

## **The UK Economy**

AI technologies in the post-Covid-19 recovery

PARLIAMENTARY BRIEF



***The UK Economy: AI technologies in the post-Covid-19 recovery*** is a Parliamentary Brief based upon the All-Party Parliamentary Group on Artificial Intelligence (APPG AI) Evidence Meeting held online on the 19<sup>th</sup> October 2020.

This Evidence Meeting was chaired by **Stephen Metcalfe MP** and **Lord Clement-Jones CBE**.

We would like to express our appreciation to the following people for their oral evidence:

- **Dr Carl Benedikt Frey**, Director Future of Work Programme, University of Oxford
- **Dr. Aida Ponce Del Castillo**, New technologies and foresight, European Trade Union Institute
- **Kishan Pattni**, AI Studio Lead, Deloitte Ventures
- **Professor Jonathan Haskel**, Chair in Economics, Imperial College, External Member of the Monetary Policy Committee, Bank of England
- **Malika Malik**, Data & AI Cloud Solution Architect, Microsoft UK
- **Dr Daniel Susskind**, Fellow in Economics, Balliol College, University of Oxford
- **Dr Phoebe V. Moore**, Associate Professor of the Futures of Work, University of Leicester

Big Innovation Centre is the appointed Secretariat for APPG AI

- CEO, **Professor Birgitte Andersen**
- Rapporteur: **Dr Désirée Remmert**

*The video recording of the Evidence Meeting can be found on our websites.*

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# PARLIAMENTARY BRIEF

## The UK Economy: AI technologies in the post-Covid-19 recovery



All Party Parliamentary Group on  
**Artificial Intelligence**

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## Introduction

The shift to remote working and the accelerated adoption of AI-driven technologies that accompanied this change have severely affected our working lives during the pandemic. The widespread reliance on such technologies has changed how we communicate and collaborate at work and might leave a lasting imprint on our definition of the "workplace" and challenge certain company culture principles.

In this evidence meeting, the APPG AI critically discussed the socio-economic consequences of the accelerated adoption of AI-technologies in various sectors. It explored how AI can be applied effectively by businesses to alleviate the looming economic crisis. Further, it was debated if AI technologies' increased application has changed people's stance on AI in general. It was particularly debated how a growing acceptance of AI by the workforce might change the workplace in the future.

The APPG AI Evidence Meeting convened a group of experts in economics, technology, and psychology from academia and business.

- **Dr Carl Benedikt Frey**, Director Future of Work Programme, University of Oxford
- **Dr Aida Ponce Del Castillo**, New technologies and foresight, European Trade Union Institute
- **Kishan Pattni**, AI Studio Lead, Deloitte Ventures
- **Professor Jonathan Haskel**, Chair in Economics, Imperial College, External Member of the Monetary Policy Committee, Bank of England
- **Malika Malik**, Data & AI Cloud Solution Architect, Microsoft UK
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- **Dr Phoebe V. Moore**, Associate Professor of the Futures of Work, University of Leicester

This meeting was chaired by **Stephen Metcalfe MP** and **Lord Clement-Jones CBE**.

**Parliament has appointed Big Innovation Centre** as the **Secretariat of the APPG AI**, led by **Professor Birgitte Andersen (CEO)**. The Project Manager and Rapporteur for the APPG AI is **Dr Désirée Remmert**.



**EVIDENCE GIVERS FROM LEFT TO RIGHT + CoChairs**

- **Dr Carl Benedikt Frey**, Director Future of Work Programme, **University of Oxford**
- **Dr. Aida Ponce Del Castillo**, New technologies and foresight, **European Trade Union Institute**
- **Kishan Pattni**, AI Studio Lead, **Deloitte Ventures**
- **Professor Jonathan Haskel**, Chair in Economics, **Imperial College London**, External member of the Monetary Policy Committee of the Bank of England
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- **Dr Phoebe V. Moore**, Associate Professor of the Futures of Work, **University of Leicester**
- Co-Chairs: Lord Clement-Jones CBE and Stephen Metcalfe MP, UK Parliament
- APPG Secretariat: Professor Birgitte Andersen, Big Innovation Centre

Suggestions for policymakers to guarantee the efficient and safe implementation of AI technologies to accelerate the recovery from the current economic crisis include:

- 1) Ensuring that **funding is distributed to a diverse range of AI research projects and research groups/individual researchers**. The government should ensure the **funding of a wide array of AI technologies** beyond machine learning to **encourage innovation and economic growth**. At the same time, science policy should encourage **collaboration between academia and industry**.
- 2) **Upskilling of the workforce** to make sure that **AI implementation processes are inclusive** and that new technologies can be used efficiently to persevere companies' competitive edge.
- 3) **Regulating AI technologies to protect the rights of employees and consumers**. A close orientation on **existing regulation and AI frameworks** should be at the centre of the strategy to guarantee that AI systems are deployed responsibly and fair and that the privacy of employees' data is secured. **New regulation might be needed to safeguard against the risks of emerging technologies**.

The report will begin with an overview of the impact that the Covid-19 pandemic has had on the enterprise adoption of AI technologies. It appears that while the circumstances surrounding the pandemic have accelerated the implementation of AI-drive technologies in some sectors, their deployment has stalled in others. We will then take a closer look at how the increased application of devices introduced in the course of the shift to remote working has affected employees. In this context, we will discuss the potential dangers that certain technologies might mean to workers' physical and mental health and make suggestions on how to safeguard employees. Lastly, we will present recommendations for policymakers on how to

facilitate the responsible implementation of AI technologies into a wide range of businesses to contribute to a swift recovery from the economic crisis caused by the Covid-19 pandemic in the UK.



## 1. Which impact has the Covid-19 pandemic had on the adoption of AI technologies by enterprises?



The shift to remote working that has affected a large part of the UK workforce has brought our **dependence on modern communication technologies** to the fore. Currently, most of our social interactions at the workplace have to be maintained **via online meetings, chat and and collaboration software**. Those new tools that accompany us in our workdays have left many with the impression that the **adoption of new technologies at the workplace has accelerated** significantly during the pandemic. At this evidence meeting, we asked experts in workplace technologies, economics, and psychology how impactful the pandemic has been on adopting AI-driven technologies by enterprises. We wanted to know if the challenges brought about by the Covid-19 pandemic had not only increased our reliance on communication technologies but if it had also accelerated the implementation of more complex data-driven technologies at workplaces.

Susskind argues in his pivotal work *A world without work: technology, automation, and how we should respond* (2020)<sup>1</sup> that **ever more AI technology is replacing jobs that perform complex cognitive tasks**. However, how fast have UK companies been so far in implementing these technologies and how have employees been affected by the technological transformation of their workplaces? Has the pandemic had a meaningful impact on the speed of AI adoption by enterprises?

