



# MEASURING TOMORROW'S WORK AND ECONOMY

## INSIGHTS FROM 50 EXPERT INTERVIEWS IN THE UK, FRANCE AND GERMANY

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### I. HOW TOMORROW'S WORK WILL CHANGE THE ECONOMY AND SOCIETY

Digital technology is so omnipresent in our daily lives both at work and at home that it is easy to forget how far we have come in only a short time. During the early days of the internet it was hard to imagine how profound its impact on society and on the economy would be, as the internet economy largely developed independently of the brick-and-mortar economy. The position began to change with the emergence of smartphones and cloud-computing in the 2000s, which rapidly accelerated the merging of the online and offline worlds. The impact on existing business models throughout the economy was transformational.

As a consequence, e-commerce platforms have moved into retail and traditional retailers have developed strong e-commerce brands. Software companies are largely no longer selling physical products, but have moved towards a flexible software-as-a-service model of doing business, based on the cloud, and industrial giants including the likes of Siemens now employ tens of thousands of software developers. Digital technologies are an integral part of successful companies and no longer simply a sector of the economy. All business is now digital.

In many cases, digital transformation has been an evolution rather than a revolution. The digital economy offers vast opportunities, and the chance for entrepreneurs to build new, efficient and innovative businesses that create jobs, growth and solid returns on investment. But in its impact on the economy and society, digital transformation has unquestionably been a double-edged sword, and new technologies have clearly had a disruptive impact. There is no aspect of industry, the workplace, or the local economies that has been left untouched by digitalisation. Structural changes have also created winners and losers in relation to the distribution of employment and wealth. As a result, there is the potential for a political backlash from those who are at risk of being "left behind". Ensuring that this fundamental transformation of the economy is inclusive, and does not marginalise particular regions, individuals or even whole sections of society, is at the heart of the public policy challenge around digitalisation. For policy-makers, business and trade union leaders, as well as other labour rights advocates across the developed economies, managing the social and economic consequences of digitalisation has become of major concern. Until recently, it had been argued that governments have generally been slow off the mark:

**"THESE NEW TECHNOLOGIES MUST BE EMBRACED HEAD-ON; THEIR CONSEQUENCES (GOOD OR BAD) ARE NOT WRITTEN, INSCRIBED WITHIN THEMSELVES. [...] EVERYTHING DEPENDS ON THE COMPANY THAT USES [THEM] AND ON SOCIAL DIALOGUE, ON HOW THE DIGITAL CHANGE IS PRESENTED TO SOCIETY."**

- BUSINESS LEADER, FRANCE

**"POLICY-MAKERS DO NOT TAKE THE DISRUPTIVE POTENTIAL OF AUTOMATION AND DIGITAL TRANSFORMATION OF WORK SERIOUSLY, THEY WHITEWASH THIS TOPIC."**

- MEMBER OF THE GERMAN BUNDESTAG

It is this debate around how new technologies are impacting the shape of tomorrow’s work that frames this report. The future of work is too often narrowly defined as the “platformisation” of work in the gig economy, and the replacement of human labour with robots. Yet, the implications of new technologies for the workplace are more complex as digitalisation changes the very nature of the economy, the manner in which firms operate, and how people work and collaborate together. We will examine the different perspectives on each of these factors throughout this report, drawing on the views of some 50 senior voices from business, academia and public policy.

## METHODOLOGY

This report begins from the assumption that policy-makers, the business community, academic researchers and civil society, all play an important role in shaping the economic transformation that is currently unfolding. This report by the Berlin-based think tank Das Progressive Zentrum and the London-based think tank Policy Network, in collaboration with Dropbox, seeks to contribute to the debate on tomorrow’s work and economy, while identifying strategies that will maximise the opportunities to be gleaned from the digital economy for the whole of society.

Our findings in this report are based on semi-structured expert interviews with fifty well-known experts in France, Germany, the United Kingdom, as well as at the EU institutions in Brussels. All of the experts we spoke to work on different aspects of how new technologies shape the workplace and the economy, and have considered opinions about the risks and the opportunities that are created (or destroyed) by digitalisation.

Our interviewees included parliamentarians and senior civil servants, managers of large and medium-sized global companies, entrepreneurs from startup accelerators and co-working spaces, academic researchers and thought leaders, and representatives of employer associations and trade unions. All of the interviewees spoke to us on the basis of anonymity, allowing them to speak candidly when expressing their views, and allowing us to create a more open space for discussion. Additionally, we examined statistical data and a wide range of secondary literature on the development of the economy and of digitalisation, so as to validate the insights gained from the expert interviews.

By drawing on the views of a diverse range of stakeholders and sources, our research aims to provide a comprehensive and balanced overview of the transformation of work today, and of the challenges confronting employers, workers and policy-makers in today’s economy.

## KEY ARGUMENTS AND FINDINGS

In the report, we put forward a range of ideas for how to harness the potential of new technologies, and of how to address the social and economic risks that are posed by the impact of digitalisation. Based on the insights that we identify, four major challenges that are central to the public policy discussion on tomorrow’s work emerge, namely: the need to ensure an inclusive digital transformation, training and skills, fostering growth and innovation potential in the economy, and the fact that “one size does not fit all”.

