**The Future of Labor Unions in the Age of Automation and the Dawn of AI**

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**Abstract**

**Introduction**

During the final stages of editing this paper the world has been experiencing a global crisis, which made governments around the world take unprecedented actions to try and stop the spread of the SARS-CoV-2 virus. These actions included closing borders to ground and air travel, closing schools and universities, closing shopping malls, closing production and manufacturing lines, and requiring social distancing practices between people including quarantine and shelter in place practices. Companies in numerous countries were required to change their work procedures to safeguard the health of their employees, and move to a full mode of remote work and work-from-home settings. Many hi-tech companies allowed their employees to work from home occasionally, but it was extremely rare to find companies that fully and continuously worked in this mode. It is not only companies that are adapting the ways they operate, but also the education and higher education systems, which closed their gates and moved to remote learning. The entire health sector globally is changing as doctors and nurses need to protect themselves and continue and provide healthcare remotely to quarantined and infected people. This abrupt change demanded organizations to adapt and create ways and means to allow their employees and students to continue to work and learn. The current coronavirus crisis accelerated significantly the adoption of digital technologies to allow the mass mode of ‘remote life’ (working, learning and interacting), and allow people to work, meet, communicate, collaborate, learn and access information. Organizations are experiencing a lightning speed digital transformation through the adoption and implementation of advanced technologies. The accelerated pace of implementing digital technologies and allowing different modes of work is also advancing more rapidly the “future of work” and its changes that many scholars, analysts and influencers write about, and this paper focuses on in the context of labor unions.

 There is an extensive scholarly writing - in fields of labor studies, sociology and labor law - about platform capitalism and the way it is intertwined with the gig economy. Gig economy has been so far perceived as the next thing at the labor market, as a transitional phase, kind of a 'grace period', from the current state in the a fully dogitilized economy. However, the Covid-19 pandemic and its social distancing requirements are affecting heavily the gig economy [1], which are based on the interactions between individuals mediated by a digital platform. Ride sharing platforms such as Uber and Lyft are experiencing a drastic decrease in use [2]. In some countries the ride sharing platforms have decided to stop operating in order to help stop the spread of the virus [3], and in other places governments have banned ride sharing [4]. The current crisis has highlighted the risks and insecurities for those who work for the gig platforms and rely on them as their main source of livelihood [5, 6]. But, on the other hand there are gig economy platforms that are experiencing a significant increase in the demand for work and employees. The social distancing measures and mass closure of businesses have pushed people to massively use delivery services [7].

 It seems, then, that the prospects of gig economy are more limited than what has been assumed before. But the Covid-19 crisis has an additional and much more dramatic effect. It has caused a massive job loss, layoffs and unpaid leaves for millions of people around the world [8]. The retail, hotels and hospitality, airlines, travel and tourism, sporting, restaurants and theaters and concerts sectors has been affected heavily [9, 10]. In the US it is estimated that the job loss will be the largest in the history, even more than the 2008 financial crisis [11]. These massive layoffs are putting huge stress on governments and especially unemployment and welfare agencies that need to handle unprecedent number of requests in a very short time [12]. Coupled with the need to keep strict social distancing governments are also adopting and implementing quickly digital tools and solutions to be able to continue to function and support their citizens in a times of crisis. Major crisis have long been a powerful driving engine, and an accelerating innovation force, for the creation and adoption of new technologies and ways of work. Following the 2008 financial crisis the world of work experienced the resurgence of the gig economy driven globally by digital platforms such as AirBnB and Uber. The Coronavirus crisis may also be the harbinger of fast paced changes that people will experience in all aspects of their lives and driven by digital technologies. The current mode of ‘remote life’ as we call it may become the new normal for many organizations globally even after the crisis finished. This change that may become permanent as progress is usually unidirectional will affect how labor unions operate, as the ‘together’ part of the union is managed remotely.

The combination of massive layoffs, the inability of human workers to access their workplaces, and the augmentation and substitution of human labor by digital technologies - all imply that the current changes within the labor market may not be temporary but a prologue of a deeper transformation that might turn masses of people to non-standard jobs or leave them unemployed. The digital age is here faster than expected and in accelerating manner. It means mass substitution of human labor by the machines.

So far trade unionism has been the main institution for representing workers. How can unions stay relevant in the new context? What could be their contribution in a new era which may be characterized by a continuous reduction of their members? Our article addresses this question.

