affected by the technology used).

- **Industrial relations:** The relatively institutionalised ways, in which workers and employers organise their relations and settle their disputes, the effect of technological change on this domain is also indirect (affecting the three previous aspects in the areas of interests, power and organisational capacity of workers and employers).

- **Employment conditions:** The contractual and social conditions of the work, including issues such as stability, opportunities for development and pay (these mostly depend on the institutional framework and labour regulation, with the effect of technology being more indirect).

The table below summarising this section considers these different dimensions.

Socio-technological scenario	Dimensions	Main outcomes and related effects
Digital revolution, based on digitalisation, automation and platformisation of labour, is changing working conditions and relations	Digitalisation and automation	**Job creation, task change and employment transformation** • Likely to exacerbate inequality • Uncertainty around autonomy and privacy of workers • Training mismatches • Personal/professional life balance • New forms of worker/machine interaction • New digital management • Reduction of the accidents and Isolated and repetitive tasks **Job destruction** • Differential impact of automation on skilled and unskilled workers. Minor impact on very specific activities (bottlenecks to automation) • Differential impact of automation on employees that perform routine tasks, who are more likely to be displaced • Variance in automatability across countries is large (depending on their socioeconomic structure)
	Platformisation	**New or transformed jobs** • More breakdown and subcontracting of tasks • Low income • Fragmentation of work • Less favourable conditions of employment for workers in terms of stability, income and working hours • Physical and psychological negative effects have also been assessed (including musculoskeletal problems, repetitive strain, work-related stress, visual strain and headaches, or stress) • Possible disruption of union solidarity **Workers** • More young workers • More men than women • Online work: more likely than average to hold a degree-level qualification. For Offline work it is closer to those of the general population **Limited regulation and social impact** • Ability to reveal the black economy • Underemployment • Lack of health coverage/insurance for workers

Table 2. Digital revolution: dimensions and possible effects on labour relations

Source: Own elaboration

3.3 THE FUTURE OF WORK'S INSTITUTIONAL APPROACHES

As above mentioned, the digital revolution poses major and new challenges for trade unions. Citing a strategic document by Berenberg and the Hamburg Institute of International Economics, Walwei (2016) identifies three scenarios in his report for the International Labour Organization. The first is the optimistic scenario of a "land of milk and honey", where machines will ensure the continuous well-being of people in the long run. The second is the more pessimistic scenario of a "20/80-society", where a minority of the population generates high income and owns most of the capital, while the bottom 80% toils for subsistence. The third scenario describes a fundamental structural change in labour demand, affecting industries, occupations and tasks.

While it may be tempting to view the digital revolution as a threat to the rights of workers, it is worth remembering that the social forces that dispute its implementation have always determined technological change. As key players in this process, **unions have a critical role in not only confronting the challenges described above but also in exploiting the opportunities technological change offers.** These include: enabling access to work for people who would otherwise be excluded; enabling consumers to access affordable services on a just-in-time basis; providing flexibility to combine work and private life; enabling low-cost entry into the market for new enterprises or firms to try out new products and services; enabling social innovation, enabling creativity, self-expression and the generation of new cultural products and services; and helping to consolidate a European digital single market (OSHA, 2015).

In this context, we first need to consider some of the theoretical analysis related to the above-identified problems from a policy and worker organising perspective. Though his study focuses primarily on the German case, Joaquim Möller (2015) of the German Institute for Employment Research (IAB) provides a compelling framework for understanding the challenge at the European level. Möller describes the need for **a good "operating system" containing infrastructure, education, and legal security as well as data security and flexible employment.** As he points out, in order to achieve this, a secure and humane working environment, employee participation, creative leeway and social partnership will be crucial (Möller 2015). Walwei (2016) expands on this idea,

highlighting the strong role of vocational training, a strong focus on social security, advanced labour market programmes, and the **comprehensive social partnership between employer organisations and trade unions.** More concretely, he identifies four main areas of concern, including **skill adjustment, labour market regulations, social programmes and social dialogue.**

With regard to re-skilling, Peña Casas et al. (2018) recommend that the European Union and its Member States expand the availability of digital skills through the education and training system to lifelong learning, providing broader skillsets and including competencies that are growing in importance because of technological development. For even if the labour market impact of the digital revolution is closer to the lower estimates than the higher ones, the need to ensure that all citizens have the ability to adapt to changing technologies and make the most of technological progress will increase.

In this sense, Peña Casas et al. argue that EU Member States should promote access to learning and training (including e-learning and e-training, but not exclusively) and provide more opportunities to upskill staff and expand their capabilities in order to overcome the digital divide (notably for older workers) and develop new competencies linked to the changing nature of jobs. Drawing on the German case, Walwei (2016) points to skills adjustment and development as a way to tackle skill shortages and unemployment persistence at the same time. In his report for the ILO, he recommends apprenticeship systems as a valuable asset and an appropriate starting point for large parts of the workforce. However, as he points out, recent research on technological change suggests that adaptations of German vocational training would not be sufficient, since the gains from vocational training related to youth employment can under certain circumstances be offset by less adaptability and diminished employment later in life (Hanushek et al., 2016). In this sense, fast-growing digital technologies require a **"lifelong learning" approach** to investment, with an emphasis on the development of ICT skills on the one hand and creative and social skills on the other.

With respect to the **regulatory framework,** Drahokoupil and Fabo (2016) point out that, because platforms are generally embedded in specific locations, they are within reach of existing regulatory tools. With Peña Casas et al., they

consider it essential to be aware of the various impacts and outcomes of digitalisation in terms of health and work-life balance, to promote decent working conditions and sustainable quality employment. To this end, **regulations must be improved and developed as safeguards against the potential negative outcomes of the digital revolution.** This was particularly underlined by David Autor:

> *"The way labour unions can be more effective at this point is through legislation rather than through collective bargaining with employers, at least in the United States. This means focusing on standards and requirements, health care, minimum benefits, paid leave and sick leave, etc, which also avoids putting one employer at a competitive disadvantage relative to another"*
>
> **[Autor, D. (2018). Phone interview]**

More specifically, Drahokoupil and Fabo highlight the European Commission's clarification of the definition of 'worker' in its communication on the "collaborative economy", specifying that it can also apply to platform workers. The authors recommend a regulatory response that goes beyond this and addresses specific risks related to platform-mediated work. In the same line, Autor adds:

> *"What concerns me is that we have a bifurcation between direct hire employment and everything else. The law is really built around protections for direct hire employment, and very little for self-employment. And I'm concerned about people saving for retirement, about access to health care and so on. And I think a more effective way to do that is to improve the design of employment law and employment institutions."*
>
> **[Autor, D. (2018). Phone interview]**

For his part, Walwei points out that a key concern is **the social protection of self-employed workers.** He points out that, although the German legislation already offers an option for self-employed workers to insure themselves against unemployment, the number of insured self-employed recently decreased, increasing the risk of self-employed workers being forced out of business to become immediately dependent on social transfers (Jahn and Springer, 2013). Walwei claims that the present focus of German social security on dependent employment is not only a problem for unemployment insurance but also with regard to retirement insurance, and additional incentives to enter the retirement insurance system must be examined in the coming years as a result.

With respect to labour market programmes, Walwei (2016) emphasises the challenge of adjusting to new developments caused by the dynamics and reallocation of jobs and labour accelerated by the digital revolution. To this end, labour market policy must play a preventive role by facilitating lifelong employability. This would involve **more continuous professional counselling and fostering transitions from less stable forms of employment to more secure forms.** The strong tendency towards self-employment induced by digitalisation must also be addressed by different means, such as the development of professional support infrastructures.

In this framework, Peña Casas et al. recommend that the European Union and its Member States should not only **strengthen existing data protection and labour rights, but also promote new ones,** such as the above described right to disconnect.

Perhaps the most crucial of the above four areas of concern is **social dialogue,** as it is the space where the other three will be decided and where labour unions have a crucial role to play. The ILO (1999) defines social dialogue as consisting of all types of negotiation, consultation or information exchange between or among representatives of governments, employers and workers, on issues of common interest relating to economic and social policy. While the variety and intensity of this process are captured by Ishikawa's typology and triangle of social dialogue (Figures 1 and 2), its functioning is depicted in the Cycle of Social Dialogue model (Figure 2) by Kilhoffer et al (2017).