Figure 1: Experts by professional background

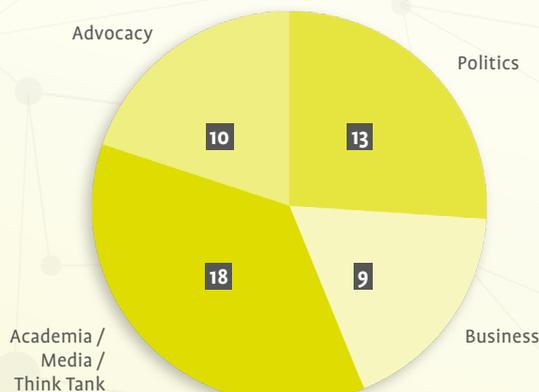
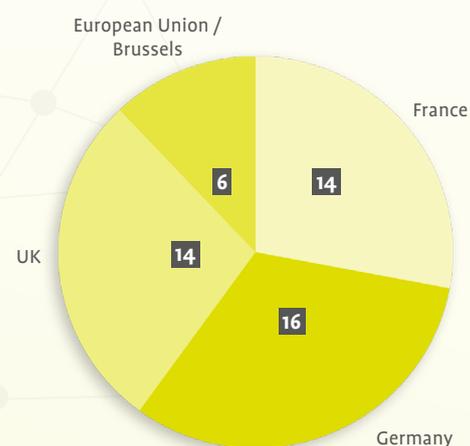


Figure 2: Experts by country



### ENSURING AN INCLUSIVE DIGITAL TRANSFORMATION

The digital transformation creates many opportunities, but also uncertainties. An inclusive digital transformation addresses these uncertainties by specifically supporting individuals and communities that may be at risk of falling behind. These can include certain demographic groups that need (re-)training and upskilling, employers in legacy industries that may lag behind the digital transformation and need access to talent, technology and funding, or rural areas that need to develop their own strategies to thrive in the digital age.

### TRAINING AND SKILLS

A major effort by policy-makers, businesses and individuals is required to increase the quality of training and opportunities for upskilling, not only for the educated few, but for all those who enter the world of work or who are being affected by structural change in the labour market. Advanced training for workers of all ages is vital to create a dynamic and highly skilled workforce across all sectors. Ensuring digital literacy and competencies is essential and that adequate investment is made in human capital is one of the most pressing challenges in today’s economy.

### FOSTERING GROWTH AND INNOVATION POTENTIAL IN THE ECONOMY

Digitalisation does not only alter how we work. Firms themselves are changing dramatically, too. Over the last century companies were essentially organised to

maximise productive efficiency. Today, companies need to be organised to maximise creativity and innovation, given the emergence of the knowledge economy. This clearly calls into question traditional management models. In addition, the boundaries of a company are becoming increasingly blurry and collaboration – both internally between different divisions and externally, with outside actors such as start-ups or even competitors – gains increasing importance.

### ONE SIZE DOES NOT FIT ALL

All of these changes are happening quickly. While the transformation of the economy in the first industrial revolution took around 40 - 80 years, the digital transformation is happening significantly faster. The challenges however are clearly not the same in each industry or region. While some industries are already well advanced in the digital transformation, others are beginning this process only now. Depending on where an industry stands, a different policy framework may be needed to support growth. Similarly, smaller cities might invest their political capital in a university to gain access to talent while larger metropolitan areas face other challenges such as high costs of living. Therefore, there is no silver bullet that can master the challenges of the digital transformation. Instead, a broad and robust policy agenda is required to address the economic imbalances within countries and regions.

## II. AN INCLUSIVE DIGITAL TRANSFORMATION

The digital transformation has to be understood as a major structural change in the economy and society of the advanced developed economies. We currently find ourselves in the midst of an era of economic and social change which began in the late 1950s and 1960s, and can broadly be understood as a shift from the dominance of analogue to digital technologies. Some digital technologies have already revolutionised the way humans communicate, consume and travel – such as the smartphone – while other technologies are about changing our work lives and daily routines – such as the development of autonomous vehicles.

The Industrial Revolution that began in the 19th century showed us that in times of technological change, the benefits for society overall do not materialise all at once, and are accompanied by the emergence of new

forms of democracy, new political coalitions, and bold public policy reforms. During the Industrial Revolution the income levels of workers initially fell, profits swelled, and economic inequality grew to an extent that parallels today’s economic situation in developed economies.<sup>1</sup> So this begs the question – how can an inclusive digital transformation be delivered?

### POLICY-MAKERS NEED TO BE AWARE OF MAJOR STRUCTURAL SHIFTS IN THE ECONOMY AND IN SOCIETY

New technologies have the power to alter how economic and social value are created. In a globalised economy this often creates winners and losers within and between

1. Cf.: FREY, CARL BENEDIKT (2019): The Technology Trap: Capital, Labor, and Power in the Age of Automation, Princeton: Princeton University Press.

countries and regions. The goal of an inclusive public policy strategy should be to harness the jobs and growth potential of the digital revolution, but at the same time address the social and ecological risks that accompany such shifts. Such a strategy requires an assessment of the consequences of automation for individuals and businesses, as well as of how emerging technologies affect the competitiveness of industries. For example, skills maps can help policy-makers to identify the capabilities and competencies that will be needed in the workforce in the future and to develop flexible training programmes that ensure that employees can update their skills to reflect shifting demands in the labour market. As one expert told us:

**“OVERALL, THE CONNECTION BETWEEN WORK AND VALUE CREATION IS KEY AND SHOULD BE THE CENTRAL FRAMEWORK OF BUSINESS SUCCESS”.**

- CONSULTANT AND AUTHOR, GERMANY

## **NEW TECHNOLOGIES MUST BENEFIT SOCIETY AS A WHOLE, NOT JUST A PRIVILEGED ELITE**

If new technologies are not designed and perceived as being at the service of people and society, there is a danger that citizens will refuse to embrace them overall. They need to have a voice in determining how new technologies are used and the regulatory environment that shapes the digitalisation process:

**“WE NEED TO RETURN TO AN INNOVATION THAT MEETS THE NEEDS OF SOCIETY.”**

- INNOVATION ENTREPRENEUR, FRANCE

The extent of social acceptance and legitimacy will depend upon whether this transformation benefits large segments of society, not only corporate elites.

**“THE MAIN CHALLENGE FOR BUSINESSES IS TO MANAGE THE EXPECTATIONS OF NEW TECHNOLOGIES AND TO HAVE A SUBSTANTIVE DIALOGUE WITH SOCIETY AND POLICY-MAKERS ABOUT THE BENEFITS AND DOWNSIDES OF NEW TECH.”**

- FORMER EUROPEAN COMMISSIONER

## **A JOINT EFFORT: EQUIPPING PEOPLE, BUSINESSES AND COMMUNITIES WITH THE TOOLS TO SHAPE TECHNOLOGICAL CHANGE**

Co-ordinating the transformation of the economy and society through digitalisation also means addressing the provision of public goods and ensuring access to economic opportunities. Policy-makers must also address the need to deepen social equity and to address conflicts over national identity, for example by encouraging more democratic participation.

