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“Negotiating the algorithm”:
Automation,
artificial intelligence
and labour protection

Valerio De Stefano

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Abstract

This paper aims at filling some gaps in the mainstream debate on automation, the introduction of new technologies at the workplace and the future of work. This debate has concentrated, so far, on how many jobs will be lost as a consequence of technological innovation. This paper examines instead issues related to the quality of jobs in future labour markets. It addresses the detrimental effects on workers of awarding legal capacity and rights and obligation to robots. It examines the implications of practices such as People Analytics and the use of big data and artificial intelligence to manage the workforce. It stresses on an oft-neglected feature of the contract of employment, namely the fact that it vests the employer with authority and managerial prerogatives over workers. It points out that a vital function of labour law is to limit these authority and prerogatives to protect the human dignity of workers. In light of this, it argues that even if a Universal Basic Income were introduced, the existence of managerial prerogatives would still warrant the existence of labour regulation since this regulation is about much more than protecting workers' income. It then highlights the benefits of human-rights based approaches to labour regulation to protect workers' privacy against invasive electronic monitoring. It concludes by highlighting the crucial role of collective regulation and social partners in governing automation and the impact of technology at the workplace. It stresses that collective dismissal regulation and the involvement of workers' representatives in managing and preventing job losses is crucial and that collective actors should actively participate in the governance of technology-enhanced management systems, to ensure a vital "human-in-command" approach.

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1. Introduction

In October 2017, a cover of the *New Yorker* magazine represented humanoid robots walking on the street, giving handouts to a human beggar. That same issue published a lengthy article on job automation. The article examined several implications of introducing modern automated work processes in existing workplaces, including an extensive analysis of the relation between human and machine labour and how workers interact with advanced manufacturing machinery (Kolhaktar, 2017). Though the article focused on job displacement, it also dealt extensively with the consequences of automation on the jobs that would remain in place after the introduction of automated processes. Why, then, did the artist who drew the magazine's cover depict a future in which humans will beg robots for money?

It is likely that the artist was influenced by a mainstream narrative on job automation and the future of work that focuses overwhelmingly on the number of jobs that will be lost to automation. Indeed, the academic and policy debate on these issues has largely adopted a "quantitative" approach, trying to estimate the number of workers that could be put out of a job as a consequence of technologic breakthroughs (Frey and Osborn 2013; Dauth et al. 2017). Some studies have criticized these estimates, pointing out some of their possible flaws and also concentrating on the potential benefits of technological progress in terms of job creation (Autor, 2015; OECD, 2016; OECD, 2018; see, for a general critical discussion, Kucera, 2017; for a legal discussion, Estlund 2017). So far, however, this debate has not sufficiently focussed on the qualitative aspects connected with job automation. In other words, much less attention has been devoted to the quality of the jobs that will remain, but that will require growing interactions between humans and technological tools, both in the forms of advanced machinery and of software used to manage businesses and production processes (an exception is Eurofound 2018).

It almost seems taken for granted that these "jobs of the future" will require high technical skills, that new machinery and programmes, complemented by artificial intelligence, will absorb routine, menial and dangerous tasks and that the fortunate workers who remain employed will have access to highly rewarding jobs, with technology playing a liberating role for them. Accordingly, instead of focusing on the quality of these jobs, regulators should be concerned in making sure that the highest number of persons possible acquire the skills necessary to be employed in these liberated roles; they should also envisage measures to absorb occupational shocks determined by automation and to mitigate its social consequences for workers that will be displaced and will not be able to develop these high-level skills or will not find employment because there will be fewer jobs available (MCKinsey Global Institute, 2017).

This narrative, however, follows a techno-deterministic approach that should be called into question. To begin with, it assumes that technological breakthroughs will imply progress, particularly for the fortunate workers who have developed the skills to remain in employment after the introduction of new machinery and business processes. This assumption, however, risks proving excessively optimistic. While it is probably true that technology will be able to automate some routine and unpleasant tasks, it will also increase the possibility of management to increasingly monitor working activities in a way that is not desirable for workers (see below Section 3). Software and hardware are already spreading in modern workplaces that allow management to give workers instructions on the work they do and to control their performance through digital tools (Moore, P., Akhtar, and Upchurch 2018). Artificial intelligence, the use big data and "management by algorithm" are already a reality in the world of work (Dagnino, 2017), potentially leading to very intrusive work practices. The risks connected to these practices are almost absent from the mainstream debate on the future of work and on the effects of automation, even if, as argued below, the introduction of advanced machinery in the workplace can materially spur these risks.

Another assumption that follows this techno-deterministic approach is that these developments are inevitable – in other terms, they are the price to pay to benefit from the rewards of technological progress. Accordingly, limiting the functioning of new technologies at the workplace would inescapably reduce progress for societies and economies at large, supposing that these limits could theoretically be imposed through regulation. Moreover, the mainstream narrative on automation also risks leading to the impression that regulation over the introduction of new technological tools and machinery and their implications on the quantity and quality of jobs cannot be put in place and that any attempt to govern the effects of technological breakthroughs would hamper innovation and lead to economic losses.

These assumptions must be questioned. Regulation aimed at mitigating the potentially detrimental effects of the use of technological devices on job quality and workers' human dignity already exists in various countries of the world. Moreover, , many jurisdictions already have in place regulation aimed at mitigating the social impact of mass redundancies and job losses, also connected to automation and technological innovation. A detrimental economic impact from this regulation has not been proved. On the contrary, strong involvement of social partners and regulators in the management of potential mass redundancies is associated with high levels of productivity and innovation, in addition to the benefits for workers (see Section 6, below).

This contribution aims at filling some of the gaps in the current debate on automation, the introduction of new technologies and the future of work. Section 2 addresses the potential detrimental effects on workers of awarding legal capacity and rights and obligation to robots. Section 3 examines management practices such as electronic performance monitoring, People Analytics and the use of big data to direct and monitor the work performance, and their positive and negative implications for workers. Section 4 examines an oft-neglected feature of employment regulation and the contract of employment, namely the fact that they vest the employer with authority over workers that is underpinned by the legal system; this section underlines how employment regulation is structurally ambivalent, on the one hand recognising huge managerial prerogatives to employers and on the other hand trying to limit and rationalise the exercise of these prerogatives to protect human dignity of workers. In light of this ambivalence, Section 5 deals with Universal Basic Income (UBI), by arguing that, even if a UBI were introduced, the structural features of the employment relationship and the existence of managerial prerogatives would still warrant the existence of labour regulation – this regulation, it is argued, is about much more than protecting the income of workers. The existence of managerial prerogatives justifies the classification of labour rights as human rights, to protect workers from abuses of managerial authority at the workplace. The benefits of a human-rights based approach on labour regulation are exemplified, by referring to the protection of workers' privacy against invasive electronic monitoring. Section 6 concludes, by highlighting the crucial role of collective regulation and social partners in governing automation and the impact of technology at the workplace. It stresses that collective dismissal regulation and the involvement of workers' representatives in managing and preventing job losses is crucial and that collective actors should actively participate in the governance of technology-enhanced management systems, to ensure a vital “human-in-command” approach.