**Background**

Digital technology is already transforming society and ultimately, production, services, and the creation of wealth may not rely on human labor. Consequently, trade unions, whose power is dependent upon membership of masses of paid workers, will lose much of their strength. Hence, trade unions will have to reinvent themselves – to redefine their vision, goals, strategies, organizational culture and even, potentially, their constituencies. Furthermore, unions' challenge does not lie solely in the far future, as they also must take measures to cope with the immediate manifestation of this development. So, in this article, we are aiming to discuss the two next significant challenges of unions in capitalist democracies: first, their role in the transition phase from an economy based on paid-labor to an economy based on automated production and second; their new vision they ought to embrace as the jobless economy becomes a reality.

The labor market’s scenario we present is the most radical, and under debate. However, we believe that unions must get prepared for it. Scholars do not necessarily agree as to the extent of the future transformation of work, but there is still a broad consent that the change is going to be transformative [13].[[1]](#footnote-2) Hence, unions should consider designing new strategies towards this future.

**Why now is different? the risk of automation from AI**

The discussion about the implications of automation and artificial intelligence (AI) on production and service processes must begin with a broader discussion about technological innovations, economic progress and their social implications.

In 1930, the notable economist John Maynard Keynes wrote about the economic and social condition a century ahead of his time, and the road to get there. Keynes started with the contention that the rapid economic changes since the eighteenth century - and the social changes they had propelled as well as social problems they had inflicted - had led to pessimist views about the future. These views represented two groups – the revolutionaries who saw no alternative to improve society but violent change, and the reactionaries who wished to stop progress by avoiding any active measures to improve economy. Unlike these voices, Keynes offered an opposite view. At the midst of the great economic depression, he envisioned an optimist yet realist future. He saw the economic and social problems of his times not as pathologies but as "growing pains of over-rapid changes" [14, p. 358]. Keynes stated that the combination of capital accumulation and major technical improvements would enable to produce more than what the growing population consumes. He predicted that advanced technology would turn part of the human workforce redundant. Keynes assumed that the new society, free of material shortage, would introduce a new system of allocation and a new moral system. Money would cease to be a goal for itself; people would work fewer hours and would do so for the sake of their mental well-being, not for their material security.

The next wave of public debate arose at the 1960s. Again, growing automation led to optimist views of new possibilities of freeing workers from routine jobs, but also anxiety regarding their health, technological unemployment, and further issues. One solution possible was automation funds, jointly administered by unions and employers to support workers in this transition [15]. David Ben Gurion, the founding father of the modern State of Israel wrote in a letter on December 1969: ”...advanced technologies that will enable only one worker that is using cutting-edge technological tools to perform the work that now requires ten workers or more. And in my opinion, it demands a complete revolution in all occupations, and it depends on the government.” This was written originally in Hebrew [16].

Following the literature and data we introduce; we claim that the dramatic technological advancement of our times will necessarily lead to an all-encompassing change. We are also following the dualist stance that progress entails strains. As a society, we should learn to discern between growing strains and strains as symptoms to broader acute problems. Either case requires intervention. Growing strains should be dealt with measures that ease the transition and mitigate the pains that go with it. An acute problem needs long-term treatment and deeper supportive measures. We will elaborate about the two types of measures.

As the above review suggests, the discussion about technological change and implications on the labor force comes in waves. We argue that we currently experience the rise of a massive wave and should get prepared. Although there are a number of papers from recent years that contest the job-displacement scenario by automation (Bessen, 2017; Autor & Salomons, 2018), we should be skeptic about these studies, for the data they are based on relates to the years before 2007, an era in which AI technology was not available for industrial usage and robots were much simpler than today [17]. The modern economy is experiencing today what is known as the fourth industrial revolution, which started in 2013. This revolution is characterized by the use of advanced technologies of AI, robotics and the internet of things (IoT), in order to mainly automate tasks and jobs. The current wave of technological innovation is going to be revolutionary as it makes machines more automated, autonomous and self learning. Contrary to previous waves of technological innovation where technology was envisioned to augment people, this time the objective is aimed at their substitution [18]. Currently, AI and robotics compliment highly-skilled workers in non-routine tasks and are not substituting them. Nevertheless, these technologies already bring other new skills - that humans may not have - to improve their productivity, efficiency, and flexibility [18, 19]. The conclusion is that we are facing much more than the challenge of adjusting the workforce to the new production process by retraining; but, “this time new emerging jobs might not be able to compensate jobs endangered by the new technology” [20].

