Benefits and Hurdles of AI In The Workplace – What Comes Next?

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Abstract

During the last few years, there has already been a solid discussion and political will, transversal to most European countries, on the need to invest in prevention, promoting healthier living environments and person-centred digital solutions. In short, it seems that consensus on the need to move forward and invest in wellbeing and quality of life was achieved.

During the COVID-19 pandemic and the confinement measures it implied, many services had to be closed; teleworking suddenly became the rule and many families stayed at their homes, with the children in remote classes, some without sufficient equipment or the most adequate digital tools available. Digital services, if implemented correctly, can be the right tools to address many of these challenges. The importance of implementing them correctly increases in the current context of accelerated Digital Transformation, where many are looking towards Artificial Intelligence (AI) as a means to help people to cope with the increasing number of digitized work. We are assisting to a gear-shift in the current digital revolution, as now we better understand how it could have been helpful, if already embedded in daily life.

COVID-19 generated severe consequences for the working context, with effects on physical and mental health and wellbeing, and with trends such as teleworking coming to stay. Organizations and individuals working on AI can play a great role in providing solutions, not only during this emergency period, but also in the long-term perspective, and not only for office workers but in more traditional industries as well. Thus, the COVID-19 pandemic is a driver for the digital revolution in the workplace across many levels. However, inequalities persist and their impact on universal access to the digital world is enormous. Moreover, several other challenges come from the use of artificial intelligence in the workplace.

This paper addresses how technology applied to the work environment can be leveraged to respond to the emerging challenges raised by COVID-19. It also provides reflections on the main opportunities and challenges that the use of AI solutions in the workplace imply, suggesting measures or recommendations to tackle them, towards a concerted approach to AI, integrating the policy agenda with the implementation strategy.

Keywords: AI, Living and Working Environments, Digital Transformation, COVID19, Inclusion.

1. INTRODUCTION

Digital transformation is a latest trend, related to the transformation in business and operations by utilizing digital technologies. It is considered a major development ankle for corporations, supporting them against competition and enhancing their mid-term viability [1]. Usually, the deployment of digital technologies for supporting different aspects of a business (from sales [2] and marketing, to everyday operations and financial management), is based on the vision and decision making of the managers, who are responsible for defining and monitoring the organisation's long-term strategy. Furthermore, the application of new technological trends (e.g. teleworking) in working environments is a gradual and time-consuming process [3], especially in the most traditional ones (e.g. banking, public sector), requiring a long transition period, during which the employees need to be trained to acquire the sufficient digital literacy, potentiating the gradual acceptance of the changes.

However, the recent COVID-19 pandemic and its results proved to be a greater disruptor for the existing working environments [4]. The enforced lockdowns and physical distancing policies made it almost impossible for companies to maintain their full force at their premises, and had to proceed fast to an organizational transformation, from office settings to a fully remote format, in order to keep their personnel safe and healthy and their business running. Despite the fact that many employees were also allowed previously to work from home for a minimum amount of their time (e.g. four times per month), such policies have never applied before at such a great extent.

In order to prevent employers from interrupting their business activities, as employees from losing their income, COVID19 pandemic has been triggering remote work in a way that, probably, may never be completely reversed to its original state [5]. Modern computer technology and the digital transformation is actually the main responsible for allowing the majority of office workers to continue with their work, even if not in their usual workplace.

It is also important to note that even though digital solutions were initially welcomed as the tools that would facilitate processes and remove demands, pressure and risks, in the workplace amongst many other environments, the resulting effect has been quite the opposite, it has increased the demand of new skills (e.g digital literacy), it has increased the expectations of outcomes from employees, and also created a 24/7 environment (mostly through mobile technologies) which, in many cases, demanded a transition from a scheduled limited availability, to a constant availability [6]. Such increase in expectations, availability and technological requirements has put a strain in the quality of life of the workforce, in particular in the case of older workers [7]. It is then critical to learn about what is happening during this digital-everywhere-all the time transitions, and generate the necessary insights to guarantee and help improve overall quality of work, and of life.