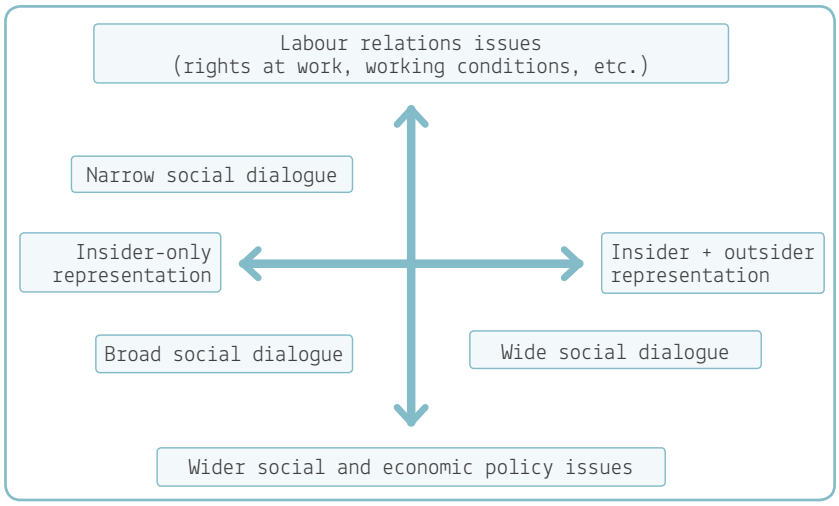

Figure 1. Typology of Social Dialogue

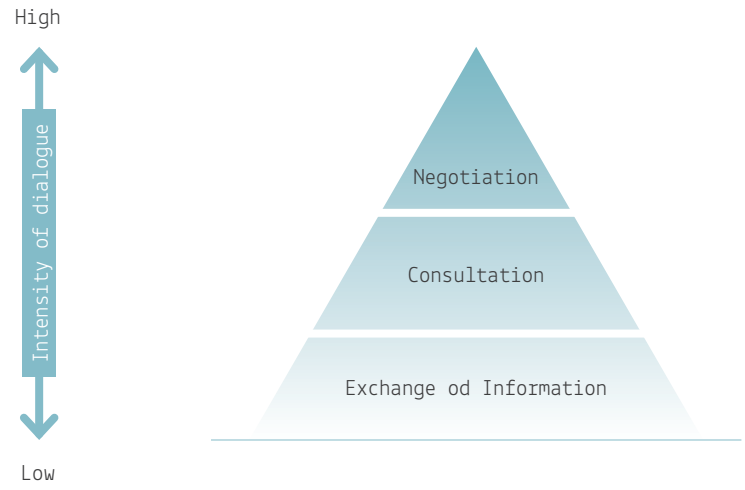

Figure 2. Triangle of Social Dialogue
Source: Ishikawa 2003 Fuente: Ishikawa 2003

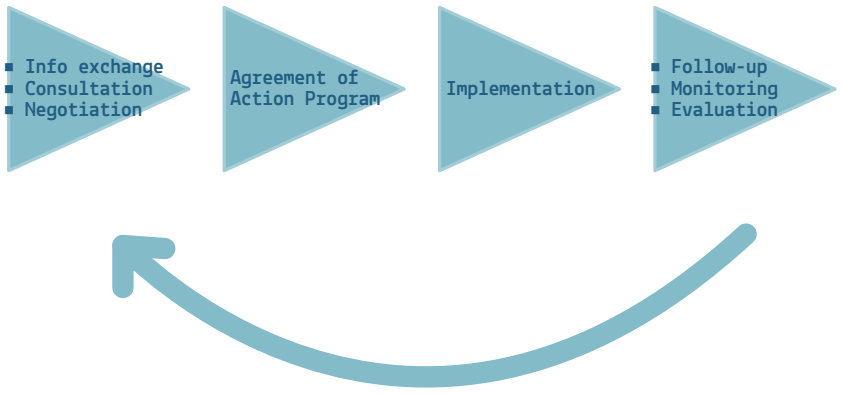

Figure 3. Cycle of Social Dialogue
Source: Kilhoffer, Lenaerts & Beblavy 2017

In a comprehensive research paper on industrial relations in the platform economy, Kilhoffer, Lenaerts & Beblavy (2017) of the Centre for European Policy Studies argue that, **unfortunately, no framework exists to govern social dialogue between the different parties involved in the platform economy.** From their point of view, the current framework described above does not fit well in the context of the platform economy, due to the differences between the profiles of the workers operating in it and also because of the difference between business models and different employers. They join other industrial relations scholars (Kaufman 2008; Bamber et al. 2004; Budd 2004; Edwards 1995, 2003; and Hills 1995), in advocating a broadening of the field of industrial relations and social dialogue. In Kilhoffer et al.'s view, accommodating both union and non-union workers would bring industrial relations closer to its original focus on the employment relationship and all forms of labour problems, as opposed to the narrower modern focus on labour-management relations. Given the scale of the challenges posed by the digital revolution, this would necessarily involve **expanding the notion of social dialogue to fit the broadest conception in Ishikawa's typology, incorporating the voices of so-called "outsiders" as well as worker organisations, employer organisations and governments.**

The content of this dialogue, as mentioned earlier, must include skills adjustments, labour market programmes and labour market regulation. Nedelkoska and Quintini's (2018) analysis of German data suggests that training is used to move to jobs at lower risk of automation. They point out, however, that these transitions tend to be gradual, as workers tend to re-qualify to occupations that are closely related to their previous training. There is an ongoing debate about social programs that provide subsidies to people during periods of professional retraining or even a basic income that guarantees a vital minimum to everyone so that they can make their personal and/or professional decisions with more freedom. A debate that often sharpens with the introduction of the financing variable, taking us to the field of taxation, with proposals - with clear detractors and supporters - ranging from the implementation of a tax on robots -which seriously depreciates jobs via technologies- to the fight against fiscal dumping.

It is important to bear in mind that **national-level responses to the challenges posed by technological change can only go so far.** The global scale of the challenges posed

by the digital revolution must be taken into account when addressing re-skilling, social programmes and labour market regulation. As Peña Casas et al. (2018) point out, the impact of the digital revolution should be part of national, regional, local and European levels of governance, in a multi-faceted perspective that is not only focused on economic growth or productivity gains. In this sense, they argue that the European Union and its Member States should not just consider **digitalisation as a management and production tool, but also as a tool for the protection of individuals and workers.**

The following table summarises these forms of approaching the different challenges posed by the scenario defined in this report.

ACTIONS		DEFINITION	MAIN EXPECTED EFFECTS
SOCIAL DIALOGUE (Incorporating the voices of so-called "outsiders" as well as worker organisations, employer organisations and governments).	**Skill adjustment**	A "life-long learning" approach, with an emphasis on the development of ICT skills on the one hand and creative and social skills on the other	• Reduce/anticipate "technological unemployment" • Improve working conditions
	Labour market regulations	Regulations must focus on labour relations and protection norms for workers.	• Protect workers' integrity and labour rights • Guarantee remuneration standards • Improve working conditions
	Labour market programmes	Unemployment compensation, Salary guarantee and/or basic income programmes	• Mitigating the effects of competition mismatch in the labour market

Table 3. Summary of proposals for addressing the current scenario
Source: Own elaboration

4. LABOUR UNIONS AND TECHNOLOGICAL CHANGE: BEST PRACTICES

Building a **new operating system for the future of workers** is no small task, but it is one that unions must lead. Though technology is often depicted as intrinsically threatening to the well-being of workers and the effectiveness of union organising, historically this has not been the case. As our state-of-the-art review shows, periods of large-scale technological change have often been accompanied by innovative forms of worker organisation to protect and expand rights, demand better compensation and improve working conditions. As a result, many of the tactics, strategies and methods in union toolkits today were developed precisely to address the impact of technological change.