2. “A citizen you can buy”: electronic personality, robots’ rights and the risk of dehumanisation of workers

In 2016, Hanson Robotics presented to the public Sophia, a humanoid robot resembling a woman and able to mimic more than 60 facial expressions (Raymundo, 2016). Sophia has cameras in its “eyes” and can recognise persons and sustain eye contact. The robot is also able to have conversations with human beings and it “has given” several interviews since it was activated. These features brought considerable attention to robot Sophia; in 2017, the UN Development Programme appointed this robot as its “first-ever Innovation Champion and the first-ever non-human” to receive such an institutional role (UNDP, 2018). Barely a month before this appointment, Sophia had been the first robot to be awarded citizenship of a country, Saudi Arabia. This award spurred some arguments and polemic discussions on the implication of recognising a robot as a citizen (see Vincent, 2017b) – can a robot have rights and duties as human beings have? Can artificial intelligence be assimilated to human conscience as a source of these rights and duties? Despite the attention that has been granted to robot Sophia, however, these questions have long been debated much beyond its case (see, also for additional references, Brožek and Jacubiec, 2017; Kaplan, 2016).

Already in 2016, a draft report of the EU Parliament inquired on the possibility of giving robots “electronic personality”, namely, “creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations” and to apply this electronic personality “to cases where robots make smart autonomous decisions or otherwise interact with third parties independently”.¹ The report also includes a working definition of so-called smart robots, which would be potentially affected by the recognition of this electronic personality, proposing to the consideration of EU institutions, as elements for identifying “smart robots”, the following features:

- “The capacity to acquire autonomy through sensors and/or by exchanging data with its environment (inter-connectivity) and the analysis of those data;
- The capacity to learn through experience and interaction;
- The form of the robot’s physical support;
- The capacity to adapt its behaviours and actions to its environment.”

The report is far from suggesting that robots should be equated with human beings in their recognition of rights and obligations, as confirmed by its proponents. The MEP who acted as rapporteur for this document, instead, drew a parallel between the “electronic personality” of robots and the “legal personality” long recognised to subjects such as corporations, allowing these non-natural persons to acquire rights, duties and obligations according to the rules of the relevant legal systems (Vincent, 2017a).

Despite legal personality being a long established legal notion and institution, paralleling it with granting personality to robots prompts several observations. Legal personality has proved vital for economic development, by allowing people to keep their personal assets separate from the assets of a corporation and, therefore, fostering investments in business initiatives including, among other, trade and manufacturing and facilitating phenomena that were crucial for economic expansion, such as vertical integration of firms and production (Deakin and Wilkinson, 2005). Its contribution to progress and development, therefore, should not be neglected. On the other hand, abuses in the use of legal personality

¹ European Parliament, 2016. Draft Report with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)) Committee on Legal Affairs Rapporteur: Mady Delvaux.

can allow people to artificially shed liabilities and dodge accountability under many key aspects of governance, including in the field of environmental and social responsibility. When it comes to labour issues, these abuses can foster a fissurisation of workplaces that can be detrimental for workers' rights in many areas, including fragmenting bargaining units, and thus putting obstacles to workers' freedom of association and the possibility of meaningfully engaging in collective bargaining as well as diluting occupational health and safety responsibilities (Weil, 2014; Prassl, 2015).

Recognising legal rights and obligations to non-human beings, therefore, is not a neutral process; it can prove beneficial, but it can also pave the way to abuses that put other parties in jeopardy. Assigning electronic personality to robots could also allow the owners of these robots to shed responsibility and could leave other parties, including commercial partners, creditors, customers and workers that interact with these robots, exposed to the risk of having no meaningful redress in case of damage. Nor can it be taken for granted that assigning legal rights and obligations to robots could precipitate having robots be equated with human beings in the future, particularly if artificial intelligence is designed in a way to develop features that render it more and more similar to conscience and human intelligence (Kaplan, 2016). Again, in this respect, the experience with legal personality is illustrative, as corporations are already protected under human-right instruments and constitutional mechanisms regarding some of their rights. The obvious example is the protection of property rights under instruments such as Protocol 1 to the European Convention of Human Rights, under which “every natural or legal person is entitled to the peaceful enjoyment of his possessions”.² But protection of the rights of non-natural persons has also been deemed to extend to elements that would in principle seem reserved to the exclusive enjoyment of human beings such as exercise of religion.³

Recognising rights to non-natural entities could, therefore, lead to outcomes that go beyond the original practical intentions underlying this recognition. As such, any potential assessment of potentially introducing electronic personality for smart robots should call for the broadest possible analysis of its potential implications. The European Parliament report discussed above covers a vast array of issues connected to the introduction of this type of personality, spanning from intellectual property and mandatory insurance to data protection and respect of human rights. When it comes to employment, nonetheless, the report seem to follow the “quantitative” approach discussed in the Introduction, merely focussing on the number of jobs that could be created or displaced as a consequence of the spread of smart robots, as well as on the potential of digitalisation and automation on the inclusiveness of labour markets. No specific reference is made to its implications for the quality of the jobs of the workers that may interact with these robots, and, in particular to the potentially dehumanising effects that this interaction may spur, particularly if those robots were to be extended legal personality and, therefore, rights and obligations.

Commenting on the award of citizenship to robot Sophia, University of Bath computer scientist Joanna Bryson warned about “having a supposed equal you can turn on and off [and how] does it affect people if they think you can have a citizen that you can buy” (Vincent, 2017b).

This is a serious risk when it comes to extending rights to robots. Whereas corporations are an abstract notion that exists in reality only fictively – even when they are associated with huge material elements, such as buildings, stocks and machinery – corporations do not exist in the physical space. Robots, in contrast, have a distinct physical dimension and existence and can share the same actual space with human beings; assimilating robots to human beings by awarding them legal capacity, and, therefore, the capability of having rights

² Emphasis added.

³ *Burwell v. Hobby Lobby*, 573 U.S. ____ (2014)

and obligations cannot be equivalent to giving legal personality to fictive entities such as corporations. Assigning personality to physical non-natural beings may cause a conceptual conflation between these entities, in this case, the robots and the human beings that share the same physical space with them. This can have unforeseen implications for the human dignity of the natural persons involved in these processes, particularly if this occurs in a framework where these human beings are already under powers of direction and control exerted by other subjects. Such is the case in workplaces, where workers are subject to managerial prerogatives that allow better integrating their working activities into the general business process of their employers (see below Section 4). Automation processes are already reported to increase feelings of alienation of work (Eurofound, 2018). In addition, persons who work side by side with physical non-human entities that enjoy legal personalities risk, even more, being considered as mere cogs in the business process, something that could lead to a severe commodification of their labour with unwanted dehumanising consequences.

By substituting human work with automated activities, technology can have liberating effects, especially if this substitution regards heavy, hazardous or repetitive work. Technology, however, can also be associated with the commodification of human work (Vardaro, 1986). One of the last, but by no means exclusive, instantiations of this phenomenon has recently been associated with forms of work in the so-called gig-economy. It has already been observed that:

The fact work is “supplied” through IT channels, being them online platforms or apps that match the demand and offer of physical chores, can “distort” the perception businesses and customers may have of [platform] workers and significantly contribute to a perceived dehumanisation of their activity. [...] Workers that can be called by clients and customers at a click of their mouse or at a tap on their mobile, perform their task and disappear again in the crowd or in the on-demand workforce materially risk being identified as an extension of an IT device or online platform (De Stefano, 2016a).