**“THE DIGITAL ECONOMY IS SO POWERFUL THAT WE ARE FORCED TO BE INCLUSIVE; INCLUSION IS ESSENTIAL. LARGE AND SMALL AND MEDIUM[-SIZED] ENTERPRISES GIVE PEOPLE OPPORTUNITIES BUT THE STATE MUST ALLOW EVERYONE TO HAVE ACCESS TO TECHNOLOGY AND THE CHANCE TO BE FREE ACTORS.”**

- PRESIDENT OF A TRADE UNION, FRANCE

Managing this transition is not only the job of government. All stakeholders across the public and private sectors must also take responsibility for ensuring an inclusive digital transformation – a theme referred to throughout this report. While the state needs to improve access to digital infrastructure and education, businesses and social partners must also provide input to training and skills development, to allow for a healthy workplace and work-life balance. Employees themselves must also take responsibility for advancing their own learning.

### III. THE WORLD OF WORK IN TRANSITION

Changes in labour markets and in the workplace that have been brought by digitalisation are part of a set of wider structural changes in the economy. Other major drivers include the changing division of labour, the reshaping of value chains across national borders, and societal changes including an ageing population, increased female participation at work, and new consumer preferences. Importantly, digitalisation alone does not explain why the world of work is changing, but work is at the centre of the emergence of new economic and social trends.

#### SHIFTING FROM QUANTITY TO QUALITY: TRENDS IN THE LABOUR MARKET AND THE AUTOMATION CONTROVERSY

Over the last ten years, the political and academic debate on the impact of new technologies on labour markets went through four phases. In Europe, the debate began in 2010 with what a former European Commissioner called, “a naïve discussion about how to transform Europe into a Silicon Valley.” There was strong pressure to change the EU policy framework in order to boost venture capital, innovation, and growth in the tech industry. On average, EU member-states invested less in innovation and R&D than was the case in the US, and European universities were less embedded in the innovation economy than their American counterparts. To some degree, such debates nevertheless neglected the fact that businesses are nested within institutional frameworks of social partnership and industrial and employment policy that make it very challenging to replicate the digital ecosystem of Silicon Valley. Nevertheless, as a response, the EU established the Horizon 2020 funding programme for research, technological development, and innovation, which recognised that R&D investments will play a major role in determining the competitiveness of the future European economy.

Starting around 2014, the debate shifted abruptly, to a focus on the growing fear of mass unemployment as a consequence of automation. Influential academic studies added credibility to the increasingly prevailing narrative of robots taking our jobs away. Our interviews made clear that there is still a great deal of uncertainty about the degree of automation in the labour markets. “A lot of the debate is not based on reliable numbers, and reliable data is hard to come by – we are flying at 10,000 feet above the ground”, a policy official at the European Commission pointed out to us.

Yet, it is a fact that the nature of work will change and with it the demand for skills. This is also the case for jobs with relatively high skill levels such as lawyers and doctors. Today, it is less clear where new jobs will come from and which skill sets workers will need in the future. Currently we have little reliable evidence about up and coming occupations, but it seems likely that, “[t]he digital transformation will most likely mean a huge demand for labour for brainy and high-skilled people”, opined a former European Commissioner.

The substitution of tasks and jobs and major changes in labour markets has been underway for several decades. Work processes in the manufacturing sector, for instance in Germany, have already shifted from routine-based, to cognitive tasks in most companies. As a consequence, the skill sets of workers have already been upgraded, a trend which is likely to continue over the coming years, a leading academic in labour market studies believes.

Facing the emergence of new and more flexible forms of employment and record levels of employment in major European economies as well as in the US, the debate on tomorrow’s work has often moved on to the *quality* of jobs. A number of important green and white papers have advanced policy proposals focussing on the promotion of fair and decent work and on reforming industrial-age employment regulation and social welfare systems. Important examples include the “Taylor review” of modern work practices in the UK, the Work 4.0 white paper in Germany, and the Villani report in France. What constitutes “good work” is clearly a theme of growing importance for governments and policy-makers.

A further central lesson that came from our interviews is that public policy is beginning to recognise that labour markets differ markedly within and across countries. The potential impact of automation varies according to the structure of the economy. Economies that are more oriented towards manufacturing will be impacted in very different ways by automation than those that are service and knowledge-orientated. “There is not one but multiple labour markets meaning that the pace and impact of change in the workforce differs significantly across regions and countries,” as a senior policy-maker in Germany remarked. The degree of change in labour markets will depend on the structure and value creation chains that dominate local and regional economies.

The transformation of work will by no means happen simultaneously, and is more likely to materialise in intervals.

## BRICKS, BYTES, AND BEHAVIOUR – WHAT DRIVES THE NEW COLLABORATIVE FACE OF BUSINESSES AND ORGANISATIONS?

Against this background of the latest trends in labour markets, new technologies and artificial intelligence (AI) are also having a decisive impact on businesses and organisations throughout the public and private sectors.

Digital transformation poses a major challenge for companies in every aspect of their daily operations as it requires them to rethink, restructure and reinvest. In contrast to start-ups which can build up their businesses from scratch, established incumbent companies often have to deal with a host of legacy issues. The barriers to change can be profound and complex. Structural and legacy issues may demand the adaptation of business strategies, building consensus across stakeholders and investors to ensure the necessary changes in the workforce and skill sets of employees, as well as behavioural changes across the whole organisation. Size also matters, explained a secretary general of a French trade union: “A major challenge is above all the speed of things; whereas the industrial revolution took years, now it all goes very fast and small companies do not have the financial means or the human capacities to keep up with this pace.”