In the present article, the authors departed from several European projects reports, implementation experiments, events and research discussion, as well as an extensive literature search undertaken under these different initiatives, to advance with some considerations regarding the topic of AI in the workplace and the effects of COVID19 in the challenges to overcome, mainly based on inductive reasoning, supported by the shared opinions of a wide and multidisciplinary team of experts.

2. USE OF DIGITAL TOOLS IN THE WORKPLACE

Technology proved to be the greatest enabler for successfully completing this transformational phase of the workplace during the COVID-19 pandemic [8]. By leveraging the capabilities of services already applied in the office environments, and with the addition of a limited number of novel ones, a virtual office space was formulated where all employees may interact, collaborate and participate in company's everyday activities while being physically located at their homes [9].

It is important to note that not all organizations and people could adapt to these new needs and environments, in some cases due to lack of budget and resources (i.e. hardware, Wi-Fi), skills or adaptive systems (i.e. the inexistence of assistive technologies) for this new hybrid-online working.

When integrating AI systems in the workplace, all of the above is to be considered, to ensure a realistic input of information into these systems, to ensure that its benefits are greater, and not limited.

2.1 Benefits and Hurdles

For instance, tele-conference services, like Teams, Skype, Zoom, GoToMeeting, Webex, along with more informal channels (e.g. viber, WhatsApp, Signal, Slack, etc.) tackled the communication needs. Cloud-based repositories like Dropbox, Google Drive and SharePoint enhanced the exchange of files, documents, and information. Online office tools, like Google Suite or Office 365 allowed for the simultaneous access and editing of their content. VPN tools enabled the access to internal information stored in a company's server. Last but not least, collaboration and project management tools like Trello, Redmine or JIRA made possible the monitoring of a project progress and the efficient task allocation. The list of digital tools is long and covers all operations of a company or other type of organisation, from human resources and high-level management to IT services and marketing and sales, ensuring the efficient collaboration in a fully remote environment.

However, the adoption of technology cannot solely make the difference leading to the aforementioned transition, as several non-technological challenges need to be also tackled. For

instance, the vast majority of companies from smaller ones to larger multinational organisations have established procedures and processes that formalized the operations and set the framework for running their businesses. Therefore, in order to make it fully running in a remote environment, the procedures should be adjusted accordingly. Modifying or adjusting these, in order to exploit the available digital tools may prove harder than learning to use the technology itself. Indeed, the modification in aspects that were successful and became part of an organisation's comfort zone (business-as-usual) may create a high resistance to change, limiting the impact of the digital intervention. Issues such as data governance, ethics and privacy assume a much more important role when the work increases its digitalisation.

Similar to the procedural changes, another challenge that needs to be tackled, is the change in a company's nature. The transition in a remote setting may have been proven easier for companies already in the technology domain (e.g. software houses) or companies using a great deal of digital tools. But what would happen in a more "traditional" business (e.g. food production)? In this case, the adoption of physical distancing policies within the companies' promises, the enforcement of strict hygiene measures and the implementation of shift-work programs, will have a better effect for such organizations, whose premises are core elements of their business. Even here, technology may play a supporting but substantial role in the effective employee management and the monitoring of physical/social distancing policies.

Last but not least, one of the greatest challenges during the COVID-19 period is how to keep the employees healthy and safe. As the employees are the heart of a company, making sure that they will not get sick is crucial for keeping the business running. In addition, this period was proven to be extremely stressful, the consequences of which in personal health have been measured yet. Therefore, maintaining the good mental state of the employees is of equal importance. Preserving the good physical and mental health of the employees does not only concern the older ones, who may belong to a vulnerable group and consequently are more susceptible to COVID-19, but also affect younger ones who may be living with their parents or families, are more concerned about the future and may experience higher stressful conditions. Technology interventions in this case, may help to monitor their health and to ensure the good level of their mental and physical wellness.

Technology can have a role into workers environment also when they return to the workplace when restrictions are relaxed. In this context tracing technologies and behavior change approaches can support workers in developing working practices that are safe and minimize the chance of contracting the virus. It has come to light that maintaining a healthy environment is as much a social acceptance and behavior change problem as much as it is a problem of protection equipment and vaccines.