The risk of IT tools contributing to the commodification of platform workers and their social invisibility has been examined in the literature (Cherry, 2016; Prassl, 2018). Interaction of workers with ever-smarter technological devices and robots also risks introducing new elements of dehumanisation, a trend that could be exacerbated by the growing relevance of so-called collaborative robots or co-bots, namely “robot for direct physical interaction with a human user, within a shared workspace”. If these devices were to be endowed with rights and obligations that would conceptually equate them, even marginally, to human beings, the risk of dehumanisation of workers could be aggravated, particularly if workers were somehow held responsible for damages that robots may endure as a consequence of workers’ conducts.

Risks of dehumanisation associated with the spread of smart robots were expressly cited in the EU Parliament report, which pointed out that “human contact is one of the fundamental aspects of human care” and that “replacing the human factor with robots could dehumanise caring practices”. These concerns, however, seem to regard only those who receive care; no specific concerns are expressed regarding the potential detrimental effects of technologies on the work of caregivers, even if literature has pointed out how some technologically-enhanced managerial practices magnify pressure on these workers (Moore, S. and Hayes, L., 2018; Ekbia, H and Nardi, B., 2017).

Implications of the introduction of ever more advanced technologies and machinery in workplaces deserve attention from academics and policymakers. As already pointed out, the impact of technologies on the quality of jobs calls for particular attention also because of the nature of workplaces as material (and, with the advent of IT tools, also increasingly immaterial) “spaces” where human beings are subject to the managerial powers of control and direction of other persons. Subsequent sections will explore how managerial prerogatives can in principle impinge upon the human dignity of workers by virtue of the structural features of the contract of employment. Before delving into these issues, however,

the next section will partially explore how some technological innovations can lead to intrusive managerial practices that potentially magnify these risks.

3. Technologically-enhanced workers' monitoring: artificial intelligence, big-data and the risks of algorithmic discrimination

Technological tools and digitalised supervision systems are increasingly used to manage the workforce in modern workplaces (See Ajunwa, Crawford and Schultz, 2017; Moore, P., Upchurch, Whittaker (eds.), 2018). Workers' surveillance is, of course, nothing new; business historians such as David Landes (1969) have long reported that concentration of workers in factories started occurring before mechanisation, to monitor and direct the workforce better than what was possible in processes based on dispersed homework. Fordist-Taylorist business models were also based on extensive monitoring of workers (Stone, 2004).

Information technology and artificial intelligence,⁴ however, allow in principle the carrying out of monitoring and surveillance of workers activities to extents unthinkable in the past, as well as the gathering and processing of an enormous amount of data on these activities (Dagnino, 2017). More and more workers, for instance, use wearable work instruments that enable registering of their movements and location minute by minute, also measuring their work pace as well as breaks. Data collected through wearables, including sociometric badges (see below), are often analysed by means of artificial intelligence to assess workers' productivity and fitness to execute particular tasks (Manokha, 2017; Moore, P., Akhtar, and Upchurch 2018). Wearables are also used or experimented in warehouses and other workplaces to direct workers to their next task. Goods in Amazon warehouses, for instance, are stored apparently at random. Amazon workers are guided via technological tools to the next item to pick and process, a system that also enables the company to automatically track and measure the speed and efficiency of every individual worker (Baraniuk, 2015).

GPS systems allow monitoring the position and speed of truck and van drivers as well as of delivery riders and ride-sharing drivers working for on-demand platforms. These systems can also be used to verify, for instance, if these workers gather in specific locations, to prevent or react to collective action (De Stefano, 2016a). Similar to workers in a warehouse that use automated systems of direction, platform workers are assigned to the next task by the app's algorithms, which are also designed to measure the speed and diligence of the worker in completing the tasks, also by factoring in the rating and reviews that customers assign to workers. Bad scores or performance below the algorithm's standards can lead to the exclusion of the worker from the platform and thus to "dismissal", also made easier by the purported self-employment status of these workers (Aloisi, 2016). And this is not confined to tasks "on-the-road". Workers on online "freelancing marketplaces" and domestic workers who are contracted on platforms to do work in customers' households live in constant worry over ratings and how the platforms' algorithms take ratings into account when assigning the next job (FEPS, 2017).

⁴ The term "artificial intelligence", in this paper, is used as a reference to the so-called "narrow artificial intelligence" or "weak artificial intelligence", namely the artificial intelligence used to performed a single task, such as – as a commonly used description goes – "playing chess or Go, making purchase suggestions, sales predictions and weather forecast" (. This is the only type of artificial intelligence that exists, nowadays. Even self-driving cars are considered merely a sum of several narrow AIs, and the same applies to online translation engines. Narrow AI is commonly opposed to "General AI", *i.e.* "the type of Artificial Intelligence that can understand and reason its environment as a human would", which has not been developed yet (the direct citations are from Dickson, 2017). For a broader discussion of the distinction between "strong" and "weak" AI, see Kaplan, 2016.

The way these management systems operate is almost never transparent, as companies do not share the methods through which ratings and customers' feedbacks over the workers' activities are gathered and processed. Management by the rating is also spreading ever more beyond platform work, with apps that allow processing patrons' and restaurants' feedbacks over individual waiters.

Nor should it be assumed that increased forms of surveillance are confined to low-wage or blue-collar jobs, since HR practices that make resort to forms of artificial intelligence that facilitate "management by algorithm" and "electronic performance monitoring" are also extensively used in white-collar occupations. Electronic performance monitoring (EPM) has been described by Phoebe Moore et al. as including "email monitoring, phone tapping, tracking computer content and usage times, video monitoring and GPS tracking". According to these researchers, "data produced can be used as productivity indicators; indication of employees' location; email usage; website browsing; printer use; telephone use; even tone of voice and physical movement during conversation" (Moore, Akhtar, and Upchurch 2018). These data, coupled with the use of "big data" analytical instruments, also constitute the basis of so-called People Analytics practices. Pioneering legal studies on this topic, conducted by Matthew Bodie, Miriam Cherry et al. (forthcoming) define "People Analytics" as:

a process or method of human resources management based on the use of "big data" to capture insights about job performance. The core idea is that unstructured subjective judgment is not rigorous or trustworthy as a way to assess talent or create human resources policies. Instead, data— large pools of objective, generally quantitative data—should form the foundation for decisionmaking in the HR space.

Data are therefore collected from a vast array of sources. One of the companies at the forefront of these practices, *Humanize*, for instance, reports on its webpage that metadata can be collected from "email and call timestamps, number of chat messages sent, and duration of meetings can be measured to uncover patterns on how teams actually work". This does not necessarily mean that the actual content of messages and chats is examined, as the company claims to include "no names or content in the metadata".⁵

Nonetheless, even if these individual-content data are not collected or are effectively anonymised, collection practices can be highly invasive and aimed at detecting highly personal elements, including the level of interaction with colleagues and even the humour of workers, for instance through the use of so-called "sociometric badges". These are wearable devices that allow monitoring the location of workers, their movements and also, through the use of incorporated microphones and voice-pitches analysis the mood of workers without actually recording the content of their conversations (Fischbach et al., 2009).