Kishan Pattni, AI Studio Lead at Deloitte Ventures has a positive view of the role that AI can

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<sup>1</sup> Susskind, Daniel (2020): *A world without work: technology, automation, and how we should respond*. New York: Metropolitan Books.

play in the economic recovery of the UK:

*“AI is often criticised for failing to deliver on its industry hype, and some analysts are speculating that the COVID-19 winter will bring an ‘AI spring’. However, the reality we are seeing at Deloitte is that AI is already a driving force helping our clients to respond to the challenges of the pandemic and we expect it to play a key role in the UK’s economic recovery.”*

Pattni argues that the “rising business adoption of AI is delivering a step-change in results”. According to Deloitte’s recent *State of AI in the Enterprise*<sup>2</sup> research for which over 2,700 IT and line-of-business executives were surveyed, four out of five UK organisations stated that the implementation of AI had raised employees’ productivity, improved decision-making, and made processes overall more efficient. Pattni emphasises that one can currently observe **gradual democratisation of AI in the UK** as applications become easier to develop and implement. As a consequence, organisations of any size and AI ability can now benefit from these new technologies. However, he also alerts to the main barriers that still slow down AI implementation into businesses. According to the above mentioned Deloitte study, UK organisations face **three major barriers** when adopting AI:

- 1) the high cost of AI-related technologies and solutions
- 2) the integration of AI into the organisation, and
- 3) challenges related to data.

These challenges, Pattni argues, have been observed in previous annual surveys. However, they have been further aggravated by the global pandemic and economic climate.

Jonathan Haskel, Chair in Economics at Imperial College London, also attributes the **relatively low overall loss of productivity after the shift to remote work** during the pandemic to the adoption of digital technologies. However, according to Haskel, most significant part of technological transformation that now facilitates remote working has already happened during the **Information and Communication Technology (ICT) revolution** of the 1990s and 2000s. Haskel stresses that during these decades, the necessary logistical infrastructure was put in place. He explains:

*“We have managed to do this by bringing into the production boundary domestic IT, phones and the Internet that links them. The magnitude of this is amazing. Capitalising spending on durable domestic IT and telecoms purchases over time yields a value around £23bn in 2019, compared with a business hardware capital stock of £52bn. We have that around 30% of the workforce is working from home using around 30% of the hardware capital stock. Anecdotal evidence points to greater automation during the pandemic.”*

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<sup>2</sup> Deloitte Insights (2020): *Thriving in the era of pervasive AI: Deloitte’s State of AI in the Enterprise*, 3<sup>rd</sup> Edition.

However, referring to a recent study by Beane and Brynjolfsson (2020)<sup>3</sup> on the barriers companies face in the efficient implementation of robotics into production processes, Haskel concedes that there is still way to go when it comes to the enterprise adoption of highly complex technologies, especially those that involve AI.

Likewise, Dr Carl Benedict Frey, Director of the Future of Work Programme at the University of Oxford, remarks that the overarching narrative that the global pandemic has accelerated technological change does not hold true in all areas. He explains that **in certain domains the uptake of digital technologies has increased**, as demonstrated by the almost doubling of patent applications that support remote work technologies. “However”, Frey argues, “there is **no persuasive evidence that the adoption of artificial intelligence has accelerated to a meaningful extent**. If we look at most automation that has been happening during the pandemic, it has mostly been plug and play.”

The above-mentioned study on the current deployment of robotics in production processes by Beane and Brynjolfsson confirms this reluctance towards the implementation of more complex technologies:

*“Managers want systems with a relatively small physical footprint and proven capabilities that are easy to connect to power, spressurised air (for robotic grippers that rely on suction), and the existing IT infrastructure. Such plug-and-play systems can be rapidly set up to deliver results and rapidly reconfigured when things inevitably change. [...] Any automation project that’s more complicated — that takes more time, more space, more expertise, more parts — is a hard “no” for the time being, because it would slow efforts to meet surging demand. For each category of activity — moving goods, sorting them, orienting them, stowing them, retrieving them — plug-and-play systems offer a far greater return on investment than large-scale, custom installations.”<sup>4</sup>*

Further, Frey warns, AI is not yet offering viable solutions to smaller enterprises that might not have large amounts of training data available. Thus, **more efficient AI technologies are needed that can learn from smaller data sets**. However, Frey notes, the current situation does not foster an environment that facilitates the kind of **cooperation and collaboration necessary to create innovative new technologies**. Frey explains:

*“It is helpful to think about this in terms of how the First Industrial Revolution evolved. Early steam engines were tremendously coal inefficient; they were merely used to drain coal mines. It was only with James Watt’s separate condenser that steam engines became energy efficient. [...] This innovation is less likely to happen in the midst of a pandemic. We know that knowledge industries have always clustered since the days of Renaissance Florence, that is not different today. [...] what drives*

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<sup>3</sup> Beane, M. and E. Brynjolfsson (2020): “Working With Robots in a Post-Pandemic World.” *MIT Sloan Management Review*.

<sup>4</sup> See footnote no.3.

*innovation is to a large extent sporadic interaction. When important conferences get cancelled, for example, innovation tends to suffer consequently. We need a lot of innovation in AI for it to have a meaningful impact on the economy and on productivity growth more broadly.”*

Andy Haldane, Chief Economist at the Bank of England, made a similar argument in his seminal speech at *the Engaging Business Summit and Autumn Lecture* in October 2020<sup>5</sup>. Reflecting on the pros and cons of working from home during the pandemic, he observed that despite the many advantages that a more flexible working day and less time spent on the commute bring, **creativity is likely to suffer from the social isolation** which often accompanies remote working. Haldane remarks:

*“Lack of distraction and noise is not always and everywhere a good thing, including the creativity. It is also well-established that exposure to new and different experiences - sounds, smells, environments, ideas, people – is a key source of creative spark. These external stimuli are fuel for our imaginations and the imagined, made real, is what we typically mean by creativity.”*

From this follows that providing work environments in which productivity and creativity can thrive is a tricky endeavour and that there is no one-fits-all solution. It has been found, Haskel points out, that simple tasks such as answering routine calls can be more productively performed in the quieter environment of the home, whereas complex tasks that rely on human interaction are more efficiently done at the office (Battiston et al. 2017; Bloom et al. 2015). “The ease of collaboration in a shared environment, including chance conversations that spark creativity,” Haskel argues, “are important for innovation and productivity, suggesting the benefits of working from home are very much task-dependent.” A **hybrid work strategy that allows employees some flexibility in the choice of their workplace** might hence be the most promising way forward. Malika Malik, Data & AI Cloud Solution Architect at Microsoft UK warns that organisations “will need to consider how to adapt to their people, places of work and processes” when designing new work strategies. This is to make sure the entire workforce can benefit from those changes.

In sum, it emerges from the evidence presented at the meeting that certain technologies put in place long before pandemic proved to be extremely beneficial in mitigating the adverse effects that remote working could have had on workflows and communication. However, the idea that the circumstances created by the pandemic have simultaneously accelerated the business adoption of AI is contested. Companies are currently still **reluctant to implement more complex AI technologies** that might be difficult to sync with existing systems. Further, the **social isolation** in which many employees find themselves currently, appears **detrimental to collaboration and creativity**, impeding technological innovation in the foreseeable future.

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<sup>5</sup> Haldane, Andy (October 14, 2020): “Is home working good for you?” <https://www.bankofengland.co.uk/speech/2020/andy-haldane-engaging-business-summit-and-autumn-lecture>. Accessed on December 17, 2020.