For this reason, it is important to underscore the importance of unions in this new phase of the industrial revolution. Nevertheless, as new technologies give way to new forms of work and employment, **workers themselves are finding new ways to connect and demand fair conditions.** In the following sections, we describe some best practices revolving around three major dimensions. Firstly, good practices carried out in organisational terms. This includes those that emphasise expanding the base of social dialogue and taking advantage of the potential that new technologies offer to apply new tools and digital strategies to the service of the exchange of information between equals and the accumulation of intersectoral forces in the interests of a better collective negotiation. Secondly, at a regulatory level, the participation of workers on the design of policies which aim to address the changes arising from the digital transformation of the labour market and new training initiatives that, co-produced by representatives of workers and public and/or private actors, agree on the need to address the competence gap with lifelong learning strategies. Thirdly, we develop two public agendas and workers strategies, including upskilling, and new digital tools and strategies for collective bargaining (new strategic tools). The resulting fields of action address the main challenges considered by the literature summarised in the previous section, namely broader social dialogue, the need of skill adjustment, market

regulations and public programs. As we will show, union innovation to foster a new and better future for workers will be less about reinventing the wheel than adapting or expanding their repertoires to new territories.

4.1 BROADER SOCIAL DIALOGUE, BETTER COLLECTIVE BARGAINING

Freedom of association and the effective recognition of the **right to collective bargaining** are the first of four fundamental principles and rights at work that the ILO's conventions require signatory states to uphold. As an enabling right, it is effectively the worker demand that contains all other worker demands, thus providing a foundation for social progress and social justice. Protecting and exercising it effectively is at the heart of guaranteeing a decent future for workers. Along these lines, Thiébaut Wéber considers:

> *"The main factor affecting the success or failure of an organising strategy is the people themselves and the collective bargaining frameworks of the countries they're in."*
>
> **[Weber, T. (2018). Phone interview].**

Concerns over the effects of technological change on workers' rights and inequality have sparked widespread public debate. A new and vital social dialogue is taking shape, in which union actions can expect greater visibility and relevance. For instance, news of the **strikes by Amazon warehouse workers** in Germany, Italy, Spain and the UK, or the more localised protests by **Deliveroo riders or taxi drivers against Uber and Cabify** made headlines all over the world. Though the long-term effectiveness of these mobilisations in achieving their demands remains to be seen, some of their demands are already being met. In May 2018, Amazon announced that, for the first time, it had reached a deal with unions. This took place in Italy, where the tech giant and the FILCAMS CGIL union negotiated an agreement endorsed by 70% of the employees who voted on it. Then in May 2019, an international strike of Uber drivers protesting the company's listing on the stock exchange gave visibility to the negative labour and social implications of Uber's business model and played a key role in the 7.9% drop in its securities on the first day of its stock market launch.

In addition to these sectors, there has been a rise in demand for unions in other fields heavily affected by technological change. Over the last few years, several major digital news outlets (Vice Media, ThinkProgress and Huffington Post) have signed collective agreements with their writers, while Slate, Salon, MTV News, Fast Company and Vox have negotiated contracts with the Writers Guild of America East. These contracts establish minimum salary and future pay increases, set agreed payment for derivative republication of writers' work and limited the power of management to fire employees.

These advances notwithstanding, the organisational scale and complexity favoured by technological change continues to be a great challenge for the articulation of a broad and inclusive social dialogue for collective bargaining. But workers are responding with innovative strategies and new coalitions. On November 1, 2018, thousands of Google workers walked out of the company's offices all over the world in protest at claims of sexual harassment, gender inequality and systemic racism. The catalyst was a series of allegations of sexual misconduct by senior executives, which organisers claimed were just the tip of the iceberg of similar cases throughout the company. The protest began in Tokyo and spread to Singapore, Haifa, Berlin, Zurich, London, Dublin and New York. Among others, workers demanded an end to forced arbitration in cases of harassment and discrimination, a commitment to ending pay and opportunity inequality, greater transparency about sexual harassment, a more inclusive process for reporting sexual misconduct safely and anonymously, and more and better employee representation. Within just a few days, they achieved several of these demands, most notably those regarding sexual harassment.

The story of the Temporary Workers of America, a union of bug testers for Microsoft, could have had a similar ending. This 38-person union successfully organized in 2014, winning the right to negotiate with cloud services contractor Lionbridge, which provided subcontracted marketing, testing, and language services for the tech giant. Their demands were quite simple, mainly revolving around paid leave, yet they did not achieve them. Within a few years, Lionbridge had eliminated all of their jobs. According to the workers, a union-busting complaint they filed against Microsoft in December 2016 with the National Labor Relations Board dragged on too long. As a result, they agreed to settle in order to get some financial relief. Union head Philippe

Boucher then turned to organising tech workers at other companies and local clergy to engage Microsoft shareholders, but he has found little success so far.

While there are certainly many factors at play, two stand out immediately. First, the Google protesters' demands regarding sexual harassment took place within a broader, global social dialogue sparked by the #MeToo movement and massive mobilisations by women all over the world, which had dramatic implications for their rights as workers. This social dialogue substantially raised the costs of the tech giant being associated with cases of sexual misconduct, and perhaps explain why the demands related to this issue were so quickly addressed while those related to wage inequalities and worker representation are being met with more resistance from the company.

Second, while both mobilisations targeted the tech giants specifically, the actions and demands of the Google walkouts **were organised by temps, vendors and contractors in coalition with workers directly employed by Google.** In contrast, the Temporary Workers of America were largely ignored by Microsoft's employees, and the company drew out and distanced themselves from the conflict by placing responsibility on the temp agency Lionbridge. While the organisational complexity enabled by subcontracting and other forms of externalisation associated with technological change was able to weaken attempts at collective bargaining by workers in one agency, **organising across all sectors and forms of employment used by the tech giant yielded better results.**

As part of a general shift towards a more balanced model of labour relations, Wéber considers that platforms will have to assume further responsibility:

"Platforms need to recognise their responsibility. And I agree that these should not necessarily be the basic employer's responsibility, because sometimes the situation really is one of freelancers working on platforms. But they should have a responsibility, and not only saying that they offer some social protection to attract the best. People working with these platforms should be able to negotiate the share what platforms take from their activity or for fair working conditions."

[Weber, T. (2018). Phone interview].

In the past three years, unions have organised thousands of blue-collar contract workers on Silicon Valley campuses, from shuttle drivers at Apple, Tesla, Twitter, LinkedIn, eBay, Salesforce.com, Yahoo!, Cisco, and Facebook to security guards at Adobe, IBM, Cisco, and Facebook or cafeteria workers at Cisco, Intel, and Facebook. White-collar workers are also organising and achieving important victories, as evidenced by the engineers at Lanetix, a San Francisco-based transport and logistics company, who used Slack to organise around their right to unionise and gained the support of the US National Labour Relations Board in August 2018. With support from organisations like Working Partnership USA and the Tech Workers' Coalition, and campaigns like Silicon Valley Rising – which brings together a coalition of unions and civil rights, community, and clerical groups – are addressing important labour demands related to labour rights within technological platforms from a broad-based approach to confrontation and collective bargaining is increasingly engaging large tech firms directly and making them responsible for the wellbeing of all their workers.

4.2 NEW TOOLS FOR ORGANIZING, NEW WORKERS TO ORGANISE

Much has been made about the impact automation, digitalisation and platformisation Owill have on employment and working conditions. But these technological changes are not just connecting firms with workers and consumers in previously untapped sectors of the economy. **They are also connecting workers with one another, and with unions.** Reflecting on a Data & Society study on domestic workers, journalist Michelle Chen of *The Nation* writes, "Whether networked job markets have the effect of alienating workers from one another or unifying them in a shared struggle for equity depends on whether workers can harness technological innovations to build their own power, on and offline." In this regard, Leanerts indicates that unions must ensure a dynamic communication with workers, providing a wide set of information and support, to both the public at large and their members:

"Even if workers are no longer joining unions, they will need someone to stand up for their individual and collective rights. Trade Unions, and social partners in general, play an important role in policymaking in the EU (see European Pillar of Social Rights). As new forms of work and work relationships are starting to change, the discussion will also shift to issue relating to access to social protection, health and safety, and so on."

[Lenaerts, K. (2018). Phone interview].