Artificial intelligence is also being used to monitor workers in telework and smart work arrangements, which allow workers to perform their activities outside of traditional workplaces, and are thus usually associated with greater workers' autonomy (Solon, 2017; The Economist, 2018). Companies like Crossover sell systems such as the Worksmart Productivity Tool to monitor teleworkers and other remote workers by taking screenshot of their computers at fixed intervals and collecting other data, including, as the company's website explains: "keyboard activity, application usage, screenshots, and webcam photos to generate a timecard every 10 minutes". This timecard is then shared with the workers and their managers via a "logbook where all of your timecards are displayed and a dashboard summarizes your timecards to show you how you spent your time".⁶ Other companies

⁵ Humanize website <https://www.humanyze.com>

⁶ Crossover website <https://www.crossover.com/worksmart/#worksmart-productivity-tool>

market web filtering software, like Interguard, that record and reports on data such as web history and bandwidth utilization “whether the employee is on or off network”.⁷

Business-sponsored wellness programs also use software like Fitbit to track employees’ fitness (Ajunwa, Crawford and Schulz, 2017). This, among other things, can also contribute to having access to information related to off-duty activities of workers. Surveillance of workers off-duty activities is also nothing new, suffice here to think of the Social Department of Ford (Bodie, Cherry et al., forthcoming), which famously investigated the lifestyles of workers in the motor company. However, the blurring of boundaries between work and life, the constant interconnection with IT devices and digital services such as social networks and technological devices that allow to gather data from individuals’ online and offline conducts makes it possible to accede to a flow and amount of information that is very difficult to quantify and limit in advance. Articles in the press also reported cases of monitoring practices that aimed to prevent fraud by snooping social network activities and statuses (Solon, 2017).

Personal data gathered on the Internet, also by acceding to information available through social networks is also increasingly used to make hiring decision (Dagnino, 2017), and the practice of asking employees to disclose their social network passwords is also spreading, so that 18 individual states of the United States passed legislation explicitly banning it (Bodie, Cherry et al., forthcoming).

All these practices, of course, can sometimes be rooted in genuine business needs such as fostering productivity and raising levels of security, also to the benefit of individual employees. Wearables that analyse fitness data, for instance, can be employed to mitigate health and safety risks, including stress, and to prevent accidents (The Economist, 2018). Workers may also be interested in using systems that help them staying focused on their jobs both when they are on-site and off-site and having their activities faithfully recorded so that – if anything goes amiss – they can prove to have acted diligently. Business and workers can also be interested in the prevention of illicit behaviours such as fraud as well as forms harassment that can occur online. Moreover, HR practices such as People Analytics are also grounded in the idea that artificial intelligence can help better manage the workforce by eliminating individual biases of supervisors and replacing them with more objective and neutral metrics (Bodie, Cherry et al., forthcoming). The use of artificial intelligence and other technological tools to supervise working activities, therefore, should not be regarded as necessarily negative.

The practices discussed above, however, can also lead to very severe intrusion into workers’ private life and materially infringe their privacy (Hendrickx, 2015), by allowing management to access to extremely intimate information, including, for instance, through the use of data based on medical insurance claims on the intention to become pregnant and on the possibility to develop sickness (Ajunwa, Crawford and Schultz, 2017). Wearables and security cameras, programs that register online and offline activity as well as take screenshots of computers can also turn into extenuating practices of endless surveillance. Far from fostering workforce performance, these models can also generate stress as well as adverse reactions and cause sharp declines in efficiency and productivity (Moore, Akhtar and Upchurch, 2018).

In addition to this, the idea that management by algorithm and artificial intelligence can necessarily lead to more objective and bias-free HR practices may prove materially wrong. The risk is that these systems reflect the biases of their human programmers and only focus on their ideas around productivity and work performance, for instance by discarding or penalising job candidates or workers with disabilities or with features that differ from the expectations programmers have. The scarcity of diversity in technological companies can

⁷ Interguard website <https://interguardsoftware.com/web-filtering.html>

also exacerbate these phenomena. In an official Opinion on artificial intelligence, the European Economic and Social Council recently observed: “the development of AI is currently taking place within a homogenous environment principally consisting of young, white men, with the result that (whether intentionally or unintentionally) cultural and gender disparities are being embedded in AI, among other things because AI systems learn from training data”. The Committee warned against the misconception that data is by definition objective. Data, instead, “is easy to manipulate, may be biased, may reflect cultural, gender and other prejudices and preferences and may contain errors”.⁸

The risk, therefore, is that management by algorithm and artificial intelligence at the workplace, long from having neutral outcomes and reducing discrimination, could augment discriminatory practices (Bodie, Cherry et al., forthcoming). This risk is even more serious when these practices are based on self-learning artificial intelligence, with software being able to reprogram their own criteria and metrics to reach a very general predefined outcome, such as improving work productivity. The lack of transparency and the risk of dehumanising work would then be even more exacerbated.

Nor it should it be taken for granted that a one-dimensional vision of productivity and efficiency embedded into artificial intelligence technologies would necessarily lead to better business outcomes. Algorithms are often being used to implement just-in-time work practices that scale the workforce’s figures and shifts by the expected business demand, thus contributing to a casualization of work patterns and job and income instability that goes far beyond the “usual suspects” in the platform economy. A study conducted by various universities on retail workers, for instance, shows that algorithms aimed at fostering business’ efficiency can lead to suboptimal results, as a consequence of these algorithms being based on a very limited notion of efficiency and therefore not taking into account the numerous hidden costs associated with schedule instability (Williams et al., 2018).

One oft-overlooked dimension of advanced forms of automation is its potential role in introducing technology-enhanced management of workers facilitated by artificial intelligence. A smart-robot is, in the definition proposed by the EU parliament report discussed at Section 2, a robot that has the “capacity to acquire autonomy through sensors and/or by exchanging data with its environment (inter-connectivity) and the analysis of those data” and the “capacity to adapt its behaviours and actions to its environment”. Robots that collect the personal data of employees, including by measuring their biological data through interaction with fitness applications and wearables, to enhance productivity or attune the pace or other features of the work to the particular conditions of workers are not impossible to introduce. This is particularly true for co-bots, which, as discussed above, are by definition meant at having a “direct physical interaction with human beings” and at sharing workspaces with workers.

Moreover, the use of artificial intelligence, management by algorithm and People Analytics are, per se, a form of automation of middle-managerial and managerial roles. Managing and disciplining platform workers via workers’ ratings is arguably a way of outsourcing assessment of work performance to customers facilitated by algorithms (De Stefano, 2016a). EPM has also the potential to increasingly automate core business functions such as HR and also displace the associated clerical occupations, adding to the list of professionals that can be severely affected by automation, together with lawyers and medical doctors (Kaplan, 2016).

The implications of these managerial practices, therefore, warrant serious attention by policymakers and scholars and the consequences on privacy, diversity, employment as well

⁸ European Economic and Social Council, *Artificial intelligence – The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society* (own-initiative opinion) 31 May 2017, JO C 288, 31.8.2017, p. 43.

as business productivity should be carefully assessed. Even the most well-intentioned measures, including wellness programs, risk turning into forms of dystopian and paternalist control, unless a serious reflection on the use of technology at the workplace is carried out.