There seems to be some sort of lack of control of the use of technology, as it has entered people's personal and professional lives, increasing the number of online interactions in a given day, with colleagues, vendors, clients, friends and family members. It appears there is a need to spread awareness about its healthy uses, possibly about self-managing digital access and study how it can affect stress and, in result, quality of work (increased human error, lack of attention, etc.). AI systems can help understand what is happening and provide the guidance to help steer into the right direction, for increased economic and personal wellbeing.

2.2 One Step Further with AI at the Workplace

Current international research and innovation actions (e. g. Horizon 2020 projects SmartWork, WorkingAGE, SustAGE or CO-ADAPT) are focusing on the development and validation of technology-driven interventions, for supporting older employees in their everyday tasks, monitor their health status and enable them to remain longer in the active workforce, while allowing companies to efficiently exploit their long experience and collected knowledge. The SmartWork project (www.smartworkproject.eu/) builds a worker-centric AI system for work ability sustainability of older office workers, by integrating unobtrusive sensing and modeling of the worker state with a suite of novel services for context and worker-aware adaptive work support [10]. On a parallel line, the SustAGE project, develops a multi-modal person-centred IoT platform,

which integrates with the daily activities of ageing employees, both at work and outside. The system timely provides its users with personalised recommendations that jointly increase safety, well-being, and productivity of harbor and factory workers. Moreover, in the case of a Covid19-incident for one of the workers, an analysis of all workers positions is carried out in order to identify colleagues who have been close enough to the incident and, therefore, enter a higher control priority. AI can also facilitate the access to knowledge in terms of information and of colleagues, as it is the case in the CO-ADAPT project (https://coadapt-project.eu/) that, besides a personal health assistant, has developed AI (EntityBot) capable to learn in office and knowledge work what tasks the workers in engaged, along with a model of what information entities such as people, documents, applications are connected to it, being then capable to recommend contextually relevant actionable entities that improve the efficiency and quality of work.

Digital tools and services deployed in these projects can pave the way and act as indicative paradigms to similar commercial initiatives on the management of older, as well as younger employees, working on a remote basis. These are AI based tools that bring to the discussion supplementary added-value, but also additional and diverse challenges.

There are enormous benefits of applying AI-based solutions to monitor workers' health and prevent accidents or, currently, COVID-19 infections, and those benefits are reported with enormous potential. According to the recent Deloitte and MedTech Europe report [11], implementing AI in European healthcare systems could save up 380,000 to 403,000 lives annually or €170.9 to 212.4 billion per year.

Moreover, as the paper on "The role of AI technologies in working through COVID-19 and its aftermath" [12] published by Horizon 2020 project SmartWork presented, the AI solutions developed for different scenarios might be particularly useful in the era of pandemic and in the longer future. This non-scientific paper on the role and contribution of the digital solutions and systems to the COVID19 implications in the work environments, gathered all projects funded under the same call to join efforts, reflect and share about the COVID-19 implications to the work environments, now that teleworking turned into a main instrument and necessity for the whole society; understand how the digital solutions and systems could be developed, adapted, optimized or applied to better respond to the pandemic context challenges.

From the different contributions, some similarities can be highlighted: the desire to leverage the existing knowledge and rapidly respond to the challenges of this new (even if hopefully temporary) era; the understanding of the challenges ahead; and the will to overcome them collectively. With the help of technology, employees who have successfully passed through COVID-19 or another high-risk virus, can communicate their experiences in chat-rooms or other social media to alert their colleagues about the possible dangers and make them pay more attention to the prevention procedures.

However, there are also enormous risks of misuse (if not even abuse). Those vary from privacy concerns, gender, disabilities or other discrimination/racial prejudices, or the basic bias based on the poor quality of the data, data collection with inadequate tools, or even the imbalance in power between employer and employees. They should and can be limited in order to fully allow stakeholders to benefit from the opportunities AI solutions may bring. In order to gain the best insights, realistic and massive data collection practices are necessary.