Understanding the scope of the new revolution requires an in-depth account of automation. A common way is first to understand the types of tasks people do for each job and to divide them into a sequence of actions, and secondly to estimate the level of automation that could be applied to each one [18]. Usually, a job of a person is a combination of the different types of tasks, and therefore as Gibbs [21] stated: “the effect of technology on job design rests on a substitute-complement continuum.” Therefore, the concept of automation may be applied to an entire job, or only to specific tasks within that job, whether at home or work [20, 22]. Augmentation occurs when automation works side-by-side to complement humans performing their work. Substitution occurs when automation technology replaces humans who perform specific tasks or jobs [23].

The current development of automation is revolutionary due to its potential extraordinary scope. It encompasses not only routine tasks (physical and cognitive) but also non-routine tasks. Whereas previous waves of technological innovations and advancements have mainly augmented and assisted the human workers, automation today means, more and more, the replacement of human activities and tasks with very little need of human intervention or supervision [22]. Tasks include both routine and non-routine activities[[2]](#footnote-3) (figure 1). While routine tasks (physical or cognitive) are more easily automated and therefore have been those that so far replaced human labor; non-routine tasks (social and abstract), which have been up till now perceived as harder to automate, have started recently to replace human labor as AI technology advances rapidly [24, 21, 25]. Therefore, an unprecedented amount of jobs are under the threat of substitution, including many skilled and non-manual jobs that were considered to be immune [26].



Figure 1 - Types of tasks in a job

The major driver of automation is the rise of new computer hardware enabling to crunch and churn the enormous amounts of data, hence to apply AI and machine learning (ML) algorithms on them [20]. AI-enabled robotics hardware today allows robots to have more delicate interactions with humans and are much safer for operation side-by-side them [18]. Service (social) robots, for example, such as personal care robots, operate side-by-side of humans. Hospitals around the world have started deploying and using robots to provide remote care and treatment to coronavirus patients, in order to enable continuity of care while protecting the medical and health staff [27]. Robots of this kind have a real chance of further evolving into more autonomous machines that will gradually substitute human labor. Or, in the words of Autor and Salomon [28], the new automation technologies are “labor displacement” as they “reduce labor’s share of aggregate output.”

To sum up, the overview of the current development and further potential of the new technologies leads us to embrace two scenarios. The first is “the collapse of the 'full employment' norm to which all the developed economies have become accustomed to [26, p. 12]. The second is that "we are likely to face substantial turbulence as careers and industries are disrupted right across the economy before the hoped-for 'new jobs' emerge in sufficient numbers" [26, p. 11].

**Review of all job automation predictions**

How can we predict the probability of human replacement by automation? In 2013, Frey and Osborne published the first comprehensive report on the potential and probability of automation of more than 700 different jobs [13]. Brandes and Wattenhofer [20] extended the work published by Frey and Osborne [13], by analyzing the tasks that comprise each job and calculating the probability of automation of each of them.[[3]](#footnote-4) Using O\*Net historical data, pertaining the period of 2001-2015, researchers showed that jobs they found to be with a high probability of automation have already started showing a decrease in demand and employment percentage during this time [20, 29]. This was also validated on a national level with local variabilities [30, 31].

While these two reports provide a high-level overview of the potential of automation, other studies focus on specific domains and industries. For example, occupations that require enormous amounts of information to perform (i.e., knowledge workers), have a high potential to improve their efficiency by using AI, therefore automating major routine processes in them [32]. In the medical and clinical domains, for instance, AI and robotics may include the automation of the diagnosis, screening, and even counseling procedures. In the medical imaging domain, numerous tasks and tests could be automated using AI for image recognition, such as various pathological tests [32]. As the Covid-19 pandemic spreads AI technologies were utilized to assist and augment the work of public health professionals and medical doctors for screening and diagnosis [33, 34, 35].

Automation and AI will also transform other fields. One of them is the function of governance in organizations, particularly human resources (HR), where AI and robotics may make the regular management supervision and guidance of humans redundant, and there will be no need for the HR traditional recruiting functions [36]. Another domain is of the banking industry that may leverage AI and robotics in various occupations and roles, starting from contact-center to front desk tellers [37].

Furthermore, the automation and AI revolution will encompass not only high-skilled economic branches but also mass-production industries. For example, Acemoglu and Restrepo [38] showed that substitution by industrial robots is more likely when the workforce is older (ages of 36-55), and in countries that are experiencing a demographic shift. Recently, the oil and gas industry have started adopting advanced automation technologies that the need of human labor on ocean rigs [39].