Indeed, **many of the digital tools that allow platforms to connect with workers serve as an impetus for workers to organise around collective grievances.** Turkopticon, MTurk Crowd, TurkerNation and TurkerHub are well-known fora organised by Amazon Mechanical Turk workers to organise and share relevant information. Meanwhile, the *Transformative Technologies for Migrant Workers* project identifies several trends in digital tools that allow migrant workers to engage with each other and demand just treatment. These include platforms that enable them to rate and review recruiters, employers and other intermediaries (Contratados, HospoVoice, GoldenDreams, Pantau PJTKI, Recruitment Advisor); tools that provide access to legal services (DOL Timesheet App, HourVoice, Impowerus, Jornaler@, Migrants Rights Violation Reporting System, Outflank, My Labor Matters); platforms that provide them with responsive and tailored information (Just Good Work, Shuvayatra); and tools promoting peer-to-peer connection and collective organising (Coworker.org, OFW Watch, WorkIt). **With these tools, worker organisations have helped migrant workers share their experiences and strategies and take collective action for better working conditions.** Meanwhile, worker advocates have developed digital platforms to transform the power and information asymmetries that underpin exploitation, allowing migrant workers to access the information necessary to assert their rights. In turn, governments and civil society organisations have sought technological solutions to overcome the barriers facing migrant workers who wish to register complaints and pursue redress.

Another ambitious example of how technology can change the strategies of worker organisation is **The Workers Lab in the US,** a so-called "accelerator" backed by the Service Employees International Union (SEIU), which funds, mentors and initiates projects with the goal of supporting a new, worker-oriented economy based on cooperatives, social enterprises and worker participation. Taking some cues from Silicon Valley's notion of disruption and Google's famous **design sprints**[1], they've supported projects such as the California Harvesters (a labour trust representing 800 workers that negotiates with employers as a cooperative) or The Hood Incubator (an organisation focused on building businesses in poor communities focused on the legal cannabis industry).

But are new digital tools enough to combat exploitation and advance workers' rights in the economy currently being shaped by technological change? The aforementioned Data & Society study, *Beyond Disruption,* shows how, although platform workers in the domestic sector use online fora to socialise and solve problems, these are generally inadequate for workers seeking to organise and petition for changes. The authors found that one-sided ratings and ineffective policies required workers to handle "unfair, prejudiced, or vindictive actions" by clients themselves, or led to them ignoring small disputes and absorbing risks because of the amount of (unpaid) time and effort it would take to address them. Moreover, workers were often uncertain of the risks of not completing a job, causing them to put themselves in harm's way so as not to be penalised by receiving a lower rating and being less likely to procure future work. Unions are needed and well-positioned to strengthen these struggles considerably. Doing so would have the added benefit of boosting union recruiting efforts, particularly in the unregulated (or informalised) labour markets opened up through digitalisation.

There are **several examples of how an approach that emphasises cooperation between unions and platform workers can promote and fortify collective bargaining, advance workers' rights and help regulate informalised work.** One such case is the struggle over the Danish online platform Hilfr.dk, which provides cleaning services in private homes for around 1,700 customers across the country. As of August 2018, over 400 workers who were once considered freelancers are now considered employees, enjoying significant guarantees under a new collective agreement. They will automatically receive

1. Design Sprints is a method developed to solve problems, test business ideas and improve projects in just 5 days, in an effective way, using Design Thinking methodologies.

Hilfr pension contributions, holiday pay and sickness benefits, and considerably higher collectively agreed wages (a minimum of €19 per hour, a 22% increase). Moreover, if after 100 hours a Hilfr worker wishes to remain self-employed, they will have to make a request to do so.

Thorkild Holmboe-Hay authored the one-year agreement and Tina Møller Madsen, both of the United Federation of Danish Workers (3F), the largest trade union in Denmark, led negotiations with about 278,000 Danish members and over 48,000 members from other countries working in Denmark. Though it currently only covers workers for one company, the Confederation of Danish Industry hopes it leads to a collective agreement covering other existing digital companies in the domestic work sector.

The Hilfr case is just one example of how critical it is to bring unions closer to tech and platform workers in order to guarantee the rights and dignity of all workers, as well as the strength and vitality of existing workers' organisations. As described in the previous section, recent years have seen platform organizing by janitors, riders and cleaners, among many other occupations, and they've often used innovative tactics to do so. For instance, Las Kellys, a Spanish association of hotel cleaners, confronted Tripadvisor about the employment practices in the hotels they promote by asking them to carry a seal they developed to highlight quality employment conditions. However, this often-informal style of organising has occasionally been viewed by unions with frustration or suspicion, as competition with unionised workers. The recent victory by drivers working for Uber, Lyft and other ride-hailing apps in Seattle, who successfully defended their right to organize, suggests it could be viewed instead as rising demand for unionisation and collective bargaining.

In an interview for Forbes, labour researcher Ilaria Armalori of the University of Bergamo highlights several more successful cases of unions reaching out to non-unionised workers. These include the virtual space *Faircrowdwork*, developed by the German trade union IG Metal, where freelance and platform workers share views and organize themselves. Another example is the UK Broadcasting, Entertainment, Cinematograph and Theatre Union (BECTU), which represents both employees and freelance workers in the sector and has signed an agreement with an employers' organisation, the Producers' Alliance for Cinema and Television (PACT), to

regulate labour relations in the U.K. film-making industry. Finally, in the US, the Freelancers Union has recently signed an agreement with Uber to advise the company on how to create portable benefits for its drivers.

Through **protests, strikes, litigation and effective communication, these kinds of mobilisations have been so successful that new startups are taking note.** According to *Fast Company*, cleaning and home assistance startups such as Hello Alfred, MyClean and others are opting to hire employees instead of contractors. Across the board, this approach rewards the higher investment in labour costs with higher employee retention, better training and information sharing, improved processes and consistency, more trust with customers and higher levels of customer satisfaction overall.

In conclusion, and in the context of the examples, if the main objective in order to guarantee an effective collective struggle for labour rights in an increasingly fragmented labour market must be the definition of intersectoral strategies and the mediatisation of conflicts in order to broaden the basis of social dialogue and with it a greater accumulation of forces, the incorporation of new technologies into workers' self-organisation is unavoidable. In this sense, it seems more necessary than ever to be present in the platforms that connect workers with each other, add value to them and promote new spaces where the possibilities of new technologies are used to serve the interests of working people.

4.3 WORKER PARTICIPATION IN POLICY DESIGN

While workplace organising is critical to securing a better future for workers, the scale and speed of technological change demand profound changes at multiple levels, from individual firms to local, regional and national governments to supranational institutions. Especially in their most disruptive phases, the processes of automation, digitalisation and platformisation will require adaptation to complex new realities and a strengthening of social protection. **Worker participation in policy design is necessary in order to avoid the most pessimistic and unequal future scenarios and improve working lives.**

Some promising steps are already being taken. In November 2015, the German Ministry of Labour and Social Affairs introduced the concept of Work 4.0 *(Arbeit 4.0)* to describe new prospects and opportunities for shaping developments in future workplaces. In addition to identifying trends, areas for individual action and a vision for the social dialogue through which it would take shape, Work 4.0 identifies the concrete institutions of a renewed social state. These include labour law, free collective bargaining, staff representation, occupational health and safety and self-governing social insurance systems. Specifically, the latter would entail the promotion of employment through efforts to increase individual employability and improve the employment structure via vocational education and training, along with unemployment insurance and basic income support for jobseekers. Moreover, the report suggests a shift from the current statutory pension system, which primarily covers people in dependent employment, towards a comprehensive pension insurance scheme that includes all gainfully employed workers, including the self-employed.