2.3 Paving The Way Further

The report on occupational safety and health for EU-OSHA [13] reminds us about all kinds of risks, and that people would prefer AI in the workplace as an on-demand helper rather than as a manager, co-worker or proactive assistant. But, if applied properly, workers believe that AI could improve safety, help reduce mistakes and limit routine work.

The "if applied properly" mentioned earlier is the key differentiator. With the technologies based on personal data, and many of them being so sensitive, such as health related data of various kinds, there is the need to ensure that the solutions are safe, secure, follow the legal standards

when it comes to privacy, and at the same time put the individual's control over their data, and their wellbeing in the centre. Clear and transparent communication is necessary to ensure fairness and ethical practices.

Health and productivity go hand in hand and AI can bring benefits for health, such as promoting behaviour change, as well as safety, as long as there is a clear division on the information that is made available to workers and employers.

It is a huge opportunity for AI to understand who is impacted and how, do it at a very early stage and develop all the needed preventive and mitigative actions that may solve some of the challenges, namely sensitive uses, clear accountability, risks to health and safety, potential denial of services.

Four main areas of challenges are thus clustered and highlighted:

- Legal and regulatory - customising solutions at the country level, as well as in different domains, such as data quality, issues of ownership, privacy, ethics and overall data governance.;
- Technical – this includes how data fragmentation can be overcome, storage, access, use, and how to progress on interoperability, not only data quality;
- Social - including workforce accepting and trusting the apps, improving the working environment;
- Education – on the topic of AI for governments, employers and employees.

The societal issues are probably the most challenging hurdles for a wider use of AI in many disciplines, since, as it has been broadly accepted by experts [14]), it is not about the technology but rather about how it is used and governed. Consequently, solving all societal issues is recognised as the crucial issue related to the implementation of AI for health and wellbeing in the workplace.

Complexity is one of the variables that implies societal challenges, mainly connected to the fact that people do not understand what happens to their data nor the benefits – due to the lack of clear and transparent information. Trust in the digital tools and the use of data is the main challenge to developers and there is the need for broader user validation in AI to increase trust.

One additional angle that requires discussion is to understand how big is the risk that AI solutions can endanger jobs if they massively analyse productivity? And how can misuse by employers or other authorities be prevented? However, there are technical ways in which good governance can call for anonymization of data in a way that it can still contribute to providing insights that help improve existing processes, without pointing at specific people. Hence the insistence in proper data privacy policies and governance in place. Employees need to understand the company's practices in their decisions.

Departing from the book "Architects of Intelligence: The truth about AI from the people building it" [15] it is also worth to point out that it is the first time in history that more jobs are erased by a new technology than the ones created, which means that this a real discussion to hold. Automation may provoke less jobs, a shift in job types and creations, a new universe of jobs has grown as a result, while others are rapidly fading, and measures to prevent or address this in the societal area are required. Is a minimum global income to protect people that may lose jobs one solution to discuss? Will it be accepted that the State will provide money for those who do nothing? How is the digital transition managed?

On the crossover between the human and technological factors, an important question for apps and systems to work correctly is eliciting the correct rules and defining the right values. AI technologies don't all work the same, or face the same challenges. For example, machine learning algorithms deal with a huge amount of data, which can be anonymized, but still rely on data quality, whereas chatbots can focus on individual and personal data and encode rules and knowledge in order to interpret human-provided input. Consequently, the performance of AI

solutions strongly depends on the data provided and governance, as well as on the models developed, but in any case, there is still a long way to go. Privacy is, of course, a relevant issue, but to enable trust on AI, the collection instruments and the transmission channels are really important. Recent developments like blockchain technology may provide solutions with respect to data privacy and protection in order to improve citizens' trust on AI.

This also highlights the need for more clarity in what concerns the EU Health Data Space [16] and the different uses of data, anonymised or personal. Fair data and standards bring also very important initiatives in Europe to enable progress in this area. Data governance models are necessary to help guide the transition into AI-friendly ecosystems and organizations.

2.4 Discussion

When applied to the work environment, AI poses several possibilities related to its ability, not only to learn and predict human behaviour, but also to develop its own value and 'morals'. Under the actual pandemic context, which seems to be here to stay for a while, the AI potential allows us to daydream on how, at the workplace, it could be used to promote and ensure the compliance of contingency measures and safety procedures, by workers, employers and even clients within the organizations, as well as to maintain or increase the workability sustainability of the oldest ones in the active.