The paternalism behind EPM is well represented in this statement from the CEO of Awareness Technology, the company that markets *Interguard*, a monitoring system for on-site and remote workers: “if you are a parent and you have a teenage son or daughter coming home late and not doing their homework you might wonder what they are doing. It’s the same as employees (cited by Solon, 2017).”

Comparing employees to underage son and daughters is nothing new. In discussing privacy and employers’ managerial prerogatives at the workplace, Matthew Finkin recalls that in 1884 the Tennessee Supreme Court did not object to an employer telling employees where to shop – as a father could order his children where to shop, so could employers to their employees (Finkin, 2017). Beyond the irony of finding very old arguments somehow replicated in the most cutting-edge work scenarios, the possibility of management unduly and excessively compressing workers’ autonomy and privacy is a structural feature of the contract of employment (Hendrickx, 2014). As scholars Bodie, Cherry et al. (forthcoming) point out, unless regulation specifically limits managerial prerogatives, “in the workplace, there is no legal protection against surveillance per se [...]. The need for monitoring follows from our legal conception of employment, which is based on control: an employee is one whose work is controlled by her employer” and it is the right of employers to specifically direct employees activities “that separates employees from independent contractors”. The next Section will examine these structural features of the contract of employment, which are often overlooked in social sciences other than the law.

4. The “hidden” side of employment regulation: managerial prerogatives, control and subordination

A common assumption concerning employment regulation is that it is protective. Yet while strengthening the position of the worker on the labour market or in the course of the employment relationship is one of the purposes of employment law, it is not its only aim (see, also for additional references, De Stefano, 2011; Mitchell and Arup, 2005). Employment law also provides employers with extensive powers to manage their workforce – conveyed by the idea of “managerial prerogatives”. These powers are often taken for granted as if they were given by nature. In fact, managerial prerogatives are not only the result of socio-economic factors, such as the weaker bargaining powers of workers or the employers’ ownership of machinery and other forms of capital. Employers’ managerial powers are instead also legally underpinned by explicit or implied provisions of employment regulation that embed them in the employment relationship to a much greater extent than happens under other relationships regulated by contract or property laws (Davidov, 2016; Anderson, 2017; De Stefano, 2017).

As already noted, a key feature of the employment relationship, one that can be found across countries and legal traditions, is the hierarchical power – or control – of employers over employees (ILO, 2006). This power consists mainly of three principal prerogatives: (i) the power to assign tasks and to give unilateral orders and directives to employees; (ii) the power to monitor both the performance of such tasks and the compliance with these orders and directives; (iii) and the power to sanction both the improper or negligent performance of the assigned tasks and any disobedience to lawfully-given orders and directives.

The presence of hierarchical power, control and managerial prerogatives in a working relationship has been traditionally established – either statutorily or by case law – as the distinctive element of employment status in contrast to self-employment, and, accordingly, as a gateway to labour protections in many jurisdictions (Countouris, 2011). In common law systems, the relevance of these employers’ powers and prerogative is designated under the concept of “control”, mentioned at the end of the previous section. Control, namely the possibility to direct, monitor and discipline work, is one of the key tests to determine the existence of an employment relationship in common law countries. Civil law countries, instead, express the notion of control under the concept of “subordination”. The Italian Civil Code refers to employees as “*lavoratori subordinati* (subordinate workers)”, namely persons who work “depending upon and under the direction of” an employer.⁹

The French *Cour de Cassation* considers that the key element of an employment relationship is the “*lien de subordination* (link of subordination)”, i.e. “the performance of work under the authority of an employer who has the power to give orders and instructions, to supervise their execution and to penalise the failure of his subordinate [workers] to perform such work”.

Managerial prerogatives, control and subordination answer to precise economic and organisational needs of businesses. In labour law scholarship, it is now almost a commonplace to refer to the works of Ronald Coase to provide an account of the key economic function of employment contracts, i.e. allowing firms to curb transaction costs by reducing the need to constantly search and select counterparts on the market, negotiate terms and condition of contracts and enforce these contracts in order to conduct a business (Coase, 1937). Internalising production into firms, substituting market transactions with hierarchical organisations and unilateral exchanges that allow skipping the need to get the consent of the

⁹ Article 2094.

other party for every business operation or to respond and adapt to any unforeseeable change in the business environment is one of the key reasons firm exists, in Coasian terms (Coase, 1960). The contract of employment, by providing business with the hierarchical power discussed above is one of the key legal “bricks” of the modern firm. Managerial prerogatives allow employers to operate their businesses and to quickly respond to circumstances that could not be exactly predicted at the moment of the negotiation of the contract. In other words, they allow employers to not need to continuously get employees’ consent with authority to issue unilateral orders, within the limits of what is reasonable and lawful, and to monitor their execution and sanction recalcitrant workers. In other words, the contract of employment is still based on the mutual and, therefore, bilateral consent of the parties at the moment of its conclusion, since workers have to freely accept to enter into the contract. Once the contract is in force, however, they are subject to the unilateral prerogatives of employers, who no longer need their consent to direct, supervise and discipline their work performance, within the limits of what is reasonable and lawful under the given contractual and legal system.

The possibility of employers to avoid obtaining employees’ consent to implement and enforce their unilateral decisions had already been flagged by legal scholars as one of the critical functions of the employment relationship decades before Coase’s famous analysis (Pedrazzoli, 2001). Already in 1915, Italian scholar Ludovico Barassi wrote that the relationship of subordination inherent in the employment contract:

implies a unilateral affirmation of the will of the creditor of the work [i.e. the employer], a seigniorial and imperative affirmation, which does not need to meet on its way an actual consent of the worker, because he has already committed himself in the contract to unquestionably submit to those commands (Barassi, 1915-17).

The relationship of subordination in civil law, the notion of control at common law, and the managerial prerogatives that correspond to them and make the employment contract a crucial element of capitalist production did not come to light by chance, as a mere result of socioeconomic factors (Deakin and Wilkinson, 2005; Merritt, 1982). Instead, they descend from precise legislative interventions introduced in pre-industrial eras and at the outset of industrialisation. Deakin and Morris (2006), for instance, refer to the Master and Servant Acts enacted in Britain in the nineteenth century and to legislation passed in earlier times that provided for the abatement of wages and the imprisonment of servants and labourers for “misdemeanour, miscarriage or ill behaviour”. Absconding from and refusing to work was also criminally sanctioned and imprisonment for breach of servants’ contractual obligations was also a practice adopted by courts and enshrined in legislation, together with criminal sanctions for embezzlement of the masters’ goods and raw materials. Master and Servant legislation was also introduced in the British colonies, becoming a regular feature of common law jurisdictions (Hay and Craven (eds.), 2005). Also in civil law countries, similar public and criminal regulation to police the workforce were introduced, for instance through the legislation imposing the *livret du travail*, which ensured that workers would not leave their workplace in search of another occupation without the consent of their employers (Veneziani, 1986; Steinmetz (ed.), 2000).