It appears, then, that the impact of automation and AI is certain and their scope is vast. They will probably deeply penetrate domains that so far were considered as immune and will challenge the employment of entire populations.

Figure 2 - The implications of automation upon human jobs

**The (ir)relevance of education and training on automation**

The common belief is that education, training and upskilling is a panacea to the threat of job loss caused by technological advancements. The assumption is that the higher the level of education and training is the less the probability of staying out of the workforce for an extended period. According to this view, unskilled workers who work in industrial factories are at a higher risk of automation, as the routine tasks they perform are the easiest to program and automate by a software or a robot [18]. Jobs with high-level skills are more complex to automate than middle-level skill jobs [21]. Therefore, the ones who will probably get hurt are those whose jobs require middle level skills (such as knowledge workers and the service sector workers) [40]. Additional research showed that there is a direct correlation between the level, and type, of education required from a job and the probability of its automation. For example, jobs that require pre-training, like an apprenticeship, have a lower probability of automation than jobs that require on-the-job training [20]. While pre-training and apprenticeship is employer led, we should also refer to what people (employees) do with the need to retrain themselves. Sorgner [24] showed that people who work in jobs with higher risk, or even lower risk, of automation are more likely to acquire new skills and training than those with medium-risk jobs. They do it as a self-preservation action against the effects of automation on them. And, people who work at low-risk jobs are more likely to move to self-employment and entrepreneurial model, as they also possess the soft skills that are harder to automate and more important for innovation (creativity, abstract thinking etc.) (as shown in figure 2).

Sorgner [24] concludes that we still do not know the required type of education, or recommended type of training, to reduce employees' risk of replacement by automation.[[4]](#footnote-5) However, we can still conclude that jobs with the lowest risk of automation require skills such as “deductive reasoning, originality, communication, training, problem-solving, and reading and writing” [21].

**The motivations of employers to replace employees with automation**

The automation of production and service processes may prevail as employers have an incentive to do so. Dirican [37] argued that “companies could achieve more profitability and sustainability only by following two options: minimizing costs or maximizing value.” The employers’ ultimate objective is to find ways to reduce the cost of each task while increasing their output [28]. As automation and AI becomes prevalent, there is a possibility that there will be no “either or” dilemma. AI and robotics can provide both in parallel. For instance, the financial crisis of 2008 accelerated the adoption of new technologies, as they enabled organizations to optimize and re-engineer their business processes so that they could take part in the new digital transformation [37]. The outcome is demonstrated by Gutelius and Theodore [41] who also found that the growth of the US economy after the Great Recession of the last decade has skipped the labor market.

Companies have three main incentives to minimize costs. The first is to reduce not only the demand for employees who do routine jobs, but also of highly skilled employees who receive high wages [36]. The second is indirect - the prospect for reducing the costs surrounding the employment cycle, such as searching for and recruiting new employees; or the shadow costs that stem from the fact that labor's cost is much higher than the actual salary the employee receives [36, 18, 21]. The third incentive is the reduction of costs inflicted upon employers by the “malfunctions” and limitations of their human workers. Although machines may break down and incur a high cost for fixing them, they will not go on strikes and will not require any managerial attention like human employees do [36, 21]. Furthermore, industrial robots are designed for reliability and durability so that they can work continuously 24 hours a day, 7 days a week [19]. Thus, automation reduces the differences in execution of performing tasks as occurring with human workers, removing almost any uncertainty and improves the final product [21]. Qureshi and Syed [42] confirmed and elaborated on this claim, as they showed that by using robots, employers can save up to 65% of their labor costs, by keeping their business working continuously without the need of managing human shifts. They added that robotics have a major and growing effect in the service sector, in fields such as health, where employees may work in unhealthy environments and using robots that may perform the same tasks while avoiding the risks. This same claim was also raised by Decker, Fischer, & Ott [18]. They showed how the use of robots could increase efficiency and how service robots may augment numerous tasks.

It appears, then, that employers' motivation to replace human labor by robots and AI is high and its logic is multiple.

**Social implications of automation**

Automation of jobs has various effects on individuals as well as on the entire society. Sorgner [24] claimed that mobility due to automation would be mainly downward, meaning that people will either be demoted in their current workplace or move to lower-level job in a different industry (figure 2). Furthermore, displaced workers might find out that retraining, reskilling and educating themselves into new industries require time and money, which might be too costly for them [36]. The risk of job loss is also associated with the increase of physical and mental health issues [43], as well as impaired family relations and even its breakup [44, 45]. People who lose their job due to technological advancement might also experience difficulties in maintaining their social status and their self-value, assets and money decline [36].