## 2. AI technologies at the (remote) workplace: automation, employee management, and monitoring



The Covid-19 pandemic has raised questions about the future of work, which, until recently, were expected only to become pressing in a decade from now. Requirements for social distancing and the protection of vulnerable groups have **shifted our focus to new modes of work that help to contain the virus's spread**. Consequently, technologies that facilitate **remote working and the automation of production processes** rank among those that have attracted the most attention in this context. Susskind stresses:

*“What is being so striking in this pandemic is that these challenges I thought we would face with growing severity as we move through the 21st century, we instead had to face right now because of this virus. We have found ourselves in a world with less work, not because the robots took over all the jobs, but because this virus completely decimated the demand of so many of those jobs relied upon. The interventions we had to adopt to contain the spread of the virus which had been necessary, made those economic matters worse.”*

Dr Aida Ponce Del Castillo, senior researcher at the European Trade Union Institute, affirms that the current pandemic has accelerated the deployment of specific AI technologies that increase efficiency and productivity. In particular, **AI technologies that perform algorithmic workplace management and monitor workers to protect them from the Covid-19 virus** have been increasingly deployed. Dr Ponce Del Castillo, explains, that the latter is mostly achieved by devices that check for typical Covid-19 symptoms and those that facilitate social distancing. However, in this process, **personal data and health parameters can be collected**. This, she warns, raises important questions concerning data privacy and employee rights. Some of these technologies, she warns, might have been **implemented without sufficient information, consultation, or the involvement of workers**. Further, the increase

in **automated decision-making systems** that could be observed since the onset of the pandemic might so negatively impact workers as it might **prevent them from fully exercising their legal rights**. Informing workers about technological tools that are implemented into working processes, Dr Ponce Del Castillo stresses, would be essential to creating a fair working environment in which employees are integrated into decision-process and feel connected to their work.

Dr Phoebe Moore, Associate Professor of the Futures of Work at the University of Leicester, takes a closer look at the immediate **dangers which the implementation of such management and monitoring technologies could mean to employees**. Dr Moore stresses that certain devices which accumulate high amount of data which can be used to train advanced AI technologies for automated decision-making in workplaces might be especially attractive to companies. To these count “human resource people analytics, wearable device precision, self and other-tracking technologies, sociometric solutions, and a range of software and hardware products.” Like Dr Ponce Del Castillo, Dr Moore fears that **organisations might exploit the Covid-19 pandemic to implement AI technologies that would have a detrimental effect on the privacy rights and safety of employees**. In her work *The Quantified Self in Precarity: Work, Technology, and What Counts* (2018)<sup>6</sup> Dr Moore accentuates how companies might exploit new technologies to accumulate valuable employee data- possibly to the disadvantage of the workforce

*“The implications of new forms of measure are bringing corporealised data into appraisals and the possibilities of intensified workplace monitoring are very real. Both behaviour and workplace design change are central to this new regime; indeed, the reduction of the need for staff on the basis of data accumulation by wearable technology and other forms of monitoring are already evident in warehouse work. The collection of extensive personal data is contributing to an increasingly lucrative business, and the aggregation and comparison potentials of information about many users’ experiences is seen as extremely valuable.” (Moore 2018: 21)*

Both Dr Ponce Del Castillo and Dr Moore call for **stricter regulation of such devices’ implementation and auditing**. “The Covid-19 pandemic started as a public health crisis,” Dr Del Castillo warns, “[it] has now triggered an economic crisis, and action must be taken to prevent it from becoming an open door to hyper-surveillance at the workplace.”

That is, the pandemic and the accompanying recession and rising unemployment in the UK has thrown questions for the automation of tasks, the monitoring of employees, and, more generally, the future of work, into sharper relief. How, Susskind asks, will a world with “less work” change how we think of work and our purpose in society? How will we deal with the arising inequalities that unemployment and shifting power structures in the global economy will cause? Susskind names three challenges that we will have to cope within the coming

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<sup>6</sup> Moore, Phoebe V. (2018): *The Quantified Self in Precarity: Work, Technology, and What Counts*. London and New York: Routledge.

years:

- 1) **Economic challenge:** *“How are we sharing our income in society when our traditional way of doing so – paying people for the work that they do – might be less effective than it was in the past?”*
- 2) **Growing power of large technology companies:** *“What do we do not only about the growing economic power [of large technology companies], but also their growing political power – their impact they all have on how we all live together collectively in society?”*
- 3) **Meaning and purpose:** *“It is often said that work is not simply a source of an income, but that it is also a source of direction and purpose and fulfilment in life. If that is right, how do we provide people with a sense of direction, meaning, and purpose in a world where work is no longer sitting at the centre of their lives?”*

However, Pattni emphasises, AI technologies can also have an **empowering effect on employees** if the implementation of the new AI system is communicated transparently and adequate training is provided:

*“While COVID-19 is driving an uptick in automation strategies in particular, e.g. through the introduction of Conversational AI to better manage remote call centre demand, we see the greatest value of AI lies in employee empowerment – helping people do their jobs better. Organisations which leverage AI to enable their employees and boost operational performance will emerge more resilient and best prepared to return to growth in this new unstable normal.”*

Malik puts special emphasis on the need for organisations to foster a **spirit of togetherness among employees** in times of a pandemic. She stresses that

*“among all the benefits of remote working, there is a clear need for human interaction. The future of work isn’t solely duplicating the old way in a digital form. [...] As organisations think about their hybrid work strategy, they will need to consider how to adapt to their people, places of work and processes. As work-life boundaries blur, open and frequent communication is vital to ensure collaboration at the workplace. At its core, it involves embracing organisational change management to reimagine the future of an organisation and how employees can work and collaborate. The current crisis and its aftermath should motivate organisations to strengthen a culture of inclusion and ensure that employees feel part of their team, wherever they choose to work from – Home or Office. Trust, accountability, and results should be thoroughly baked into its culture, whether individuals work in the office or not.”*

With open communication being at the heart of this new work strategy, the implementation of new technologies should be accompanied by **proper information and consultation of workers** to provide them with an opportunity to become **involved in the process as early as possible**.



### 3. Enterprise adoption of AI in the post-Covid-19 economy: suggestions for policymakers

Three major challenges emerge in the context of enterprise adoption of AI at scale in the post-Covid-19 economy. Whereas these problems had been evident before, it appears as if the economic crisis caused by the pandemic has amplified them due to the accelerated implementation of certain AI-driven technologies.

#### 1. Distribution of funding

Research funding for AI technologies should be **fairly distributed** so that it supports a wide range of projects instead of being focused on one particular AI technology. Further, funding should **support research groups and individual researchers from various disciplinary backgrounds**. Frey criticises that currently funding is mainly concentrated in the field of deep learning, whereas other, more data-efficient types of AI appear to be ignored. For this reason, Frey advocates for a science policy that will broaden and diversify the scope of AI research.

*“There was a lot of bias toward funding of large, cross-disciplinary teams that collaborate across institutions and universities. Research actually suggests that the most disruptive innovations often come from single inventors or smaller teams where people are more likely to pursue an unconventional hypothesis. There are thus a lot of things that can be done by science policy to accelerate innovation in AI and to make it likely to have a much bigger impact going forward after this pandemic.”*

Pattni warns that following the economic crisis, public funding will likely be restricted to priority areas. For this reason, it must be ensured that **tools and methodologies will be repurposed** and that **key learnings will be shared with other industries**. “With a large number of AI applications having a variety of cross-domain uses”, Pattni argues, “collaboration and knowledge sharing can accelerate successful development and integration.” Specifically, he argues, the government should continue “funding incentives to support home-grown software companies developing world-leading AI products that collectively drive the proliferation of AI into more niches of our economy, from large enterprise to small.”