With time, custom and practice, this authoritarian model of enforcing contractual obligations of servants and labourer seeped into the common law construction of the contract of employment and in the civil law notion of subordination. As Deakin and Morris observe elaborating on the analysis of Alan Fox (1974), managerial prerogatives “do not simply result from the employer’s superior bargaining power prior to the agreement”. They are “underpinned by certain legal norms that today take the form of the common law implied terms of the contract of employment”, such as the employees’ obligation of fidelity and obedience, “which can be traced back in many cases to the master and servant legislation of the nineteenth century and before” (Deakin and Morris, 2006).

Employment regulation, therefore, is about much more than protecting workers. The protective elements accompany a side of that regulation that is too often neglected in mainstream accounts of the employment contract. French labour law scholar Alain Supiot (1994) has long analysed this structural ambivalence of employment regulation. On one side, this regulation provides management with the unilateral power to direct, control and discipline human work, and therefore the physical and mental activities of human beings; on the other side, it has to reconcile these almost “seigniorial” prerogatives with the respect of the human dignity of workers necessary in democratic societies founded on equality principles. To that end, an essential function of employment regulation is to rationalise and limit managerial prerogatives. This is a function that risks being overseen under simplistic accounts of employment regulation that consider the employment contract as the mere exchange of labour in consideration of a salary and labour protection as a simple form of protecting the workers’ income from the superior bargaining power of employers. The next section deals with some of these simplistic accounts that have lately been associated with automation.

5. Universal Basic Income is not enough. Labour and human right protection still need to apply.

The policy and journalistic discussions on automation have also stirred an extensive debate on universal basic income (UBI) (Romano and Zitelli, 2017). Numerous tech entrepreneurs and companies have maintained that one of the responses to the displacement of jobs caused by automation should be the introduction of UBI, to mitigate the social impact of mass technological unemployment (Sadowski, 2016). The debate on UBI is broader than and goes beyond these proposals. Several labour advocates have suggested UBI as a progressive policy that would help to face significant challenges in modern labour markets, including technological unemployment and the growth of casualised and unstable forms of employment (see, for instance, Hollo (ed.), 2016; Standing, 2014). This is a very complicated issue that cannot be treated here. What is important to state, however, is that even if a functioning UBI scheme were possible to implement, this would not affect the legal structure of employment contracts and regulation discussed above.

Neoliberal proponents of UBI often take for granted that this measure would substitute for other welfare schemes, including social security (Zwolinski, 2014). A corollary of this vision could also be that, if a UBI were introduced, employment regulation could be rolled back because, in system where everybody had a secure access to income, regulation aimed at supporting workers' income and remediate against their weak bargaining position would no longer be needed, also because the UBI would likely increase their reservation wages.

These assumptions are in line with conventional accounts of employment regulation and mainstream approaches to employment policy. Indeed, the objective of the flexicurity approach to employment protection is to replace protection of workers "on the job" with protection "on the market", by deregulating aspects of employment protection while securing workers' income through unemployment benefits and active labour market policies (Sciarra, 2007; Hayes, 2011).

Policies aimed at substituting protection of employment rights for protection of income risk neglecting an essential feature of employment regulation, which is not just protecting workers because they are economically dependent on their employers and have weak bargaining power "on the market", but is also limiting and rationalizing the unilateral exercise of managerial prerogatives "on the job", i.e. while they are employed (De Stefano, 2014).

Regulation against discrimination, working time regulation protecting physical and mental health of workers against the risks of fatigue and burnout, rules protecting privacy at the workplace against abusive forms of monitoring, to cite only some of the regulation that limits the exercise of managerial prerogatives cannot be swapped with protection "on the market". This regulation, in fact, concerns powers and duties that are functioning during the entire course of the employment relationship and do not merely depend on the superior bargaining power of employers but are also enshrined in legal norms. The idea of replacing labour protection at the workplace with securing the stability of income neglects fundamental aspects of the employment relationship, which warrant regulatory limits aimed at protecting human dignity at the workplace. This is also something to take into account when discussing the possibility of introducing UBI or any other form of income protection – even if UBI schemes were introduced, there would still be need of employment regulation and labour protection "on the job".

The fundamental features of employment regulation and its ambivalence in granting far-reaching and intensive unilateral managerial powers that can materially compress the workers' autonomy, on the one hand, and limiting and rationalising those powers, on the

other hand, must be particularly heeded in the wake of automation and the increasing use of technological tools to direct the workforce. EPM, People Analytics and the use of artificial intelligence and big data at the workplace magnify the possibility of supervising workers and closely monitoring the performance of working activities. As already discussed in Section 3, these technologies can enable egregiously invasive practices and lead to arbitrary and discriminatory outcomes. Constant attention must thus be paid to these developments and regulation is needed to prevent abuses that imperil human dignity.

To this end, it is also essential to frame workers' rights in fundamental and human rights discourses. The nature of labour rights as human rights has long been debated (Arthurs, 2006; Fenwick and Novitz (eds.), 2010; Mantouvalou, 2012) and it has also been enshrined in a vast number of international treaties and sources of law (Politakis (ed.), 2007). One of the rationales to recognise labour rights as human rights lies precisely on the existence of managerial prerogatives (De Stefano, 2017c). As discussed above, legal systems vest employers with authority over their workforce that goes beyond social norms and is underpinned by legislation. Limiting and rationalising authority to preserve human dignity – which is one of the essential functions of human rights – is also essential at the workplace. Labour protection, by limiting the exercise of managerial prerogatives, is also crucial to ensure that the authority of employers is not exerted in ways that jeopardise the human rights of workers.

Human rights approach to labour regulation can indeed prove beneficial also concerning the protection of workers' autonomy and dignity regarding electronic monitoring of their activities (Hendrickx, forthcoming(a); Hendrickx, forthcoming(b)). The European Court of Human Rights, for instance, has interpreted the right to private life under article 8 of the European Convention on Human Rights to enshrine the protection of privacy of individuals at the workplace. In a recent case that concerned the dismissal of a worker for the use of the internet at work for private purposes, in a situation where the employer had access to the content of the workers' communications via IT tools, the Court established that employers' monitoring of online activities, while admissible in principle, had to be carried out in a proportionate way, to ensure that arbitrariness and abuses be avoided.¹⁰ Among the safeguards that the Member States have to consider, to determine whether monitoring practices are legitimate, the Court indicated: the circumstance that employees be properly notified of the possibility that the employer might monitor correspondence and other communication; the presence of legitimate reasons to justify monitoring the communications and accessing their content; the possibility to establish less intrusive monitoring practices. The Court also mandated to consider, in general, the extent of the monitoring and the degree of intrusion into the workers' privacy, also making a distinction between access to the metadata covering the flow of communications and access to the content of these communications.