Since the publication of the "green paper" that introduced the notion, Work 4.0 has been taken up in several other countries within the European Union. Its influence can also be appreciated in the European Pillar of Social Rights proclaimed by the European Parliament, the European Council and the European Commission on 17 November 2017. This document claims to deliver new and more effective rights for citizens by building upon 20 key principles, structured around three categories as follows:

Equal opportunities and access to the labour market

- Education, training and lifelong learning
- Gender equality
- Equal opportunities regardless of gender, racial or ethnic origin, religion or belief, disability, age or sexual orientation
- Active support to employment

Fair working conditions

- Secure and adaptable employment
- Fair wages that provide for a decent standard of living
- Information about employment conditions and protection in case of dismissals

- Social dialogue and worker participation
- Work-life balance
- Healthy, safe and well-adapted work environment and data protection

Social protection and inclusion

- Childcare and support for children
- Social protection regardless of the type and duration of employment relationship
- Unemployment benefits
- Adequate minimum income
- Old age income and pensions
- Health care
- Long-term care
- Housing and assistance for the homeless
- Access to essential services

Meanwhile, in the United States, a July 2018 Executive Order announced plans to establish the **National Council of the American Worker,** which seeks to develop a national strategy for training and retraining workers for high-demand industries and skilled trades through cooperation with Walmart, Home Depot, General Motors, and Microsoft, among others. Shortly after this was announced, the Federal Trade Commission began its Hearings on Competition and Consumer Protection in the 21st Century in September 2018 to examine whether broad-based changes in the economy, evolving business practices, new technologies and international developments will require changes in the enforcement priorities related to competition and consumer protection. During these hearings, key policy and enforcement issues were evaluated in sessions on algorithms, artificial intelligence and predictive analytics; antitrust; data security; common ownership; innovation and intellectual property; and privacy, Big Data and competition, among other topics.

These overarching initiatives show that the impact of technological change on workers' lives is very much on the agenda, and the principles and strategies laid out by these initiatives can provide a solid foundation for the design of social protection policies. Yet whether the content and implementation of these policies align with the abovementioned principles depends strongly on union participation throughout the process.

An illustrative case regarding the importance of including labour unions as key social agents in the defence of new public policies occurred in the United Kingdom during the autumn of 2018, when Theresa May's government promised to expand the rights of gig economy workers, following the publication of a review of modern employment practices by Matthew Taylor, a senior policy advisor to Tony Blair and the chief executive of the Royal Society for the encouragement of Arts, Manufactures and Commerce. Based on the review, the government's proposals included the right to request a temporary or fixed-hours contract after 12 months; implementation of notice periods and compensation for cancelled shifts; legislation to clarify employment status; naming and shaming employers for non-payment; and paid holidays for vulnerable workers.

However, upon its publication, the Independent Workers Union of Great Britain strongly criticised the Taylor review's findings for failing to adequately address its three main policies: 1) rigorous enforcement of employment law, 2) abolition of all employment tribunal fees and 3) access to employment rights currently enjoyed only by "employees" for all workers). Moreover, the IWGB questioned its introduction of policies they deemed harmful, such as piece rate legislation for the entire gig economy, which **would allow employers to avoid paying all its workers a minimum wage so long as they could demonstrate that the average worker earned 120% of the minimum wage.** Perhaps most importantly, the proposal did nothing to guarantee gig economy workers' rights of free association and collective bargaining. This shortcoming was made all too clear in December 2018, when after months of mobilisation and organising, the Central Arbitration Committee rejected an application by IWGB to represent Deliveroo riders.

Cases like this highlight that, in addition to strengthening the social rights pillar, worker participation in policy design can help find creative responses to complex problems. The Danish Hilfr workers case mentioned earlier emerged from a broader conversation on a suspected reduction in national tax revenues. Prime Minister Lars Løkke Rasmussen started talks with employers and trade unions to deal with the matter, and this quickly evolved into the tripartite **'Disruption Council' formed in 2017**, which focuses on digitalisation and the future of work, among other themes.

Also, in Denmark, the HK trade union is at the forefront of discussions on a new political agreement on digitalisation

at the workplace, where they have proposed seven principles to guide digitalisation-ready legislation: simple rules; digital communication; automated digital case processing; consistency across authorities; safe and secure data management; use of public IT infrastructure; control of fraud and errors.

In France, the Ministry of Labour commissioned a report on the effects of technological change on labour in March 2015. Five trade union and employer representatives (CFDT, CFE/CGC, CGT, FO, and MEDEF) participated in the writing of the resulting publication, the so-called "Mettling report", which made 36 recommendations regarding job quality, including gender equality, training, reclassification and reskilling and the right to disconnect, among others. Since January 2017, firms with more than 50 employees and a trade union representative are required by law to include the right of being 'non-reachable' (or the right to disconnect from the use of digital tools).

In Italy, the Presidency of the Council of Ministers, along with the Ministry for Economic Development, the Digital Italy Agency and the Agency for Territorial Cohesion prepared its *Strategy for Digital Growth* in 2014. This process was carried out in consultation with the major trade union associations and employer organisations and is to be implemented by 2020 in order to attain the goals set out by the European Digital Agenda. This led to an agreement signed by the Italian government in 2016, which promised to promote Industry 4.0 by increasing investment in the national production system and negotiating with social partners. In May 2017, the Parliament passed Act No. 81/2017, which addresses the employment conditions applicable to ICT-mobile based work brought to light by unions. As a means of promoting work-life reconciliation, it introduces the concept of "agile work" as a mode bound to targets or steps rather than predefined working time and space. Such arrangements must be agreed upon through individual agreements, which set out rules, methods, tools and measures for implementation of the policy.

Meanwhile, **Spanish labour unions have developed their own comprehensive plans for dealing with digitalisation.** Workers' Commissions (CCOO), the country's largest labour union, proposes Statewide Industrial Pact bringing together firms, political parties, educational institutions, tech centres, professional associations, and the central and regional governments around a set of common objectives ranging from

reindustrialisation via Key Enabling Technologies to reskilling, strengthening STEM education and vocational training. In a report for Fundación Alternativas, CCOO economist Bruno Estrada argues that, in order to keep up with European industries, Spain must expand access to broadband, orient educational and training systems towards creating and maintaining a knowledge-centred economy, seek the "digital integration" of society as a whole, centre reindustrialisation efforts on innovation, and pursue the sophistication of demand. On the other hand, the General Union of Workers (UGT) has proposed the development of a Technological Inclusion Plan which focuses on collective bargaining and lifelong learning in the short-term and reduction of the work week to four days (while maintaining the same salary) in the mid-term. As for the long-term, UGT points to the need to develop new systems of taxation and new forms of income for workers unable to adapt to the needs of an increasingly automated and digitalised economy.

Regardless of the specific agreements reached, there is an urgent need to establish spaces that address technological disruption, Danish disruption, or the articulation of other types of spaces, similar to those described above, where work can begin on a public agenda to address the impact of technological change on the labour market. New specific spaces are needed from which to diagnose the current situation, anticipate possible scenarios, decide on the future of work, identify challenges and articulate new solutions. This is not an easy task, and it is precisely for this reason that trade unions, as first-level social agents, are the best placed actor to lead proposals to improve the participation of workers and the balance of forces in work environments.

4.4 UPSKILLING FUTURE-PROOF WORKERS

Perhaps the theme that generates the most consensus among experts, firms and workers is the need for **training through a lifelong learning approach.** For instance, according to Nedelkoska and Quintini (2018), the unequal distribution of the risk of automation demands policies to prepare workers for the new job requirements. The authors emphasise **adult learning as a crucial policy instrument for the re-training and up-skilling** of workers whose jobs are affected by technology. However, the authors find that a **great deal**

must be done to facilitate participation by the groups most affected by automation, as their odds of participating in any type of training were several times lower than among workers less at risk of being automated. Experts interviewed for the US National Academy of Sciences study *Information Technology and the U.S. Workforce* claimed that the education system must be adapted to prepare individuals for the changing labour market, and that recent advances offer new and more widely accessible ways to access training and education. More learning systems are migrating online, with web-based courses receiving a boost from advances in augmented reality, virtual reality and artificial intelligence. These courses can be self-directed or offered by employers, and new credentialing systems will arise as a result of this diversified educational landscape.

According to a 2016 Pew Research Center survey, *The State of American Jobs*, workers seem to agree with this forecast. Among those interviewed, 87% believed it will be essential to receive training and develop new job skills throughout their work life in order to keep up with changes in the workplace. The same survey **noted that employment is much higher among jobs that require an average or above-average level of preparation** (including education, experience and job training); average or above-average interpersonal, management and communication skills; and higher levels of analytical skills, such as critical thinking and computer skills. As a result, Pew finds that upskilling efforts focusing on intangibles such as emotional intelligence, curiosity, creativity, adaptability, resilience and critical thinking will be highly valued going forward.