The evidence presented at the meeting suggests that the government must design **policies that will guarantee to fund a diverse spectrum of researchers and AI projects** and which facilitate the **sharing of results between academia and industry as well as between businesses**.



## 2. Upskilling of the workforce and protecting the rights of employees:

For a successful implementation and scaling of AI systems in companies, the **workforce must be included in the process from the start**. Employees must be informed about the purpose of the new technologies, how they will change work processes, and receive adequate training to understand and apply these technologies. Dr Ponce Del Castillo emphasises that workers should be enabled

*“to become ‘AI literate’, understood as the ability to critically understand AI, what impact it has on their work, their company, their sector. Workers should not be passive users of a specific technology, which serves the interest of the employer only, but actively engage with it.”*

Dr Moore adds that in the training of staff during the implementation of AI technologies, the focus should be placed on **facilitating AI understandability**. Indeed, Pattni highlights, there is a high need for AI training among UK employees. “61% of UK adopters”, Pattni explains, “say they have no skills or low-to-medium skill levels around integrating AI technology into their existing IT environment.” For this reason, he suggests that “in addition to **channelling funding into skills programmes** to increase the number of data scientists in the UK. The government should strongly **encourage the use of the software that lowers the skills barrier for development and deployment of AI applications**, effectively increasing the accessible pool of AI development resource.”

Haskel agrees that new AI technologies can only effectively contribute to an increase in *Total Factor Productivity* (the efficient combination of labour and capital) “if the workforce has the requisite skills to make the most of the new technologies and the necessary tangible and intangible co-investment is made”. Haskel accentuates that due to the fast-paced nature of investment and technologies, policies must be designed that are “**highly responsive on training, the science base, city clusters and financial markets**”.

## 3. Regulating AI technologies to protect the right of employees and consumers

The evidence presented by the expert speakers at the meeting highlights the importance of **enforcing existing regulation around AI technologies** and the need for **new regulation that anticipates the dangers that the implementation of new technologies can mean particularly to the workforce**. Moreover, a lack of adequate regulation will also deter companies from adopting AI technologies, thus increasing their risk of losing their competitive edge. Pattni highlights that

*“concerns about risk management and regulation deter many organisations from implementing even simple, relatively low-risk applications of AI. For every high-risk application of AI, there will be many more benign ones which can offer organisations a significant boost in productivity. Currently, 63% of adopters agree that AI*

*technologies should be heavily regulated by the government, but 61% have a major or extreme worry around how new and changing regulations could impact their AI initiatives.”*

Pattni suggests that both the Office for AI’s *Guidelines for AI procurement in the public sector* and the *Guide to using AI in the public sector* are “intuitive and well-defined” and should be extended to other areas and industries. Making these guidelines and their regular updates accessible to small and medium-sized businesses would be particularly critical as compliance management can mean a significant barrier to realising projects due to the high cost it incurs.

Pattni further highlights the need for **collaboration between the public and private sector in advancing the current application-specific guidance with more holistic frameworks for AI roadmap development**. This, he argues,

*“can support organisations in appropriately sequencing their adoption of AI across a range of applications. A well sequenced AI roadmap can help an organisation achieve value from AI in the short-term, and incrementally build a foundational capability that is better equipped for the more challenging applications in the future, be that from a technical, regulatory, or organisational perspective.”*

Malik stresses the need for **principles that ensure that companies apply inclusive strategies when implementing AI**. Highlighting the need for a conscious application of AI systems and the importance of employee training, she argues that models must be “fair, inclusive, and transparent. The path ahead is full of uncertainties. A successful, inclusive economic recovery means that everyone has the right digital skills for today and in the future, consequently addressing the skill gap and bring people back to work.” In this context, AI-driven tools for workplace surveillance must be evaluated particularly critically. “The use of monitoring and AI tracking tools must be justified and discussed on a case-by-case basis”, Dr Ponce Del Castillo emphasises, “this must cover aspects such as what is possible, what the limits are, and where and how the data collected from the workforce comes from (for instance, private email, social media posts or offline activity)”.

Further, she adds, **the ‘right to disconnect’ should be guaranteed by regulation** or, at the very least, be ensured through company agreements. **Labour inspection and data protection authorities should be given greater roles** to guarantee that AI-related risks are identified early and that employees’ rights are protected. In this context, Dr Moore suggests that “**worker representative groups** including unions at all stages of the data life cycle” should be involved in the creation of **codes of conduct that should be based on AI ethics frameworks**. Further, Moore argues for **adoption and enhancement of the GDPR** to improve UK data protection and labour law in order “to protect workers and workers’ data and surrounding rights, in these dramatic times”.

In sum, suggestions for policymakers to guarantee the efficient and safe implementation of AI technologies to accelerate the recovery from the current economic crisis include

- Ensuring that **funding is distributed to a diverse range of AI research projects and research groups/individual researchers**. That is, the government should ensure the **funding of a wide array of AI technologies** beyond machine learning to **encourage innovation and economic growth**. At the same time, science policy should encourage **collaboration between academia and industry**.
- **Upskilling of the workforce** to ensure that **AI implementation processes are inclusive** and that new technologies can be used efficiently to persevere companies' competitive edge.
- **Regulating AI technologies to protect the right of employees and consumers**. A close orientation on **existing regulation and AI frameworks** should be at the centre of the strategy to guarantee that AI systems are deployed responsibly and fair and that the privacy of employees' data is secured. New regulation might be needed to safeguard against the risks of emerging technologies.

## 4. Evidence

**Dr Carl Benedikt Frey, Director Future of Work Programme, University of Oxford**



There seems to be an overarching narrative that the pandemic has, if anything, accelerated technological change. I think it is certainly true that it has in some domains. If you look at the share of patents that support remote work technologies, it has nearly doubled from 0.5% to 1% of total patent applications. If we look at certain technologies like delivery robots at hospitals and in hotels, that has certainly accelerated as well. However, there is no persuasive evidence that the adoption of Artificial Intelligence has accelerated to a meaningful extent. If we look at most automation that has been happening during the pandemic, it has mostly been plug and play. We can basically adopt the technology and it is ready. But I think most automation projects are more complicated, they are reliant on great knowledge and expertise, new data pipelines must be constructed, the new systems must be in sync with the old systems, and all of that has been more difficult during the pandemic. Getting this to work requires a lot more experimentation and innovation. This is something we are not seeing at a time when most people are working remotely. To just put this into perspective. The most rigorous survey that I am aware of is by the U.S. Census Bureau looking at AI and ML adoption rates across the United States last year, finding that less than three percent of American firms apply AI or ML to any meaningful extent even before the pandemic. We must ask ourselves why adoption rates are so low. In my mind, the reason is primarily that AI is still at an experimental stage. Yes, it works well in certain applications where you have an abundance of big data, but for most domains, it does not. It is helpful to think about this in terms of how the First Industrial