A leading European thinker on the new work emphasised to us that tomorrow’s work is driven by changes in “bricks, bytes, and behaviour”:

“Bricks” refers to the physical space of the office and its reconfiguration in the light of the emergence of the knowledge economy. Traditionally, the knowledge worker had to adapt to the office space. But today, the office must create room for the variety of tasks that modern knowledge work entails, such as communicating effectively, working in teams, applying cognitive capabilities such as analysing complex data sets, and engaging in “deep work”. In addition, these “bricks” not only cover the traditional office, but also remote work spaces, such as co-working spaces and home offices.

“Bytes” refers to the changing digital infrastructure that makes certain tasks faster and easier, while adding an additional layer of complexity. The increasing digitisation

of companies and the introduction of new software and digital platforms to the workplace is happening at an unprecedented pace. This transformation is either targeted at improving performance, enabling employees to perform tasks faster, for example, by ensuring faster computers and processing speeds. On the other hand, technology has the purpose of cutting transaction costs, for instance by using AI to stock retail outlets. New technologies are also often used to boost internal communications and collaboration, such as enterprise social networks and intranets.

**“NEW WORK GOES HAND IN HAND WITH A FLEXIBILISATION OF WORK. IN OTHER WORDS, WORK TRANSCENDS ESTABLISHED TIME AND SPACE CONSTRAINTS IN TERMS OF WHERE TO WORK, HOW TO WORK AND, CRUCIALLY, WHEN TO WORK; HENCE, WE NEED TO FUNDAMENTALLY RETHINK ITS NATURE.”**

- CONSULTANT AND AUTHOR, GERMANY

When it comes to the implementation of new technologies, the size of companies may become an issue. Small and Medium Enterprises (SMEs) from legacy industries “are very far from enabling the potential of digital technology. The production, consumption, distribution... remain far from the possible in terms of e-business, cost rationalisation, international scope”, a former member of government in France told us.

“Behaviour” refers to the evolving social and cultural context within which work takes place.

As a French union representative told us: “We need a new management model – not just team management but also self-management (...) The enterprises need to rethink horizontally their organisational structures to integrate this knowledge at all levels”. Behaviour therefore refers to the activities and corporate culture that help realise the benefits of the “bricks” and “bytes”.

**“WHEN IT COMES TO DIGITAL TRANSFORMATION, IT DOES NOT MATTER HOW GOOD OR BAD YOUR TECHNICAL INFRASTRUCTURE IS. WHAT REALLY MATTERS IS THAT YOU TAKE INTO ACCOUNT THE HEARTS AND MINDS OF PEOPLE – YOU NEED MORE THAN A TECHNICAL SHIFT; YOU NEED A CULTURAL SHIFT.”**

- MANAGER, GERMANY

Cultural changes have indeed featured prominently in our discussions with experts, emphasising the opportunities as well as the trade-offs and challenges of tomorrow’s work. A workforce that is increasingly flexible and seamlessly connected through digital tools will require:

- A new style of management that goes beyond the delegation of tasks and that enables workers to unleash their creative skills and to engage in self-management. The major task for new management models is to strike a balance between the demand for autonomy and the need to conform to corporate strategy.
- A reconsideration of existing hierarchy structures, and increased access to information and knowledge-sharing which must become more open. New technologies can facilitate the creation of horizontally structured businesses with flat hierarchies, strong collaboration among employees, and engaged decision-making.
- The creation of the right mind-set and environment to allow for collaboration with external employees outside the business. This process includes “learning

*new forms of collaboration with individuals from elsewhere, not only from within the company. This is new and it’s difficult to enter the decision-making processes with freelancers or competitors”, a former member of the French government explains.*

There is likely to be more autonomy and freedom for employees with regard to setting schedules and gaining control over work tasks, which is likely to improve individual well-being and productivity.<sup>2</sup> Yet, at the same time, freedom of choice and action in the digital workplace might be limited to those who already have employment experience and sufficient human capital. Realising this means that realising the benefits of freedom and autonomy for workers across the board will continue to be determined by power structures, such as levels of educational attainment, economic status, existing hierarchies.

## IV. THE POLICY-MAKING AGENDA: CHALLENGES AND OPPORTUNITIES

In this chapter we analyse the challenges and opportunities that were identified in our discussions with experts in Germany, France and the UK. In our expert interviews, we identified a number of concrete challenges that will impact tomorrow’s work. These issues surfaced in our discussions across each case, which is testament to their enduring importance. In particular, this chapter will focus on the “crisis of cognition” and the increasing importance of psychological health in the workplace, the role that artificial intelligence plays in tomorrow’s work, and the need for a fresh approach towards training and education.

The challenges described below show that policy-makers as well as managers, unions and other stakeholders can all play an active role in shaping tomorrow’s work. *“These new technologies must be embraced head-on; their consequences (good or bad) are not written, inscribed within themselves”, a French business leader told us; “everything depends on the company that uses [these technologies] and on social dialogue, on how the digital change is presented to the society”.* Thus, these issues should be high on the agenda for everyone with an interest in shaping a healthy future of work.

### THE “CRISIS OF COGNITION”

While the fact that many knowledge workers today can work from anywhere brings much needed flexibility into working life, our discussions also show that there is also a dark side to the prevalence of digital devices and tools at work.

*“It is a crisis of cognition”, a French writer we interviewed said. “Every case of stress, anxiety, and depression can be accounted for by the crisis of cognition – we are unable to handle all these pop-ups and notifications that pollute our lives”.* While we do not necessarily work more, many workers encounter more stress than ever before because we are not able to handle the constant bombardment of information in the digital economy. Others stressed that coordination has sometimes taken over value creation: *“in some teams, they spend 75-85% on these modes of coordination rather than actual work”, an expert from Germany told us.* While teamwork and collaboration are important in a modern workplace, it

2. WHEATLEY, DANIEL (2017): Autonomy in Paid Work and Employee Subjective Well-Being, in: Work and Occupations, 44(3), pp. 296–328, <https://doi.org/10.1177/0730888417697232> (access date: 30.09.2019).

may increase the need for coordination and organisation. Managers not only need to enhance collaboration but also must allow workers to disconnect to manage workplace-related stress.