This judgment can provide a general protective framework for workplace relations in countries that adhere to the European Convention on Human Rights. For countries that also belong to the European Union, further guidance can be found in the General Data Protection Regulation (GDPR), which provides that the EU Member States may introduce, by law or by collective agreements, “specific rules to ensure the protection of the rights and freedoms in respect of the processing of employees' personal data in the employment context”. These rules shall “include suitable and specific measures to safeguard the data subject's human dignity, legitimate interests and fundamental rights” with particular regard to “monitoring

¹⁰ European Court of Human Rights, *Bărbulescu v. Romania*, 5 September 2017 (application no. 61496/08).

systems at the work place”, transparency of processing and transfer of personal data (see, for initial comments, Fusco, 2018; Hendrickx, 2018).¹¹

These regional approaches to workers’ privacy protection, founded on the idea of protection of human and fundamental rights at the workplace, and specifically addressing the need that the prerogatives of managing and monitoring workers do not impinge upon their human dignity, can guide the introduction (or the update) of labour regulation aimed at protecting workers against abusive supervision practices in the wake of the spread of technology-enhanced monitoring systems (Hendrickx, 2018). A human-rights based approach, grounded on the idea that the human right to privacy can only be limited insofar as this is indispensable to the exercise of other human rights and that any limitations must be proportionate to this end, can indeed provide a meaningful general framework of protection that may prove beneficial, in contrast to spot-remedy approaches adopted in systems where recognition of workers’ rights as fundamental rights is still lagging behind, like the United States (Hendrickx, 2014; Finkin, 2016; Ajunwa, Crawford and Schulz, 2017; Cherry et al., 2017;).

In this respect, it should also be remarked that employment-at-will rules allowing termination of employment for “any or no reason” can indeed exacerbate risks of abuses of managerial prerogatives (Anderson, 2017), particularly in connection with monitoring practices that, through the use of technology and big data, allow access to information on workers’ sensitive data and private life. Even if practices like targeting personal features protected under discrimination law were illegal, the possibility of terminating employment without providing any reason may give room to violations that would not be easy to detect or that would require lengthy litigation to be sanctioned. This is not only true for systems that operate under an employment-at-will rule but also for systems that do not provide effective remedies against unfair termination of employment or access to justice in employment disputes, since lack or scarcity of remedies or significant litigation costs may discourage individual action against violations (De Stefano, 2014; Adams and Prassl, 2017). Moreover, these risks would not only be confined to termination of standard employment relationships. Increasing recourse to temporary and casual work arrangements, which do not require a reason of termination for the work to be discontinued magnify managerial prerogatives and aggravate the risk of abuses, as workers would be reluctant to resist invasive supervision practices lest their work arrangement not be renewed or be zeroed-down (De Stefano and Aloisi, forthcoming).

For this reason, “protection on the job”, also against unfair termination, is pivotal to protect human dignity at the workplace. Human rights approaches can also justify a universal approach aimed at extending labour protection beyond the traditional scope of employment relationship, since casualization of industrialised labour markets and the spread of platform work are materially blurring the distinction between employees and some self-employed workers in terms of managing practices (De Stefano, 2016a). For instance, the practice of taking screenshots of computers of remote workers to monitor their work performance and productivity has long been in use in platform work, to control alleged self-employed workers in platforms like Upwork and other online crowdwork platforms (Aleksynska, Bastrakova, and Kharchenko, forthcoming).

A human-right based approach to labour protection, of course, cannot neglect the importance of collective rights such as freedom of association and the right to collective bargaining in the protection of human dignity at the workplace. The function of collective rights is not only to give workers a better position to negotiate economic conditions of employment; collective rights also act as “enabling rights”, facilitating securing and

¹¹ Article 88, Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

effectively enforcing any other right at the workplace. As such, collective rights also act as a fundamental tool to rationalise and limit the exercise of managerial prerogatives, since they allow counterpoising a collectively organised party to the intrinsic collective and organisational dimension of these employers' prerogatives, which can be exerted on an individual basis but also on the workforce as a whole. In this respect, collective rights, including the right to collective bargaining, allow moving from a purely unilateral exercise of those prerogatives towards a consensual governance of work, by requiring negotiations on aspects of the business organisation that would be, in lack of collective relations, unilaterally governed by employers, by means of the authority vested in them by the legal system (Liebman, 1993). The next section explores how collective regulation is essential to secure adequate labour protection in times of automation and technologically enhanced monitoring practices.

6. “Negotiating the Algorithm”: “human-in-command” and collective rights for the future of work

As discussed in the Introduction, the mainstream discourse on automation tends to follow a techno-deterministic idea that the introduction of new technologies will determine job losses or gains as an autonomous and heterogeneous process impacting labour markets. This approach, nonetheless, does take into account the role that labour regulation can play to influence this process – something that is indeed surprising, given the high number of international and national instruments that deal with the impact of technology on employment. Leaving aside the scope of this contribution the binding treaties and sources that aim at achieving the objective of full employment (McGaughey, 2018), such as the ILO Employment Policy Convention, 1964 (No. 122), and other detailed sources such as the instruments governing collective dismissals are crucial in this regard.

Collective dismissals are governed by copious international, regional and national regulation. These instruments commonly require businesses to adequately inform and consult with trade unions and workers’ representatives and to involve public bodies before carrying out mass redundancies. The ILO Termination of Employment Convention, 1982 (No. 158) mentions explicitly that information and consultation procedures should also be followed when redundancies are envisaged for “technological” reasons, with the aim of finding measures “to avert or to minimise the terminations” and “to mitigate the adverse effects of any terminations on the workers concerned such as finding alternative employment”. The ILO Termination of Employment Recommendation, 1982 (No. 166), which supplements this Convention, also gives examples of the measures that could be taken to mitigate the impact of redundancies, such as “restriction of hiring, spreading the workforce reduction over a certain period of time to permit natural reduction of the workforce, internal transfers, training and retraining, voluntary early retirement with appropriate income protection, restriction of overtime and reduction of normal hours of work”.

Provisions concerning information and consultation between employers and workers in case of redundancies are also included in regional sources of regulation. The CARICOM Model Harmonisation Act on Termination of Employment mandates these procedures be followed where layoffs take place because “the employer has modernised, automated, or mechanised all or part of the business”. Information and consultation duties and involvement of public bodies are also required in the EU Member States, in implementation of the EU Directive on Collective Redundancies. Similar measures are also provided in many national legislations, both in compliance with the international and regional sources mentioned above and as a matter of national policy. Involvement of workers’ representatives in the governance of mass redundancies is a widespread and established practice in a vast number of industrialised, emerging and developing countries – the ILO Employment Protection Legislation Database,¹² for instance, indicates that more than 60 countries, belonging to all the continents of the world, provide for procedural duties of information and consultation in the event of collective redundancies.

Yet having this type of regulation in place is far from sufficient for solving the problems deriving from automation. Job losses could occur at levels unheard-of in the past, for instance, or new technologies could be introduced at a pace that strains current regulation and industrial relations. Moreover, this regulation aims at mitigating the consequences of redundancies but is not able to avert them per se, especially if new machinery and business processes displace a high number of jobs in a short amount of time. Nonetheless,

¹² <http://www.ilo.org/dyn/eplex/termmain.home>

policymakers, researchers and scholars should not start from the assumption that regulation aimed at attenuating mass job losses does not exist or is impossible to apply. Collective redundancies regulation exists, and its existence should be considered when discussing the impact of automation on labour markets, together with the role that social partners and regulators can have in governing these processes.