Revolution evolved. Early steam engines were tremendously coal inefficient; they were merely used to drain coal mines. It was only with James Watt's separate condenser that steam engines became energy efficient. AI is still waiting for its separate condenser moment. We need innovation for AI to be able to learn from smaller data sets. This innovation is less likely to happen in the midst of a pandemic. We know that knowledge industries have always clustered since the days of Renaissance Florence, that is not different today. The reason for that is that what drives innovation is to a large extent sporadic interaction. When important conferences get cancelled, for example, innovation tends to suffer consequently. We need a lot of innovation in AI for it to have a meaningful impact on the economy and on productivity growth more broadly. The worrying tendency in my mind is that there seems to be a narrowing in AI research which seems to me premature. Back in 2013, for example, when we wrote a paper trying to estimate the potential scope of automation, AI was a field with anarchy of methods. Now it has very much narrowed down on deep learning in particular. Much of innovation is coming from a few companies focusing on that. I think it something to keep in mind, going back to the early 20th century, electric vehicles were practically as good as gasoline powered vehicles. Then we had the huge oil discoveries which tipped the balance in favour of the internal combustion engine and now we are trying to get back into electric cars. In similar fashion, if we have something like a locking into deep learning which is tremendously data inefficient, that is a real risk. I think it is a role for science policy here for trying to broaden the scope of AI research to fund projects that are outside of the theme of deep learning which is absorbing most of the funding now. I also think there is a role for science policy to actually diversify more in terms of who gets funding. There was a lot of bias toward funding of large, cross-disciplinary teams that collaborate across institutions and universities. Research actually suggests that the most disruptive innovations often come from single inventors or smaller teams where people are more likely to pursue an unconventional hypothesis. There are thus a lot of things that can be done by science policy to accelerate innovation in AI and to make it likely to have a much bigger impact going forward after this pandemic.

**Dr. Aida Ponce Del Castillo, New technologies and foresight, European Trade Union Institute**



**Key takeaways:**

- AI solutions may impact workers beyond their working life, as is the case with distance monitoring of teleworkers.
- Automated decisions can impact workers negatively, and they need to be able to exercise their legal rights, including the right to collective bargaining.
- These technologies are implemented with insufficient information, consultation and involvement of workers and their representatives in the process.
- A greater role must be given to the labour inspection and to data protection authorities.

The focus of my work are the legal, regulatory and social issues of new technologies at work. I will share evidence about the impact of the rapid implementation of AI solutions on workers. I will also present recommendations on the subject.

The pandemic has accelerated the adoption and use of technology by companies. Although the panorama is far from homogeneous (sectors differ, companies of different sizes have different budgets, etc), we see that AI tools are used for 3 main purposes:

- 1) to increase efficiency and productivity (automate tasks, etc.)
- 2) to carry out algorithmic workforce management (scheduling)

and, most importantly since the beginning of the crisis:

- 3) to monitor workers and attempt to protect companies against Covid-19. This is mostly achieved by measuring workers temperature or ensuring social distancing. The solutions used include the analysis of video images, both from imaging cameras (to alert about failure to respect social distancing) and thermal cameras (to measure body temperature), the use of mobile phones (social distancing and contact tracing) and wearable devices (vibrating wristbands). In the process, personal data and health parameters can be collected, including heart rate, sleep or exercise patterns (Ponce del Castillo 2020, Chopra TS 2020; Lock S 2020).

My focus here is on this last dimension. **Some monitoring solutions go beyond the simple monitoring of work processes**, by analysing sensitive private data, including health and biometric data. Possible examples of this include Amazon SageMaker Model Monitor to track workers' movements (Amazon 2020), IBM 'Return-to-Workplace Advisor' to measure and monitor worker engagement, including a 'daily check-in' where the worker can enter symptoms, exposure and diagnosis (IBM 2020), as well as PricewaterhouseCoopers (PwC) with a facial recognition tool for financial institutions. Some software taps into workers' webcams to capture face images (Webber 2020). At this level, monitoring becomes surveillance and is both intrusive and excessive.

In addition, **the way in which AI-solutions are implemented is a concern**. There can be no "acceptance" of technology without proper information and consultation of workers (a legal right), understood as giving workers the ability to be involved before and after the technology is implemented in their company.

New technologies create new risks. In the case of AI, these are discrimination, invasion of privacy, dilution of data protection by failure to obtain informed consent, loss of autonomy and loss of personal freedom. All of this, combined, takes us closer to a modern version of Jeremy Bentham's Panopticon.

To avoid this, I would make two recommendations:

*First, that information and consultation must take place and address the following priorities:*

- Guaranteeing worker privacy and personal data protection.
- Fighting workplace surveillance. The use of monitoring and AI tracking tools must be clearly justified and discussed on a case-by-case basis. This must cover aspects such as what is possible, what the limits are, and where and how the data collected from the workforce comes from (for instance, private email, social media posts or offline activity). Moreover, the 'right to disconnect' should be part of national legislation, as is already the case in some EU countries such as France, Italy and Spain. At the very least, it should be ensured through company agreements, as done by multinational companies such as Telefonica, Orange, Natixis or Société Générale.

- Making the purpose of algorithms transparent and ensuring the exercise of the ‘right to explanation’, as established by the General Data Protection Regulation, regarding decisions made by algorithms. For workers, this means understanding the significance and consequences of an automated decision, obtaining an explanation of its logic, and having the possibility to contest it.
- 5. Boosting workers’ autonomy in an hyper-connected environment, where the boundary between working life and private life is increasingly thin.
- 6. Enabling workers to become ‘AI literate’, understood as the ability to critically understand AI, what impact it has on their work, their company, their sector. Workers should not be passive users of a specific technology, which serves the interest of the employer only, but actively engage with it.

***Second, that a greater role must be given to the labour inspection and to data protection authorities.***

- Labour inspectors can play a role in identifying AI-related risks in the workplace, data protection authorities should provide further guidance in the context of employment.

In short, some will exploit the Covid-19 crisis as an opportunity to rapidly adopt AI solutions that normally would take years to implement and involve consulting workers and national parliaments. The impact of those technologies is such that we should take the necessary time to assess their long-term implications. The Covid-19 pandemic started as a public health crisis, has now triggered an economic crisis, and action must be taken to prevent it from becoming an open door to hyper-surveillance at the workplace.



## Kishhan Pattni, AI Studio Lead, Deloitte Ventures



Weak productivity has long been a challenge for the UK economy, even before COVID-19. Despite the promise of new productivity-boosting Industry 4.0 technologies, the 2010s were the worst decade for productivity growth since the 19<sup>th</sup> century.

AI is often criticised for failing to deliver on its industry hype and some analysts are speculating that the COVID-19 winter will bring an 'AI spring'. However, the reality we are seeing at Deloitte is that AI is *already* a driving force helping our clients to respond to the challenges of the pandemic and we expect it to play a key role in the UK's economic recovery.

Rising business adoption of AI is finally delivering a step-change in results. According to our latest State of AI in the Enterprise research – a global survey of over 2,700 IT and line-of-business executives – four out of five UK organisations indicated that implementing AI has made their employees more productive, improved their decision-making and made their processes more efficient. Three-quarters have also lowered their costs.

Strikingly, this was not just the big industry players: over 70 per cent of AI adopters achieved a typical payback period of less than two years for their AI projects, irrespective of their size or digital maturity. The gradual democratisation of AI, as applications become easier to develop and implement, means organisations of any size and AI ability can now benefit.

While COVID-19 is driving an uptick in automation strategies in particular, e.g. through the introduction of Conversational AI to better manage remote call centre demand, we see the greatest value of AI lies in employee empowerment – helping people do their jobs better. Organisations which leverage AI to enable their employees and boost operational performance will emerge more resilient and best prepared to return to growth in this new unstable normal.

So how can we collectively help UK organisations deploy AI to deliver the productivity gains the country so urgently needs?