Digital technologies clearly have the potential to empower workers and to make them more productive by allowing them to do synchronous work online or by granting them more autonomy. Yet, many concerns were raised regarding the danger that these same technologies can create a form of “digital Taylorism”: *“ultimately, technology is a tool that can enhance the empowerment of workers”,* a British social entrepreneur told us. However, *“there is [also] an insidious threat that goes with monitoring and control [as a] danger to people’s autonomy. The scope [for monitoring] is almost limitless, with wearable technology, facial recognition technology, location technology.”*

A German Member of Parliament added: *“Algorithms and [...] new forms of performance management [...] aren’t good or bad per se but are a digital version of [...] Taylorist management techniques.”* Checks and balances are key to using these digital tools in the workplace. Some experts have made the case for a “right to disconnect” which can either be enforced by the companies themselves or regulated by national authorities, such as happens in France. Policies that determine when workers need to respond to co-workers and when they can switch off, can help to give individuals more control over their lives while protecting their physical and mental health, and building resilience.

**“DIGITAL TECHNOLOGIES DEFINITELY HAVE THE SCOPE TO HELP WITH WORK-LIFE BALANCE, BUT THEY CAN ALSO RESULT IN THE “ALWAYS ON” WORKPLACE, WHICH NEEDS TO BE MANAGED.”**

- SOCIAL ENTREPRENEUR, UK

## TAMING ARTIFICIAL INTELLIGENCE (AI): REGULATION AND COOPERATION

A number of experts shared their beliefs with us that, with respect to digitalisation, we have only seen the tip of the iceberg. *“AI is the next big thing after digitalisation”,* a researcher at a German economic policy think tank told us. *“It might become even bigger than digitalisation, with highly disruptive implications for society as well.”* Another expert added: *“AI has the potential to replace monotonous, boring tasks at some point. However, it is*

*unclear when this is going to happen with which effects.”* Experts highlighted two themes that they identify as most important in addressing the unknowns of AI: the importance of accountability and the need for a common European strategy.

**“HUMANS STILL NEED TO MAKE THE DECISIONS – AND WE NEED LEGISLATION AROUND THIS.”**

- INDUSTRY REPRESENTATIVE, BRUSSELS

At the core of our discussions of AI is the claim that technology must be there to serve citizens and not the other way around. A labour economist reminded us that we often have high and potentially unrealistic expectations of new technologies: *“With regards to AI, we tend to expect a type of perfection that had never been there.”* Policy-makers and society need to set a framework ensuring that new technologies operate within widely accepted rules and norms. The use of AI needs to win public trust.

**“THE WHOLE THING ABOUT AI IS ABOUT TRUST.”**

- MEMBER OF PARLIAMENT, FRANCE

An important challenge will be to build trust in new technologies such as AI. One union representative said that this will also require active participation by workers: *“Acceptance of employees in relation to AI and new digital technologies is not enough, there need to be opportunities for active participation during change processes (...) co-determination (Mitbestimmung) is key.”*

Given the importance of AI and the differences across the UK, German and French economies, experts pointed to the different paths in the development of AI. In Germany, business insiders stressed the unique position of (hidden) industrial champions in harnessing non-personal data, while maintaining a competitive advantage in manufacturing and engineering. In the UK, respondents stressed the high levels of investments in AI, and the capital’s tech ecosystem that will help to make the country an AI leader. Some reflections in Paris and Brussels went beyond national solutions calling for greater EU cooperation, in particular in research and development, scaling up efforts and responding to the emerging AI powerhouses in the US and in China.

**“IN THE DEVELOPMENT AND APPLICATION OF AI IN EUROPE NATIONAL SOLUTIONS ARE NOT SUFFICIENT. THERE NEEDS TO BE STRONGER EUROPEAN COOPERATION IN SCIENCE.”**

- MEMBER OF PARLIAMENT, FRANCE

As it is still unclear precisely how AI will develop, it seems important that ethical considerations and regular consultations are front and centre as AI systems are being introduced in the workplace. There has to be a voice for the whole of society in the debate about AI. For example, machine learning and AI have a huge potential in streamlining work processes and freeing knowledge workers, for example, from coordination and administrative tasks, thus creating space for more productive work. In keeping with this, a union representative from Germany stressed the need for the establishment of negotiation processes to allow for the implementation of AI at work, and for the introduction of experimental spaces to test AI in the workspace. This could include “sandboxing”, where new technologies such as new AI innovations can be tested under a less complex and onerous regulatory environment for a limited period of time.

## FROM “WHAT” TO THINK TO “WAYS” TO THINK: EDUCATION AND TRAINING FOR THE DIGITAL AGE

As we have seen in section three, many jobs and tasks will change as a consequence of the digital revolution. No sector, industry or profession will be left untouched by digitalisation, including knowledge-based professions. In this context, training and investment in human capital is becoming the “*first responsibility and everybody’s duty*”, as a French representative concluded.

Our interviews with experts centred around rethinking the approach to training by providing access to formal education opportunities alongside in-work skills development. This policy approach is particularly important in countries where education is biased towards academic learning rather than vocational training. “*The education system we [currently] have is based on knowledge. At work today, what is expected is not knowledge but of the capacity to learn*”, a senior digital advisor to the European Commission said. “*A major aspect here is soft skills – such as creative thinking, team work, problem solving. There is not enough emphasis on this in secondary schools.*”

Much of the content and material that students absorb in school or university is outdated by the time they reach employment, and modern education systems lack the agility to adapt to the needs of the modern workplace. Crucially, students will have to “learn to learn”, rather than merely to acquire knowledge. This finding however is not limited to students and young people. Such an approach must apply to all workers in the economy and not just to “the next generation”, given the far-reaching implications of the digital transformation.

However, it is also clear that formal training is not an end in itself, and the wider education and working environment must be made conducive to ongoing reskilling. There is a question of responsibility here: who should guarantee investment in the human capital of the workforce? Should it be the state, the individual or the private sector who should deliver? “*Probably this has to come from all stakeholders*”, an EU representative said. “*It’s not going to be a one solution fits all*”.