The hope that these people will find alternative ways to make their living is undermined by Sorgner [24], who found a significant rise in self-employment, which may be a result of people working in jobs with high risk of automation opening new enterprises. However, these businesses are not growth-focused and bring little value in terms of employment, innovation or market value [24].

The effects of automation and AI are unevenly experienced by different groups. Generally, technological innovation contributes to an increase in inequality, as it usually comes to substitute the work of less-skilled workers and decrease the demand for them [36, 23, 25]. One outcome of the rising unemployment rates among the Middle and the low classes is growing social and political unrest that has already manifested itself in the 2016 elections at the United States of America or the Brexit in UK [46, p. 205].

A group of researchers from the International Monetary Fund (IMF) recently stated that the “arguments for technological optimism don’t work”, meaning that the current wave of automation technologies will destroy more jobs than it will create [25]. This threat is already felt among people around the world. It raises fear, suspicion and frustration as the risk of automating jobs increases among workers [47]. The fear is understandable since we expect very high rates of structural unemployment that is different from the familiar short-term frictional or cyclical unemployment [48, pp. 4-8].

Structural unemployment is a serious threat since work has been a key institution of modern society. It is not only an instrument for material subsistence, but also defines the modern human self [49, pp. 677-680]. According to the deprivation theory, employment is not only essential as source of income and subsistence, but also for its psychological and social functions, like a sense of purpose, identity, social status, maintaining social relationships and more [50, 51, 52]. Jahoda [52] articulated the five functions jobs have on our social existence - "First, employment imposes a time structure on the waking day; second, employment implies regularly shared experiences and contacts with people outside the nuclear family; third, employment links individuals to goals and purposes that transcend their own; fourth, employment defines aspects of personal status and identity; and finally, employment enforces activity” [52, p. 188].

Massive structural unemployment in the contemporary society might undermine the social order. Coping with such a condition is a major challenge, as "many predict a significant increase in structural unemployment as a result of the microprocessor technology and other innovations. Even if one rejects the fantasies of optimists […] and rejects the pessimists' prophecies of total collapse, there are serious problems ahead relating to work and unemployment” [52, p. 190].

As we showed, AI and robotics may have a major impact on the future of work and the wellbeing of future generations. Therefore, governments, enterprises, and individuals should try to tackle this symbiosis already today [23]. Nevertheless, even if the future will be less severe, unions should get prepared to face a massive transformation.

**Obstacles on the road to UBI**

As we showed, automation and AI will probably significantly increase productivity and push many people out of the workforce, making them unable to support themselves.

Currently, the most debated solution for deep and structural unemployment is Universal Basic Income (UBI) [46, pp. 205-208, 53], which aims to guarantee the material subsistence of the entire population via governments. These changes may entail an additional financial burden on high-income earners, capital owners, investors, and corporations. Thus far, UBI has been tried as an experiment in countries such as Finland. However, the turmoil brought by Covid-19 virus has made UBI's implantation feasible. The Spanish government is considering to enact UBI during the crisis period as well as afterwards [54, 55].

UBI is in its initial phases and not certain. The financing model and many other details are not clear. For corporation, investors and employers it may be finacecialy demanding. Nevertheless, due to the their current tendency to maximizatize financial profits [56, 57], they might be reluctant to carry the extra burden. Evidence of this is provided by Tali Kristal [58] who showed that the lion share of income growth brought with computerized technology over the last three decades was grabbed by capital owners (and not by workers). Hence, there is a possibility that investors and employers will use their power to thwart the efforts to establish adequate UBI.

Another impediment for the implementation of UBI is the state's decline. In the current era of globalization the state "survives by […] adjusting domestic policies to the imperatives of global competitive pressures" [59, p. 316]. Hence, the state lost much of its economic sovereignity and having trouble "in controlling monetary policy, deciding its budget, organizing production and trade, collecting its corporate taxes, and fulfilling its commitments to provide social benefits" [59]. In this context, it is reasonable that states will experience difficulties in promoting UBI and safeguarding the economic and social security of the citizens. Therefore, the state needs assistance in fulfilling its commitment to workers' rights, and particularly to former-workers' rights in case of a mass structural unemployment.