Our research shows the top three barriers UK organisations encounter when adopting AI are: the high cost of AI-related technologies and solutions, the integration of AI into the organisation, and challenges related to data. These challenges are consistent in our research year-on-year, but have been further exacerbated by the current pandemic and economic climate. To help organisations of all sizes overcome them, through the ongoing pandemic and beyond, we see a pressing need to support by addressing the following three issues:

### **Making funding go further**

With public funding likely to be restricted and centred on priority areas, we must ensure the resulting tools and methodologies are repurposed where possible, and key learnings are shared into other industries. With a large number of AI applications having a variety of cross-domain uses, collaboration and knowledge sharing can accelerate successful development and integration.

61% of UK adopters say they have no skills or low-to-medium skill levels around integrating AI technology into their existing IT environment. In addition to channelling funding into skills programmes to increase the number of data scientists in the UK, the government should strongly encourage the use of the software that lowers the skills barrier for development and deployment of AI applications, effectively increasing the accessible pool of AI development resource.

The government should seek to maintain the UK's position as a leading European AI hub through continued support for novel research, and funding incentives to support home-grown software companies developing world-leading AI products that collectively drive the proliferation of AI into more niches of our economy, from large enterprise to small.

AI has previously been identified as a “Grand Challenges” to put the UK at the forefront of the industries of the future. We believe this should continue to be prioritised in future iterations of the government's Industrial Strategy.

### **Providing regulatory certainty and making compliance guidelines more accessible**

Currently, 63% of adopters agree that AI technologies should be heavily regulated by the government, but 61% have a major or extreme worry around how new and changing regulations could impact their AI initiatives.

In our public sector AI work, we have found both the Office for AI's ‘Guidelines for AI procurement in the public sector’ and the ‘Guide to using AI in the public sector’ intuitive and

well-defined. We would like to see these extended to other areas and industries, and regularly refreshed in light of upcoming changes in the regulatory environment. This is particularly critical for small and medium sized businesses where compliance management can prove a major cost and time barrier to getting projects running.

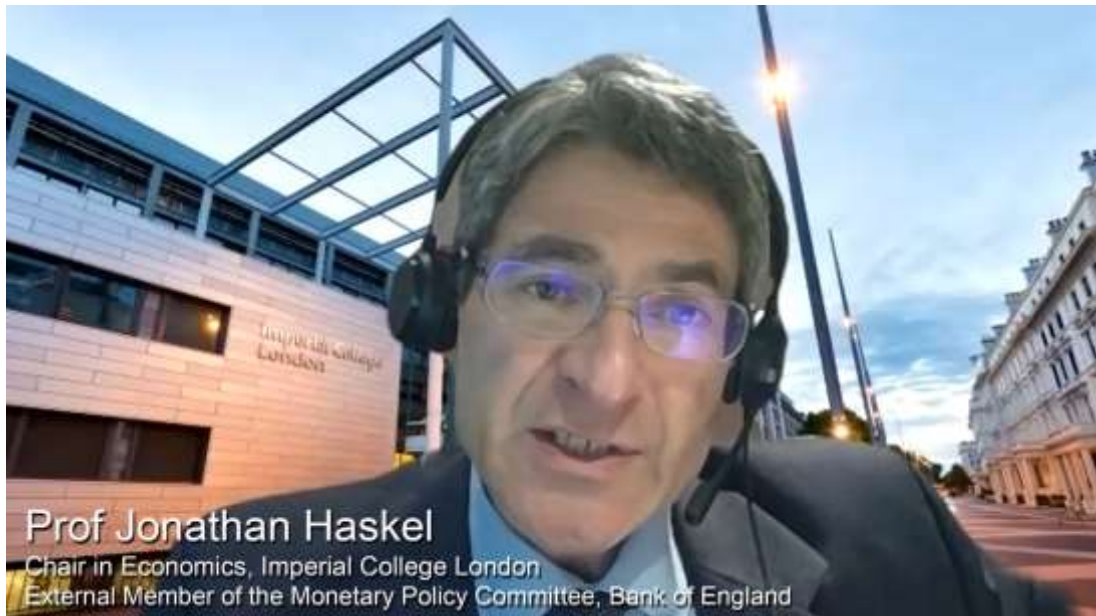
### **Establishing a sequencing framework to help organisations balance AI trepidations with AI adoption**

Concerns about risk management and regulation deter many organisations from implementing even simple, relatively low-risk applications of AI. For every high-risk application of AI, there will be many more benign ones which can offer organisations a significant boost in productivity. Why start with AI for facial recognition, when there is potentially immediate value to be gained with fewer ethical and data privacy challenges, in developing an improved AI search for internal business document management?

Current guidelines offer excellent direction on how to assess and manage risk. We would encourage the government to collaborate with the private sector, to support the current application-specific guidance with more holistic frameworks for AI roadmap development, which can support organisations in appropriately sequencing their adoption of AI across a range of applications.

A well sequenced AI roadmap can help an organisation achieve value from AI in the short-term, and incrementally build a foundational capability that is better equipped for the more challenging applications in the future, be that from a technical, regulatory, or organisational perspective.

**Professor Jonathan Haskel, Chair in Economics, Imperial College, External Member of the Monetary Policy Committee, Bank of England**



**1. What is AI?**

The OECD describes AI as “...machines performing human-like cognitive functions” (e.g. learning, understanding, reasoning and interacting). More specifically, AI is a loose term used to describe a range of advanced technologies that exhibit human-like intelligence, including machine learning, autonomous robotics and vehicles, computer vision, language processing and neural networks.

Some AI is instantiated in software. Some is in robots. Robots are a new form of automation (Aghion et al (2017)). How does this affect jobs? The correct answer is to think of a job as bundle of tasks. Until recently, automation had mainly displaced routine or low-skilled tasks but helped with non-routine ones. Susskind (2020) argues that AI is increasingly automating non-routine, cognitive tasks performed by high-skilled workers in radiology, legal services or lab-based research (see also Autor, Levy and Murnane (2003)).

**2. Has there been more AI take-up in the current pandemic?**

The automation of routine tasks is widespread in recessions (Jaimovich and Siu (2012), Graetz and Michaels (2016), Burger and Schwartz (2018), Kopytov et al. (2018)) as firms seek to streamline their production processes to cut costs. The recession brought about by the Covid

19 pandemic and associated restrictions last spring added an additional motive for automation: the introduction of social distancing to curb the spread of the virus.

Anecdotal evidence points to greater automation during the pandemic. But as Beane and Brynjolfsson (2020) document in a recent article, “successfully putting robotics into production is a complex undertaking, and most companies aren’t equipped to implement and benefit from these advanced systems”.

So rather than anecdote, what does the hard data tell us about AI adoption during the pandemic? AI technologies are part of business investment. Think of an AI problem such as image recognition: using fast computers with new software to scan databases. In National Accounts terms, this is AI as using a combination of tangible assets (hardware), measured intangibles (software) and unmeasured intangibles (databases).

The table below shows annual growth rates in 2020 Q1 and Q2, and over 1996-2019, for those sub-categories of gross fixed capital formation that are used in AI technologies:

hardware equipment (computer chips, GPUs), telecommunications equipment (phone networks, broadband), “own” software (coding, databases) and purchased software (commercial operating system, cloud computing). The bottom row shows total private business investment for reference.