While the crucial role of national governments was widely acknowledged by most experts, workers themselves also have a major role to play: “*What we don’t realise is that most people are not at all accepting the notion that [gaining] skilling is their responsibility – this is the political and social reality*”, an adviser in the European Commission pointed out to us. And a German economist added that firms, too, often expect that their employees have all the skills needed for the job when they join and are not well prepared to continuously train their employees. There are important policy innovations designed to promote upskilling. In France, for example, the use of portable training accounts<sup>3</sup>, which provide workers with access to training opportunities that are mobile, rather than tied to any particular employer, has been well received thus far. Successful lifelong learning schemes have also been introduced in Luxembourg<sup>4</sup> and further afield in places like Singapore<sup>5</sup>, where citizens are granted a state-backed portable account that allows people to “pause and learn” new skills while remaining in work. The UK also pioneered the use of Individual Learning Accounts where workers could purchase training through accounts that combined contributions from employers, employees and government.

3. “mon compte personnel d’activité”, <https://www.moncompteactivite.gouv.fr/cpa-public/>

4. Cf.: CEDEFOD (2016): Spotlight on VET: Luxembourg, European Centre for the Development of Vocational Training (CEDEFOD), 2016/17, [https://www.cedefop.europa.eu/files/8112\\_en.pdf](https://www.cedefop.europa.eu/files/8112_en.pdf) (access date: 10.09.2019).

5. SkillsFuture is a national platform which provides Singaporeans (students, employees and employers) with opportunities to further develop themselves, <https://www.skillsfuture.sg/>

Fair access to training opportunities is another major overarching theme of this study. Throughout Europe, sectors of the population can feel “forgotten” or disconnected from the fast pace of development in urban areas, as some of our interviewees emphasised. Some workers believe that they are not being given the skills to cope adequately with the digital transition. These insecurities have arisen for example in the context of President Macron’s ongoing labour market reforms in

France, and the forceful opposition expressed through the likes of the growth of the *Gilets Jaunes* (“yellow vest”) movement. Governments and local authorities must play a leading role in helping industries and workers that face major disruptions to train and retrain, and to adapt to disruptive change. Clearly, areas that are at risk of being left behind must be provided with the infrastructure needed to flourish in the innovation economy.

## V. A VIEW FROM THE CAPITALS

Interviewing experts on the shape and nature of tomorrow’s work and the future economy has enabled us to gain a unique snapshot into the drivers of change for individuals, business and industries in society. The case studies presented here highlight each country’s traditional strengths in policy-making, and demonstrate how those have been brought to bear on the challenges created by the digital and AI-related transformation.

### GERMANY: COMPETITIVENESS AND MODERNISING SOCIAL PARTNERSHIP IN THE AGE OF AI

Germany has a long tradition of tripartite modes of social partnership, that is, close cooperation between strong labour unions, employers’ organisations and the government to shape policies affecting the world of labour. Our interviews show that the German model of social partnership is likely to remain of great importance – although the model is currently undergoing a process of significant transformation. More specifically, in an era of artificial intelligence and algorithmic management, the strong position of some German unions coincides with innovative forms of worker participation. Referring to a company with an almost fully unionised staff, one expert contends that, *“the acceptance of employees in relation to AI and new digital technologies is not enough; instead, there needs to be opportunities for active participation during change processes.”* As a result, employees are in a favourable position to co-determine the implementation and use of predictive analytics. According to this union expert, the active participation of the workforce had beneficial consequences for management as well.

The changing nature of work however also poses challenges to the traditional model of labour representation that rests on the collective bargaining power of a large

homogenous workforce. *“The traditional mechanisms of leadership and management do not work anymore, we need new forms of leadership in the digital era that takes into account self-directed work”*, one expert told us. This shift also has an effect on worker representation, certainly for some sectors and types of work. For example, a public policy expert highlights that he sees a massive shift in power relations within German companies, as *“there’s a new actor within organisations: the highly-skilled individual who has potentially far more bargaining power than in previous times.”* The German government is now considering legislation that will give employees more control over where they want to work (for example in the office, at home or in a co-working space) and also loosen some of the restrictions that have until now prevented working parents from leaving work earlier to take care of their children and finish emails in the evening, for example. Coordination between the Ministry of Labour and social partners aims to ensure this new flexibility balances the interests of employers and unions alike.

### AI, GLOBAL COMPETITION AND DATA POWER: GERMANY’S COMPETITIVE ADVANTAGE

In relation to the global race in AI and digital platforms, most respondents emphasised that Germany must focus on putting in place a national strategy that would support building a digital ecosystem which is rooted in its rich set of social institutions.

A range of interviewees made clear that Germany’s competitive advantage lies in making use of the accumulation of non-personal data linked to production and manufacturing, rather than personal data extracted through digital platforms. According to a Member of Parliament, *“China controls 20% of the global platform economy, Europe only 3%, the US control the remaining part. That said, in terms of data-driven business models, Europe is not relevant on a global scale.”* Likewise, an economic expert argues that

“Germany was never in a competitive position to China and the US when it comes to personal data gathered by digital platforms but has a unique advantage in that it can connect AI and industry in a sophisticated way.” Another interviewee is even more optimistic, saying that “there is a massive data ocean, and companies have just entered it by tipping a toe in the water.” As such, our research dovetails with the government’s Industry 4.0 strategy to integrate the production of machines with digital systems.

## FRANCE: LET THEM HAVE START-UPS

Our research on France shows a growing awareness of all issues of workplace rights and inequality. There is a clear split between those who view domestic employment protections as necessary for defending the rights of working people, and those who view them as regulatory obstacles and a drag on innovation. The tension is partly reflected in President Macron’s ongoing labour market reforms, and the strong opposition expressed through the likes of the *Gilets Jaunes* (“yellow vest”) movement.

### STARTUP PROMOTION

Since his election in 2017, President Emmanuel Macron’s administration has placed a major emphasis on increasing the numbers of startups, with increased access to government financing and support, in a bid to “catch-up” with the UK particularly, for example with “The Family” and the Station F start-up incubator in Paris. In terms of the density of startups, France is second only to the UK in Europe.<sup>6</sup> As in the UK, cloud technologies have dramatically reduced the barriers to market entry in France, but scaling-up still requires costly investment that is often hard to raise. Nonetheless France’s share of tech investment is growing rapidly. Here we see a notable divide in the French case, as the hyper-modern, pro-business approach to the economy adopted by President Macron has come up against persistent and entrenched social and political barriers to reform, which at the time of writing shows little signs of abating.