Nor should it be assumed that regulation would necessarily stifle innovation, another widespread corollary of techno-deterministic approaches to automation. First, it is wrong to believe that labour regulation has an inevitable negative impact on economic development – vast literature providing evidence to the contrary exists, instead (Berg and Kucera (eds.), 2008; Berg (ed.), 2015; Lee and McCann, 2011; Deakin, 2016). More specifically, collective redundancies regulation and collective labour laws that ensure functioning industrial relations systems and sustain the role of workers’ representatives and trade unions can be associated with positive economic outcomes. Robust collective labour market institutions have been associated with good performance in maintaining employment levels stable during the recent financial crisis in Germany (Bohachova, Boockmann and Boch, 2011). Other studies show a positive relationship between stronger collective institutions and productivity (Deakin, Fenwick and Sarkar, 2014; FitzRoy and Kaft, 2005), economic efficiency, and levels of employment (Deakin, Malberg; Sarkar, 2014).

The assumption should be, therefore, that collective dismissal regulation and workers’ involvement in managing mass redundancies can be beneficial when dealing with automation processes and their social implications. Moreover, the involvement of workers’ representatives can also occur much earlier than when actual redundancies occur. The ILO Termination of Employment Recommendation, for instance, suggests to introduce information and consultation processes that operate well before actual redundancies being implemented, to involve workers’ representatives at the stage where “the employer contemplates the introduction of major changes in production, programme, organisation, structure or technology that are likely to entail terminations”. Information and consultation at that stage could allow the parties to envisage consequences of automation processes and to identify timely solutions.

Duties to engage in social dialogue to deal with the envisaged impact of technological innovation are also provided under regional instruments, such as the EU Directive 2002/14. In this respect, the Directive mandates information and consultation duties both on an ad hoc basis, “on decisions likely to lead to substantial changes in work organisation or in contractual relations” and, on a regular basis, “on the recent and probable development of the undertaking’s or the establishment’s activities and economic situation”. Examples of national regulation that provide for similar duties are also available. Swedish law, for instance, binds employers “to regularly inform an employees’ organisation in relation to which [they are] bound by collective bargaining agreement as to the manner in which the business is developing in respect of production and finance and as to the guidelines for personnel policy”.¹³

Collective bargaining can also be essential in this respect, by introducing a right to lifelong training for workers to be better prepared to face the introduction of new machinery at the workplace and the need to move to other tasks or occupations, in cases where their jobs are displaced by automation. A specific individual right to training, for instance, has been introduced in the 2017 Italian national collective agreement for the manufacturing sector (Pogliotti, 2016).

The involvement of workers’ representatives can also prove particularly beneficial to the aim of governing other implications of new technologies at the workplace, namely those

¹³ Swedish Employment (Co-Determination in the Workplace) Act (1976:580), Section 19. Analogous duties are provided also when the employer is not bound by a collective agreement.

affecting the quality of the jobs that will “survive” after automation. The introduction of artificial intelligence and the use of big data and EPM need to be governed, to avoid that systems allowing the magnification of the scope and impact of managerial prerogatives and the intensity of monitoring engender abuses and imperil the human dignity of workers.

Regulation is needed to govern the amount of data being collected on the work performance and the personal features of workers as well as the way data are collected. Nor is this only a matter of privacy protection. The way work is directed through the use of new technologies, including wearables and co-bots among other things, should be regulated to ensure that the quest for higher productivity does not result in occupational hazards and heightened stress for the workers involved. Disciplinary mechanisms facilitated by technology are another fundamental item to regulate. Even if it were possible to have artificial intelligence deciding on issues such as increasing the pace of work or intensifying production, these decisions should always be implemented after a human review. The same goes for any disciplinary measure taken in light of data collected through mechanical monitoring systems or algorithmic processes. Algorithm-based evaluation of work performance should also be disciplined, with the aim of making the criteria of evaluation transparent and known to workers and to ensure avoidance of arbitrary or discriminatory outcomes. To this end, again, even if it were possible to have automatic changes and updates in the operation of algorithms through self-learning artificial intelligence, the final decision to amend the criteria through which work performance is assessed should be taken by humans, made transparent and known to workers and also be subject to negotiation.

“Human-in-command”, an approach advocated by the European Economic and Social Committee’s Opinion on Artificial Intelligence,¹⁴ namely the “precondition that the development of AI be responsible, safe and useful, where machines remain machines and people retain control over these machines at all times” should be strictly followed also concerning work. The Opinion also specifically advocates that “workers must be involved in developing these kinds of complementary AI systems, to ensure that the systems are useable and that the worker still has sufficient autonomy and control (human-in-command), fulfilment and job satisfaction”. To fulfil this objective, it is also crucial that any managerial decision suggested by artificial intelligence be subject to review by human beings who remain legally accountable, together with their organisation, for the decision and its outcomes. The fact that decisions were taken following machine-based processes should never be a sufficient reason to exclude personal liability; even if electronic personality were introduced in the legal system, humans should always remain accountable for any decision directly affecting workers and any other natural person.

It goes without saying that regulation in these fields will have to remain flexible and quickly adaptable to technological innovation. For this reason, besides a general default legislative framework, specific and bespoke regulation is essential. In this regard, collective bargaining can play a primary role both at the sectoral and at the workplace level. Collective agreements could address the use of digital technology, data collection and algorithms that direct and discipline the workforce, ensuring transparency, social sustainability and compliance with these practices with regulation. Collective negotiation would also prove pivotal in implementing the “human-in-command” approach at the workplace. Collective bargaining could also regulate issues such as the ownership of the data collected from workers and go as far as creating bilateral or independent bodies that would own and manage some of the data (Choudary, S., 2018). All this would also be consistent with collective bargaining’s fundamental function as an enabling right and as a rationalisation mechanism

¹⁴ European Economic and Social Council, *Artificial intelligence – The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society* (own-initiative opinion) (n. 7).

for the exercise of employers' managerial prerogatives, allowing moving away from a purely unilateral dimension of work governance.

“Negotiating the algorithm” could, therefore, become a crucial objective of social dialogue and action for employers' and workers' organisation. The UNI Global Union (2017), for instance, recently issued a series of cutting-edge proposals on Ethical Artificial Intelligence at the Workplace. Phoebe Moore et al. (2018), moreover, report on several collective agreements already in place in various countries that regulate the use of technology not only in monitoring workers but also in directing their work, with the aim of protecting human dignity and occupational health and safety of workers. In this respect, Seifert (2018) also envisages a potentially key role for transnational collective bargaining and reports on transnational agreements already concluded on the issue of data protection. Social partners, therefore, are already tackling these issues. Governments also have an important role to play, in addition to providing a general legislative framework to regulate these issues in lieu of or complementing specific collective bargaining. For instance, they can also use fiscal incentives to stimulate technological business strategies, on the condition that they fully integrate sustainability objectives and are subject to social dialogue. It will not be a simple process or a quick one, and it will require efforts from all the parties involved. Among other things, substantial resources will need to be spent to ensure that workers, managers, trade unionists and HR personnel be adequately trained to deal with the challenges and opportunities that technology can prompt. Regulation and collective governance of these processes will not be built in a day, but they are essential to ensure that the benefits of technological advancements improve our societies inclusively and as a whole.

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