It is difficult to extract a signal for the first half of the year as the data are volatile, but averaging through the Q1 and Q2 growth rates, there are two messages:

- a) AI-related investments have not fallen as much as total investment, but
- b) AI-related investments during the pandemic have fallen below average growth rates seen over the previous two decades.

Absent substantial mismeasurement, there is then no evidence that AI or AI-related investment has been faster during the recession.

Gross Fixed Capital Formation ( Percent Change on Previous year)	Share of capital Stock (2020)			
	1996-2019*	2020 Q1	2020 Q2	
ICT & Software	7.5	4.3	-2.3	8.4%
Hardware equipment	8.2	0.8	-15.9	1.4%
Telecoms equipment	7.0	10.7	4.8	2.2%
Software (own)	8.6	4.8	-0.6	3.3%
Software (purchased)	5.3	3.9	3.5	1.5%
Total Market Sector	1.7	-6.8	-21.0	100%

Source: ONS Experimental Growth Accounts

### **3. The working from home puzzle**

After the initial fall and recovery, output is around 10% lower than pre-pandemic levels. But around 30% of the workforce is working from home. This raises a puzzle. How have we managed to have 30% of the workforce working from home with a (comparatively little) 10% fall in output?

The answer is that previous adoption of digital technologies during the Information and Communication Technology (ICT) revolution of the 1990s and 2000s, has provided some industries with the necessary logistical infrastructure.

We have managed to do this by bringing into the production boundary domestic IT, phones and the Internet that links them. The magnitude of this is amazing. Capitalising spending on durable domestic IT and telecoms purchases over time yields a value around £23bn in 2019, compared with a business hardware capital stock of £52bn. We have that around 30% of the workforce is working from home using around 30% of the hardware capital stock.

How have workers put the domestic capital stock to use?

As for the study of AI technology application, the relevant unit of analysis is the task, rather than the job. Jobs can be broken down into composite tasks. As such, we can set apart an individual task from a bundle of tasks. This is a useful framework to think about how the shift to remote working during the pandemic has affected worker productivity and collaboration.

Some studies have shown that working from home can improve productivity in jobs involving routine tasks. For instance, Bloom et al (2015) find in their study of Chinese call-centre workers that remote working four days a week increased worker output by 13%, although that partly reflected longer hours spent working. This makes sense – the individual task of answering a call can be done as productively at home – even more productively given the quieter environment – than in a call centre.

But some tasks become more difficult when colleagues are physically separated, especially if urgent and complex (Battiston et al (2017)). One study of emergency call handlers in Manchester found that productivity was 2% higher when colleagues were in the same room. So when dealing with a bundle of complex tasks, workers are likely to be more productive in an office. The ease of collaboration in a shared environment, including chance conversations that spark creativity, are important for innovation and productivity, suggesting the benefits of working from home are very much task-dependent.

### **4. The future**

As businesses adapt to new business practices involving greater automation and remote working, measured productivity might fall. But a greater adoption and use of AI technologies will raise productivity growth past the transition period, by increasing the capital stock per worker. The fruits of increased Total Factor Productivity (the efficient combination of labour

and capital) will only be reaped if the workforce has the requisite skills to make the most of the new technologies and the necessary tangible and intangible coinvestment is made. Such investments and technologies are fast-moving. Thus we need highly responsive policies on training, the science base, city clusters and financial markets (as outlined in, for example, Haskel and Westlake (2017)).

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## Malika Malik, Data & AI Cloud Solution Architect, Microsoft UK



An unprecedented crisis — At the time of writing, Coronavirus disease 2019 (COVID-19) presents a global humanitarian challenge, contracted by 51 million people and continues to increase worldwide. The virus has wreaked havoc across the globe, pushing world economies into prolonged lockdown and businesses to a screeching halt.

In the wake of COVID-19 outbreak, the adoption of Artificial Intelligence (AI) technology has grown exponentially and acted as a catalyst to reinvent the future of work. Organisations of all sizes, whether it's a start-up or a giant enterprise, public or private organisation have been reliant on AI - Technology to operate, maintain business continuity, and adapt during challenging circumstances. In the Education sector, COVID-19 crisis reinforced the need to transform the conventional education system. Apart from changing the conventional learning methodology, AI-powered machines enable educators in automating mundane administrative tasks, tracking student performances etc. Similar in Healthcare industry; AI-powered Chatbots equipped the public to access Covid-19 information.

AI - technologies empowered business continuity through the crisis and beyond; however, at the organisational level, the pivot to remote working has sparked a cultural shift in the expectations of workers.

In a recent, Harris Poll survey of over 2,000 remote workers in six countries (UK, USA, Germany, Italy, Mexico and China) states:

- 83% of managers surveyed expect to have more flexible work from home policies post-pandemic.
- 72% of employees and managers report a desire to continue working from home at least part-time.



- Yet, 62% felt less connected to their team working from home.

This is important.

Among all the benefits of remote working, there is a clear need for human interaction. The future of work isn't solely duplicating the old way in a digital form. Organisations that embrace a hybrid work strategy, i.e., an amalgamation of the digital way of working while respecting and leveraging the great things about the way we used to work shall ultimately create a competitive advantage for themselves for many years to come. As organisations think about their hybrid work strategy, they will need to consider how to adapt to their people, places of work and processes.

As work-life boundaries blur, open and frequent communication is vital to ensure collaboration at the workplace. At its core, it involves embracing organisational change management to reimagine the future of an organisation and how employees can work and collaborate.

The current crisis and its aftermath should motivate organisations to strengthen a culture of inclusion and ensure that employees feel part of their team, wherever they choose to work from – Home or Office. Trust, accountability, and results should be thoroughly baked into its culture, whether individuals work in the office or not.

### **The COVID-19 recovery will be Digital.**

As organisations reimagine the overall business strategy, for a long term, especially as the UK nears the end of the transition phase of Brexit — Organisations must ensure that they are match-fit and ready for the change. In the post-pandemic world, Artificial Intelligence will play a critical role in the redesign and reimagining of the new workplace. It includes boosting productivity with the ability to augment employees, helping them make better decisions and puts the focus on higher-value tasks, whilst also boosting inclusivity and sparking creativity.

As AI continues to play a significant role in our lives, companies must develop and adopt principles to build models which are fair, inclusive, and transparent.

The path ahead is full of uncertainties. A successful, inclusive economic recovery means that everyone has the right digital skills for today and in the future, consequently addressing the skill gap and bring people back to work.

Culture and Technology are at the centre of Post – Pandemic transformation.

**Dr Daniel Suskind, Fellow in Economics, Balliol College, University of Oxford**



I want to share one main thought with you by putting some of the work I am doing – trying to understand the impact of technology on the labour market – into context of the pandemic that we are currently finding ourselves in. Every day we hear stories about systems and machines that are taking on tasks that until recently we thought only human beings alone could ever do: making medical diagnoses, driving cars, drafting legal contracts, designing buildings, composing music, and writing news reports. What does all this progress mean for most of us for who their job is their main, if not only source of income. I think this is one of the greatest questions of our time. At the start of the year, I published a book called *A world without work*, essentially arguing that we are not taking the threat seriously enough of a world where there is not enough work for people to do because of these remarkable technological changes. Now, I do not think that there is a big technological bang in the next few years after which a lot of people wake up and find themselves without work. I think that is very unlikely to happen. What worries me though is that as we move into the 21st century, that more and more people might find themselves unable to make the sort of economic contribution to society that they might have hoped or expected to make given their background, given their education.