### INNOVATIVE LEGISLATIVE RESPONSES

The French state has traditionally played a key interventionist role in economic affairs. This role has resulted in the introduction of some innovative legislative responses including the “loi numérique” (“Law for a Digital Republic”) which addresses three key elements of the digital

economy, namely: the circulation of data and knowledge, the protection of individuals in the digital society, and the promotion of digital access for all.

Another notable innovation was the introduction of the “compte personnel d’activité” (“personal training account”) in 2016, which allows workers to access information about their employment rights and entitlements, and to subscribe to health insurance and other services. The “compte personnel” also amounts to a portable training account linked to the worker or wage-earner as opposed to any single employer, and is an example of a new and exciting approach to the regulation of work in the digital age (discussed above).

According to a representative of a public training agency in France, this law greatly improves the “*transparency of, and access to, public services*”. However, there is limited evidence as to the implementation and effectiveness of this programme since its introduction, and anecdotally, many stakeholders doubt that its arrival has induced much in working and training practices, as yet at least.

## UK: REGIONAL REBALANCING

The policy debate on the future of work in the UK focuses on bringing regional prosperity to areas outside of London and the South East up to the standards of the capital, which is also Europe’s leading city for technology. The UK is well positioned: the structure of the economy is relatively knowledge-based, and therefore well-equipped for digitisation. However, these highly productive industries, skills and relevant infrastructure are disproportionately located within the South of England. From a practical point of view, a business representative notes how outside of London and the big cities, “*even mobile phone coverage is something that given the UK’s geography, can be quite a challenge*”. What’s more, areas outside the South East have been historically reliant on traditional industries and manufacturing, and are therefore most adversely impacted by automation and offshoring in a more globalised world. The challenge therefore, is one of spreading opportunity and rebalancing.

Interviewees argued that the shift from the manufacturing to the knowledge economy has led to growing regional inequality across the UK. Interviewees made frequent reference to the sense that certain communities feel “left behind” during the digital transformation, regarding access to employment, digital infrastructure

6. Cf.: SCOTT, MARK; DICKSON, ANNABELLE & CONTIGUGLIA, CAT (19 April 2019): France battles to topple Britain as Europe’s top tech nation, POLITICO, <https://www.politico.eu/article/france-britain-uk-tech-digital-emmanuel-macron-theresa-may-london-paris-week-google-facebook-europe/> (access date: 28.09.2019).

and training opportunities. Particular attention was paid to geographical disparities, as the potential opportunities and benefits associated with new technologies are not seen to be evenly shared, especially outside of the major cities. A senior national-level politician with first-hand experience of Parliament’s digital agenda also claims that the economic shocks of globalisation on different local economies and the widening regional inequalities has led to “increasing dissatisfaction” among voters.

### SKILLS, CONNECTIVITY & TALENT – A KEY COMPONENT

In the UK, the concerns of business and employers largely revolve around access to skills and talent, the adoption of new technologies, and the need to maintain and extend digital infrastructure, with broadband technologies often inadequate in towns and cities especially those outside of Greater London and Manchester. A senior trade union figure notes that there is a “*real geographical problem*” with the processes of digitalisation, “*as job losses are felt in some places more than in others*”, with the potential to create massive regional disparities, and a huge retraining challenge.

### INDUSTRIAL STRATEGY & REGIONAL REBALANCING

The UK has recently launched a series of deals to promote priority sectors for the future as a part of its industrial strategy. This approach includes capitalising on the UK’s strengths in life sciences, artificial intelligence, and battery storage. This strategy aims to combine German style regional growth with US style start-up culture, while taking a hub approach bringing capital, academia and entrepreneurship together in one place. Policy-makers have prioritised the rollout of physical infrastructure.

### HUB CREATION

While London’s FinTech scene is famed around the world, one of the keys to British success has been the establishment of technology “hubs”. Complimenting their world renowned academic institutions, Oxford and Cambridge host some of the most exciting life sciences and artificial intelligence start-ups in the world; while Bristol has built on its engineering background to host exciting early stage businesses.

In a nation galvanised by more venture investment than Germany, France and Sweden combined, Manchester, Cambridge, Oxford, Edinburgh, Leeds and Bristol are all currently home to exciting unicorn companies. While this pales in comparison to the 45 in London, emphasising the regional disparity point made by interviewees, the

regional cities of the UK host significantly more of these companies than their German and French counterparts. This growth has been matched by an explosion of jobs in the digital economy spread across the country.

Meanwhile, an entrepreneur and investor, with decades of experience of working and investing in the UK and the US believes that “*the geographic flexibility that digital work provides*” can be “*very positive*” from a quality of life perspective, by helping to keep towns and villages outside of the main urban centres vibrant and prosperous, and by reducing congestion and pressure on housing and public utilities. However, this approach can only work if investment in training, infrastructure and opportunities are spread more widely than they have up until now.

### THE EU – FACILITATING DIALOGUE AND INVESTING IN RESEARCH

The EU-level institutions and agencies are actively involved in discussions surrounding digitalisation, the future of work, and the regulation of the internet.

The pace of technological change continues to outstrip national and EU policy-makers’ ability to respond, in particular around the issue of machine learning and AI. An industry representative insists there are major questions of legal liability that the EU is yet to deal with, and EU leaders must urgently update the legal framework in this area. The rights of workers employed within the gig economy and through platforms also require greater clarity and attention. However, while much employment policy emanates from the EU level, these rights continue to be enforced at the level of the member states, and a senior trade union figure remarked that “*The Commission is sceptical about issuing a directive on platform work as they don’t fully understand it yet*”.