**Are trade unions an answer?**

Until today, labor unions have been considered as the main guardians of the workers' rights. Therefore, it was expected from the scholarly literature to discuss the role of unions in the face of the coming revolution, particularly due to the threat of mass unemployment, but this discussion is completely absent. In more than fourty scientific articles dealing with automation and the effects of automation on jobs, we could not find any mention to the scenario of unions dealing with massive structural employment. Unions approach automation and AI effects as only a case of a harsh frictional unemployment. Furthermore, labor studies literature has related to the effect technology has on the transition from standard employment arrangement to non-standard, precarious ones [57, 60], but it hardly mentions the likelihood of a productive economy using a much smaller workforce.

The institutionalized modern union consolidated at the last quarter of the nineteenth century [61]. A new class of unskilled workers emerged with the first industrial revolution. Its members had leveraged unionization to compensate for their inferiority *vis-à-vis* the employers [62]: "The chief goal of the union movement is to organize workers for concerted action in support of their interests to redress the power imbalance between those who provide labor and those who control the conditions of its use through their ownership or management of productive resources. Because workers and owners of capital do not share interests, this relationship is necessarily adversarial" [62, p. 75]. Durrenberger's quote points at three basic assumptions: a) workers ought to get organized to have better bargaining position *vis-à-vis* the employer; b) unions' role is reactive; and c) workers cannot solely count on the employers to represent their interests and need to do it independently.

With time, some unions have also developed a broader role than representing groups of workers. They have been raising a social voice, next to the voices of the state and the market, and therefore broadened public debate and contributed to the democratization of workp and to allocative justice [63, pp. 35-57, 64, p. 646]. Unions have also expanded their engagements to include social services such as pensions [65], health care and others. Their activity have effected not only the workers they directly represented but also workers as a whole, as it is shown in their contribution to the institutionalization of minimum wage [66, pp. 289-291].

So, unions became relevant as a social force as they responded to the deep economical change and offered an answer for masses of workers. They had become stronger as they kept in pace with economical and institutional developments, and provided solutions for their constituencies. They were especially successful since the 1930s until the 1970s, when they were part of a peak bargaining mechanism together with the employers' associations, backed by the state. Unions were part of the 'managed' or 'organized' capitalism [67].

Unions lost relevance as they lost their responsiveness. Since the 1970’s they have failed to adjust to the rapid developements such as globalization, the introduction of advanced technologies, the transformation of the labor market [63, pp. 81-93] and flexible employment arrangements (Ibsen & Tapia, 2017, pp. 175-177; Luce, 2014, pp. 8-9; Nissim & De Vries , 2014) Bronfenbrenner, Friedman, Hurd, Oswald, & Seeber, 1998, pp. 3-6). The reasons for unions’ downfall are not only external but also internal, including the long exclusion of workers due to their gender [68], race, nationality, ideology and others; corruption [69, p. 154]; and poor internal training [63, pp. 97-119].

Unions became aware of the crisis and have been engaging in "revitalization" and “renewal” strategies since the 1990’s[[5]](#footnote-6). These strategies included measures such as organizing new members[[6]](#footnote-7) and workplaces, internal restructuring, building coalitions with other social movements, partnership with the employers (Bennett, 2013; Mcllroy, 2008), and political action aimed to influence the higher power centers (political parties, legislation, state institutions and more) [70, p. 9].[[7]](#footnote-8)

Nevertheless, given the new world unions meet today, the revitalization and renewal strategies are not enough. The new context unions face is manifold: the rise of the gig economy and digital platforms, automation and AI. Thus far, unions have been responding only to the first trend. Numerous ambitious suggestions were raised; including cultivating common class consciousness among digital workers, establishing a transnational digital workers' trade union; and using the workers' presence at the web to protest against the platforms or even to disrupt their operation [71, pp. 155-156]. Measures have already been taken including opening the trade unions to self-employed workers (a definition that fit the legal status of those employed by platforms); establishing a union of self-employed workers;[[8]](#footnote-9) legal support for un-organized workers; agenda-setting activities endorsing those workers' rights, and lobbying for standard and fair employment terms [72].

However, the measures mentioned above are insufficient to cope with the automation's revolution and the possibility of mass unemployment. These measures are even more insufficient as we refer to the deep risk that automation and AI inflict on unions’ traditional power sources, especially the the associational power, which arises from workers organizing together for collective action; and orgastructural power, which is based on the position of employees within the economic system (rare skills, their location in strategic production or distribution sites, and others) [63, pp. 124-125, 73].