I think this creates three challenges.

- 1) It creates an economic challenge. I think it is a challenge of inequality. How are we sharing our income in society when our traditional way of doing so – paying people for the work that they do – might be less effective than it was in the past?
- 2) The second challenge can be understood with respect to large technology companies and the power that they have. What do we do not only about their growing economic

power, but also their growing political power – their impact they all have on how we all live together collectively in society?

- 3) Finally, I think there is a third challenge which is very different from those two, which is around meaning and purpose. It is often said that work is not simply a source of an income, but that it is also a source of direction and purpose and fulfilment in life. If that is right, how do we provide people with a sense of direction, meaning, and purpose in a world where work is no longer sitting at the centre of their lives?

Back in January, these were the three challenges that I was worrying about in the context of automation. What is being so striking in this pandemic is that these challenges I thought we would face with growing severity as we move through the 21st century, we instead had to face right now because of this virus. We have found ourselves in a world with less work, not because the robots took over all the jobs, but because this virus completely decimated the demand of so many of those jobs relied upon. The interventions we had to adopt to contain the spread of the virus which had been necessary, made those economic matters worse. Think of those three challenges: First, the economic challenge – how do we share our income in society when our traditional way of doing so, paying people for the work that they do, is less effective than in the past? That is precisely the economic challenge we had to face over the last eight months. Suddenly people woke up and found themselves without a job. The challenge of power. The growing power of large technology companies, this has been a very conspicuous feature of the last few months, that large technology companies are doing particularly well during the pandemic. Finally, there is the challenge of meaning and purpose. One of the interesting features of quite a lot of public commentary during the pandemic has been discussion and debate about how we all best spend our time in a kind of enforced idleness that lots of people have found themselves in during lockdown.

Most of us have a good sense of how gainful employment looks like. I think a lot of us do not have a good sense of how gainful unemployment looks like. Andrew Yang, a former presidential candidate in the US put it quite nicely in a tweet when he said, “I should have been talking about a pandemic instead of automation”, because I think there is a very real sense that what we have faced over the last eight months represents some of the very real challenges that lots of people worry about the impact of technology on the labour market have been talking about. That is the thought I wanted to leave: If you take seriously the disruptive technology on the labour market then we can catch a glimpse of what that future might look like and the challenges that we will be facing in that world through what we have been through in the last few months. I hope that we can learn the lesson of what has and what has not worked when responding to these challenges that I set out before.

**Dr Phoebe V. Moore, Associate Professor of the Futures of Work, University of Leicester**



Covid 19 (C19) has illuminated a range of already existing stratifications across sectors and skills levels in the UK, but also created possibilities for new inequalities altogether. This puts the UK government and the All-Party Parliamentary Group (APPG) in a position to, as we think about the UK's investment in artificial intelligence (AI) as a route to recovery from the current recession brought about by this global pandemic, identify pressure points where workers are vulnerable, and to look for solutions at the analogue and technological levels, both.

In order to do this, we should first look at the AI value chain, asking which key workers in specific labour markets produce the very engine for AI? And, looking more specifically as AI products, which technologies can facilitate a smooth recovery across the UK, and work to protect all workers' physical and psycho-social occupational safety and health (OSH)?

AI does not exist without huge datasets used to train algorithms for machine learning used for automating decision-making in workplaces via:

- human resource people analytics,
- wearable device precision,
- self and other-tracking technologies,
- sociometric solutions,
- and a range of software and hardware products.

Indeed, AI cannot exist today, whether narrow or universal, without what I am calling human 'AI trainers'. The people behind AI are swathes of semi- and unskilled content moderators and

other data workers in both the Global North and South who carry out often psychologically debilitating 'dirty work'<sup>1</sup>, which ultimately serves to create large image and text databases.

The workers within the AI value chain include content moderators, who curate content for social media platforms such as Facebook and other news and video services and whose work is used to create text databases; and data service workers, who work with and produce data via annotation and natural language process training for such products as Amazon's chatbot Alexa, which feeds into image databases, data which is used to train AI. The invisibilised, affective labour that these workers carry out is not only to self-manage trauma on behalf of social media consumers where they do content moderation, but AI trainers are also some of the most highly monitored and tracked workers in information technology work today.

Two companies which have actually grown throughout the C19 era are Amazon and Facebook, who employ AI trainers in high numbers. In the UK, these workers are based in contact centres in London, Cambridgeshire and in Scotland, and many are now also working at home. Given rising rates of unemployment in the UK in other sectors, it is worth thinking about ways to support this most vulnerable set of workers in the value chain of the AI product and its scaffolding, as well other key workers.<sup>2</sup>

Pre-C19, 20% of non-key workers were able to work from home. In April 2020, in the second month of the C19 stipulated lockdown in the UK, the percentage of non-key workers in professional occupations working from home jumped to 70%. In the key workers categories, on the other hand, only 10% of are able to work at home. 3 10% of education workers, 2% of public administration and defence workers in non-keyworker categories, and 7% of finance and insurance and 10% of health workers who are also largely able to work at home, have been furloughed on the Corona Job Retention Scheme.<sup>4</sup> On the other hand, 70% of keyworkers have been furloughed due to C19, while PWC reported in September that 42% of manufacturing and 32% of transport and storage workers were furloughed.

Warehouse, transportation and construction workers are furloughed in the highest numbers; are least likely to work at home in the C19 era; and are also some of the least secure, where they have little protection from being laid off when schemes end. Key workers have also over time experienced the highest rates of digitalised tracking and monitoring of work and this is set to continue. These types of wearable technologies include armbands in warehouses, heart rate monitors on construction websites, time tracking in transportation and even mood and sentiment tracking in call centres.<sup>5</sup> Many of these technologies can result in psychosocial stress.<sup>6</sup>

However, in many key workplaces, image recognition technology is used to identify whether workers are wearing appropriate protective gear for OSH, where protection is paramount. Along those lines, I recommend that OSH is a priority for new wearable technologies in the post C19 era. A new wearable product on the market is designed for workplace social distancing. The badge, lanyard and wristband alert wearers if they are not sufficiently socially distanced. If a wearer remains close to another device for over 15 seconds, an 'incident' is recorded. Notifications arrive in the form of vibration and visual cues. Proximity is registered

but location and wearers' data are anonymised. This is the kind of technology that could feasibly work in all workplaces and serve to innovate and aid a sustainable economic and social recovery in the post C19 era.

**My policy recommendations are as follows.**

- 1) Investment in AI also requires investment in the value chain such as the data workers who produce AI including content moderators and natural language processing trainers, with a focus on social protection.
- 2) AI-based C19 technologies should be designed to protect OSH in all workplaces for a sustainable economic and social recovery, as people begin to return to work.
- 3) Similar to the Policy Options I have made in Monitoring Surveillance report for the European Parliament, I recommend
  - a) training all staff and to put a focus on facilitating AI understandability,
  - b) including worker representative groups including unions at all stages of the data life cycle, and
  - c) asking companies to write codes of conduct based on the AI ethics frameworks that are consulted and agreed with worker representative groups.
- 4) Adopt and enhance the GDPR into UK data protection and improve labour law, to protect workers and workers' data and surrounding rights, in these dramatic times.

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