Unions have recognised this need. For instance, after conducting its own study on automation and its impact on production systems and the potential role for unions, the Italian Federation of Metalworkers (FIM-CISL) found that the shift from manual tasks to planning and control implies an urgent need to assess the complex relationship between humans and machines. As a result, **FIM-CISL now promotes professional training as an individual right for workers,** which should be included in the national collective agreement of the metalworking sector.

Currently, there are several examples of retraining programmes designed to meet the future challenges posed by technological change for workers. One very successful example is provided by **the job security councils in Sweden**. These

are non-profit organisations based on collective agreements between industries and unions, which are funded directly through partner contributions (with no state funding) at roughly 0.3% of the company payroll, with a VAT exemption for costs related to transition services provided to workers who have been laid off. According to a recent US News story on the retraining challenge, most Swedish workers who resort to these councils are relatively quick to land another job as good as their old one. It is crucial to note, however, that while they are unemployed and learning new skills, workers are protected by strong social protection that includes solid unemployment benefits.

Another example is the US non-profit Per Scholas, which provides free, in-person training to unemployed or underemployed adults (primarily women and people of colour) for careers in IT and cybersecurity. To date, Per Scholas has trained roughly 7,000 people in six cities (Atlanta, Cincinnati, Columbus, Dallas, New York and Washington, DC). Of these graduates, roughly 80% have achieved employment, with a randomised controlled trial finding that the programme raised participants' wages by an average of 27%.

Larger tech firms have certainly recognised the growing importance of training and upskilling. In collaboration with the Markle Foundation, Microsoft, LinkedIn, the state of Colorado and various local partners are building Skillful, a non-profit initiative that helps connect people with jobs in IT, advanced manufacturing and healthcare. Similarly, AT&T has invested 1 billion USD in Future Ready, a massive re-skilling programme initiative for its workers that includes online courses; collaborations with Coursera, Udacity and leading universities; a career centre allowing employees to identify and train for the kinds of jobs the company needs or will need in the future; and an online portal called Career Intelligence, where workers can see what jobs are available, the skills they require, potential salary ranges and projected growth or shrinkage in the years ahead. Meanwhile, in March 2018 Facebook initiated its Community Boost tour, which offered tech and social media training for small businesses, and Google developed its own online training course and professional certificate for IT support.

There is no reason such initiatives should remain the sole domain of firms and philanthropists. All of the above examples are experiencing that unions could incorporate into their demands or, in some cases, provide comparable services

themselves to guarantee workers cannot credibly be deemed redundant by their employers. The latter would be in line with the rather successful approach taken by the Swedish job security councils. However, as mentioned earlier, its effectiveness depends to a large extent on strong social protection, which in turn will require unions to play a leading role in policy design.

4.5 ETHICAL STANDARDS FOR BETTER WORK AND BETTER TECH

In response to the current wave of technological change, workers are not only organising to defend or improve their employment conditions and expand social rights to cover all workers. Increasingly, they are organising to define how technology is deployed. In line with this, Aiha Nguyen expressed:

> *"In the past 10 years, there has been a shift towards making sure that health care, pensions and all these benefits are part of the equation for workers. And I think these days, there has also been a big negotiation around hours in the retail and the hospitality industries, with workers pushing for predictable and stable schedules."*
>
> **[Nguyen, A. (2018). Phone interview].**

This has especially been the case in the United States. Recently, the Teamsters reached a tentative deal with the United Parcel Service (UPS) calling for **six months of advance warning to the union of technological deployments,** as well as the creation of a committee with union and company representatives to negotiate any changes this would have on job tasks and working conditions. Similarly, the union of Marriott hotel workers Unite Here – which includes cooks, cashiers, bellhops and cleaners – made technology a central issue in their recent mobilisations across the US. In a report on their struggle for *The New York Times*, the president of the union's local in San Francisco, Anand Singh, states their goals as follows:

"We want to talk about how technology can assist the work we perform and ease the rigours of our work, how our members are trained, what happens to workers who would otherwise be tagged as redundant, how our members are repositioned to succeed or hired into other workplaces."

After months of protest, their demands have largely been met. Following the largest hotel strike in United States history, which lasted two months and spread across eight cities, a new contract with the hotel chain was ratified in December 2018. Among other improvements (including pensions, pay increases and increased security in the workplace), **Unite Here managed to introduce protections from technological change in its contracts.** However, this was not the first time Unite Here achieved this, as in June of that year the unions obtained these demands in contracts with the Las Vegas properties of MGM Resorts and Caesars Entertainment. Typically, these protections include training for jobs created or modified by new technology, a share in the productivity gains, company assistance in finding jobs for displaced workers and six months' warning of technological deployments.

Interestingly, the article's author compares Unite Here's organising to a more historical example of best practices in trade union responses to technological change, namely that of the International Longshore and Warehouse Union when containers were introduced to the shipping industry. Rather than trying to stop their proliferation, the West Coast unions demanded a share of the spoils: rich retirement packages for workers who were let go, and large pay increases for those who stayed. As a result, longshoremen working full time, year-round, now make $168,000 to $186,000 a year on average.

In a policy brief for the European Trade Union Institute, Manuela Maschke, the Head of the Work and Codetermination Unite at the Hans Böckler Foundation identifies several examples of how firms and unions are negotiating the implementation of technology. Among other areas, she points to agreements reached on: participation in ICT frameworks and IT project development; use and management of mobile devices; use and handling of social media applications; data protection and control; automation, standardisation and new production systems; quality management and continuous improvement

processes; constant accessibility; flexible organisation of working time; and health and safety issues.

But perhaps the most interesting attempts by workers to steer technological change have less to do with its effects on their own working conditions and more to do with its effects on society as a whole. In 2018, engineers, scientists and other workers at major US tech platforms rebelled against specific projects they viewed as unethical. At Google, thousands of workers signed a public letter calling on its CEO, Sundar Pichai, to end its participation Project Maven, a contract with the Pentagon to develop AI surveillance for military drones, arguing that the company 'should not be in the business of war'. Workers also criticised the company's lack of transparency around leaked plans for a censored search app in China, eventually leading the company's cloud unit to claim it would not renew the contract. In addition, at parent company Alphabet's shareholders meeting, one group of employees presented a proposal calling for the company's executive compensation to be tied to diversity metrics

Meanwhile, following Trump's caging of immigrant children through his family separation policy, thousands of Amazon workers asked its CEO, Jeff Bezos, to stop all sales of facial recognition software to the government, because its Rekognition tool could be used unjustly against immigrants. Microsoft workers also wrote a letter to protest against its contract with Immigration and Customs Enforcement (ICE) and are demanding government regulation and responsible industry measures to address facial recognition software and its uses. Specifically, they identify three sets of problems: increased risk of biased and discriminatory decisions; new intrusions into people's privacy; and mass surveillance and encroachment on democratic freedoms. They also make a number of recommendations for how to address these issues. To address bias and discrimination, they suggest an approach combining transparency requirements, third-party testing and comparisons, meaningful human review and avoidance of use for unlawful discrimination. To protect privacy, they recommend ensuring notice and clarifying consent, as well as strongly limiting ongoing government surveillance of specified individuals to protect democratic freedoms.

4.6 DIGITAL RIGHTS IN THE WORKPLACE

Unions must lead a critical social dialogue on how we want technological change to shape our society. To avoid the "race-to-the-bottom" denounced by Microsoft's workers and foster a future that is not only good for workers but for society as a whole, unions must propose new ethical standards in a wide range of areas, including their digital rights.

In this context, new challenges and concerns have emerged in the last decades, including the mentioned tracking and control of workers inside and outside their job time, which infringe data protection and work rights. In particular, **the right to disconnect from work** is being considered by public and union actors as a relevant issue. In fact, an increasing number of States and substate governments and companies are adopting legal and organisational measures to ensure the so called "right to disconnect". With the main purpose of reinforcing the limits between work and free time, ensuring the work-life balanced, France was one of the first countries establishing a legal framework to protect this right. In 2016 the so called El Khomri law *(loi n° 2016-1088 du 8 août 2016 relative au travail)* was introduced. This text mandates companies to negotiate their outside of office hour's connection practices with workers. But its provisions apply only to companies with 50 or more employees, do not limit specific time frames for this disconnection and are quite ambiguous in framing the actual obligations of firms. Still it should be noted that, according to the El Khomri law, employers are also allowed to come to agreement on this issue with their unions. A year after, Italy passed a similar law (Senate Act no 2233-B) which in Article 19(1) mandates the establishment of an Agreement on Aggregate Work.