**Unions in the transition period to a jobless economy**

More than ever before, unions should strengthen their "strategic capacity" and reinvent themselves as a learning organization if they want to stay relevant [74]. Real learning is the ability to destruct limiting patterns [75]. Therefore, we suggest that unions should adopt a new paradigm, and expand their calling from representing workers to representing the economic and social rights of the citizens. However this shift will materialize gradually.

We address two stages – the near future and the distant one. The first designates the transition period from the current reality into a future automated and digital economy, while the second refers to an era in which economy will be already widely based upon automation and AI. We also suggest unions' leaders will adopt future's most radical scenario as their point of departure. It will force them to reevaluate their underlying assumptions about who they represent, and what are their goals and strategies.

In the short term, we recommend unions should adopt the following six measures:

1. **Developing research** - Establishing or expanding specialized research units to study the accelerating changes in the economy and its course. In unions that already have research departments we recommend that they adopt methodologies as futurism and long-term planning, which are used today by numerous corporations around the world.
2. **Onboard technology experts** - In order to have a deeper and wider understanding of the possibilities new technologies bring, unions should recruit technology experts to their management teams and not be settled with general future scenarios. Recently, this gap in digital and technological knowledge in corporate boards was shown to be an inhibiting factor in the success of companies in leading their digital strategy [76].
3. **Support the augmented workforce**- Empowering workers where automation technologies will not completely substitute human labor. Unions should actively map industries and jobs that will probably remain dominated by human labor, organize their workers (where they are currently not organized), strengthen their status and improve their working conditions.
4. **Advocate employees’ health, safety and privacy in the AI-age** - Representing workers' rights regarding health, safety and ethics at workplaces undergoing automation. Employees working in workplaces with cutting-edge technologies are expected to lose some, if not all all, of their privacy during work, as they will be tracked and monitored by numerous sensors that collect data, in order to improve and optimize their work further [21]. These complicated issues will be affected by the digital revolution, and workers cannot count on the employers or state's regulation to safeguard their rights.
5. **Join AI consortiums** - Joining AI consortiums all over the world. The aim is to be connected to the main players in the field, be updated about developments as they occur and influence them.
6. **Managing dignified retirement** - Bargaining for fair retirement conditions for employees in workplaces where termination of human labor is certain. In such cases, unions should channel their bargaining efforts from hopeless struggles against dismissals to securing the best retirement compensations for workers and for their retraining to help them explore other career paths. This is called outskilling and it is a new method companies around the world has recently started to offer the employees that “don’t have a future at a company” [77].
7. **Facilitating re-skilling and upskilling** - Cooperating with employers and governments to build upskilling and re-skilling programs for workers whose jobs are at risk of undergoing automation. The goal is to facilitate their re-assignment into industries and jobs at lower risk of automation, or provide them options to find other positions with the same employer.

**The Distant Future**

In the more distant future, when a jobless society may become a reality, unions can sustain their relevancy only by adopting a new vision. They should transform their primary calling from representing employees to representing the social rights of citizens.

Thomas Marshall maintained that modern citizenship is based upon three layers of rights. The first is civil rights, which are mainly legal and secure the freedom of individuals – the freedom of speech, belief, the freedom to have possessions and more. Political rights are next, which guarantee the ability to elect, and be elected, to the sovereign institutions, where the major decisions are taken. And social rights are the most advanced layer. They endow citizens with material security. Everyone is entitled to gain access to appropriate nutrition, health care, education, transportation etc. (Marshall, 1950). Historically, political and social rights have been achieved, among others, due to pressure put by mass groups of workers, mainly organized. In Scandinavian countries, for example, not only have trade unions played an active role entrenching these rights, but they have also functioned as providers of welfare services such as pension, unemployment insurance and others [78, 79]. The end of mass employment may jeopardize these rights.

A jobless society might strip the working class of its structural power and turn former-workers to be considered as liabilities by employers and as welfare costs by governments. Governments are already pressured by corporations to cut their taxes, and the outcome might further reduce welfare budgets while widening the already huge inequality between the social classes (Morgan, 2014). In this context, trade unions' role as the representatives of lay people's material interests is crucial. They can organize and mobilize people to endorse essential solutions for their problem of the citizens' material security. So, many jobless citizens will be exposed to the dangers of poverty, without any protection of an institutional body. In this context, labor unions should consider shifting their main efforts from representing employees into broad social movements championing the following goals:

* Opening unions' gates not only for employees or for self-employed, but also to those who are left out of the labor market.
* Function as a lobbyist and leading the way for UBI or for other means that could secure people’s material needs. One possiblity for trade unions is to lobby for UBI [60, pp. 35-37, 53]. As elaborated before in this article, UBI is far from getting materialized and still needs to overcome obstacles. A prime impediment is financing UBI when most of the people do not work, and thus do not pay an income tax. Researchers from the IMF recently stated that taxing capital to pay workers UBI is extremely challenging as it will have negative effects on the high returns of corporations on the automation technologies [25].
* Besides endorsement of UBI, unions should consider amplifying other activities of universal benefit, which they have been already been engaging in, such as minimum wage, pensions, public health and more. This role for the benefit of the whole is also apparent in ther current Covid-19 crisis, as it is demonstrated by the call of the ITUC (International Trade Union Confedration) and the OECD TUAC (Trade Unions Advisory Committee) for the G20 countries, in which they plea for support packages to all workers regardless of their employment status, including those in the informal economy, in the following issues: "paid sick leave from day one; wage/income protection; managed reduction of hours where necessary, government support to maximise income security; mortgage, rent and loan relief; universal social protection and free access to healthcare; and childcare support for frontline workers in health, supermarkets, pharmacies and other vital areas" [80]. The turn to activities pertaining public policy and social rights may function as an incentive for lay citizens to join unions, even if they are not employed, self-employed or temporary employed.
* Endorsing a wide, holistic, economic perspective - the stakeholders' approach - that sees economic enterprise as embedded in the surrounding environment: investors, managers, workers, consumers, local community, public health, the environment and more. This approach is alternative to the dominant shareholders' approach which sees the shareholders revenues as the ultimate goal of the business firm [81, 56].
* Unions will pinpoint the human contribution to the economy (in opposite to the view of workers as liabilities and the motivation to cut labor costs by any means possible). In the new economy, humans will maintain crucial roles - to create new ideas that AI would still not be able to articulate; and address the moral aspects of material life [82, pp. 1-10]
* The case for human-centric economic approach could also be translated into reignition of unions' possible role as entrepreneurs. Unions may initiate new forms of ventures that will fit the new economy and enhance it. This trend had worked well in the early days of the Israeli Histadrut [83] and in the Ghent System in which unions ran the unemployment insurance [79]. This can be also traced to other movements - the Austrian Marxism or the British Fabian movements – who were more reformist than radical, and wished to build economic institutions that will embed the human and social aspects [84, 85]

At the dawn of the auuomation and AI revolution, unions have new calling. They should stop playin the role of fire-fighters and, instead, embrace a proactive, strategic, approach [74, pp. 194-195]. Further research is needed to develop each of the steps we offered, to analyze future scenarios in specific economic branches, and to analyze the possible effects those will have on employees and the representative unions.

1. The debate on technology advancement and the future role of human labor is old. However, given the new developments in the field of AI and automation, we are not referring in this paper to literarture about these technologies before 2013, when the current debate about these issues was launched following the paper by Frey and Osborne [13]. [↑](#footnote-ref-2)
2. In this article we prefer having the discussion on a task level, and whether it is routine or non-routine, and not on a profession level as represented in Eden and Gaggel’s work [86, p. 8]. There is no profession that is purely non-routine or routine, so the discussion should be on the task level of professions. [↑](#footnote-ref-3)
3. They did it by calculating the percentage of work each task is taking out a job (task share). They also used other properties (metadata) of specific jobs to calculate their probability to be automated. [↑](#footnote-ref-4)
4. Sorgner's contetion about the uncertain prospects of education is also supported by the research of Berg, Buffie and Zanna [25]. [↑](#footnote-ref-5)
5. "Revitalization" aims to organize previously ignored populations of workers and rebuild grass-root social movement. “Renewal” refers to the ways unions creatively rely on their existing capacities and familiar channels to strengthen their workers' position in a new context of globalized and more competitive economy [94, p. 443]. [↑](#footnote-ref-6)
6. "The American labor movement is at a watershed. For the first time since the early years of industrial unionism sixty years ago, there is near-universal agreement among union leaders that that the future of the movement depends on massive new organizing" [92, p. 1]. [↑](#footnote-ref-7)
7. An example of how unions used their capacities to improve workers' conditions is illustrated by Klindt [94]. Danish unions used their long-lasting partnership with the employers and their role in the local governance networks to improve their workers employability in the context of unstable global economy and liberalization policy. [↑](#footnote-ref-8)
8. In France. [↑](#footnote-ref-9)