On the other hand, at home or within other personal contexts (e.g. outside, while shopping, or in the gym), AI solutions could be conceived and personalized to ensure physical distancing, to detect risk behaviours, or to avoid unnecessary travelling or face to face interaction, thus avoiding the spread of Coronavirus. In addition, AI could also contribute to prevent older workers (at greater risk towards this threat) from becoming dangerously isolated, lacking social interaction or family support, by enhancing their linking to the people and services in the outside world.

However, apart from the good performance of an AI solution, humans need to 'see inside' the black box and understand how and why. This raises the need for explainable AI. People need to be at the center of the systems to be able to progress, which also leads to accountability – what are the systems doing? Who owns this information? This needs to be fully understood to ensure that systems and apps are used and uptake. Nevertheless, misuse can only be established through a regulatory framework at national level through the definition of an ethical framework.

In practice, this means:

- Developing ethical standards and policy frameworks to build trust and foster the adoption of AI in healthcare in conjunction with the working environment,
- Securing access to the high-quality data by building data policies and infrastructure to foster access, and interoperability of the harmonised data;
- Respecting the employees' rights to privacy and confidentiality by making sure the data is collected and managed properly, and used meaningfully and in compliance with their fundamental human rights and informed consent;
- Improving explainability and accountability, as well as digital literacy among all stakeholders involved, from the decision makers to the employers to the employees.

Although there is already extensive publication in this field, most of it is either devoted to the technical aspects or only to the social or ethical ones. An integrated approach to AI is still needed and this collaborative and multidisciplinary understanding of the challenges and benefits that is at the heart of this article, intends to pave the way beyond a siloed perspective to call for a concerted policy agenda and implementation strategy of AI in the workplace.

2.5 Conclusions

The pandemic crisis extensively affected the way companies operate, transforming them from premise-centered to remote (work from home)-centered business. The use of technology and available digital tools enabled this transition, without the need, surprisingly, to seriously disrupt the ongoing operations.

However, the success of this digital transformation significantly depends on how effectively challenges related with the established procedures, the organisation's nature and the safety of the employees are tackled and further elaboration will be required to adjust to these unprecedented working conditions.

Even though COVID served as an accelerator for the way we worked, moving from the traditional office space to a hybrid or online model, the increased adoption of the internet and communication platforms had already introduced and pushed for a tendency to working remotely. As the work environment transfers from a one-context to a multi-context (including the street), different needs arise to help balance work and personal life, without reducing quality, but the opposite, aiming at increased work efficiency and satisfaction, and greater quality of life.

Moreover, the existing digital gap, a huge number of people with problems accessing and using technologies (15% of the world's population according to the WHO [17]), suffered tremendously with this dramatic shift, because homes and other contexts where not prepared for working remotely. For example, people with disabilities had special assistive technologies in the workplace but not in their home environment. Designing inclusive solutions, including AI, in all fields of life and contexts, is now more critical than ever. The collection of data to help generate insights, in the form of information, can greatly help save time, increase efficacy and efficiency, and result in a smoother transition to this new lifestyle.

This is a call to action for a holistic and fully inclusive approach to AI, that goes beyond technology and includes ethical implementation, user-centricity, cross-sectoral policies and limits the risks to capitalise on the benefits of the new technologies.

However, the post-pandemic economic crisis and the social changes that are emerging from this period will easily create the opportunity to remove these priorities from the political agenda and funding plans and that, unless action is taken, can lead to a setback of more than five years in implementing innovation and quality of life for citizens.

A huge ethical challenge to be faced will be to redefine the balance between digital tools and human presence. If this was already somewhat stable in public opinion, the emergency period polarized opinions once again and this may actually be a threat to the broader adoption of A.I. tools for an increased workability.

It will take an enormous sensitivity and a great social conscience to evolve in the right direction and not lose focus - all political, economic, and social measures must have the ultimate goal of people's wellbeing and the promotion of common good.

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