Germany has instead chosen another approach to this issue. Its self-regulatory model is characterised by specific agreements between workers and companies that fit their shared needs (Seconda, 2019). The Confederation of Germany Employers' Associations jointly with the German Trade Union Confederations and the Federal Ministry of Labour and Social Affairs, have established some regulations adapted to both employees and employers in different domains and sectors (KREMP, 2017). As result of this approach, companies such as Volkswagen or BMW, have voluntarily imposed restrictions for the exchange of emails e-mail between managers and employees outside of working hours.

In Spain, some trade unions have been leading the way already to include digital rights in the political agenda of governments and regulate this domain. CCOO has established different campaigns for raising awareness about this issue among workers and promoted the inclusion of the right to disconnect in national legal framework. After several proposals for its regulation, it was included in the transposition to the Spanish legal order of the Regulation (EU) 2016/679 (General European regulation of data protection (GDPR / RGPD), with effects of 6 of December 2018, *"Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y garantía de los derechos digitales"*. Its Article 88, on the "Right to digital disconnection in the workplace" defines this right indicating: "Workers and public employees shall have the right to disconnect digital in order to guarantee, outside of legal or conventional working time established, respect for their rest time, permits and vacations, as well as their personal and family intimacy." However, as in the cases of France and Italy, mandates the establishment of an agreement between company and worker on this matter. So, the effective enforcement of this rule, remains in negotiations at the workplace.

This is also generally the case for the rest of digital rights recognised in the "Ley Orgánica 3/2018, de 5 de 5 de Protection of Personal Data and guarantee of digital rights", although they have been less explored. Article 87, which states that "the right to privacy and the use of digital devices in the field of Article 89, which regulates "the right to privacy with respect to the use of video-surveillance devices and the right to privacy". Furthermore, "recording of sounds at the workplace"; article 90, which prevents "the right to privacy from use of geolocation systems in the workplace"; and article 91, which opens the door to the defence and development of digital rights in collective bargaining", are by no means negligible instruments for ensuring that the introduction of "digital rights in collective bargaining" is not neglected. New technologies in the workplace do not run counter to the interests of working people.

As revealed by these cases, in the new power relations brought about by technology, trade unions have the opportunity to set standards that ensure that the use of technology in the workplace provides benefits both to employers and workers. For all sectors where working men and women are seeing their activities tracked for productivity and control

measures, tracking devices and data processes need to adhere to standards that ensure that those devices and data processes also bring benefits to the data subjects, ensuring that the following principles are built in workplace/sectorial agreements:

- **Data transparency:** Data generated by workers or in the workplace must be made available to workers and/or their unions and be available to use by them in disputes regarding overtime, injuries, etc.
- **Algorithmic transparency:** Any algorithms used in the workplace must be transparent and auditable.
- **Privacy:** Any data generated on workers and their activities must be strongly limited.
- **Confidentiality:** Data generated in the workplace must not be shared with third parties.
- **Redress:** Workers must have the right to contest any algorithmic decision made concerning them.
- **Health and safety:** Impact and monitoring studies should be periodically carried out, including physical and mental health as well as psychosocial risk factors.
- **Participation:** Workers must have the right to participate in the incorporation and implementation of new technologies.
- **Security:** Data generated by workers must be encrypted and appropriately protected.

5. LABOUR UNIONS AND TECHNOLOGICAL CHANGE: TOWARDS A NEW "OPERATING SYSTEM"

The state of the art established for this research confirms that the digitalisation, automatisation and platformisation of economic production are modifying social relations in the world of labour and distressing working conditions. Jobs are changing and shifting with undesirable effects, such as the exacerbation of existing inequalities due to the digital divide or new forms of social exclusion. For instance, automation may have more impact over unskilled workers and minor impact on very specific activities comprised in the bottlenecks to automation. Moreover, even though digitalisation may reduce accidents and strengthen communication between workers, in many sectors work hours are being extended or intensified, with negative impacts in the health, work-life balanced and safety of workers. This new scenario is also producing serious effects for the autonomy and privacy of workers and promoting new forms of discrimination as well.

The situation of labour' rights is also critical from the structural perspective, since income is being reduced in many sectors and some jobs are at risk. Overall, technology is currently contributing to exacerbate power disparities in the workplace. This challenge must be addressed through social dialogue at national and supranational level since variation in the effects of digitalisation or automation show a great variation depending on the socioeconomic structure. But developing a trade-union-led digital agenda and specific standards and practices in the workplace are also important. For all the talk about platform workers and new challenges, many of the effects of technology on work are felt in traditional sectors (industry, telemarketing, etc.) where unions are in a good position to promote change, set limits and define and protect labour rights also through technology and data.

The best practices identified above point to different but related areas of action, which we have grouped in different streams of potential immediate action:

- **Broader social dialogue and better collective bargaining:** The current scenario makes imperative a dynamic interrelation between workers organisations, public agents and private companies, which can foster transversal alliances between sectors. As we mentioned, expanding social dialogue including actors from outside the specific space of labour relations and making demands transversal to the productive sector involved are key factors.

- **New organisational tools:** The possibilities opened by digital tools to exchange information between workers and their organisations and open up their demands to the public opinion must be fully exploited.

- **New public policies and regulatory reform:** different experiences have been described on how to integrate a new political framework that responds to the socio-technical transformations that technological change is imposing, as well as the need to undertake the appropriate regulatory reforms derived from negotiations between public authorities and trade unions.

- **Upskilling:** One of the most transversal strategies to foster a good transition into this new scenario is upskilling. Private sector, unions and public authorities share in interest in adapting their structures to offer a better re-skilling system. However, the analysed experiences show that unions have a crucial role in boosting those training mechanisms that are not part of the short-term priorities of companies. Workers organisations are also decisive to activate educative and labour laws and programs in this domain by the public sector.

- **Ethics of technology:** Another crucial dimension of the new scenario is the debate around the ethics of technologies used at work, which cover a wide range of issues going from gender rights to the adaptability of new technologies for people with disabilities. To address these challenges, privacy by design, adaptability to vulnerable groups and acceptability by workers must be placed in the agenda of private and public sectors.

- **Digital labour rights:** This new scenario is also characterised by the use of data intensive technologies at work, which can affect workers' rights. Other regulatory

initiatives to be in this framework are those related to data protection and the safeguard of time and privacy of workers.

As noted, these six areas are located in three of the unions' traditional incidence arenas, as shown below:

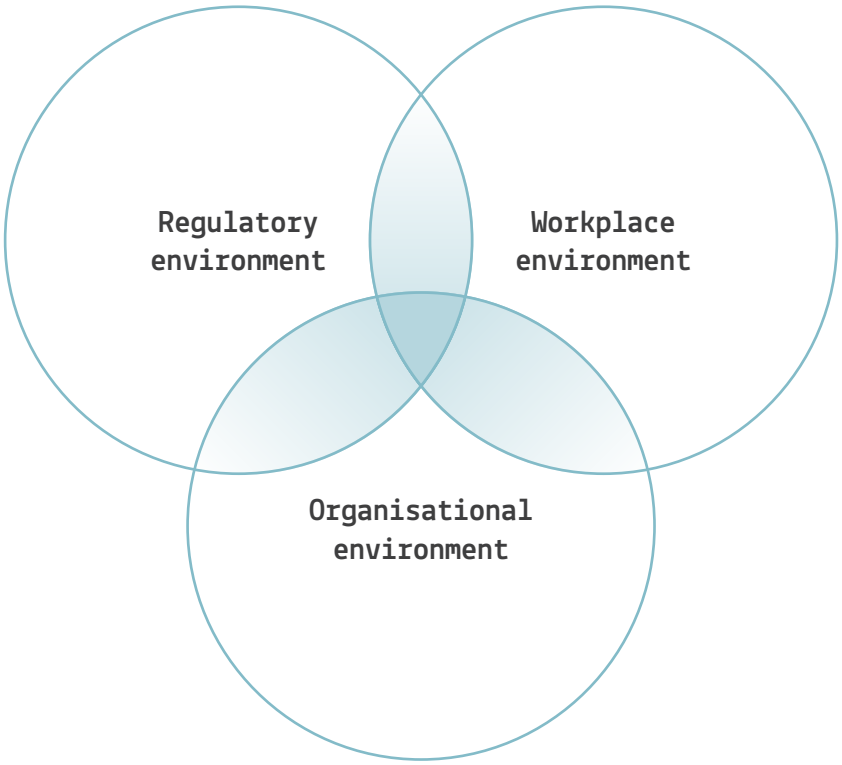

Figure 4. Unions' incidence arenas
Source: Own elaboration

These three different spheres, which concern diverse actors, require different strategies in order to achieve the above-mentioned outcomes (new structural conditions, new work environments and new strategic tools), which can address (and redress) how technology and data is impacting on labour and labour organisations.