Competences around Labour market policy and social policy are broadly shared between the EU and the member states. The view of most national governments is that social protection should remain, for the most part, the sole purview of the member states. However, given the increased supervisory role over national budgets played by the Commission and the Country Specific Recommendations issued as part of the European Semester programme, EU level policy initiatives are playing an increasingly important role. Philosophically at least, it is the firmly held view of the Commission that the social safety net must be adapted to meet the needs of the

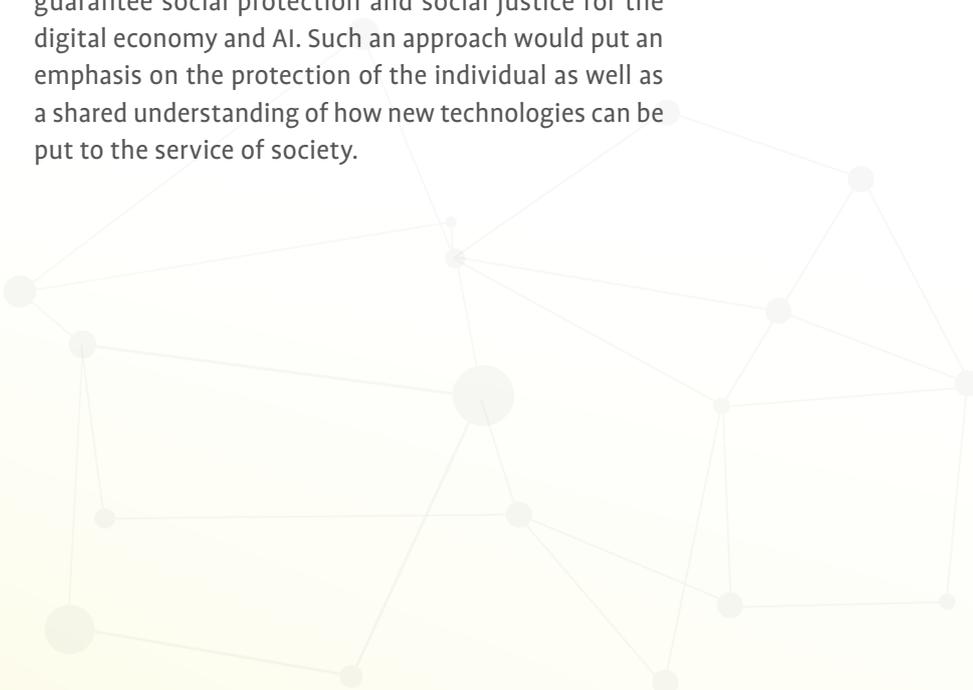
modern world, and social protection must not only be allocated to individual employers but must also move with the worker between jobs – and across borders.

As is the case in France, effective social dialogue is also seen as playing a potentially positive role in the transformation of work and with the uptake of new technologies. Across the countries considered here, there are vastly different industrial relations cultures, but many stakeholders advocate the importance of social dialogue to facilitate a fair and efficient transition to the digitised economy.

One area where the EU has taken an active role responding to the challenges of digitalisation relates to public investment. One expert in the Commission referred to the economist Mariana Mazzucato who argues that *“if you look at the history of digital innovation, these were funded by the public sector [...] because the government takes risks that the private sector cannot.”*

In many countries there is not yet a strategic approach taken to addressing the challenges inherent in the digital age, with different departments and agencies across government taking radically different approaches. At the very least, the EU affords opportunities for the sharing of best practice and benchmarking between member-states.

The Social Chapter in the 1992 Maastricht Treaty introduced legislation covering equal opportunities, working conditions and information rights at work that were ground-breaking when first introduced. Today, the EU could provide a source of rules and best practices that guarantee social protection and social justice for the digital economy and AI. Such an approach would put an emphasis on the protection of the individual as well as a shared understanding of how new technologies can be put to the service of society.



## VI. SHAPING TOMORROW’S WORK: 10 POLICY RECOMMENDATIONS

This report makes ten key recommendations for policy-makers, business and civil society to deal with the impact of the digital transformation on the economy and society. These cut across five overlapping themes:

### ANALYSIS AND INSTITUTIONS

1. Policy-makers should use skills maps and effective **skills forecasting**, particularly in combination with a culture of **social dialogue**, to help to mitigate the risks associated with job automation in different business sectors and industries by preparing the workforce for change.
2. **Institutional mechanisms** similar to co-determination between unions and management should be developed to promote dialogue and trust. Such innovations can guarantee that an employee’s voice is taken into account when it comes to the deployment of new technologies such as AI.

### TRAINING AND EDUCATION

3. **In-work training** is vital for up-skilling employees. It should be underpinned by soft skills development such as problem solving and creative thinking that will facilitate the transition to collaborative work environments.
4. Tax **credits for SMEs** to train staff and productivity-enhancing technologies can incentivise up-skilling and the uptake of new technologies, allowing them to compete with larger companies.
5. **Lifelong learning** accounts similar to the programmes in France, Luxembourg and Singapore should play an important role in supporting employees to update their skills to keep up with shifting labour demands.
6. In case of job loss, retraining efforts could be supported by a capped top-up to an employee’s **training salary**, particularly to support lower income employees, to undertake vocational training – for example, by increasing training salaries to 60% of previous income.

### INVESTMENT AND PLANNING

7. Regional and local governments must play a leading role in incentivising companies to **invest** not only in major cities and helping them to attract tech talent. For example, this can include supporting specialised educational institutions, housing, and co-working spaces and other infrastructure.
8. As the effect of new technologies on labour is rarely easy to predict, the introduction of “**sandboxing**” – where new technologies such as new AI innovations can be tested under a less complex and onerous regulatory environment for a limited period of time, can help policy-makers to observe and absorb the impact of new technologies.

### WORKPLACE HEALTH AND EQUALITY

9. Safety at work often focusses on physical safety. As knowledge work gains importance, employers, unions and ultimately governments need to incorporate current research on **mental health** into the debate to prevent burnout and other work-related diseases.
10. Technology should be embraced as a means to advance **equal opportunities** by expanding flexible job opportunities to greater numbers of traditionally marginalised groups, such as stay-at-home parents, people with disabilities, ethnic minorities, and so on.

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