In order to promote **new structural conditions** able to deal with the challenges posed by technological disruption, unions must press for setting up high level negotiations (sectorial and transectorial) that tackle the new scenarios and establish mechanisms to protect and expand labour' rights. In a multilevel system, this dialogue should take place at all regulative levels (European, national and regional) and include the cooperation between unions, the private sector

and governments. This top-down approach, which facilitates the rethinking and regulating of the new reality of labour by expanding rights and promoting guidance to face new labour risks, must be led by unions.

In this sense, it is also important that trade unions base their bargaining agenda on the conflicts and/or challenges that, as a result of the implementation of new technologies, are emerging in new work environments. Issues such as the ethics of technological production, or the threat to the digital rights of working people caused by the introduction of new data-intensive systems and automated decisions, must be taken into account. In fact, trade unions must establish bottom-up work strategies focused on identifying the main challenges of human-machine interaction in the work environment in order to build proposals to improve the situation. This analysis, as well as the resulting proposals for action, should come from the trade union sections and/or works councils of the companies themselves.

In order to achieve these goals and effectively design a both a new "operating system" for labour and a digital worker agenda, unions need to be strong. It is important to promote openness in union organisations and strengthen their ability to tackle the new challenges that technologies and data are bringing into old and new work environments. Unions should use the new technologies as a catalyst for setting up new strategic tools that allow the construction of new synergies between sectors. This dynamic can reinforce transversal cooperation strategies among workers (including employers and self-employed) eager to establish new methods for information and knowledge sharing, and in the end, facilitate intersectoral demand aggregation.

6. THE TRADE UNIONS AND TECHNOLOGICAL CHANGE PILOT PROJECTS

To test some of our hypotheses and develop specific practices to tackle the challenges in the work areas identified above the next phase of the study is to carry out pilot projects in collaboration with company committees from different work centres of the services and industrial sectors. In the case of the industrial sector, two companies have been selected to represent completely different business models. Alstom, with an industrial and metallurgic production of up to 200 units per train model, which focuses on fine details and precision and is difficult to automate, and Nissan, with a production of 180,000 cars per year for two different models, which is highly automated and based on assembly lines.

In both cases we used interviews to explore:

1. The kind of technologies that have been implemented in the workplace
2. The impact of the implementation of these technologies has on the work processes
3. The capacity of workers to participate in the implementation of new technologies in the workcentre
4. The training and/or guidance that is provided to workers to deal with technological changes

The results indicate that the reality on the ground is more complex than initially thought and in spite of the significant differences between industries, technological opportunities end up being integrated into even the most complex organisational processes. In the Alstom case, probably due to scales of production, innovation is more closely linked to the introduction of control systems in the workplace than with the modernisation of the work processes themselves. For this reason, short term work will focus on proposals to be included in collective negotiations in relation to digital rights in the workplace [access to data, transparency of algorithms performance evaluation, etc].

On the other hand in the Nissan plant, although there is no lack of control technology, the investment in robotics and automation of processes that redefine job roles, the uses of time and the relationship between workers in the workplace goes much further; this poses huge implications in the creation, destruction and transformation in terms of employment. In this case, the pilot will focus on the elaboration of arguments that explore the description of the jobs produced by new technology, the conditions which generate human-machine interactions and psycho-social risk, in order to allow the participation of workers in the implementation of new technology. This would enable compensation to be established (training, reduction of workload and/or schedule, salary supplements, etc) for workers affected by the impact of this technology.

While we have yet to contrast these first conclusions with the labour reality of other companies in the industrial sector in Spain (among which Airbus and Seat stand out), it does seem that due to the strength of the unions in this sector, the opportunities for negotiation of technological and digital agendas by the company committees of the industrial scope are as significant as the pending challenges. This is very positive, as it confirms the opportunities in this sector to acquire new rights and develop good practices that can be applied in other sectors, such as services (logistics, telemarketing, platforms, etc.) that are currently more precarious.

For pilots in the service sector, the objective is the B2B platforms for the provision of customer services, which are the companies that will participate in the Sitel and Teleperformance project. These are a type of business solutions, characterised by being highly technological, where companies increasingly are outsourcing from diverse sectors, and that according to data from the Association of Customer Experience Companies (CEX)[2], in 2017 it employed 74,196 people.

2. The Association of Companies of Experience with Client (CEX) integrates the most important companies within the sector of Contact Center, which represent approximately 85% of the invoicing of the sector in our country.

7. CONCLUSIONS AND NEXT STEPS

The goal of this report was two-fold. On the one hand, we wanted to contribute to clarifying some of the terms used to describe the "future of work" agenda (digitalisation, platformisation, automation, digital revolution, etc.) and approach them from a critical perspective and, on the other hand, to analyse good practices at the international level in cases where workers are taking action to overcome the challenges they face in their day-to-day work.

As we have seen, current technology trends point to significant changes, but continue to share many of the characteristics of the different waves of technological advances that have shaped the Industrial Revolution. Data is the most recent of these waves.

Some of the dynamics brought about by data are impacting on the ways workers organise in significant ways, but not transforming the fundamental link between work and pay or the power relationship between capital and labour. Platformisation is making distance irrelevant in the chain of production, and while this does not affect how workers relate to labour, it does affect how they are organised, as worker concentration gave rise to the modern trade union movement. It seems obvious that these new challenges require new structures and approaches.

At the same time, data is emerging as an economic sector in itself. The combination of more data and more sophisticated and advanced machine learning mechanisms is creating new possibilities for automation and automated decision-making, which will surely pose challenges to labour rights in terms of privacy, transparency and redress. The use of data-gathering mechanisms in the workplace, aimed at increasing production and control also emerge as a growing area that requires specific standards and a proactive union stand.

Finally, although we no longer share the pessimistic forecasts regarding the impact of technology on work, specifically in terms of net job losses. It seems clear that new challenges are emerging and that empirical evaluations are needed on the way the labour market is evolving in order to help improve working conditions and employment opportunities

for individuals of working age, as well as to further develop methods for the design of training and continuous learning strategies.

Placing unions at the center of this debate and making them a key space for the development of action strategies and alternatives to the current technological agenda opens up previously unexplored possibilities to tackle the impact of technology on work. The academic contributions to the subject of work and the strategies of union organisations allows the integration of new challenges related to digital labour rights in consolidated bargaining structures, organisation and thought, thereby updating the "operating system" that we mentioned earlier.

Likewise, and in the light of the conclusions, we should add that this is only the first phase of a line of work that aims to continue in various ways. As explained in point 6 of this document, pilot projects are already being carried out in different companies of the industrial sector in Spain to test some of the hypotheses raised and develop in specific practices, which will be presented at the conference organised by Eticas, COTEC and CCOO in Madrid in July 2019 to bring together important actors from the trade union movement and the academic world. Collaborations have also been developed with CCOO to incorporate the analysis and needs identified in specific strategies for Health, Safety and Strategic Union Action. The objective of this work is to promote long-term collaborations among stakeholders interested in exploring technology and technological impacts from an empirical, employment and labour rights perspective; to define a digital and technological trade union strategy and contribute to a reduction of asymmetries and imbalances of power in the workplace.

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